AUTODESK UNIVERSITY

More Dynamo for Structure

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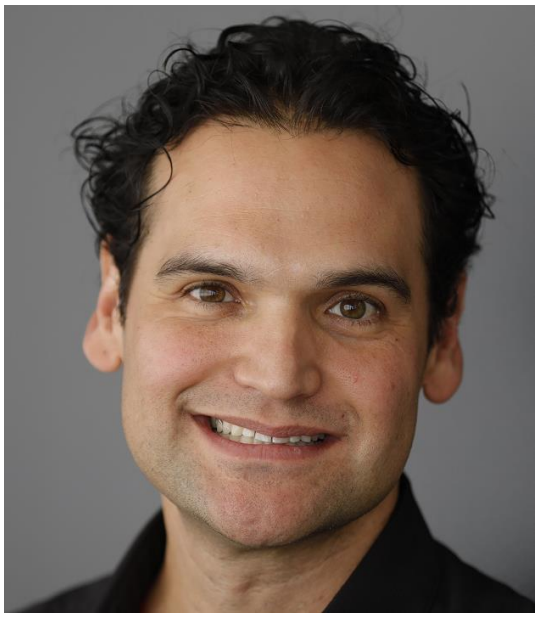
Learning Objectives

- Learn why and when to use Dynamo in your structural office
- Learn how to work with structural parameters in Revit using Dynamo
- Learn how to use Dynamo to be more efficient at modeling structure in Revit and in other structural analysis software
- Learn how to build 3D structural beams, including roof framing, using Dynamo in Revit

Description

Very few classes focus on how Dynamo software could be used in the structural design office from a practical level—until now. This class will build on the previous year's top-rated class entitled "Dynamo for Structure," and will give more hands-on experience to the attendees and teach them how to use more Dynamo examples to help model structural elements in Revit software. If you model any type of Revit structural elements, then this class is for you. This class will be exciting, and we will make modeling structure in Revit fun again! No Dynamo experience is needed, and you do not have to have taken the previous year's course. Only Revit guru status is required.



Speaker

Marcello Sgambelluri currently serves as the BIM Director at John A. Martin & Associates Structural Engineers in Los Angeles. Marcello has worked on many BIM projects over the last 20 years as a project manager, design engineer, and BIM Director. Some of the BIM projects Marcello has worked on includes the Walt Disney Concert Hall in Los Angeles - CA, the Ray and Maria Stata Technology Center at MIT, Tom Bradley International Terminal Expansion at LAX. Marcello is internationally recognized at one of the top BIM leaders and contributors to the education and implementation of BIM technology in the building industry. Marcello continually speaks at Autodesk University and the Revit Technology Conference (BILT) where he has received the 1st place speaker award for a record 14 times between 2012 thru 2018 between both conferences. Marcello received his Bachelors and Master's degrees in Civil Engineering and he is also a licensed Civil and Structural Engineer.

Introduction

What is Dynamo?

This is a very difficult question to answer simply because Dynamo does SO much. Below is my answer to this question and I hope it clarifies it for some of you.

Dynamo is a free program from Autodesk that uses visual programming (or boxes and wires). Dynamo primarily does two tasks:

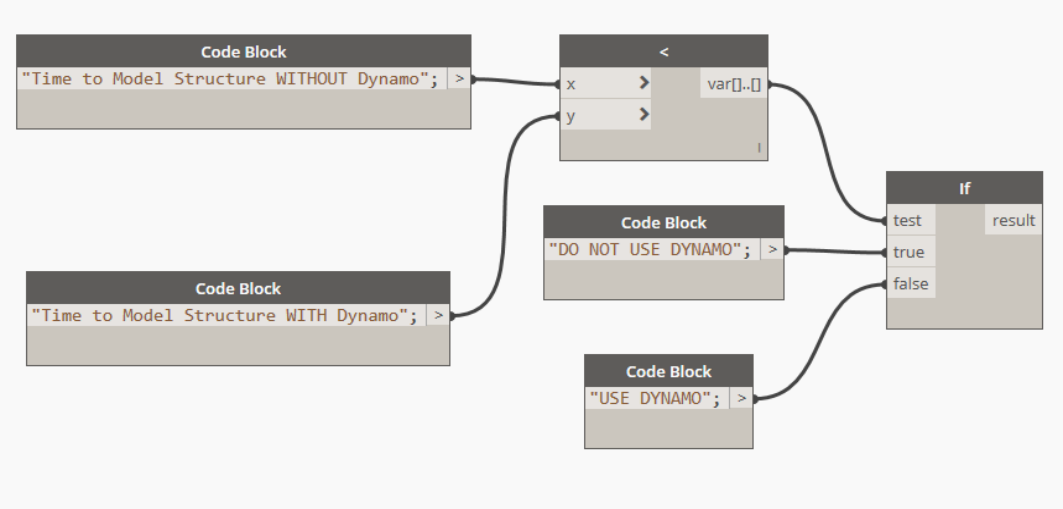
1. **Creates its own geometry with parametric r e l a t i o n s h i p s .**
2. **Reads and writes to and from external d a t a b a s e s .**

Since Dynamo creates its own geometry and reads and writes to external databases it is a perfect fit to interact with Revit because....isn't Revit simply a database with parametric geometry?

Dynamo reads and writes back **data** to and from the Revit database via the Revit API. The data could be just about anything, parameter values, family geometry, and family placement.

Why Dynamo?

Why not use Dynamo? You don't need to use Dynamo all the time but consider the following image and let that guide your decision on when to use dynamo and when not to.



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MAIN

Lab Exercises

Software version:

Use Dynamo 1.3.3 except Canopy Beam Framing Ex use v 2.0.1

Simplex Package

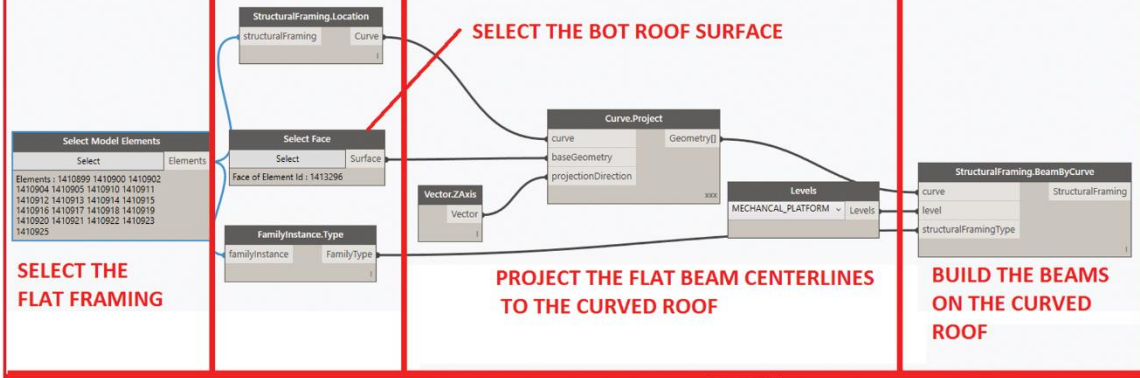
Spring Package

Revit 2018

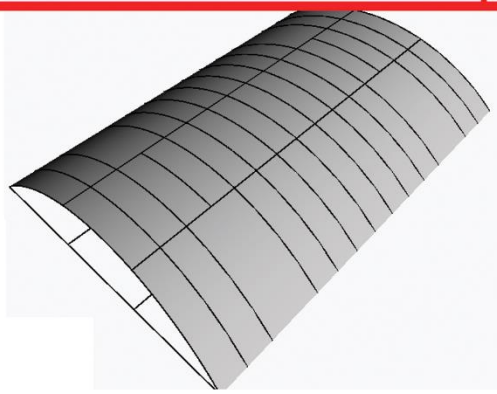
ETABS 2018

FLAT FRAMING TO CURVED (PROJECTION)

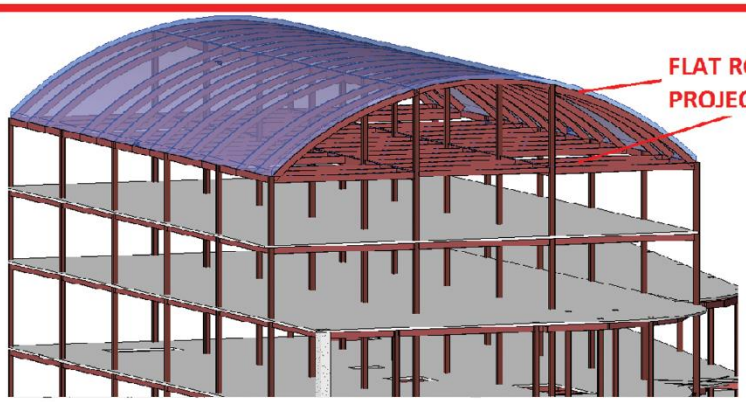
DYNAMO NODES



DYNAMO GEOMETRY



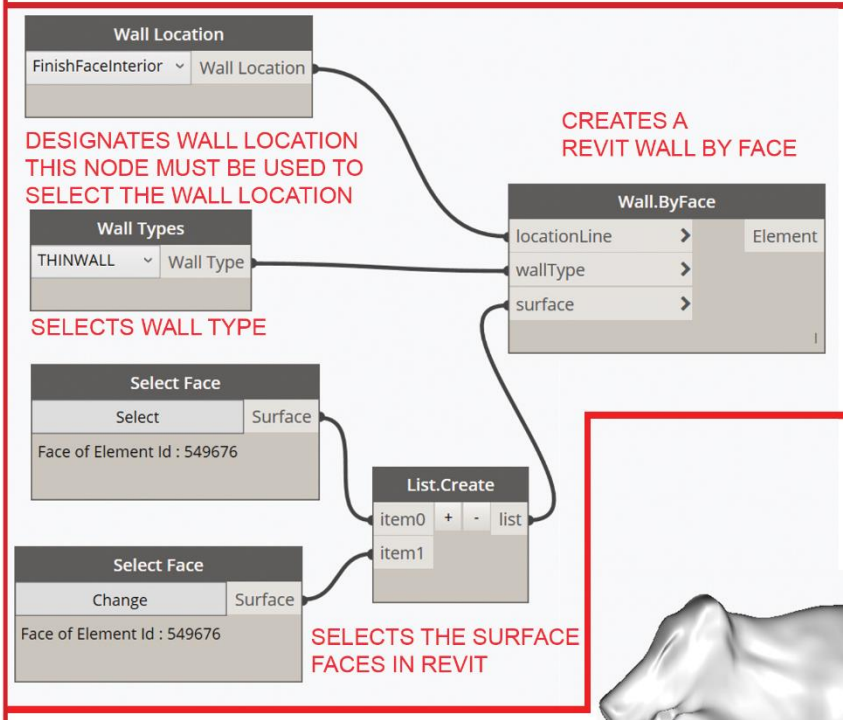
REVIT GEOMETRY



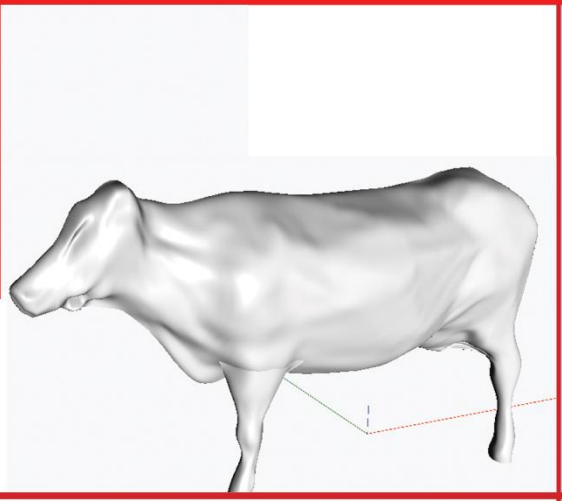
STEPS & NOTES

STEP 1: OPEN FILE “FLAT_FRAMING.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: ALT METHOD: CONSIDER USING THE “SET LOCATION” NODE” INSTEAD OF PROJECTION

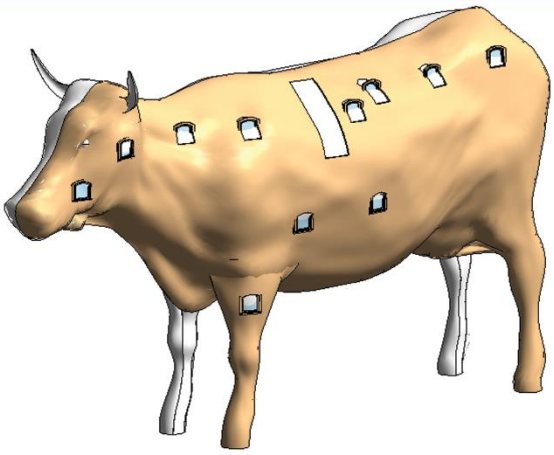
REVIT WALL BY COMPLEX FACE



DYNAMO NODES



DYNAMO GEOMETRY



REVIT GEOMETRY

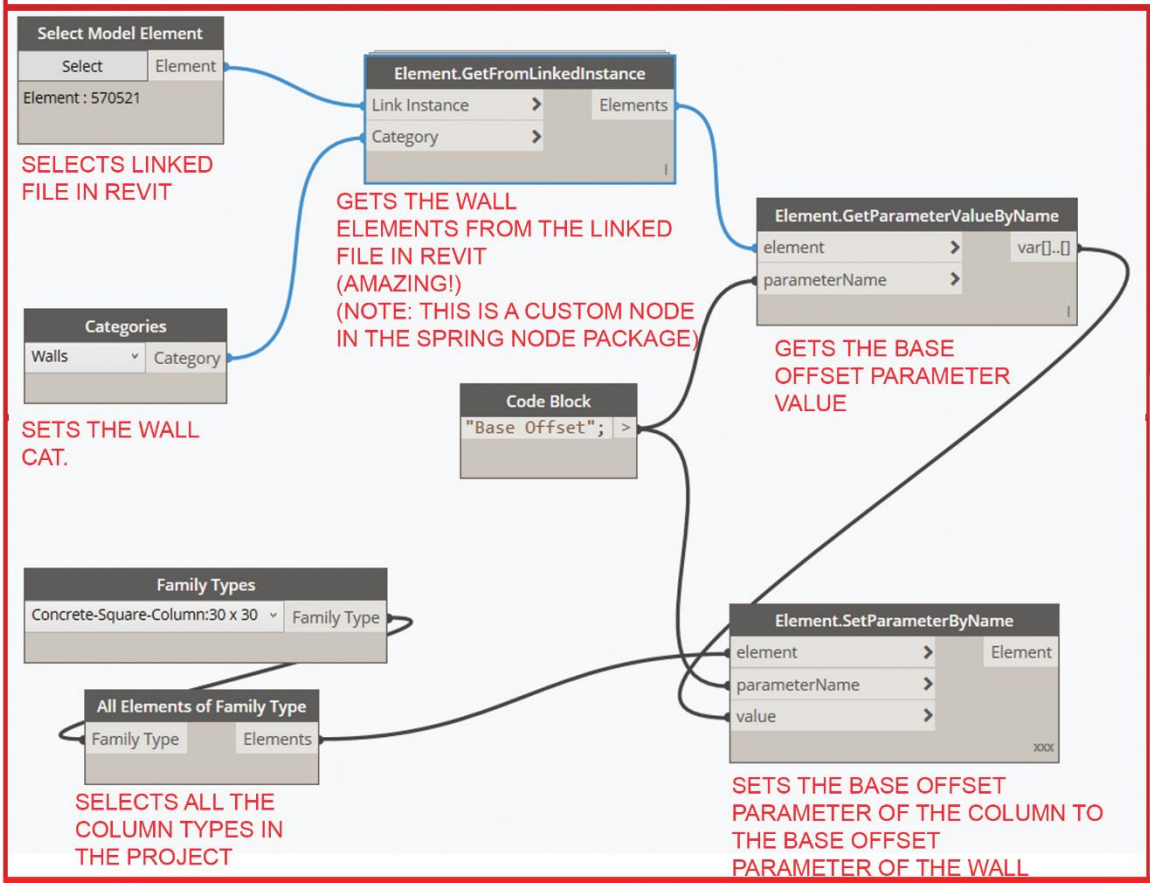
STEPS

1. OPEN REVIT FILE “REVIT_WALL_BY_FACE_COMPLEX_START.RVT”
2. OPEN A NEW DYNAMO FILE. ADD THE NODES AS SHOWN. SELECT THE COW MASS FACES
3. RUN GRAPH. ADD DOORS AND WINDOWS AS DESIRED.

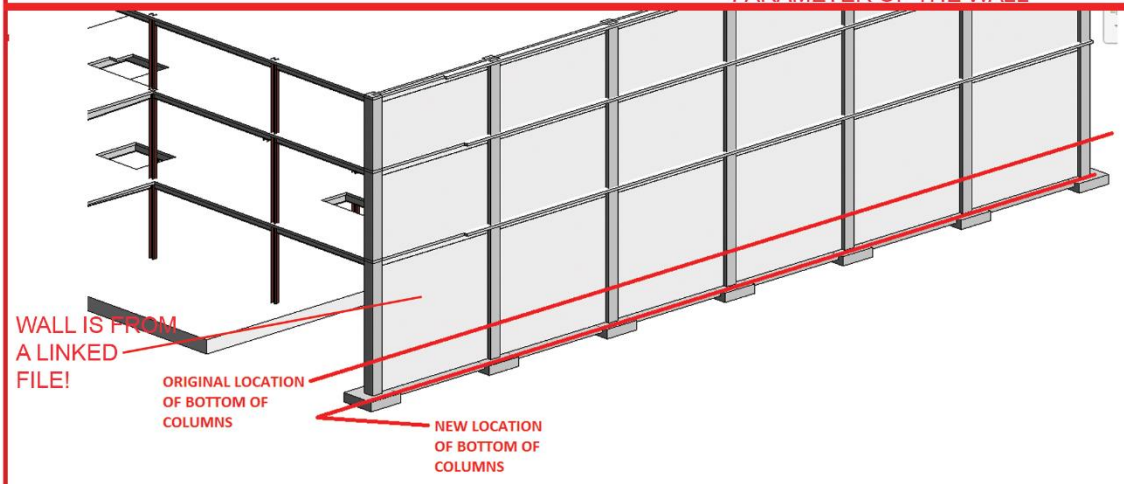
STEPS

GET AND SET INSTANCE PARAMETERS WITH LINK FILE

DYNAMO GEOMETRY ONLY



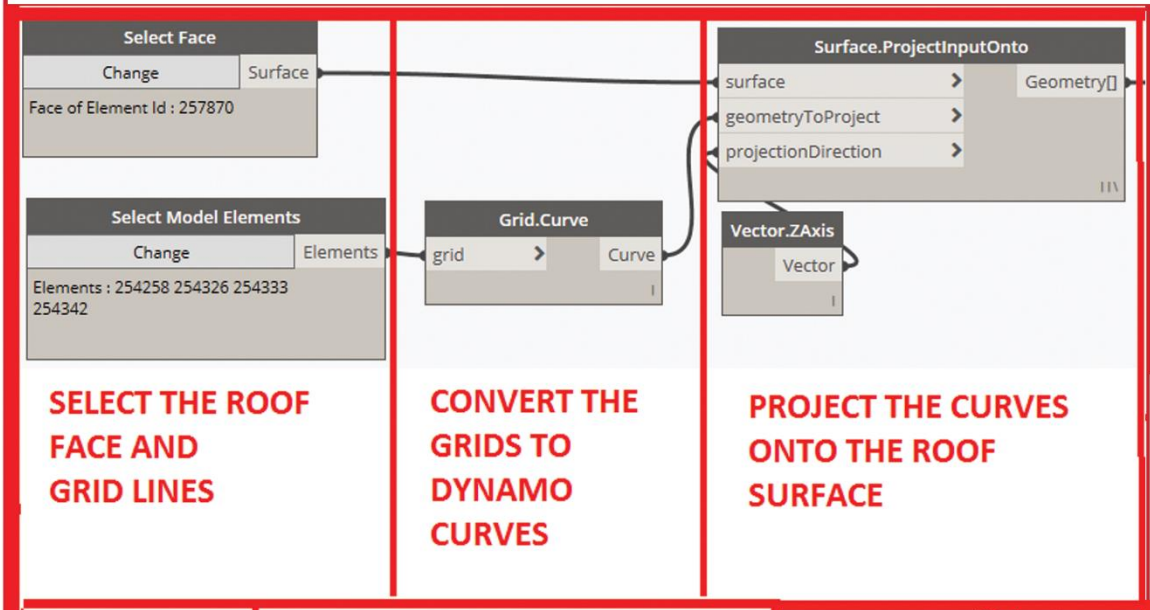
REVIT GEOMETRY

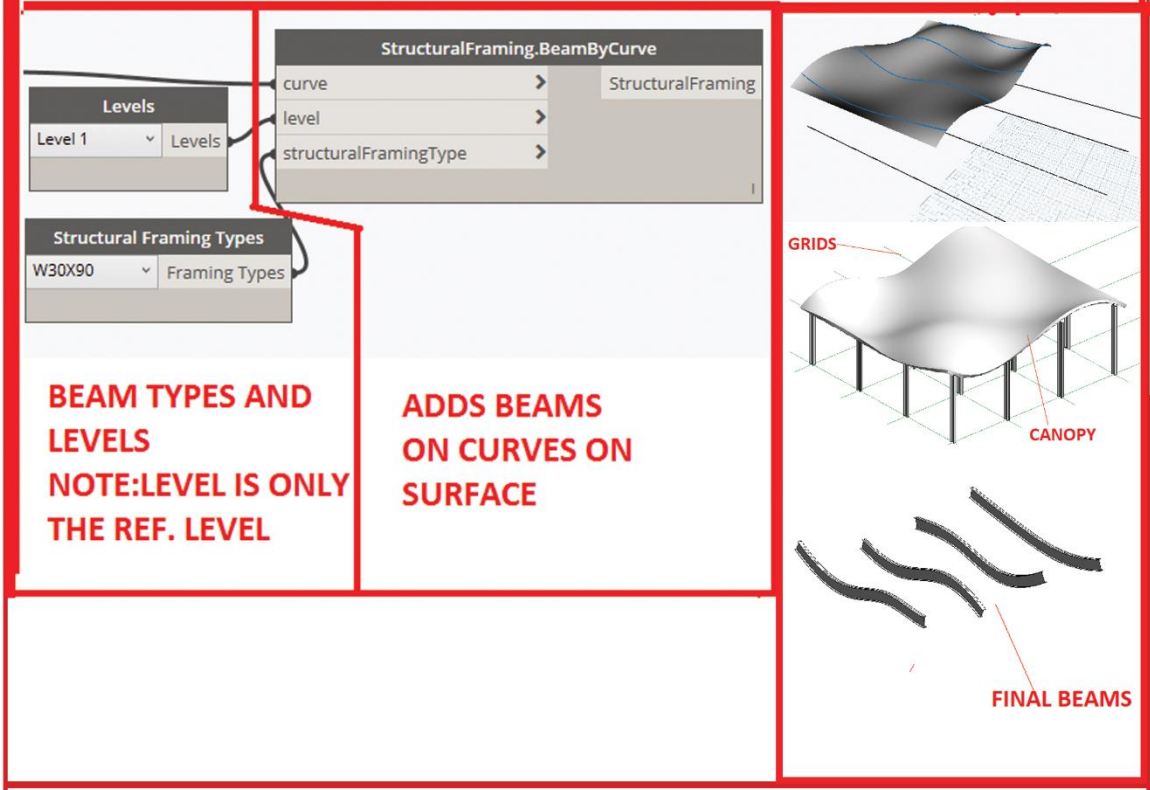


STEPS & NOTES

STEP 1: OPEN FILE "GET_SET_PARAMETERS_START_LINK.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT FOR EACH COL
SELECT THE LINKED FILE USING THE "SELECT MODEL ELEMENT" UI NODE
NOTES: LINKED FILES ARE "READ ONLY"

CANOPY BEAM FRAMING ON GRIDS (USING PROJECTION)

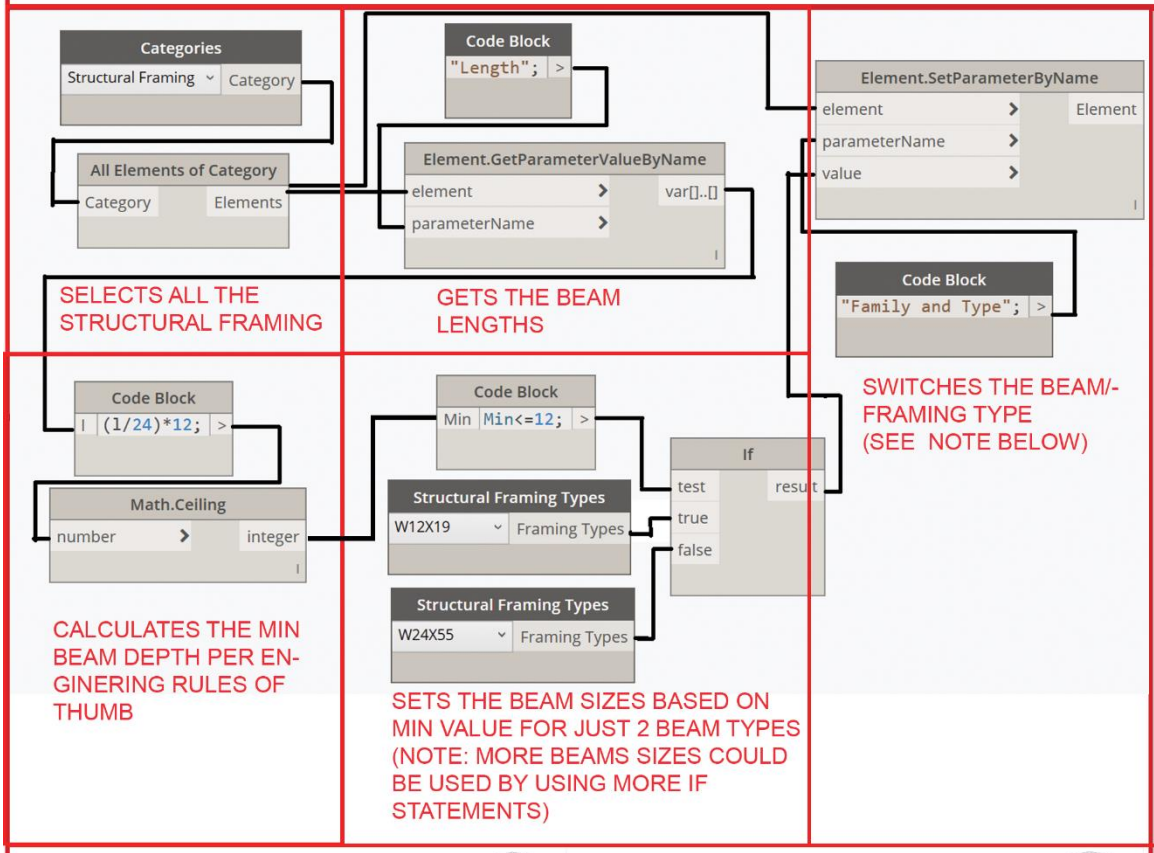


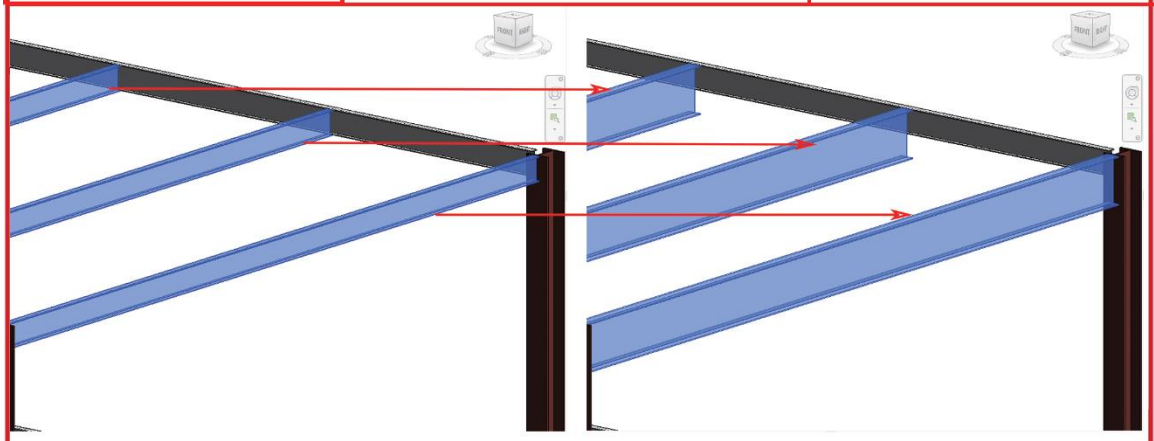


STEP 1: OPEN FILE "CANOPY_BEAM.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: IF THE STRUCTRAL FRAMING NODE FAILES TO CREATE STRUCTURAL FRAMING THEN SIMPLIFY THE INPUT CURVE OR CHECK IF THE BEAM IS CURVING IN 2 DIRECTIONS

STEPS & NOTES

CHANGE BEAM TYPES USING ENGINEERING LOGIC

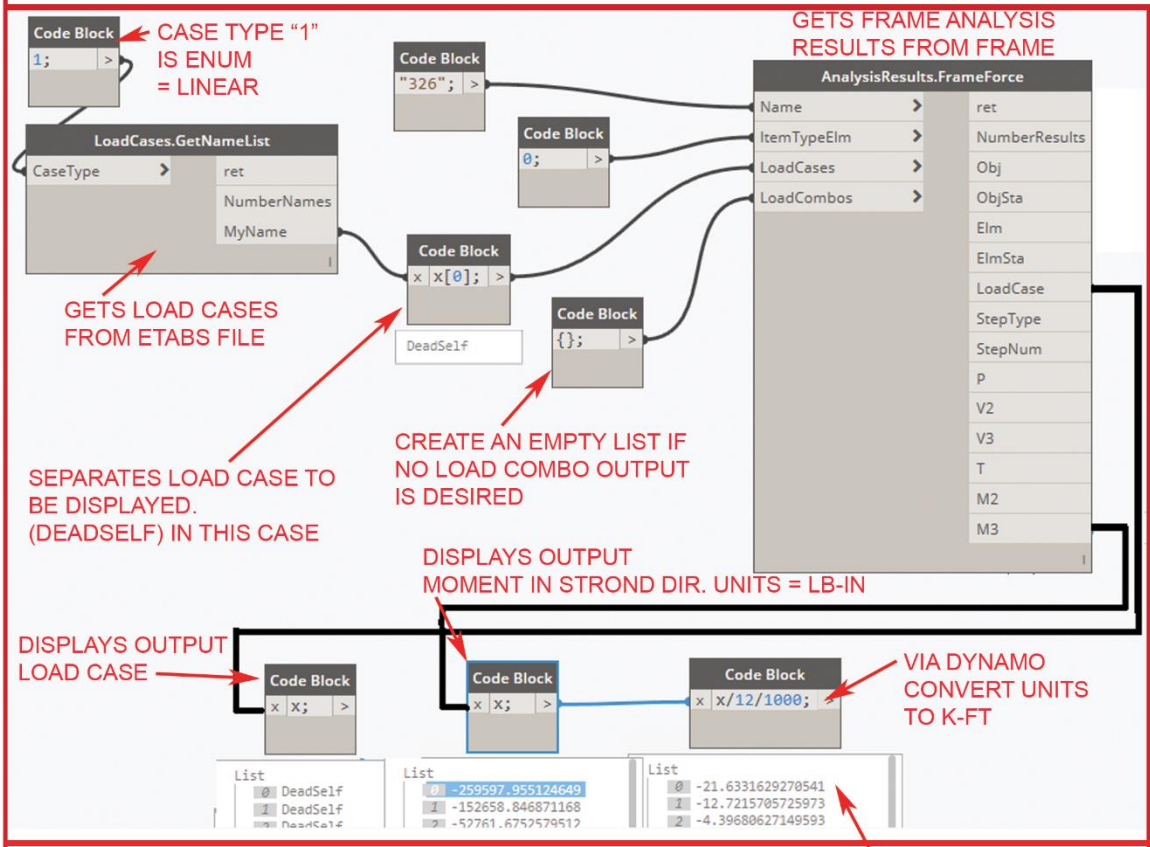




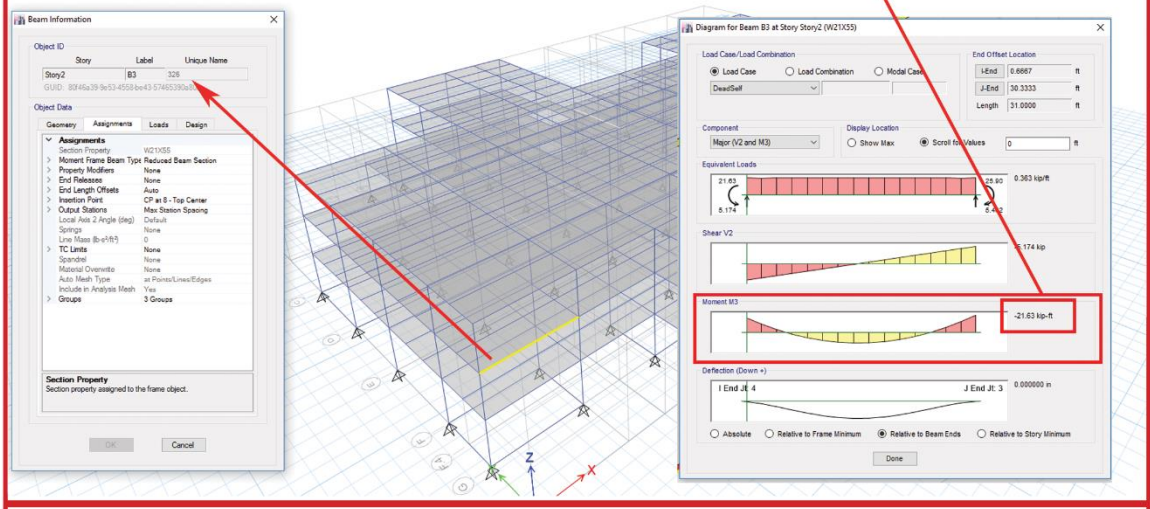
STEP 1: OPEN "CHANGE_BM_TYPE_LOGIC_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE AND ADD NODES AND RUN
NOTES: THE "FAMILY AND TYPE PARAMETER" IS USED TO CHANGE THE FAMILY TYPE
ALSO CONSIDER USING YOUR OWN ENGINERING RULES OF THUMB

STEPS & NOTES

GET ETABS ANALYSIS FRAME RESULTS



DYNAMO NODES



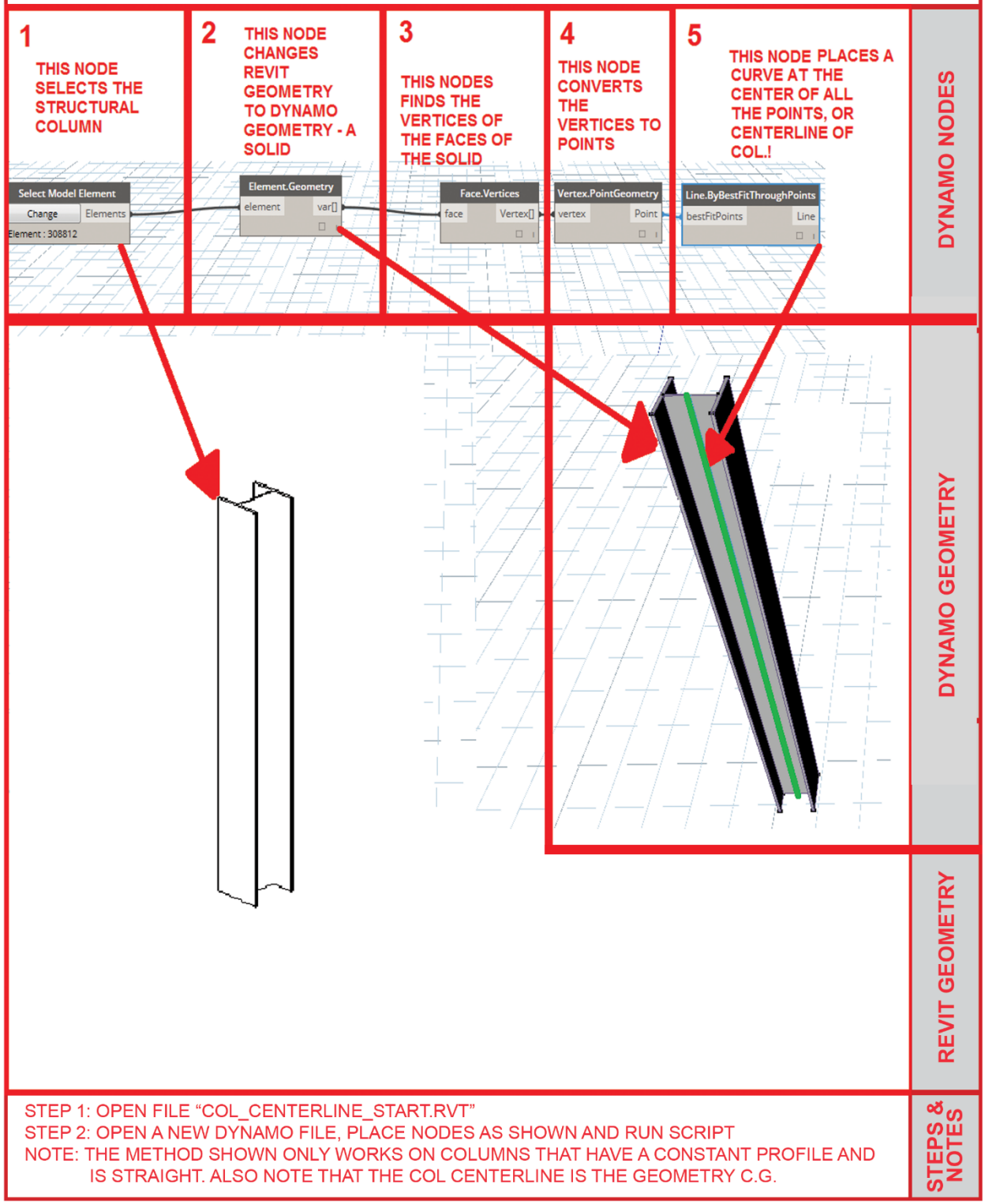
ETABS RESULTS

STEPS: 1. OPEN ETABS "ETABS_GEOMETRY_ANALYTICS_FINAL.EDB". AND RUN ANALYSIS
2. AND OPEN DYNAMO AND ADD THE NODES ABOVE

NOTES: 1. RESULTS SHOW LOAD CASE OR LOAD COMBO ALSO NOTE UNITS ARE IN LB-IN
2. IF THE NODE DOES NOT UPDATE PLACE A NEW NODE ON CANVAS

STEPS & NOTES

COLUMN CENTERLINE

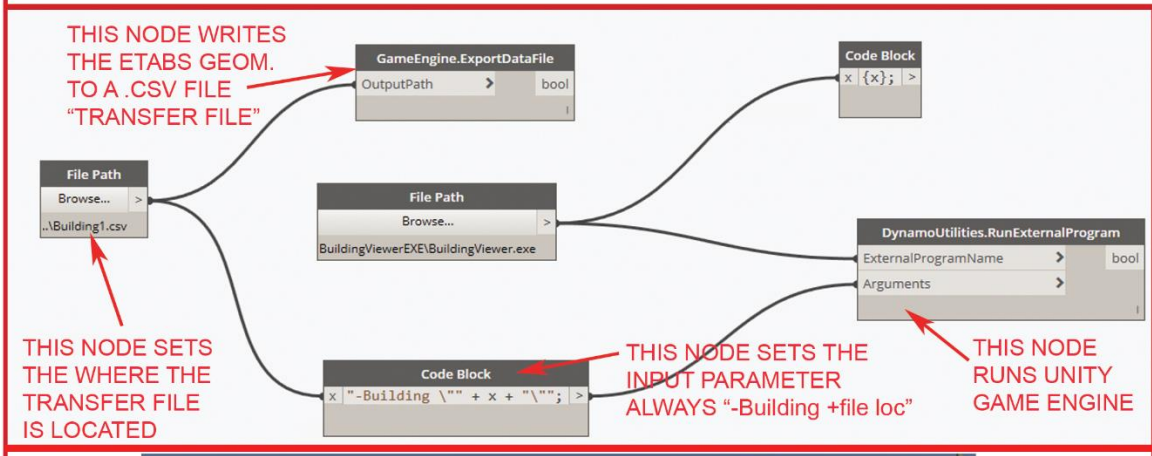


STEP 1: OPEN FILE "COL_CENTERLINE_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: THE METHOD SHOWN ONLY WORKS ON COLUMNS THAT HAVE A CONSTANT PROFILE AND IS STRAIGHT. ALSO NOTE THAT THE COL CENTERLINE IS THE GEOMETRY C.G.

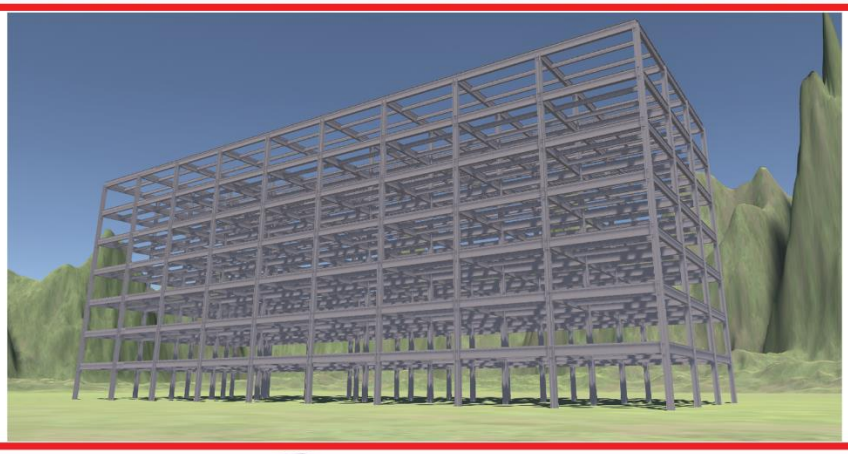
STEPS & NOTES

GET ETABS GEOMETRY TO GAME ENGINE

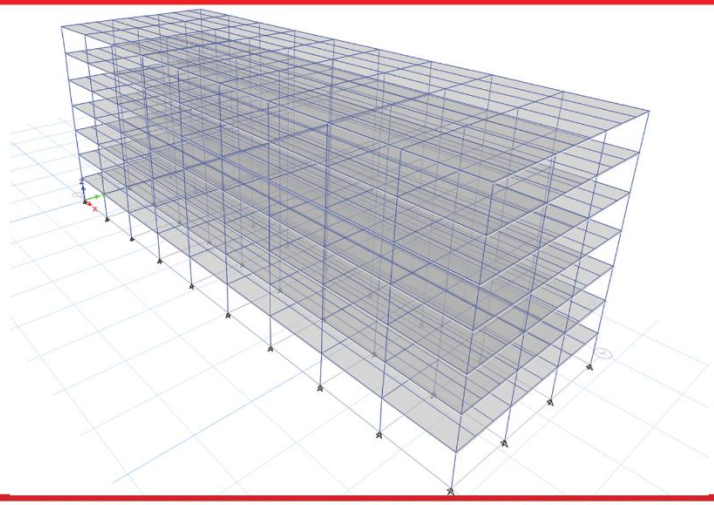
DYNAMO NODES



GAME ENGINE GEOMETRY



ETABS GEOMETRY



STEPS & NOTES

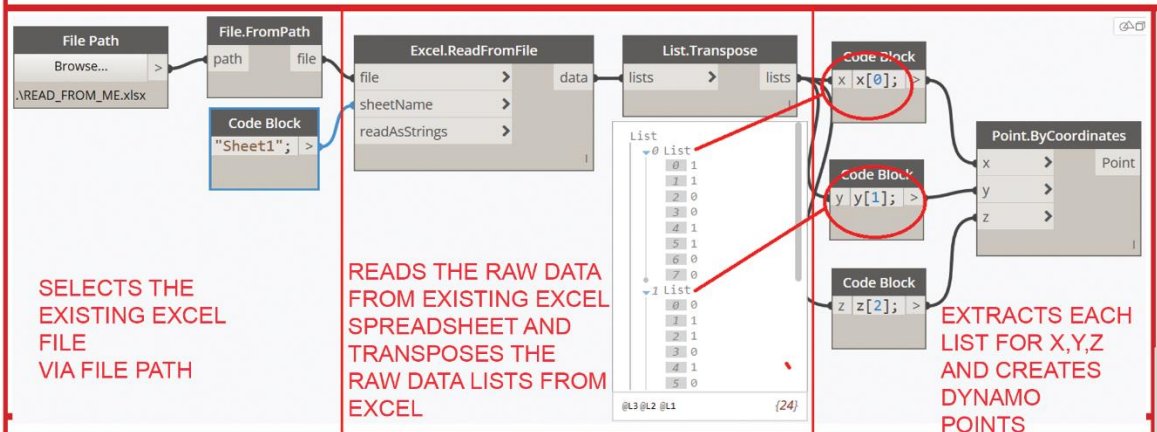
STEPS: 1. OPEN ANY ETABS MODEL "ETABS MODEL VIEWER.EDB" OPEN DYNAMO
2. OPEN ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL-
2. ONLY FRAMES ELEMENTS ARE SHOWN IN GAME ENGINE

Additional Exercises

CREATE DYNAMO PTS FROM RAW EXCEL DATA

DYNAMO NODES



SELECTS THE EXISTING EXCEL FILE VIA FILE PATH

READS THE RAW DATA FROM EXISTING EXCEL SPREADSHEET AND TRANSPOSES THE RAW DATA LISTS FROM EXCEL

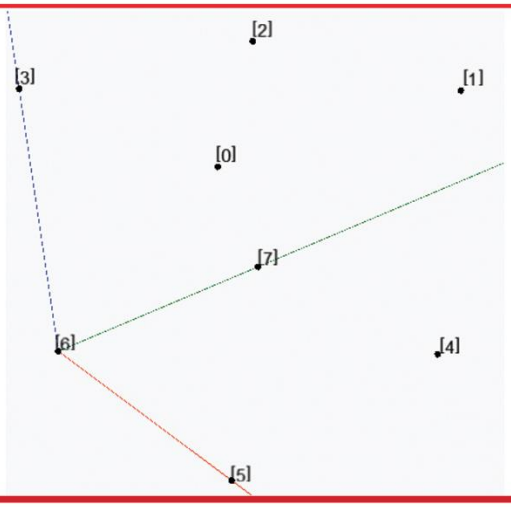
EXTRACTS EACH LIST FOR X,Y,Z AND CREATES DYNAMO POINTS

EXCEL

1	0	1
1	1	1
0	1	1
0	0	1
1	1	0
1	0	0
0	0	0
0	1	0

RAW EXCEL SPREADSHEET DATA

DYNAMO GEOMETRY



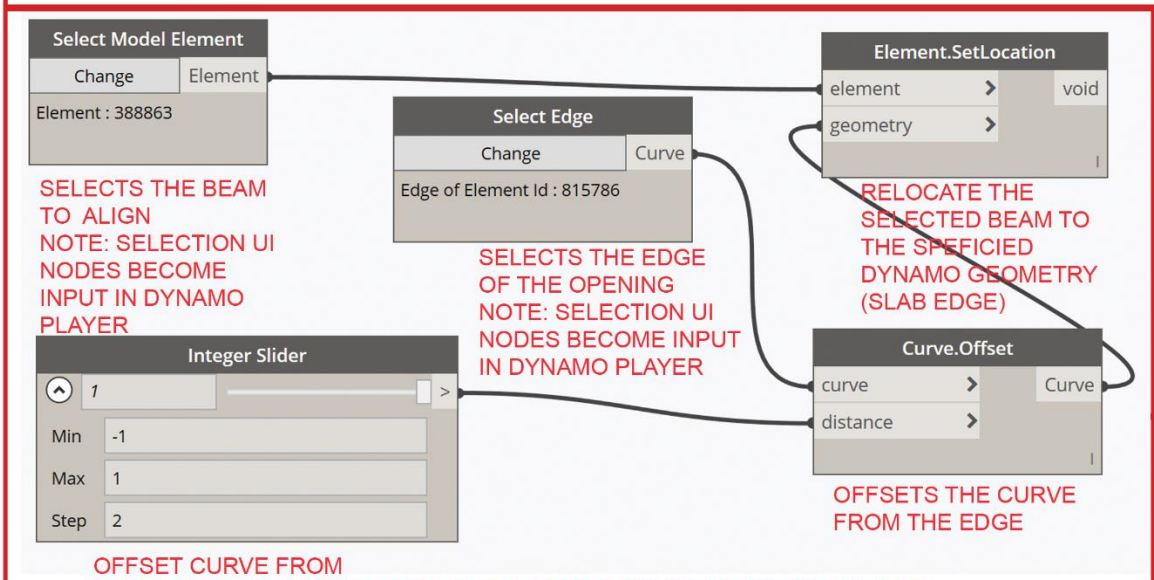
NOTE

NOTE

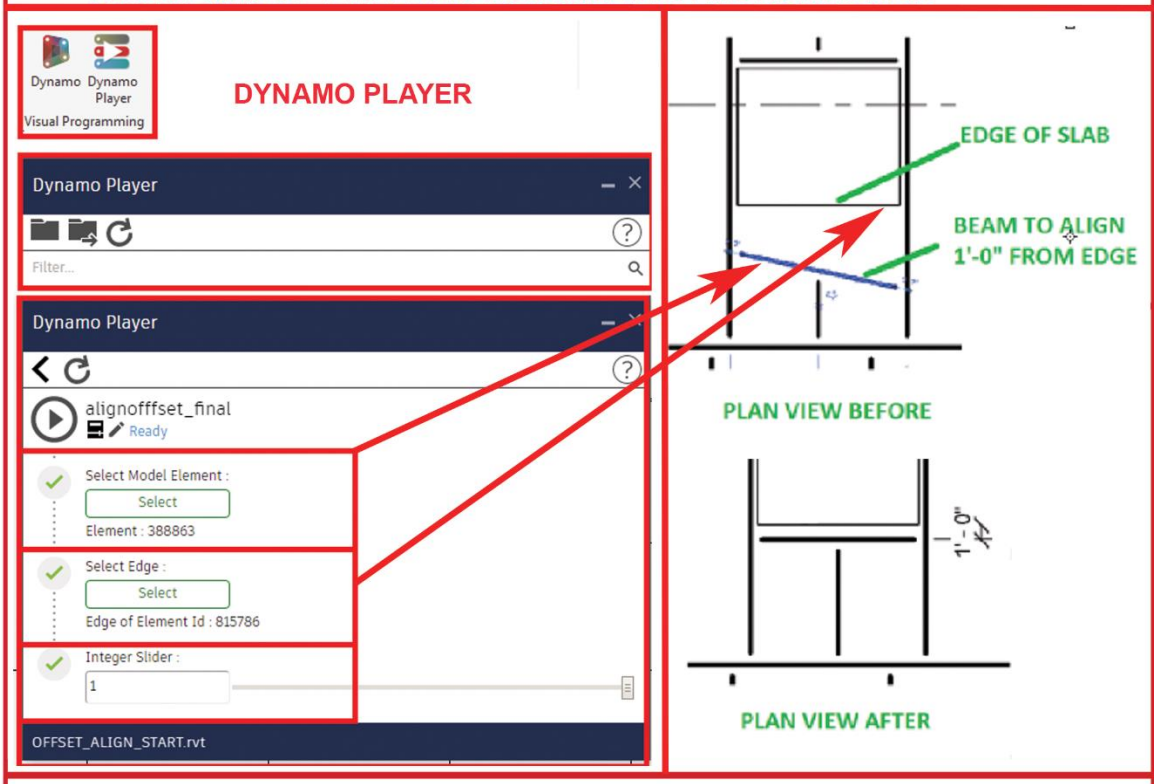
"FILE.FROMPATH" NODE MUST BE USED WHAT READING DATA FROM EXCEL AND DATA FROM EXCEL IS READ AS ROW THEN COLUMNS HENCE THE USE OF THE TRANSFORM NODE

ALIGN REVIT BEAMS WITH AN OFFSET WITH DYNAMO PLAYER

DYNAMO NODES



REVIT GEOMETRY WITH DYNAMO PLAYER

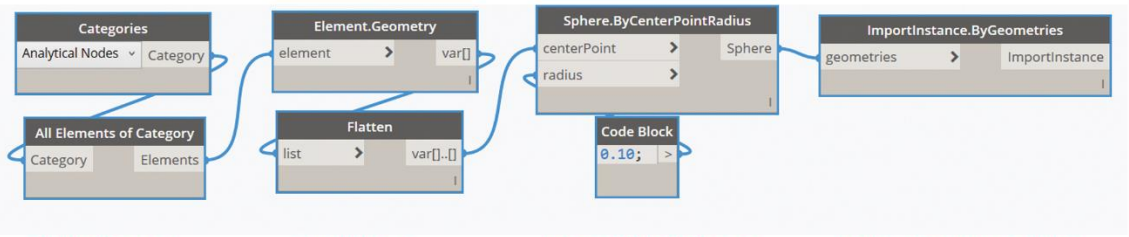


STEPS

STEP 1: OPEN FILE "ALIGN_OFFSET_START.RVT", OPEN NEW DYNAMO, ADD NODES, AND SAVE
STEP 2: OPEN DYNAMO PLAYER AND NAVIGATE TO FOLDER WITH .DYN FILE
STEP 3: SELECT THE "EDIT INPUTS' ON PLAYER, SELECT SLAB EDGE AND BEAM AND CLICK RUN

CONVERT REVIT ANAYLTICAL BMS + PTS TO SOLIDS FOR RENDERING IN A GAME ENGINE (SIMPLE METHOD)

ANALYTICAL NODES



SELECTS ALL ANALYTICAL NODES IN THE PROJECT

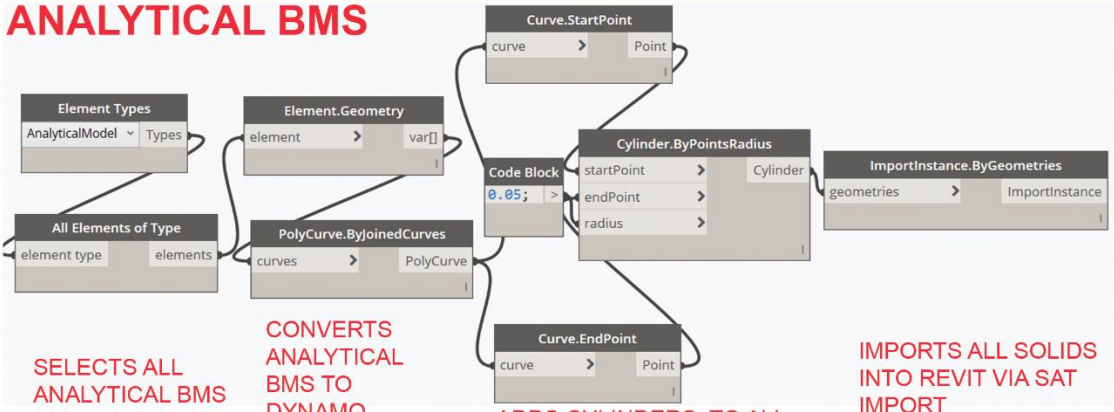
CONVERTS ANALYTICAL NODES TO DYNAMO PTS

ADDS SPHERES TO ALL ANALYTICAL NODES

IMPORTS ALL SOLIDS INTO REVIT VIA SAT IMPORT

DYNAMO NODES

ANALYTICAL BMS



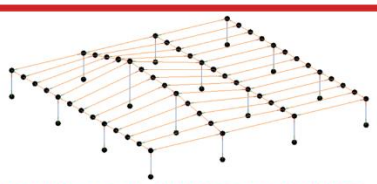
SELECTS ALL ANALYTICAL BMS IN THE PROJECT

CONVERTS ANALYTICAL BMS TO DYNAMO CURVES AND JOINS THEM

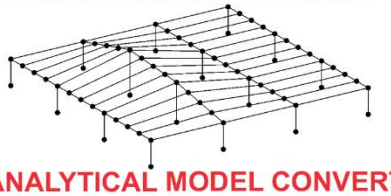
ADDS CYLINDERS TO ALL ANALYTICAL LINES

IMPORTS ALL SOLIDS INTO REVIT VIA SAT IMPORT

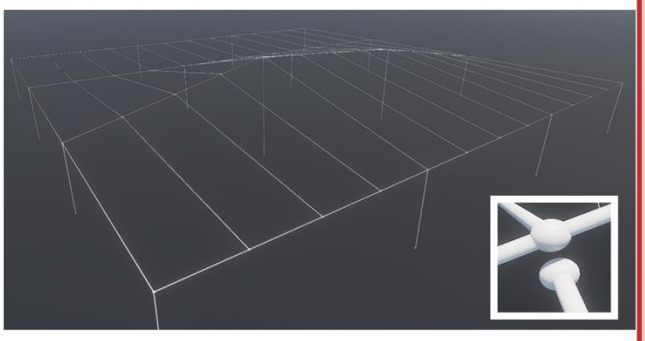
DYNAMO NODES



ANALYTICAL LINES IN REVIT



ANALYTICAL MODEL CONVERTED TO SOLIDS IN REVIT



ANALYTICAL REVIT SOLID MODEL RENDERED IN A GAME ENGINE

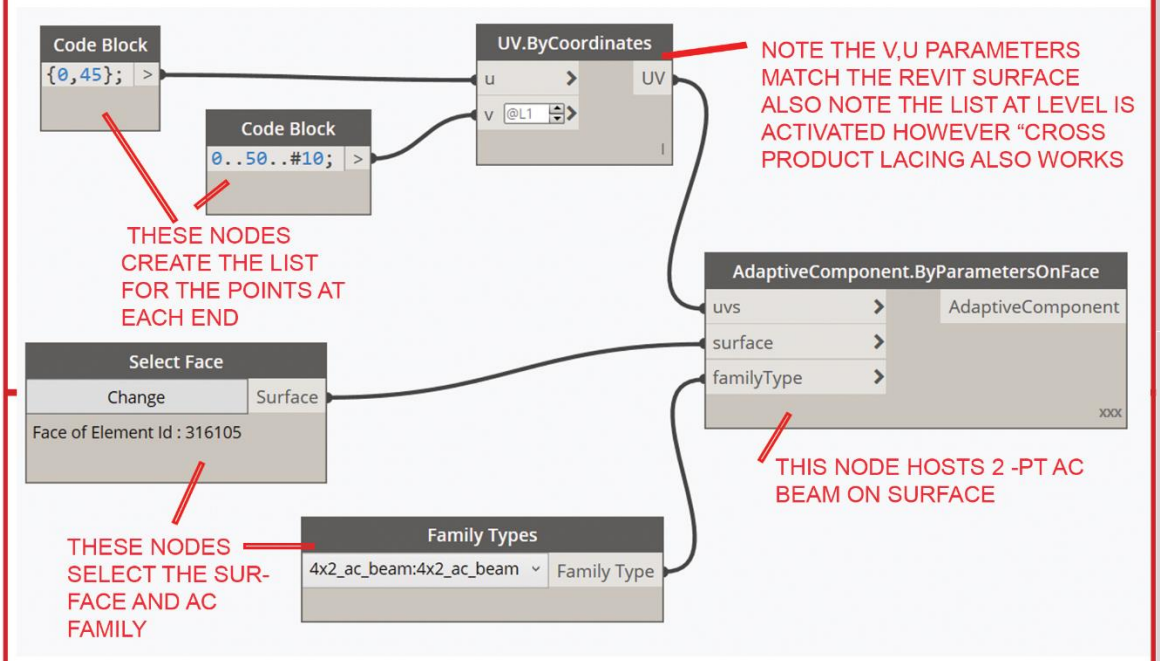
ANALYTICAL MODEL

STEP 1: OPEN "ANALYTICAL_MODEL_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE AND ADD NODES AS SHOWN AND RUN SCRIPT
STEP 3: ISOLATE AND OPEN OR EXPORT TO GAME ENGINE
NOTE: GAME ENGINES WILL NOT RENDER SINGLE LINES AND NODES THUS NEED METHOD ABOVE

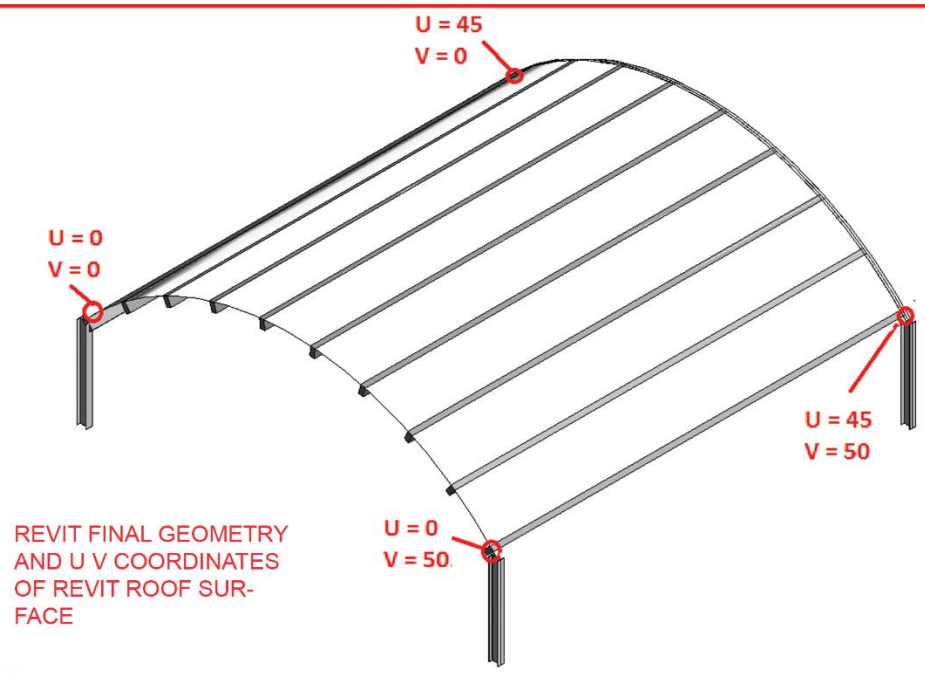
STEPS & NOTES

ORIENT BEAMS PERP TO SURFACE

DYNAMO NODES



REVIT GEOMETRY



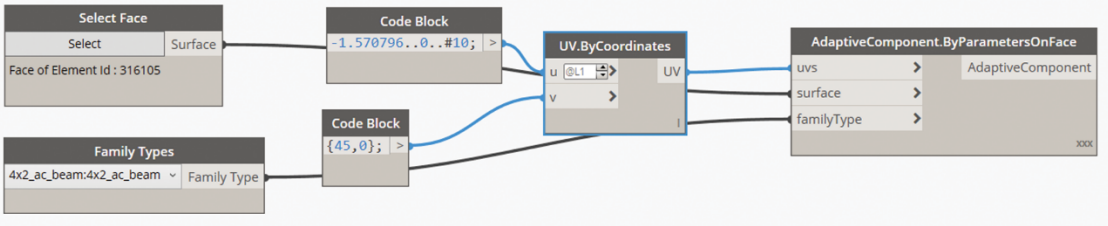
REVIT FINAL GEOMETRY AND U V COORDINATES OF REVIT ROOF SUR-FACE

STEPS

STEP 1: OPEN "BEAM_ORIENTATION_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, AND ADD NODES
STEP 3: SELECT THE SURFACE USING THE "SELECT FACE" NODE
STEP 4: SELECT THE "4X2" FAMILY TYPE AND RUN - NOTE BEAMS ARE ADAPTIVE COMPONENTS

ORIENT BEAMS PERP TO SURFACE

DYNAMO NODES

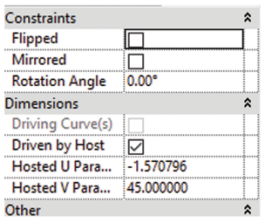


THESE NODES SELECT THE SUR-FACE AND AC FAMILY

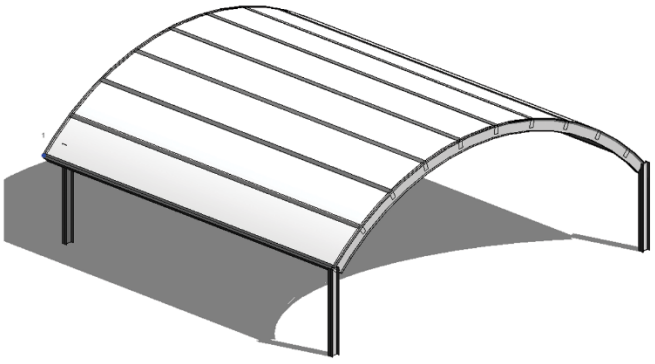
THESE NODES CREATE THE LIST FOR THE POINTS AT EACH END

THIS NODE HOSTS 2 -PT AC BEAM ON SURFACE

REVIT GEOMETRY



REVIT GEOMETRY

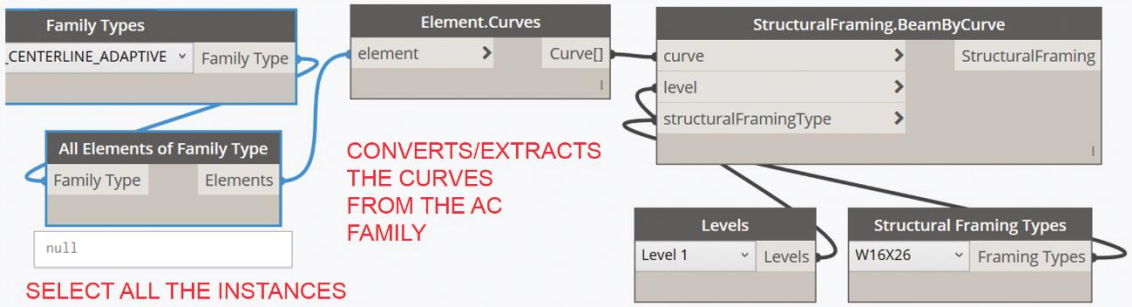


NOTE

NOTE
ADD THE FIRST BEAM AT THE ENDS OF THE SURFACE AND NOTE THE V,U PARAMETERS
USE THESE END PARAMETERS TO POPULATE THE LIST
ALSO NOTE THE LIST AT LEVEL IS ACTIVATED HOWEVER “CROSS PRODUCT LACING ALSO WORKS

CREATE BEAMS FROM 2-PT AC LINE FAMILIES

DYNAMO NODES



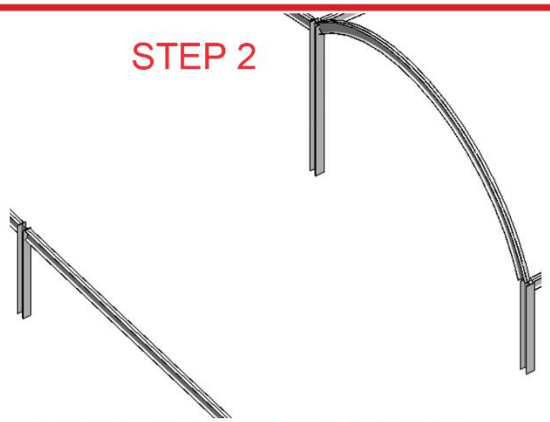
SELECT ALL THE INSTANCES OF ADAPTIVE COMPONENT FAMILY TYPES

CONVERTS/EXTRACTS THE CURVES FROM THE AC FAMILY

CREATES BEAMS OF SPECIFIED TYPES AT THE AC LINE FAMILY

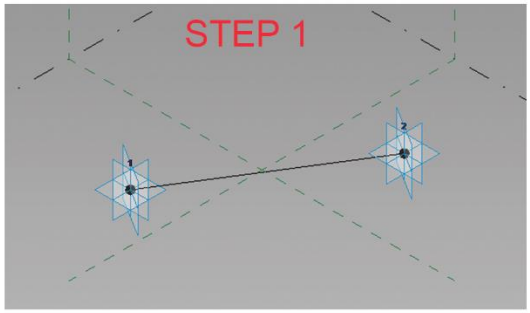
REVIT GEOMETRY AND STEPS

STEP 2



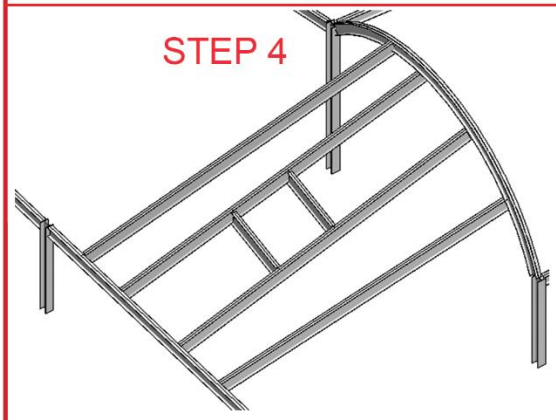
OPEN "BEAMS_AC_LINES_START.RVT"

STEP 1



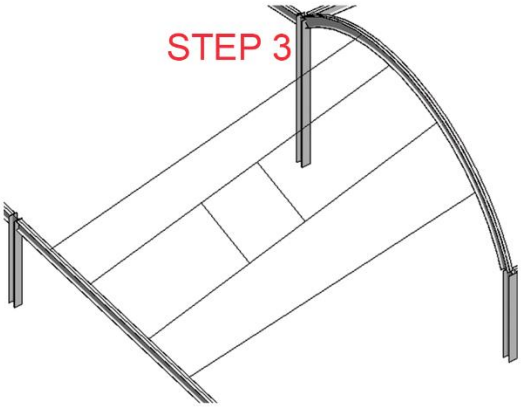
CREATE A 2-POINT AC FAMILY AND LOAD INTO PROJECT

STEP 4



PLACE DYNAMO NODES AND DYNAMO WILL PLACE BEAMS ON AC LINES

STEP 3



PLACE 2-POINT AC FAMILIES IN PROJECT AS ROOF FRAMING

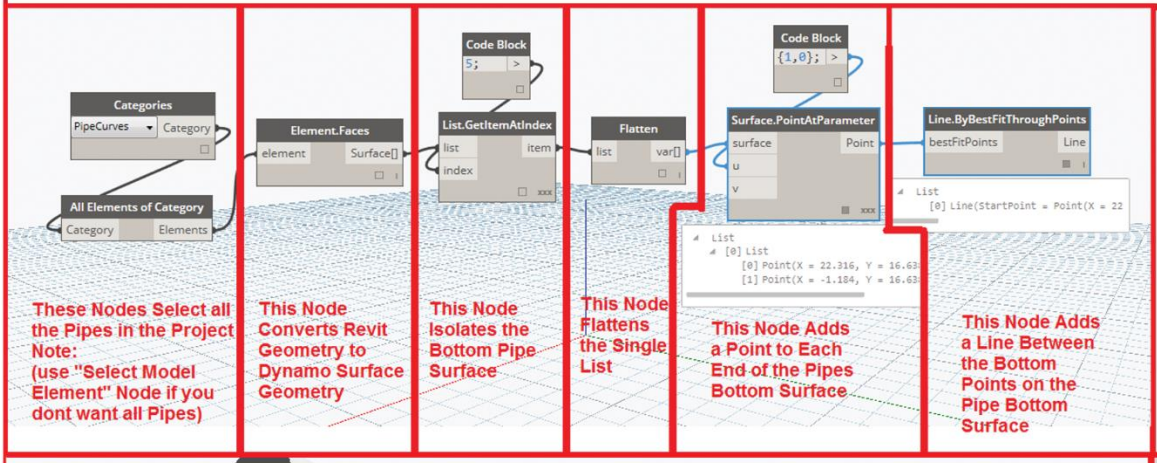
NOTES

NOTES

CONSIDER USING A 2-PT AC FAMILY FOR ROOF FRAMING IN LIEU OF BEAM FRAMING.
PLACE THE BEAMS ON THE AC FAMILIES VIA DYNAMO.

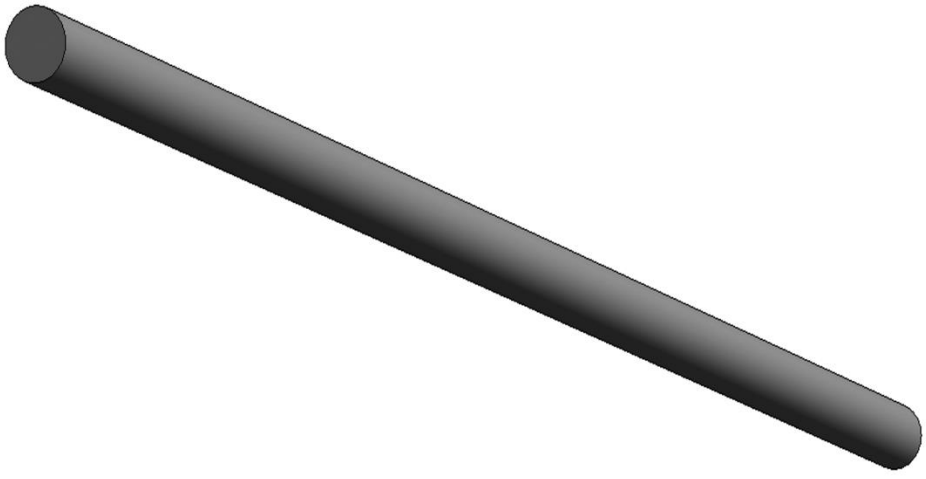
BOTTOM OF PIPE

DYNAMO NODES



DYNAMO GEOMETRY

REVIT GEOMETRY



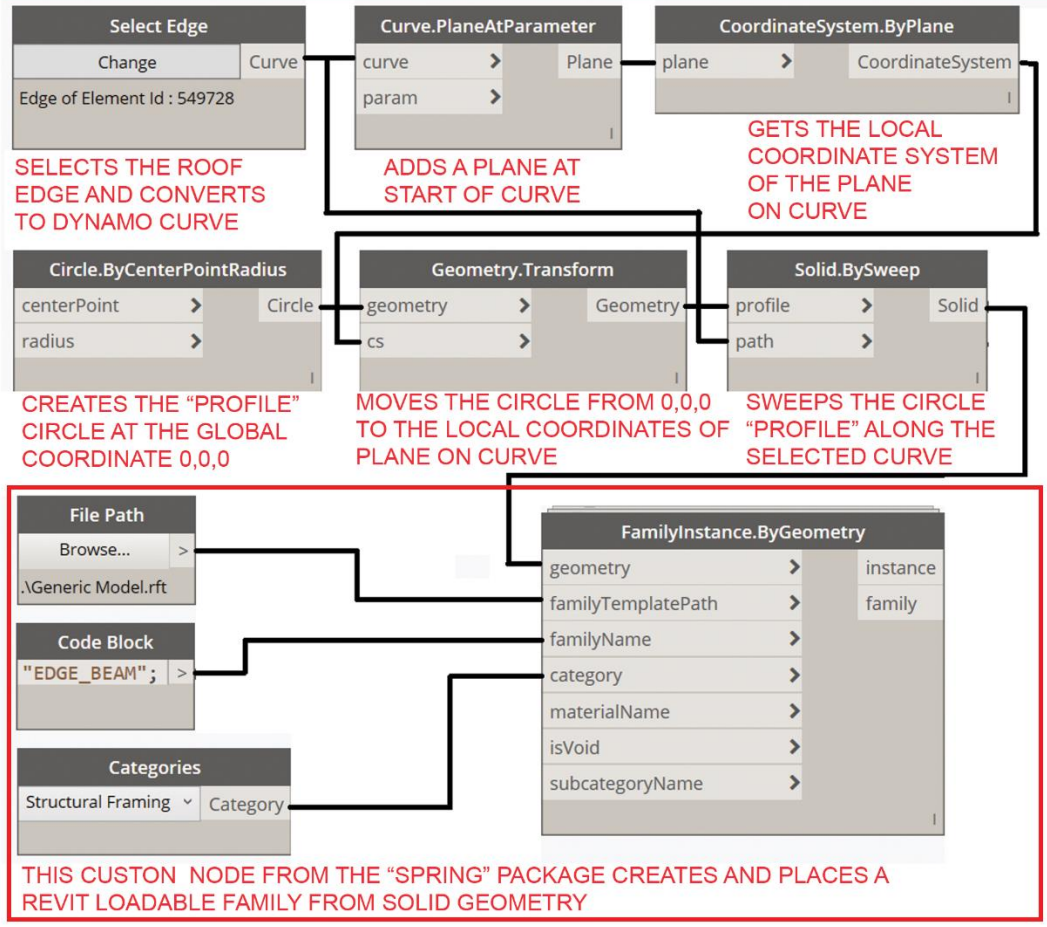
STEPS & NOTES

STEP 1: OPEN FILE “BOT_OF_PIPE_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT

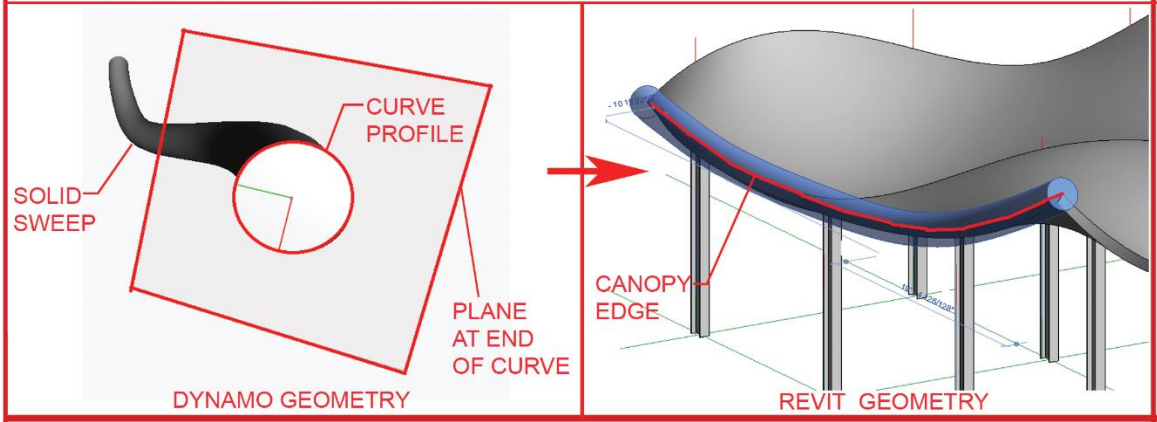
NOTE: IF THE END POINTS OF THE PIPE IS NEEDED THEN ADD POINTS TO THE END OF THE LINE

BUILD A COMPLEX BEAM IN DYNAMO AND SEND TO REVIT

DYNAMO NODES



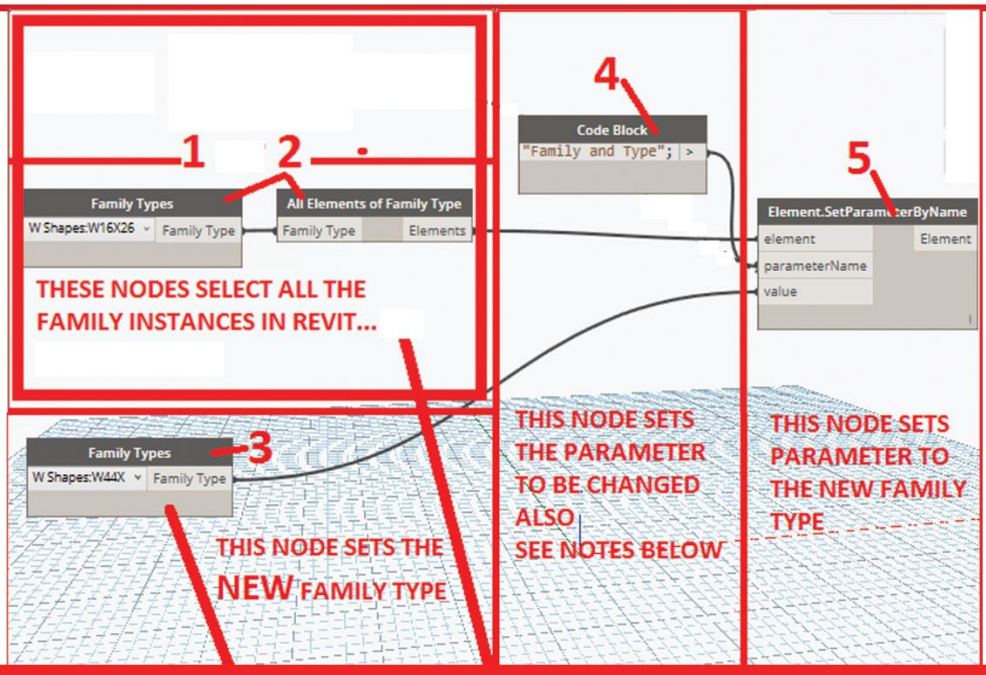
REVIT DYNAMO GEOMETRY

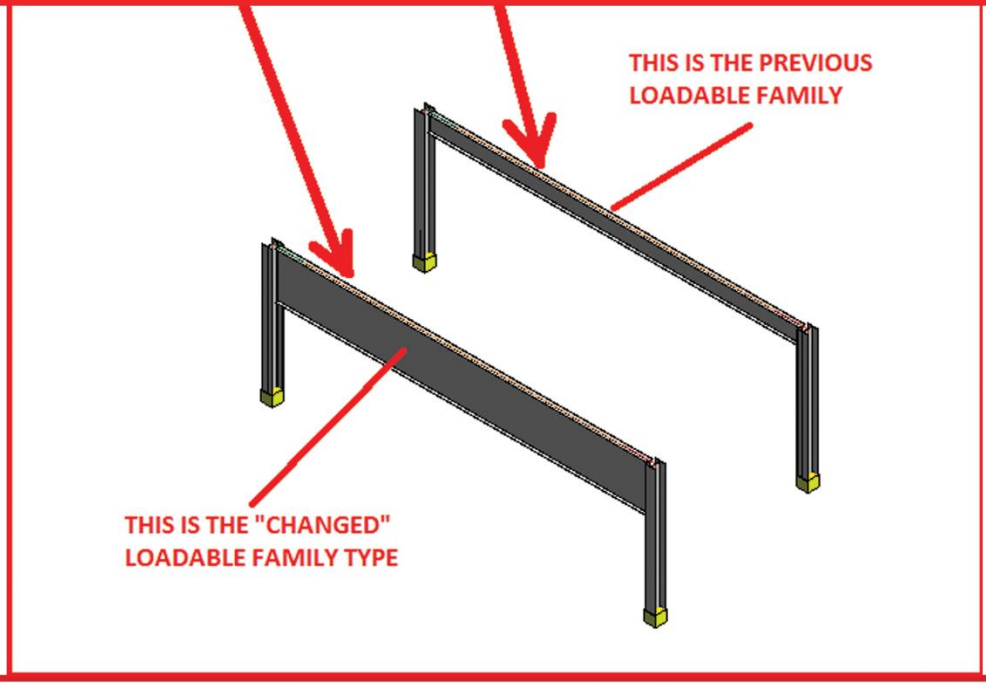


STEPS

STEP 1: OPEN FILE "CANOPY_BEAMS_TO_REVIT_START.RVT", OPEN NEW DYNAMO, ADD NODES
STEP 2: SELECT THE CANOPY EDGE USING THE "SELECT EDGE" NODE AS SHOWN AND RUN

CHANGE LOADABLE FAMILY TYPES



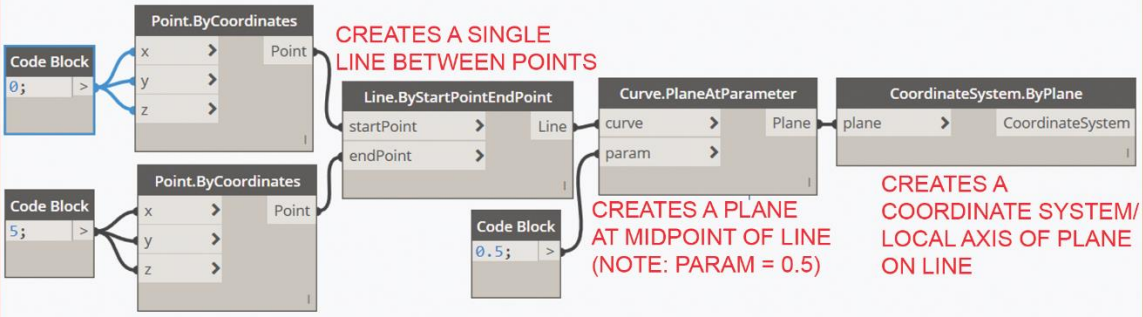


STEP 1: OPEN “CHANGE_BM_TYPE_START.RVT”
STEP 2: OPEN NEW DYNAMO FILE AND ADD NODES AND RUN
NOTES: THE FAMILY AND TYPE PARAMETER SELECTS THE TYPE IS OF EACH FAIMLY INSTANCE AND THUS ALLOWS THE TYPE TO BE CHANGED

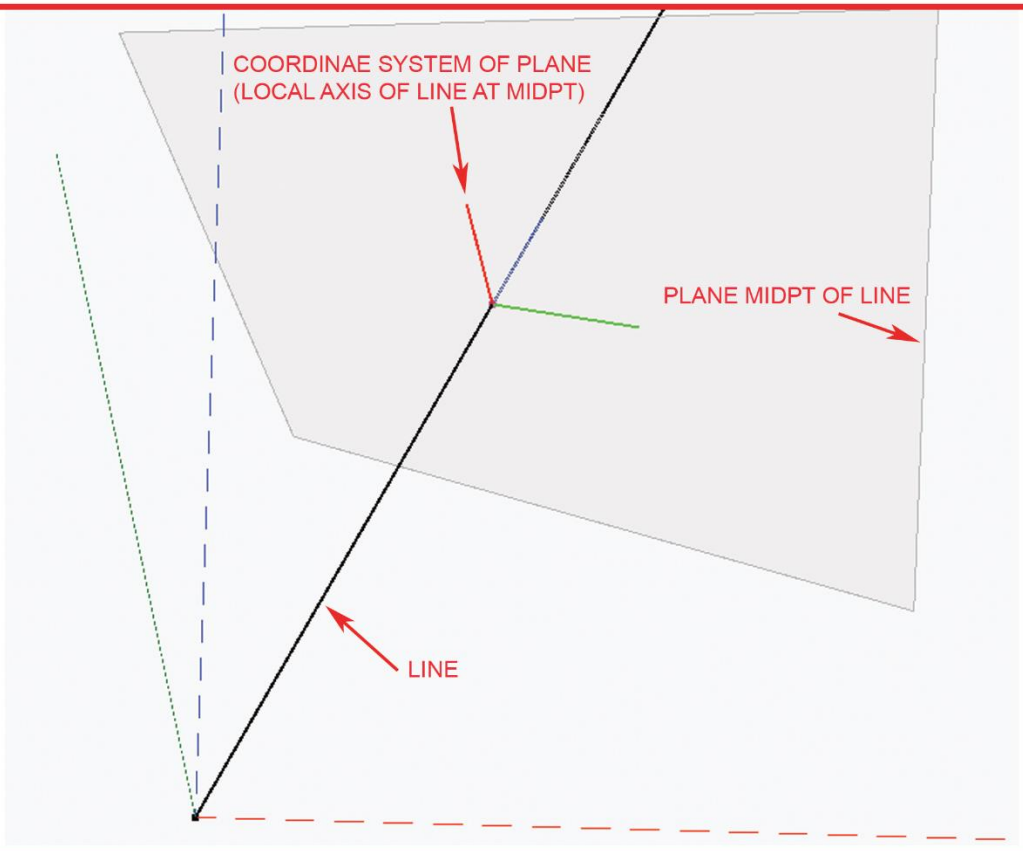
STEPS & NOTES

COORDINATE SYSTEM SYSTEM ON A LINE AT MIDPOINT

DYNAMO NODES



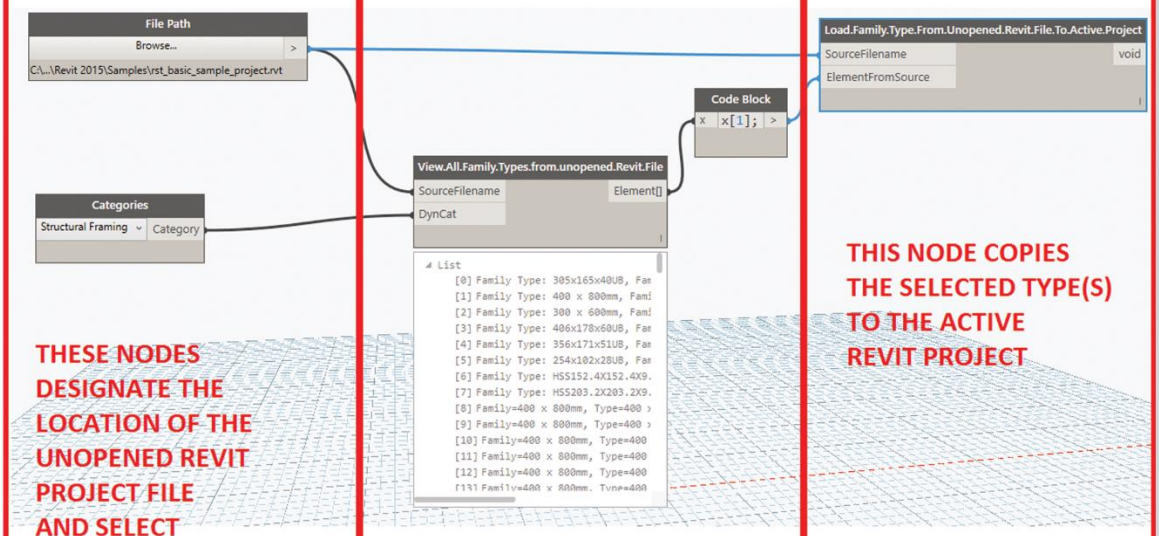
DYNAMO GEOMETRY



NOTES

NOTE: COORDINATE SYSTEMS CREATED FROM PLANES THAT ARE HOSTED TO DYNAMO ELEMENTS COULD BE THOUGHT OF A THE “LOCAL AXIS” OF THAT ELEMENT AT THAT LOCATION

COPY TYPES FROM UNOPENED REVIT PROJECT TO ACTIVE REVIT PROJECT USING ZT DYNAMO NODES

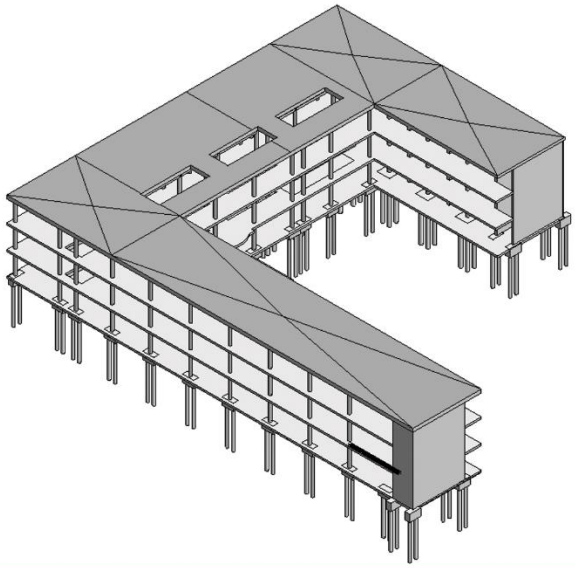


THESE NODES DESIGNATE THE LOCATION OF THE UNOPENED REVIT PROJECT FILE AND SELECT THE CATEGORY

THIS NODE SHOWS ALL FAMILY TYPES BY CATEGORY FROM UNOPENED REVIT PROJECT

THIS NODE COPIES THE SELECTED TYPE(S) TO THE ACTIVE REVIT PROJECT

DYNAMO NODES

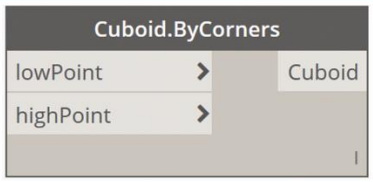


REVIT GEOMETRY

STEP 1: OPEN THE REVIT SAMPLE FILE “rst_advanced_sample_project.rvt”
STEP 2: START AND NEW DYNAMO FILE AND ADD NODE SHOWN
STEP 3: SELECT THE SAMPLE FILE “ “rst_advanced_sample_project.rvt” FROM THE “PATH” NODE
NOTE: CUSTOM NODES COULD BE FOUND IN THE “SIMPLEX” DYNAMO PACKAGE

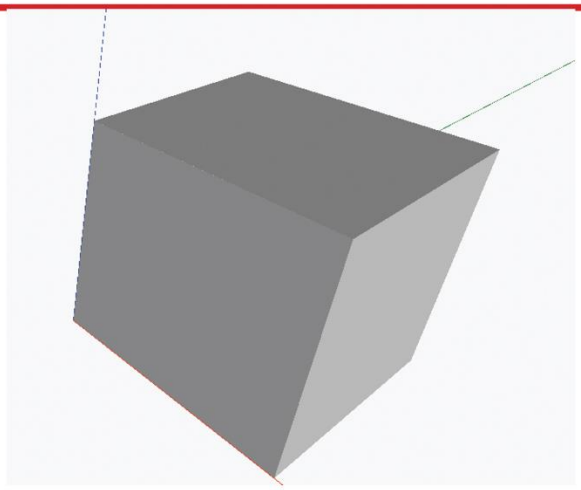
STEPS & NOTES

CUBIOD LOW AND HIGH PT



CREATES A
CUBIOD AT
LOW PT (0,0,0)
HIGH PT (1,1,1)

DYNAMO NODES



DYNAMO GEOMETRY

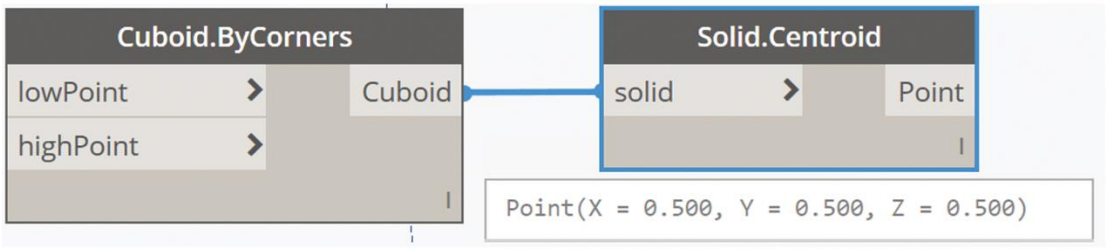
REVIT GEOMETRY

NOTE
THIS CREATES A DYNAMO CUBIOD (CUBE) LOW POINT IS DEFAULT PT (0,0,0)
HIGH POINT IS DEFAULT (1,1,1)

NOTE

CENTER OF MASS FROM CUBIOD

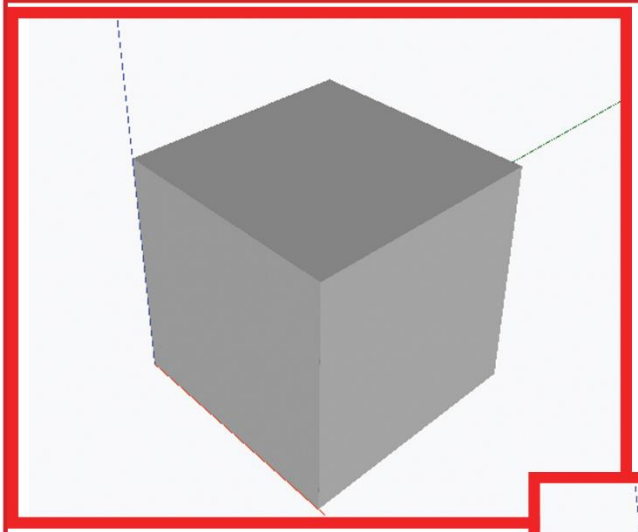
DYNAMO NODES

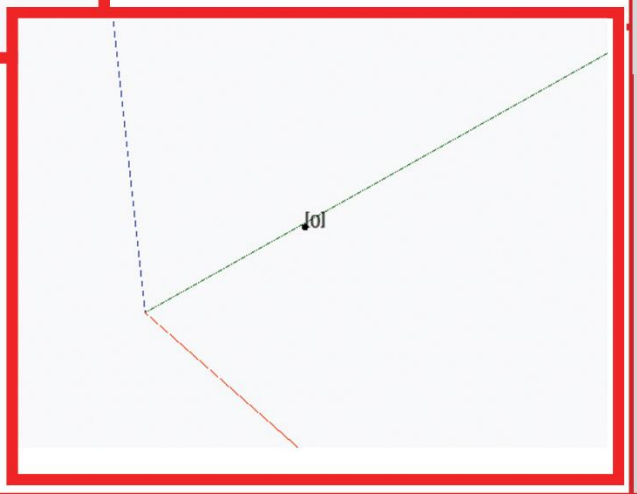


CREATES A
CUBIOD AT
LOW PT (0,0,0)
HIGH PT (1,1,1)

GETS THE CENTROID
THE CUBIOD

DYNAMO GEOMETRY



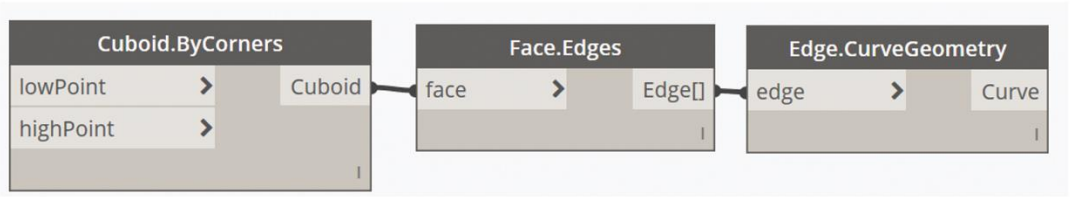


NOTE

NOTE
THIS EXTRACTS THE CENTROID FROM A CUBIOD AND COULD BE APPLIED TO MOST SOLIDS.

EDGE CURVES ON CUBIOD

DYNAMO NODES

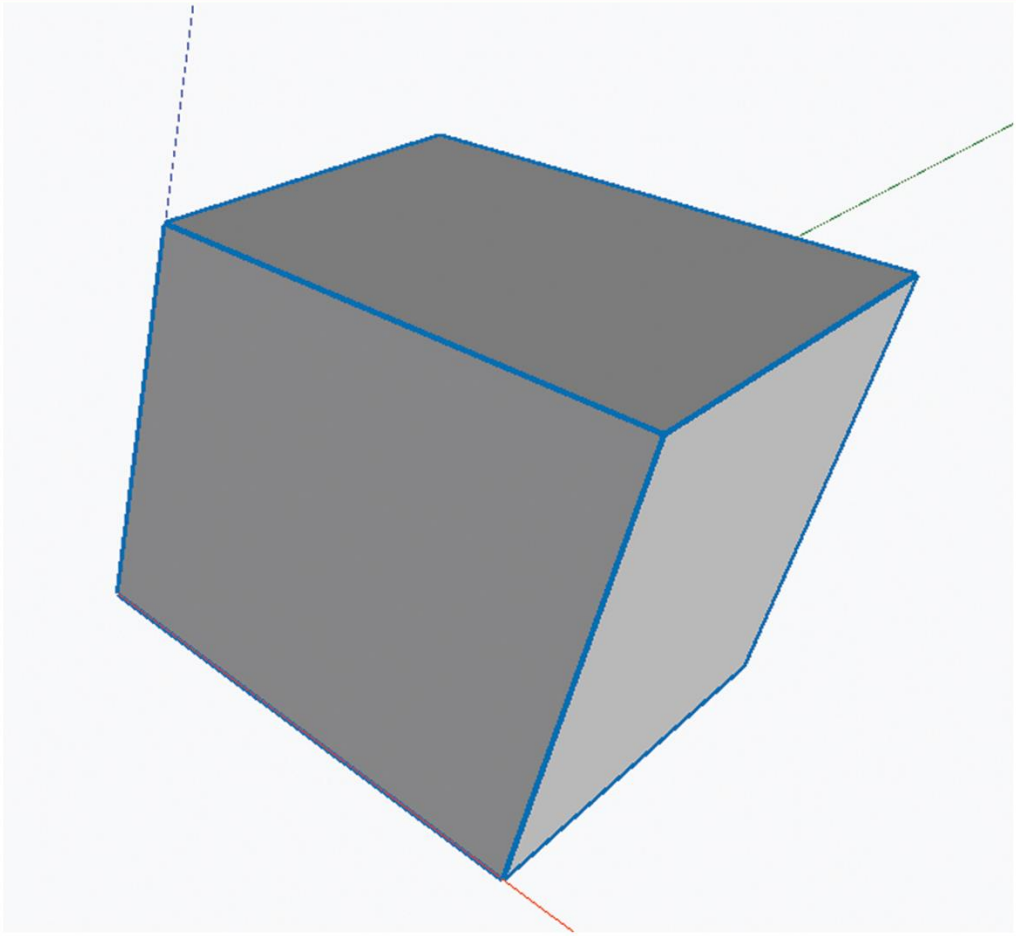


CREATES A CUBIOD AT LOW PT (0,0,0) HIGH PT (1,1,1)

GETS THE EDGES FROM THE CUBIOD

CONVERTS THE EDGES TO CURVES

DYNAMO GEOMETRY

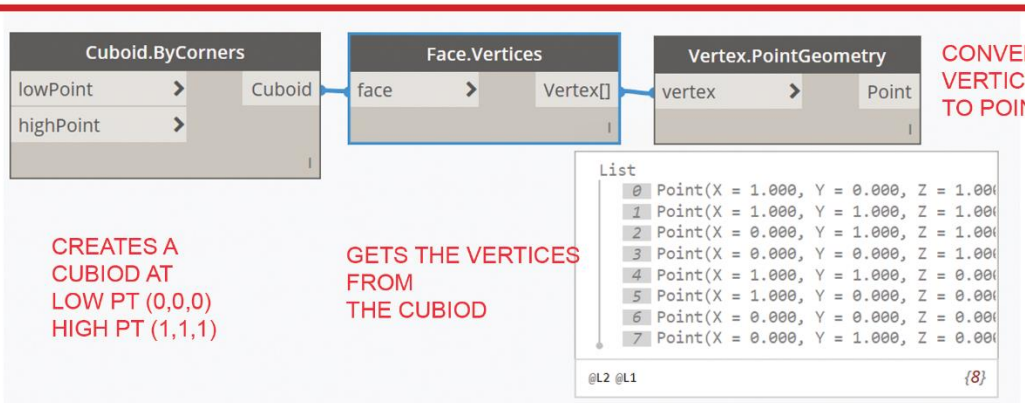


NOTE

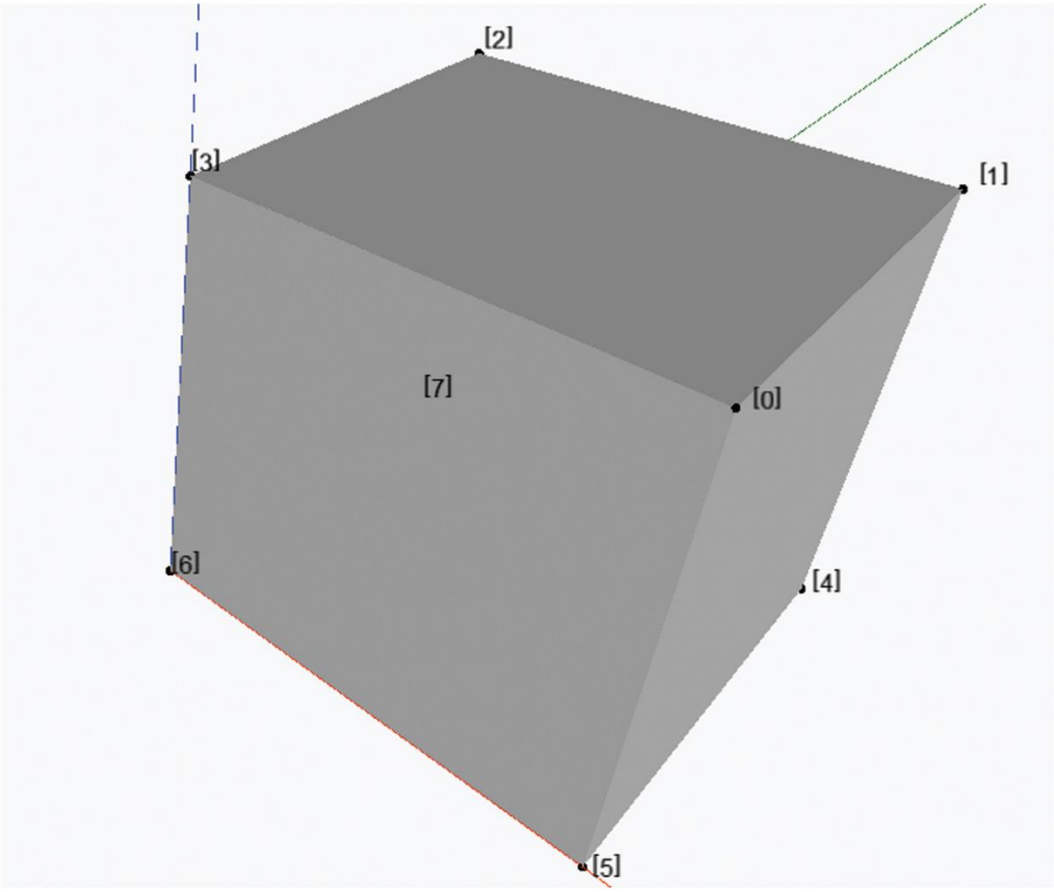
NOTE
THIS EXTRACTS THE EDGES FROM A CUBIOD AND COULD BE APPLIED TO MOST SOLIDS

POINTS AT VERTICES OF CUBIOD

DYNAMO NODES



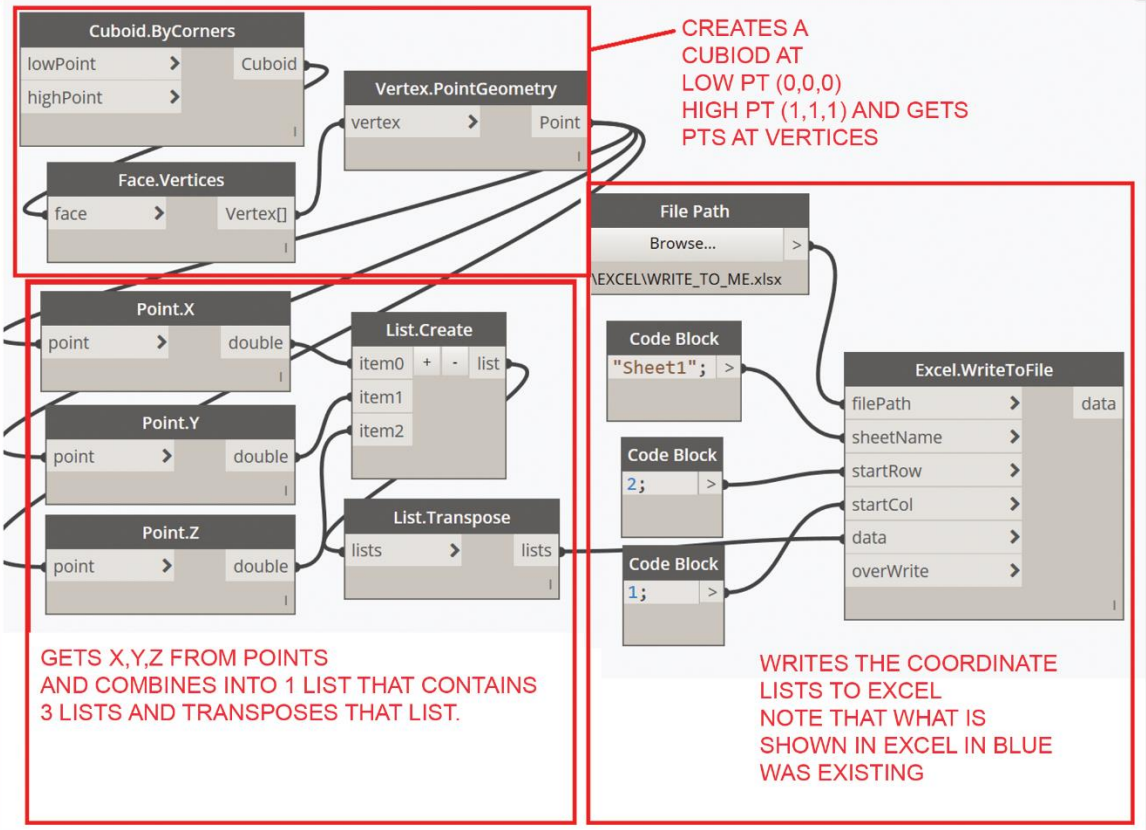
DYNAMO GEOMETRY

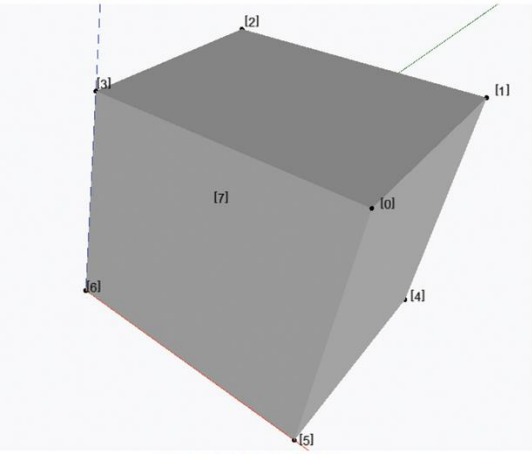


NOTE

NOTE
THIS EXTRACTS THE POINTS AT VERTICES ON A CUBIOD

POINTS COORDINATES AT VERTICES TO EXCEL





DYNAMO CUBIOD

VERTICES OF CUBOID			
POINT	X	Y	Z
0	1	0	1
1	1	1	1
2	0	1	1
3	0	0	1
4	1	1	0
5	1	0	0
6	0	0	0
7	0	1	0

EXCEL SPREADSHEET

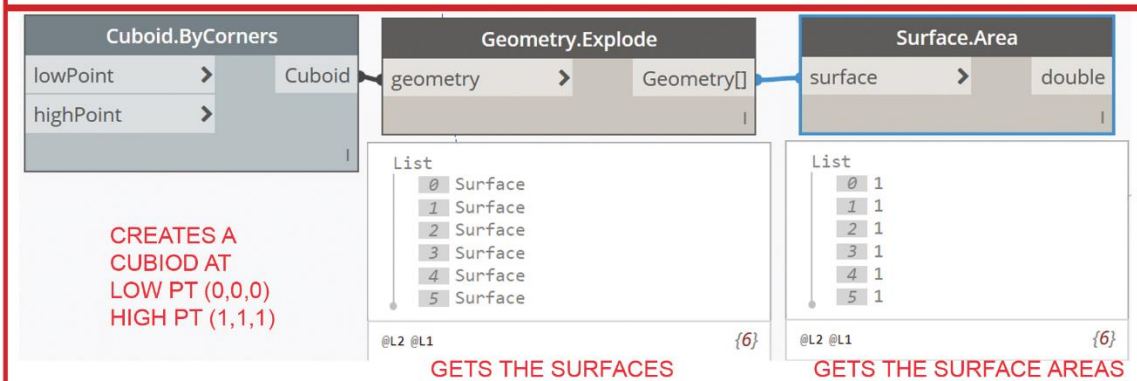
DYNAMO GEOMETRY + EXCEL

NOTE

THE EXCEL SPREADSHEET WAS EXISTING AND WHAT IS SHOWN IN BLUE WAS WHAT WAS PRESET IN EXCEL AND WHAT IS SHOWN IN ORANGE IS WHAT WAS WRITTEN IN BY DYNAMO

NOTE

SURFACE AREAS FROM CUBIOD

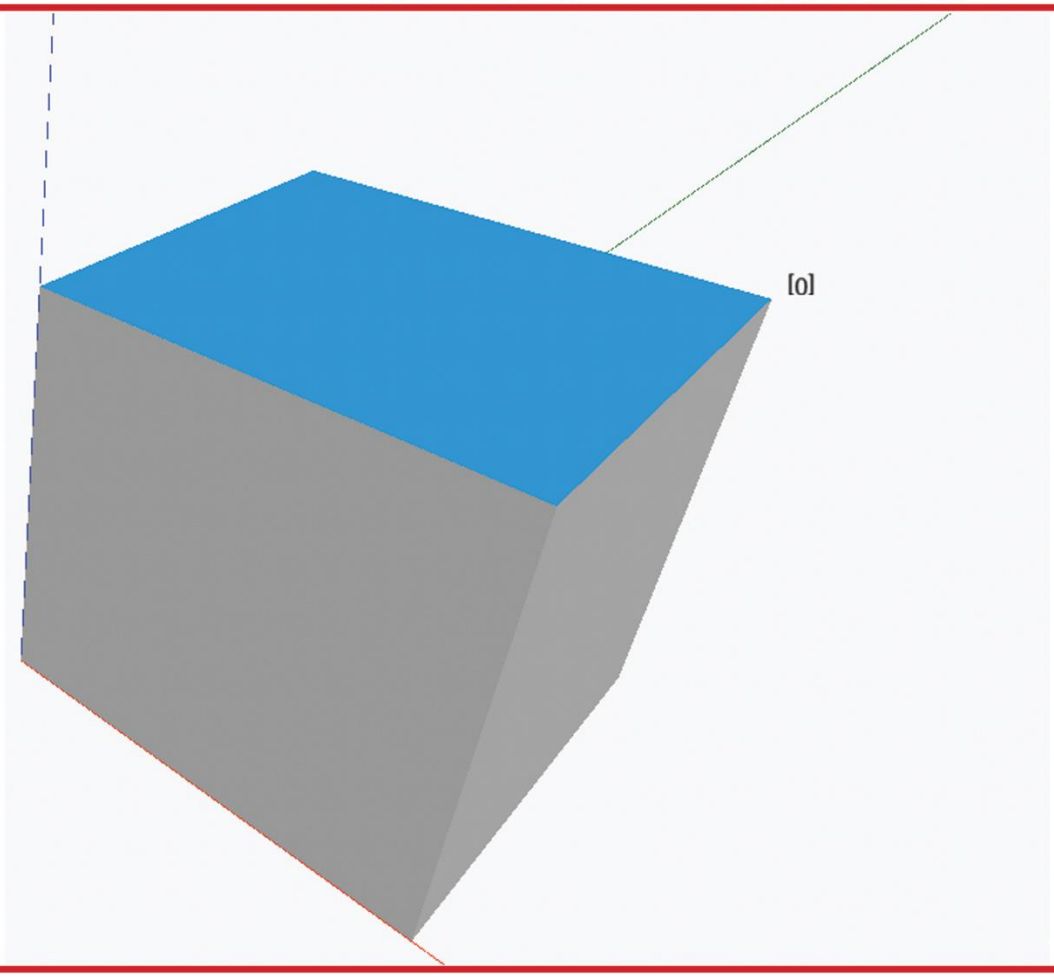


CREATES A CUBIOD AT LOW PT (0,0,0) HIGH PT (1,1,1)

GETS THE SURFACES FROM THE CUBIOD

GETS THE SURFACE AREAS FROM THE CUBIOD

DYNAMO NODES



DYNAMO GEOMETRY

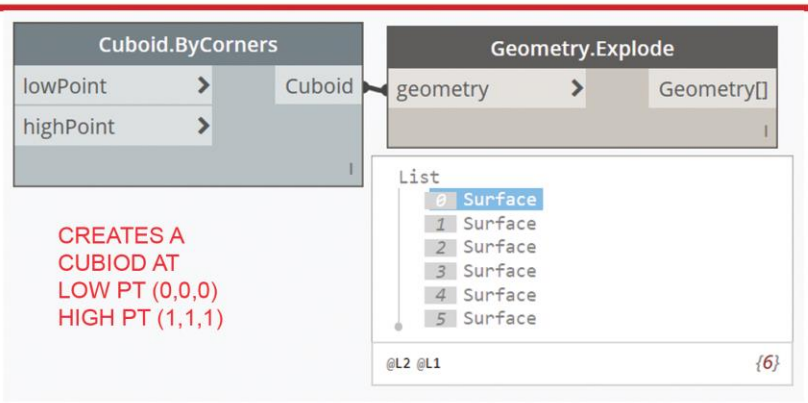
NOTE

THIS EXTRACTS THE SURFACE AREAS FROM A CUBIOD AND COULD BE APPLIED TO MOST SOLIDS. ALSO NOTE THAT IN MOST CASES THE ONLY WAY TO GET SURFACES FROM A SOLID IS TO "EX-PLODE" THE SOLID

NOTE

SURFACES FROM CUBIOD

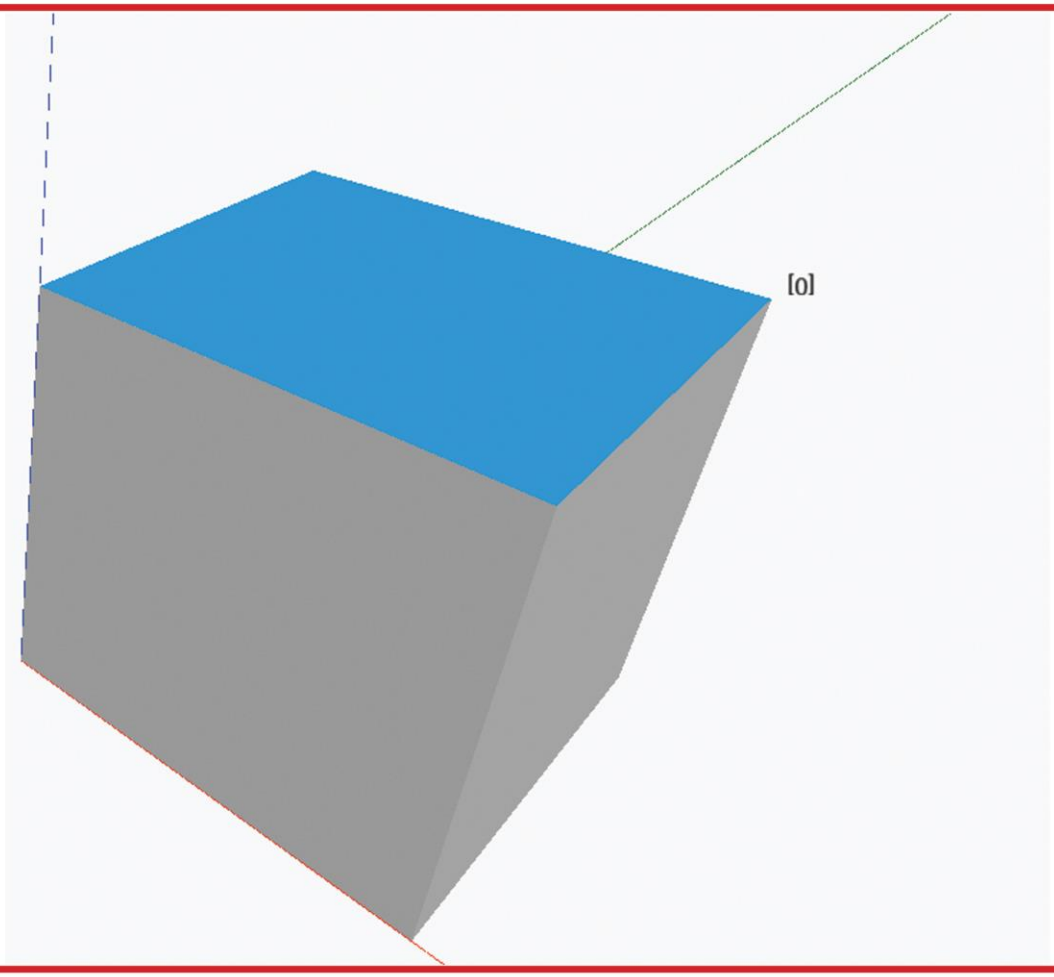
DYNAMO NODES



CREATES A CUBIOD AT LOW PT (0,0,0) HIGH PT (1,1,1)

GETS THE SURFACES FROM THE CUBIOD

DYNAMO GEOMETRY

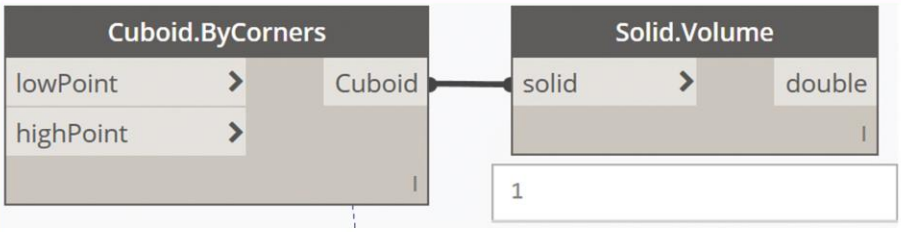


NOTE

NOTE
THIS EXTRACTS THE SURFACES FROM A CUBIOD AND COULD BE APPLIED TO MOST SOLIDS. ALSO NOTE THAT IN MOST CASES THE ONLY WAY TO GET SURFACES FROM A SOLID IS TO "EXPLODE" THE SOLID

VOLUME FROM CUBIOD

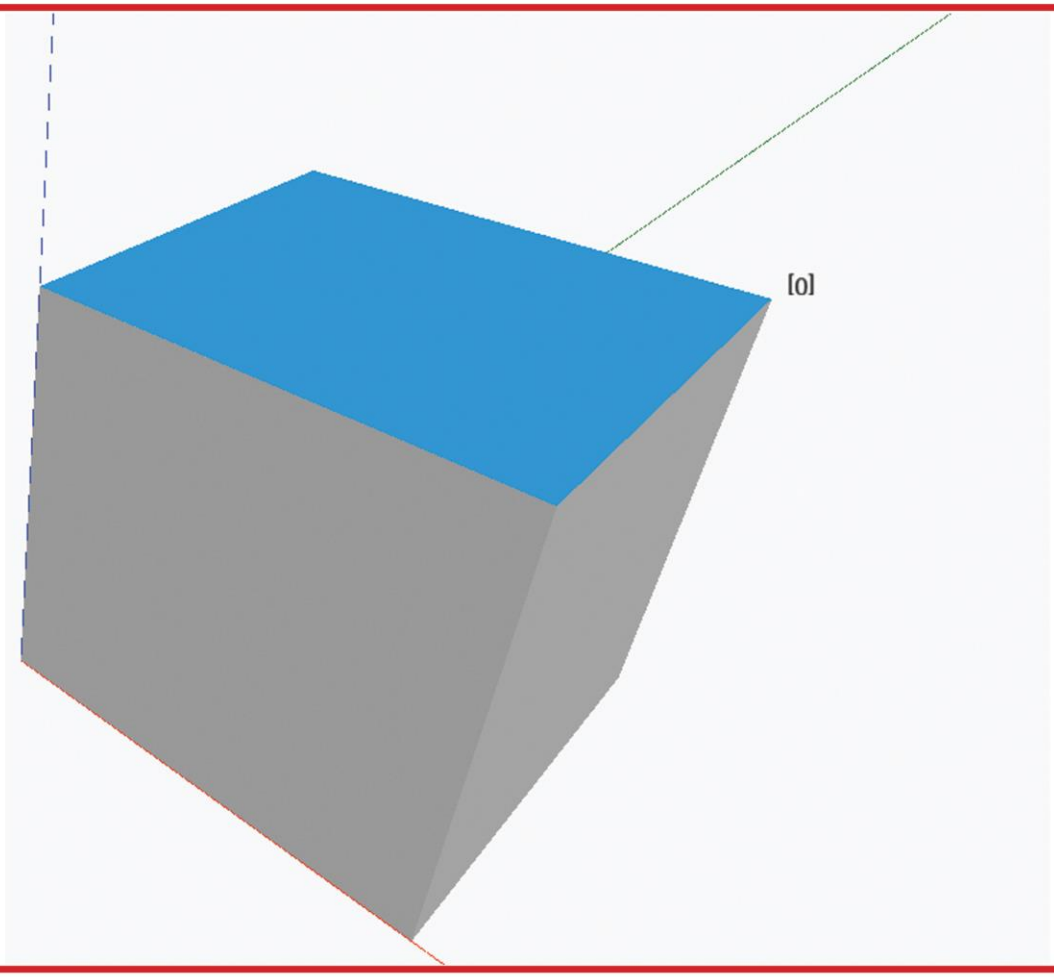
DYNAMO NODES



CUBIOD AT
LOW PT (0,0,0)
HIGH PT (1,1,1)

GETS THE VOLUME
FROM THE CUBIOD

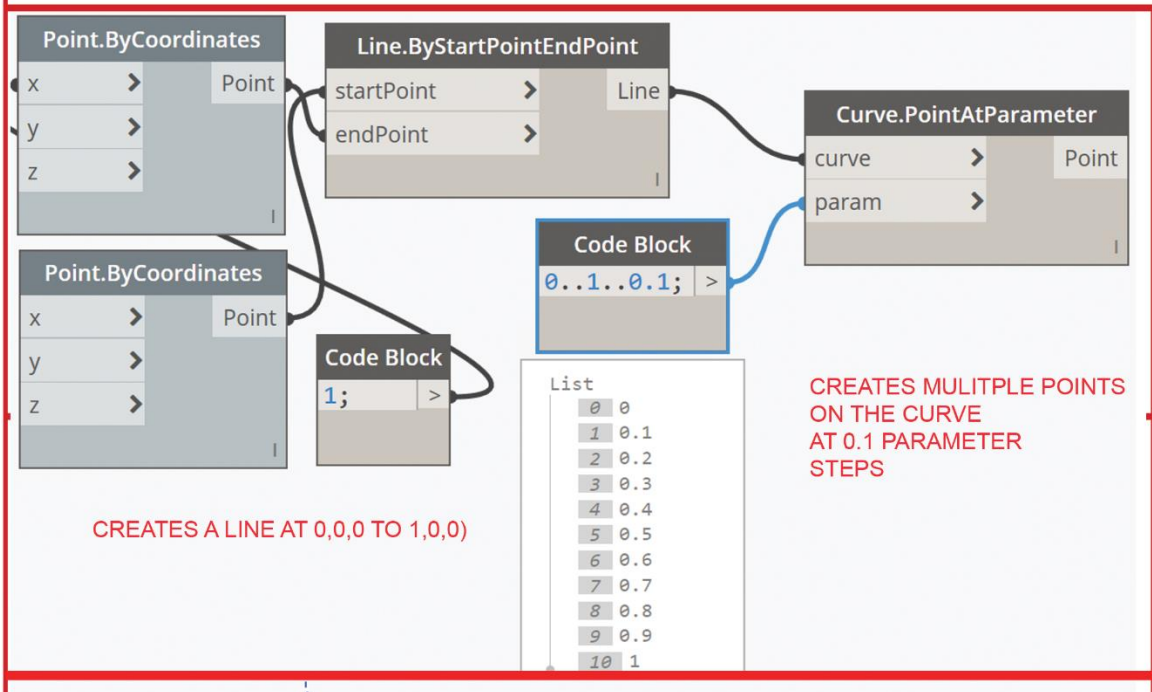
DYNAMO GEOMETRY

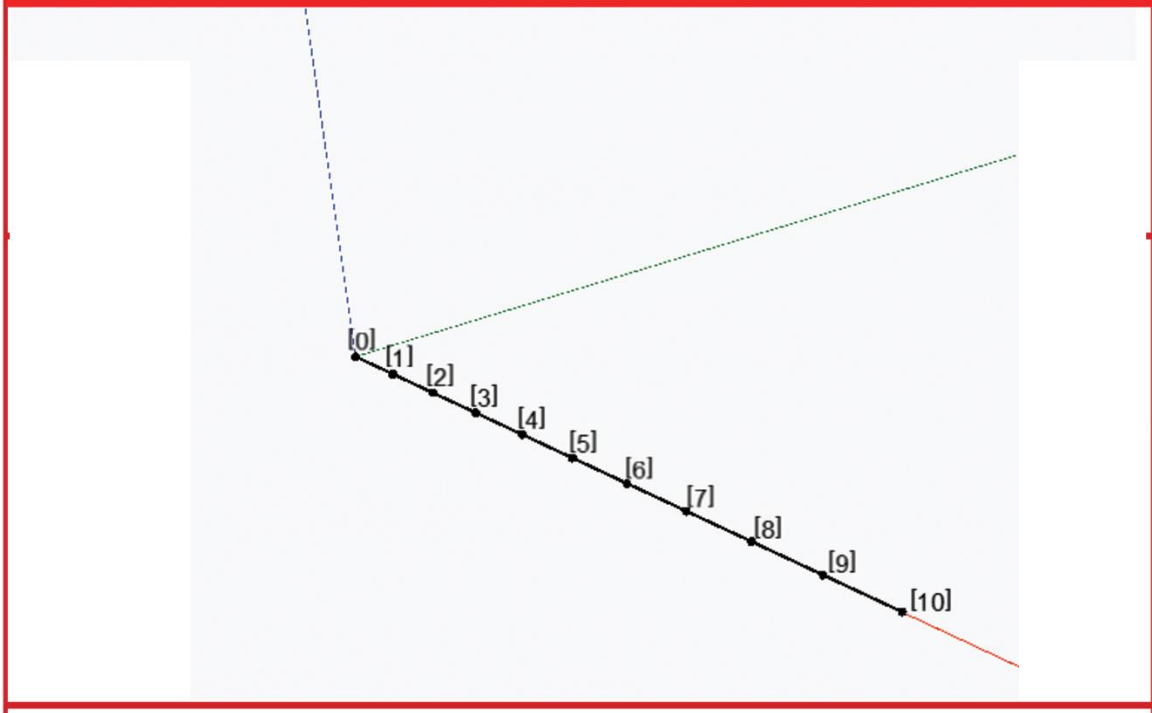


NOTE

NOTE
THIS EXTRACTS THE VOLUME FROM A CUBIOD AND COULD BE APPLIED TO MOST SOLIDS.

CURVES : START AND END POINTS USING PARAMETERS



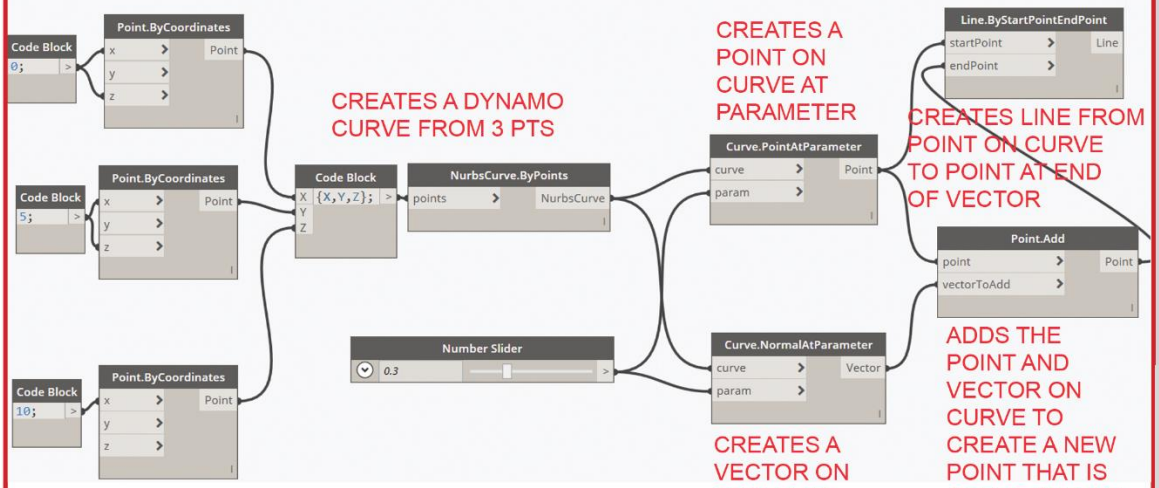


NOTE
A LINE IS A CURVE AND THEREFORE ALL "LINE" OUTPUT PORTS COULD
BE CONNECTED INTO A "CURVE" INPUT PORT
PARAMETER IS A VALUE FROM 0 TO 1 (START AND END) 0 = END (FOR EXAMPLE)

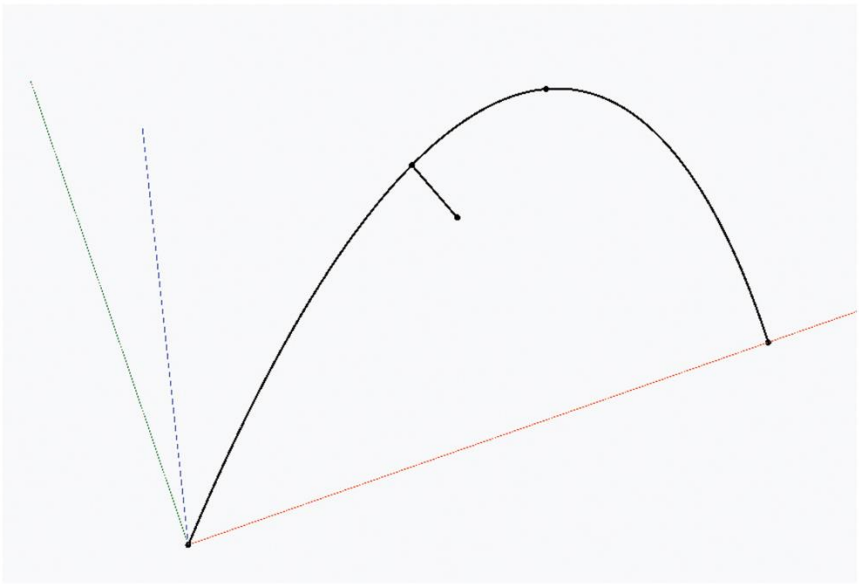
NOTE

SHOW THE VECTOR THAT IS NORMAL TO A POINT HOSTED ON A CURVE

DYNAMO NODES



DYNAMO GEOMETRY

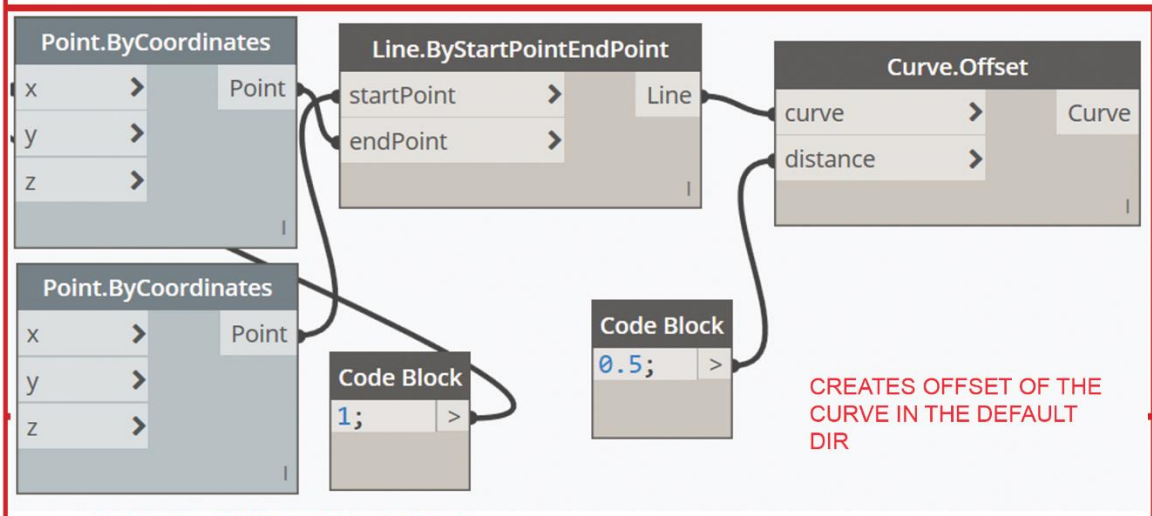


NOTES

NOTES: 1. GETTING THE VECTOR NORMAL TO A CURVE HELPS DETERMINE WHICH DIRECTION THE CURVE IS ORIENTED.
2. THE ABOVE EXAMPLE WAS CREATED TO HELP SHOW THE VECTOR

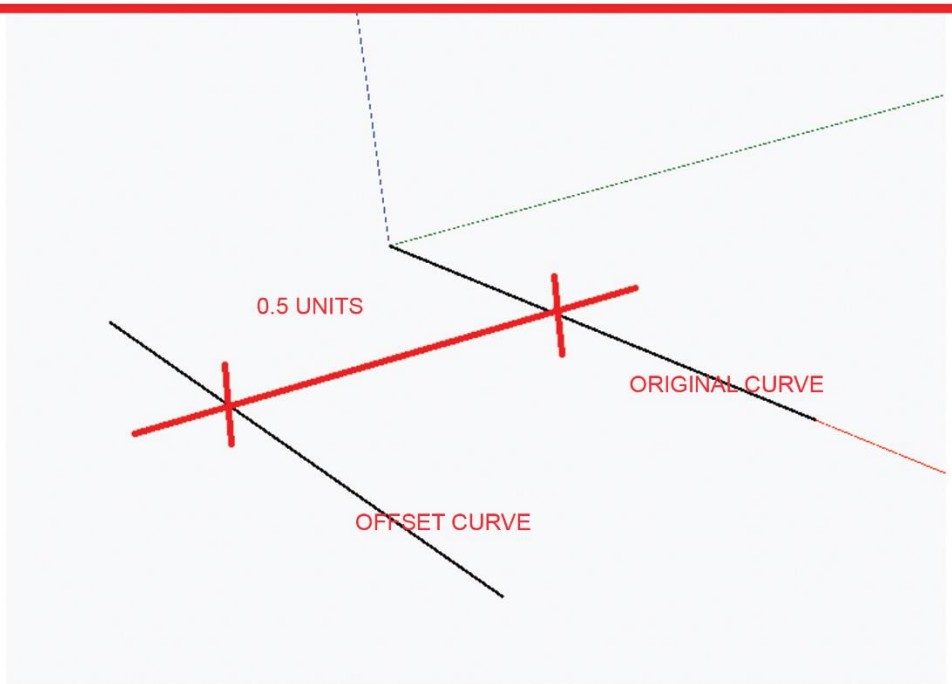
CURVES : OFFSET

DYNAMO NODES



CREATES A LINE AT 0,0,0 TO 1,0,0)

DYNAMO GEOMETRY

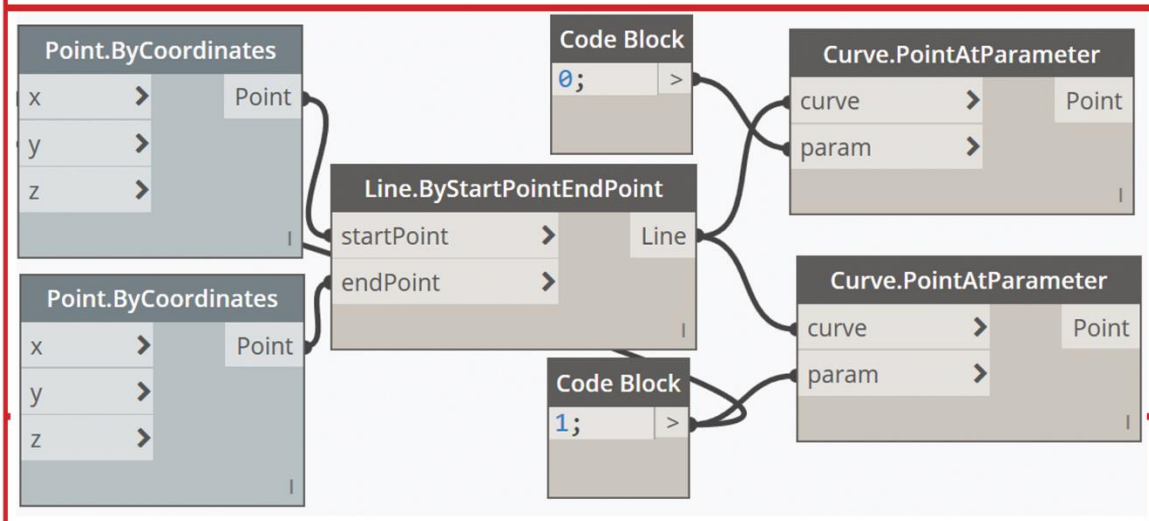


NOTE

NOTE
A LINE IS A CURVE AND THEREFORE ALL "LINE" OUTPUT PORTS COULD BE CONNECTED INTO A "CURVE" INPUT PORT
OFFST FOR A CURVE ONLY OFFSETS IN THE NORMAL VECOR (IN THIS CASE (0,-1,0)

CURVES : START AND END POINTS USING PARAMETERS

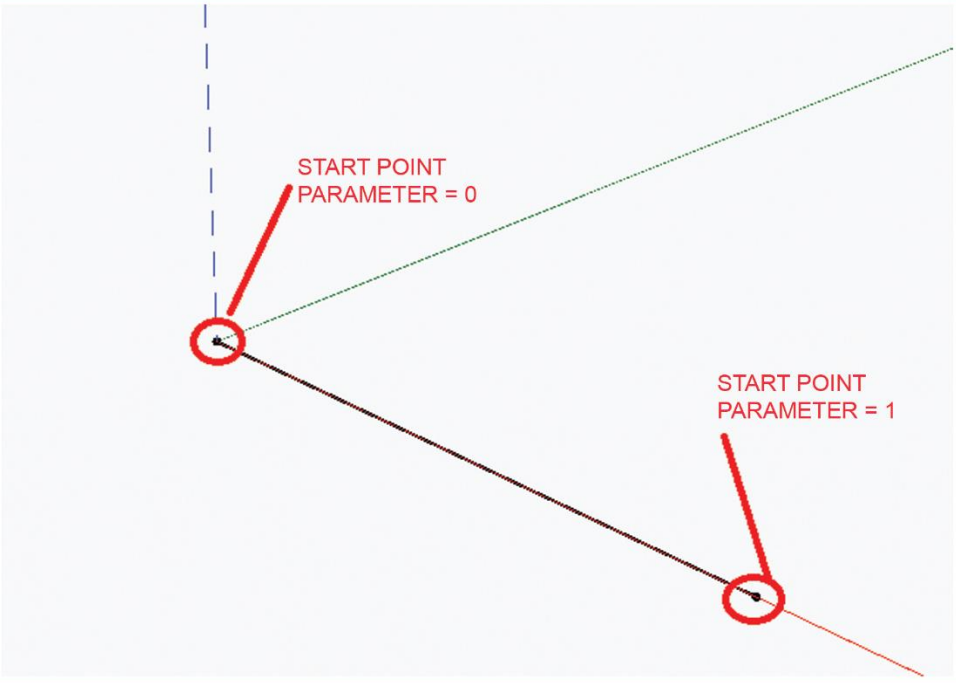
DYNAMO NODES



CREATES A LINE AT 0,0,0 TO 1,0,0)

CREATES POINTS AT THE START AND END OF THE LINE USING PARAMETER 0,1

DYNAMO GEOMETRY

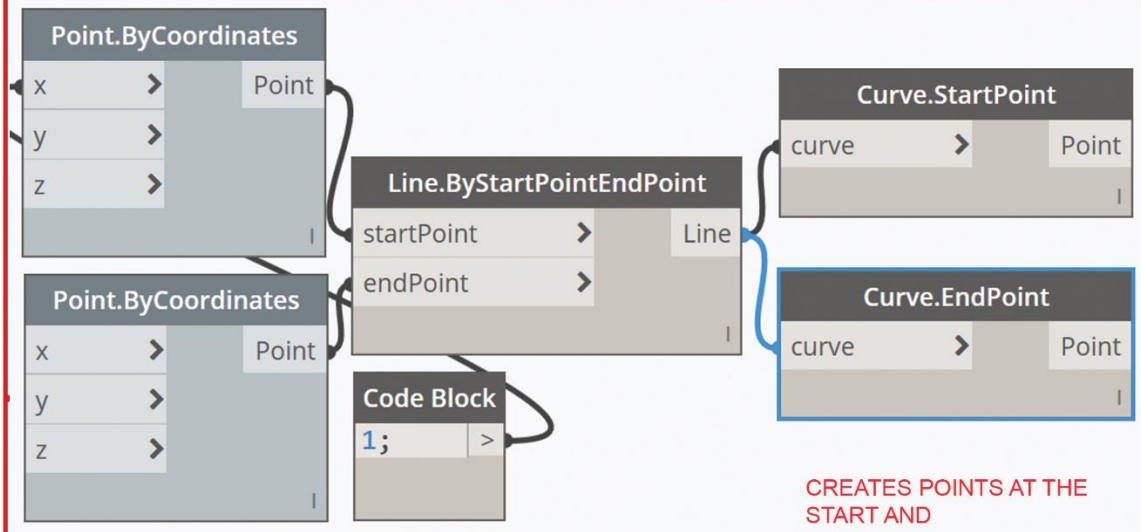


NOTE

NOTE
A LINE IS A CURVE AND THEREFORE ALL "LINE" OUTPUT PORTS COULD BE CONNECTED INTO A "CURVE" INPUT PORT
PARAMETER IS A VALUE FROM 0 TO 1 (START AND END) 0 = END (FOR EXAMPLE)

CURVES : START AND END POINTS

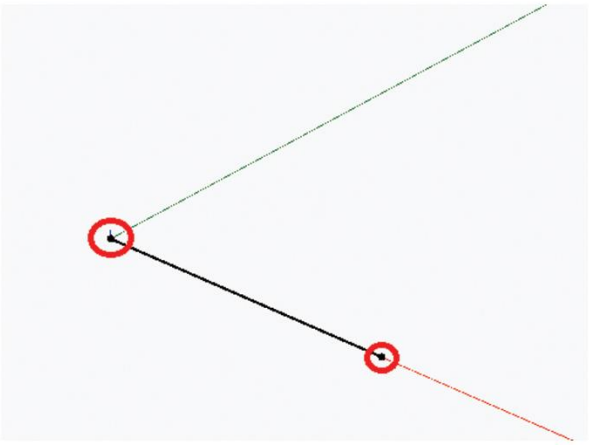
DYNAMO NODES



CREATES POINTS AT THE START AND END OF THE LINE

CREATES A LINE AT 0,0,0 TO 1,0,0)

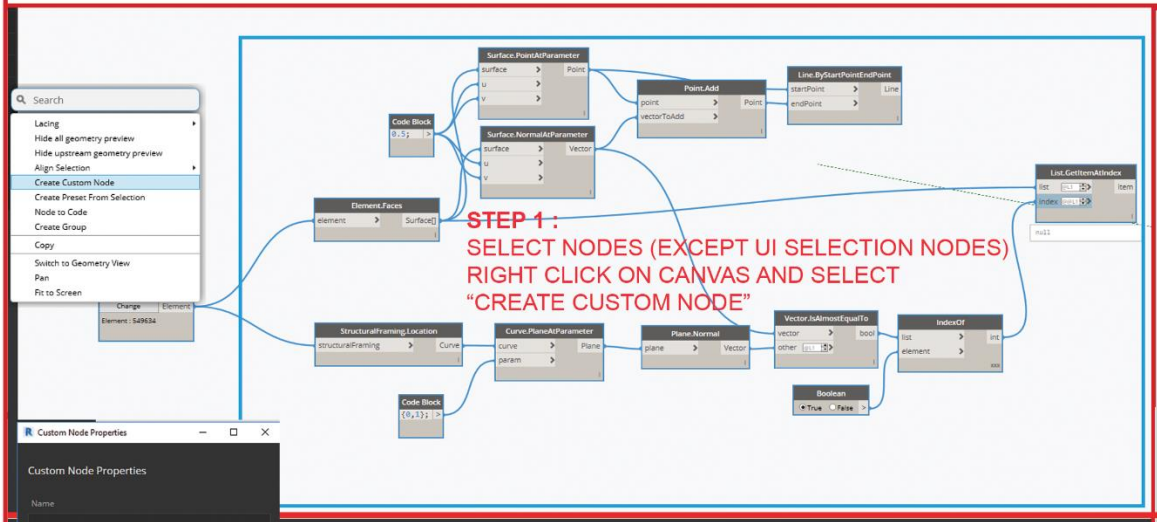
DYNAMO GEOMETRY



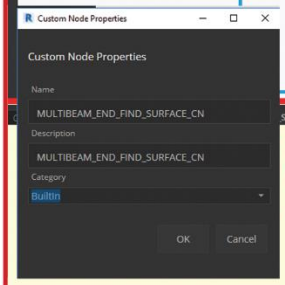
NOTE

NOTE
A LINE IS A CURVE AND THEREFORE ALL “LINE” OUTPUT PORTS COULD BE CONNECTED INTO A “CURVE” INPUT PORT

GET SURFACES AT ENDS OF MULTIPLE REVIT BEAMS VIA CREATING A CUSTOM NODE FROM OOTB NODES



DYNAMO NODES



CUSTOM DYN. NODE (EDIT MODE)

DYNAMO GEO+ NODES

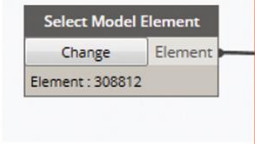
NOTES: IF IT IS DIFFICULT TO PERFORM OPERATIONS ON MULTIPLE OBJECTS TRY LOGIC ON ONE OBJECT THEN CREATE A CUSTOM NODE AND ADD VIA INPUT MULTIPLE SELECTIONS AND LET THE CUSTOM DYNAMO NODE CREATE MULTIPLE RESULTS
CUSTOM OOTB NODES ARE ALSO USEFUL FOR CONSOLIDATING MANY NODES (USE WITH CARE)

NOTES

DWG TO GRID

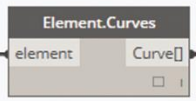
DYNAMO NODES

1

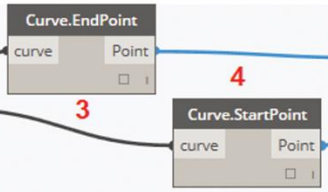


This node selects the DWG

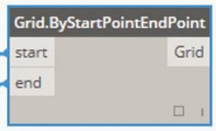
2



This node changes the DWG into Dynamo Curves



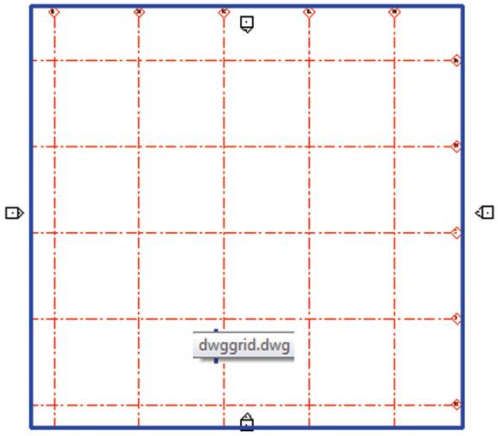
These nodes extract the start and the end points of the Dynamo Curves



This node creates grids in REVIT based on start and end points

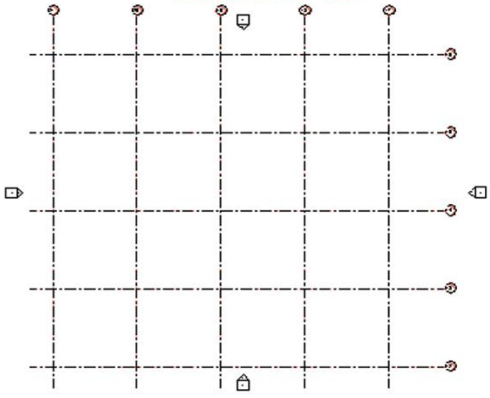
REVIT GEOMETRY

DWG IN REVIT



REVIT GEOMETRY

GRIDS GENERATED IN REVIT

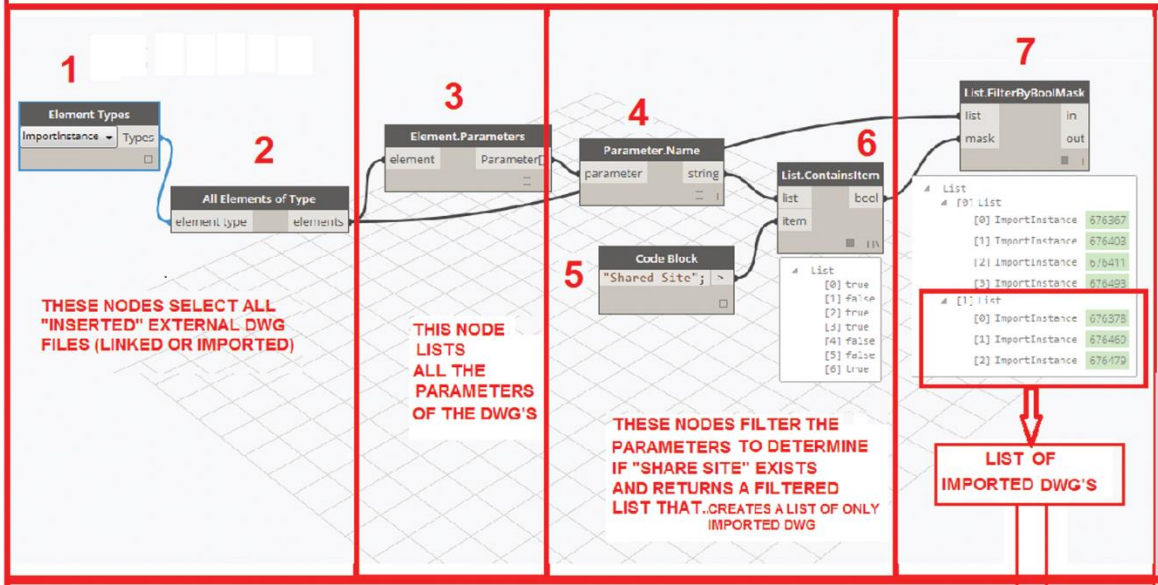


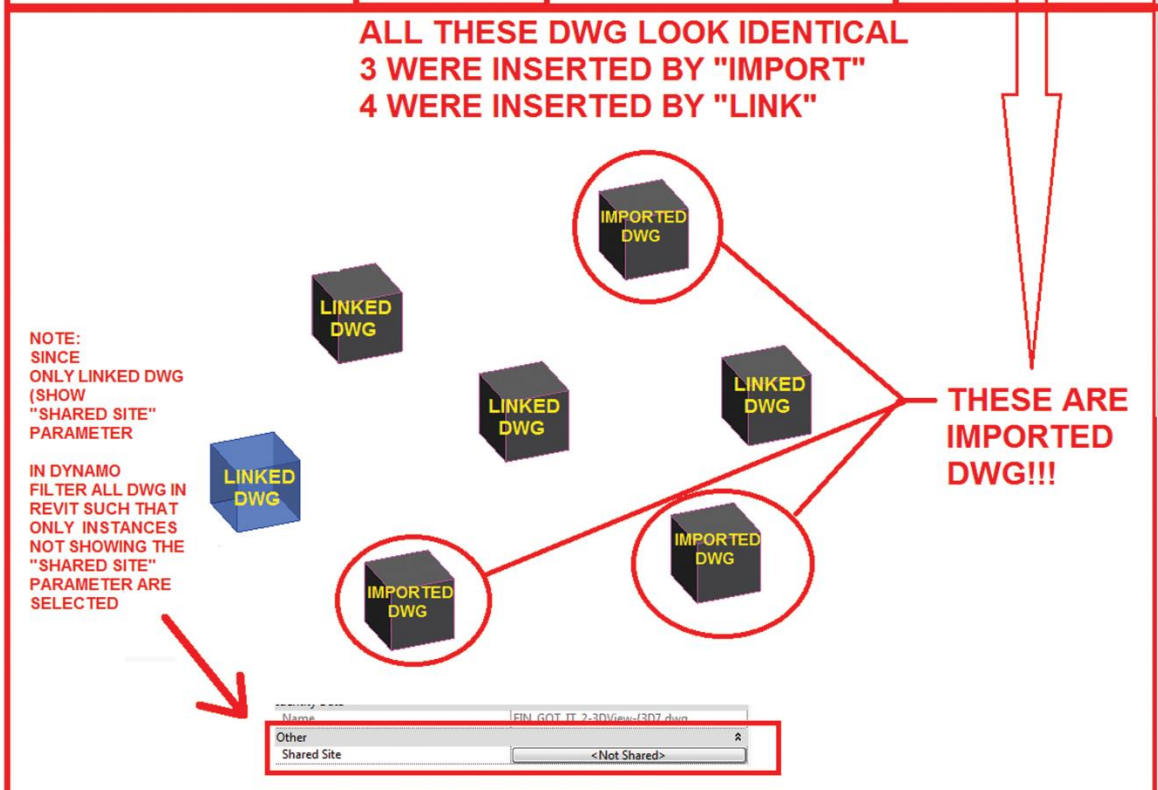
Note: Dynamo will autoname the grids
Dont like it? Simply rename them yourself using Dynamo

STEPS & NOTES

STEP 1: OPEN FILE “DWG_TO_GRID_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN
STEP 3: LINK “DWG_GRID.DWG” INTO REVIT AND SELECT WITH “SELECT” NODE
NOTES: ISOLATE LAYERS IN DWG BEFORE LINKING REVIT AND TRY TO CREATE OTHER ELEMENTS

SELECT/FIND IMPORTED DWG



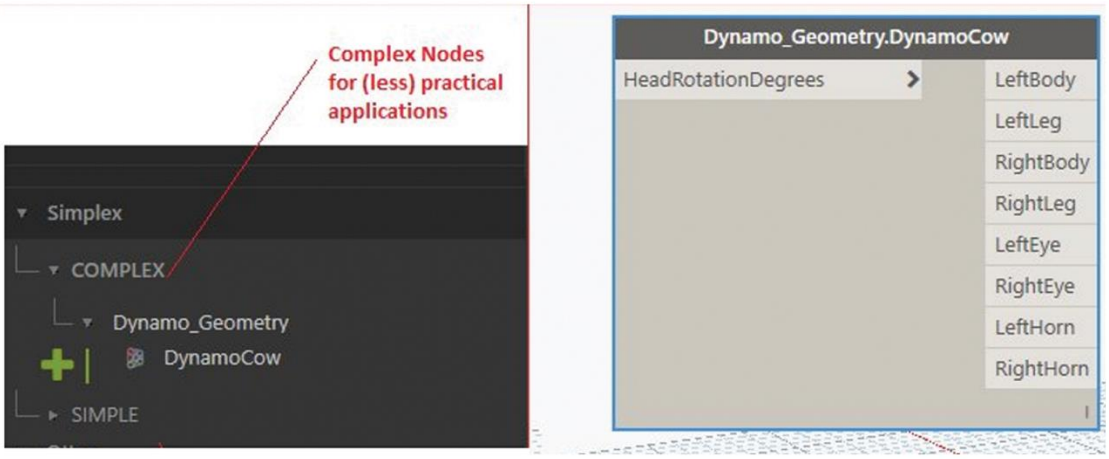


NOTE: THIS METHOD SELECTS THE IMPORTED DWGS AND IS IMPORTANT SINCE IT IS DIFFICULT IN SOME CASES TO "FIND" IMPORTED DWGS IN A REVIT FILE SINCE THERE IS NO GOOD WAYS TO "MANAGE" IMPORTED DWGS. MOST PREFER TO "LINK" DWG FILES SINCE THEY COULD BE MANAGED

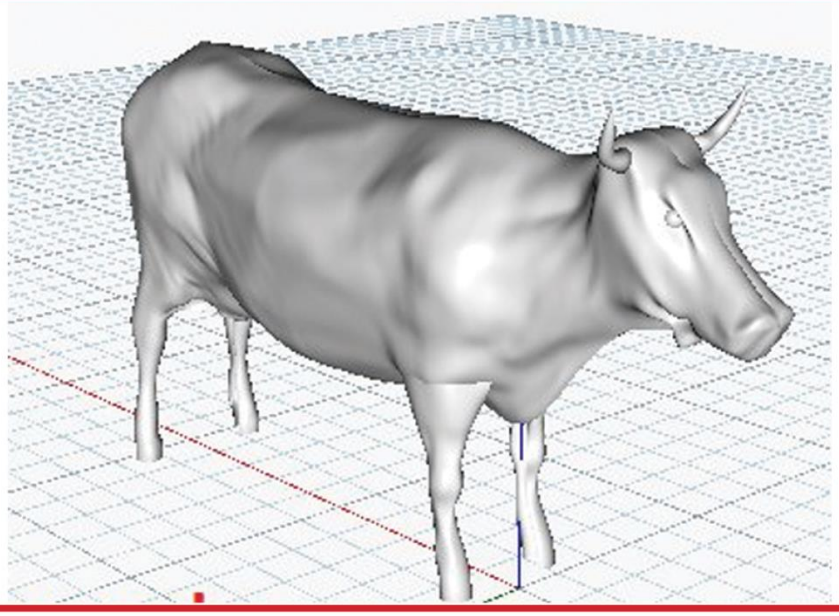
NOTES

CREATE A COW IN DYNAMO

DYNAMO NODES



DYNAMO GEOMETRY



STEPS & NOTES

STEP 1: OPEN THE REVIT SAMPLE FILE “rst_advanced_sample_project.rvt”
STEP 2: START AND NEW DYNAMO FILE AND ADD NODE SHOWN AND RUN

NOTE: CUSTOM NODES COULD BE FOUND IN THE “SIMPLEX” DYNAMO PACKAGE

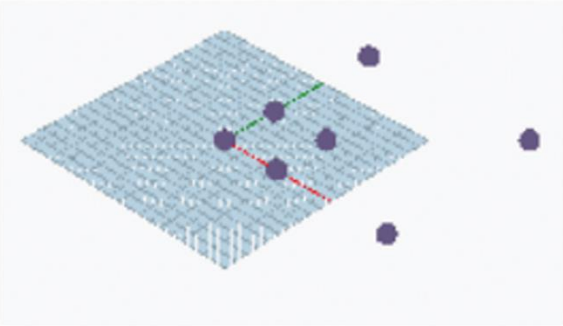
DYNAMO AND REVIT POINTS W/ SCALE VIA DESIGN SCRIPT

DYNAMO NODES

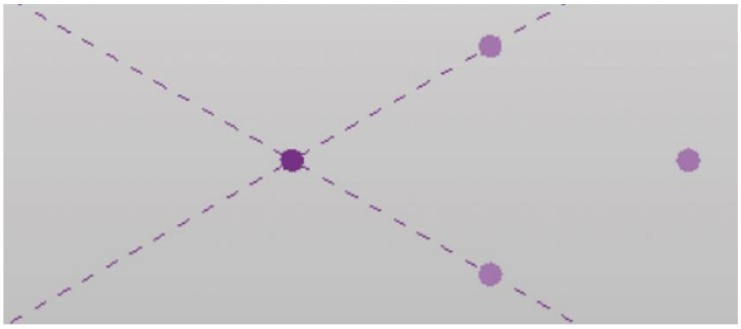
Code Block

```
p1=Autodesk.Point.ByCoordinates(0,0);
p2=Autodesk.Point.ByCoordinates(0,25);
p3=Autodesk.Point.ByCoordinates(25,25);
p4=Autodesk.Point.ByCoordinates(25,0);
points={p1,p2,p3,p4};
scaledpoints=points.Scale(3);
ReferencePoint.ByPoint(scaledpoints);
```

DYNAMO GEOMETRY



REVIT GEOMETRY



STEPS & NOTES

STEP 1: OPEN A NEW MASS FAMILY TEMPLATE
STEP 2: OPEN A NEW DYNAMO GRAPH AND ADD NODES AND RUN
NOTE: THIS CREATES DYNAMO POINTS AND SCALES 3X AND CREATES REVIT REFERENCE POINTS IN THE MASSING EDITOR AT 3X SCALE

ANATOMY OF ETABS

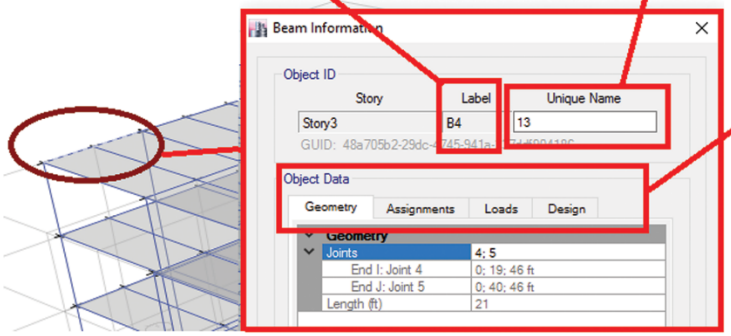
ETABS PROPERTIES

EACH ELEMENT IN ETABS HAS

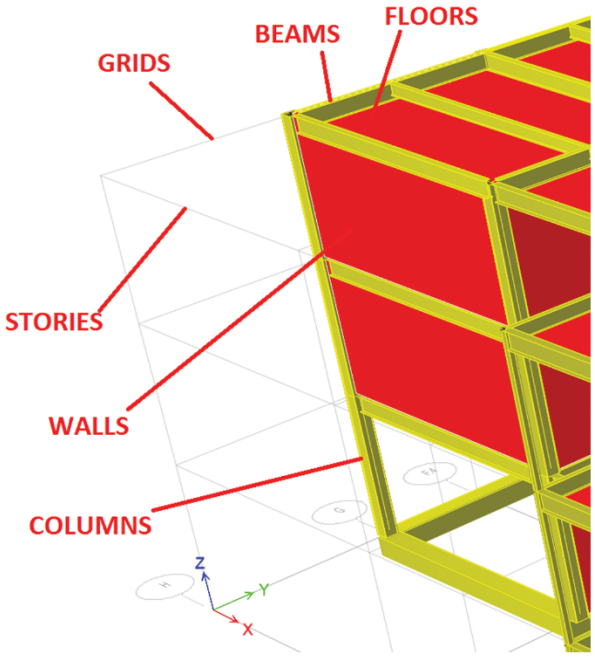
A USER GIVEN LABEL (NOT UNIQUE)

A UNIQUE NAME SIM TO REVIT ELEMENT ID

OBJECT DATA SIM TO REVIT PARAMETERS



ETABS ANATOMY



NOTES

NOTES: THERE ARE ONLY 3 MAIN ELEMENTS IN ETABS WITH SUB CATEGORIES

1. FRAMES MAKE UP COLUMNS, BEAMS, BRACES ETC
2. JOINTS MAKE UP NODES
3. AREAS MAKE UP SLABS AND WALLS

GET ALL FRAME NAMES IN ETABS USING DYNAMO USING ETABS API AND ZERO TOUCH C#

ZERO TOUCH C# API ETABS CODE

```
using System.Text;
using System.Threading.Tasks;
using Autodesk.DesignScript.Runtime;
using System.Reflection;
using Autodesk.DesignScript.Geometry;
using DocumentFormat.OpenXml.Packaging;
using DocumentFormat.OpenXml.Wordprocessing;
using ETABS2016;

namespace ETABS_SIMPLE
{
    public class ETABS
    {
        private ETABS()
        {
        }

        public static string[] Get_All_Frame_Names()
        {
            ETABS2016.cSapModel MyETABSModelThatisOpen;
            ETABS2016.cOAPI myETABSObject = null;
            myETABSObject = (ETABS2016.cOAPI)System.Runtime.InteropServices.Marshal.GetActiveObject("CSI.ETABS.API.ETABSObject");
            MyETABSModelThatisOpen = myETABSObject.SapModel;

            int NumNames = 0;
            string[] AllNamesArray = new string[1];


            MyETABSModelThatisOpen.FrameObj.GetNameList(ref NumNames, ref AllNamesArray);


            return AllNamesArray;
        }

    }
}
```

folder

does not create instance of class

name of node

this block of code looks at open ETABS file

input ports (none here)

sets place holder values

this method gets the frames

sends to output port

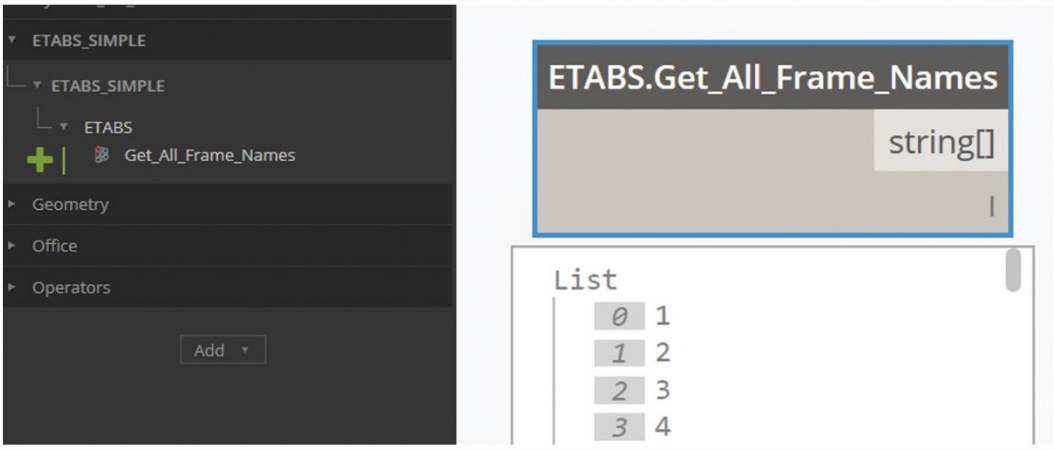
API MANUAL

Retrieves the names of all defined frame objects.

Namespace: ETABS2016
Assembly: ETABS2016 (in ETABS2016.dll) Version: 16.0.0.0 (16.0.0.0)

```
C#
int GetNameList(
        ref int NumberNames,
        ref string[] MyName
)
```

DYNAMO NODE



STEPS & NOTES

STEP 1: OPEN ETABS AND OPEN DYNAMO FOR REVIT OPEN ETABS FILE “ETABS_SAMPLE_START”
STEP 2: COMPILE THE CODE AND ADD THE .DLL TO DYNAMO
NOTE: “REF” IN THE ETABS API MANUAL MEANS OUTPUT REST MEAN INPUT

GET ALL FRAME NAMES IN ETABS USING DYNAMO USING ETABS API AND ZERO TOUCH C#

ZERO TOUCH C# API ETABS CODE

```
public static  ETABS2016.cSapModel        GetNameList()
{
                                SapModelObject; UseExistingInstance();
    ETABS2016.cOAPI myETABSObject = null;
    //attach to a running instance of ETABS

    myETABSObject =
    //create SapModel object
                    = myETABSObject.SapModel;
    int NumberNames = 0;
    string[] MyName = new string[0];
          SapModelObject.FrameObj.GetNameList(ref NumberNames, ref MyName);
    Dictionary<string, object> OutVars = new Dictionary<string, object>();


    return SapModelObject
}
```

CREATES A DICTIONARY FOR OUTPUT PORTS

STARTS THE METHOD
NOTE: NAME OF METHOD IS NAME OF NODE

(ZERO TOUCH IS A SPECIFIC FORMAT

(sets initial value place holder values)

METHOD GETS FRAME NAMES

OUTPUTS VALUES TO OUTPUT PORTS

RETURNS VARIABLES

ETABS API MANUAL

cFrameObj.GetNameList Method

Retrieves the names of all defined frame objects.

Namespace: ETABS2016
Assembly: ETABS2016 (in ETABS2016.dll) Version: 16.0.0.0 (16.0.0.0)

C#

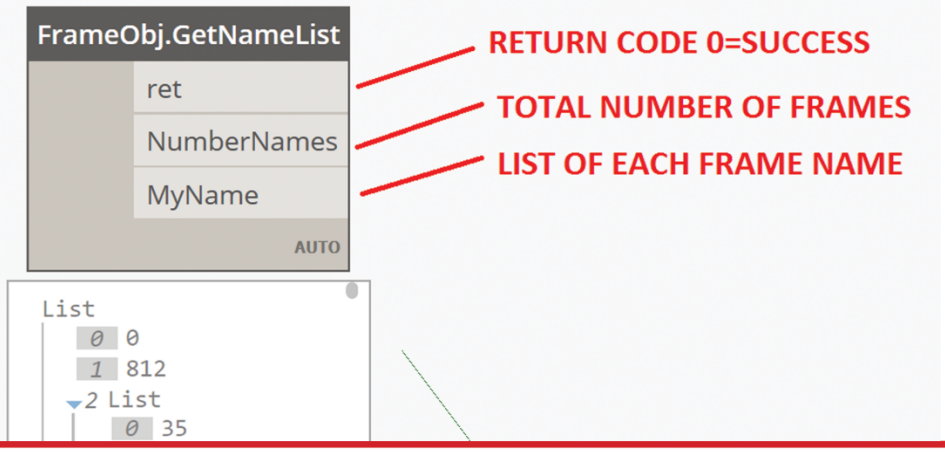
```
int GetNameList(
    ref int NumberNames,
    ref string[] MyName
)
```

INPUT IF THERE

STRING NAME,

OUTPUT

DYNAMO NODE



RETURN CODE 0=SUCCESS

TOTAL NUMBER OF FRAMES

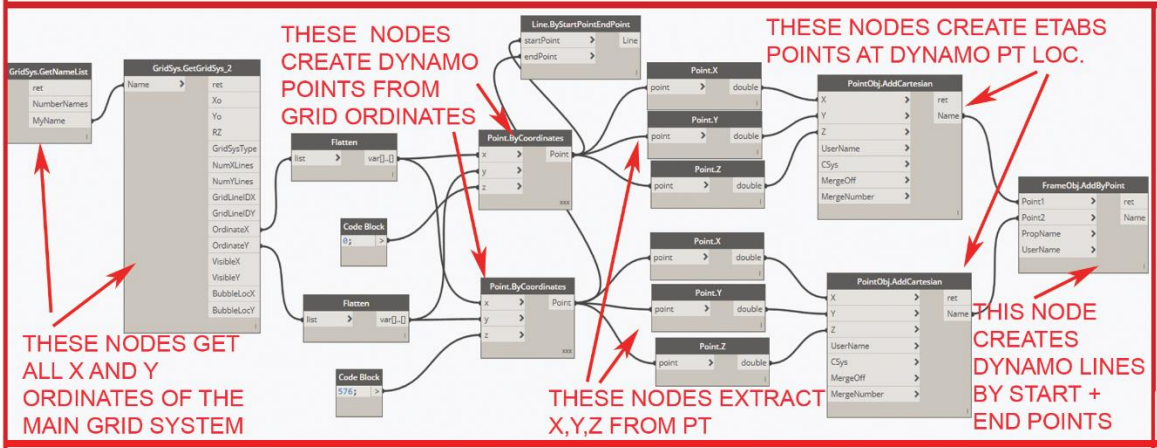
LIST OF EACH FRAME NAME

STEPS & NOTES

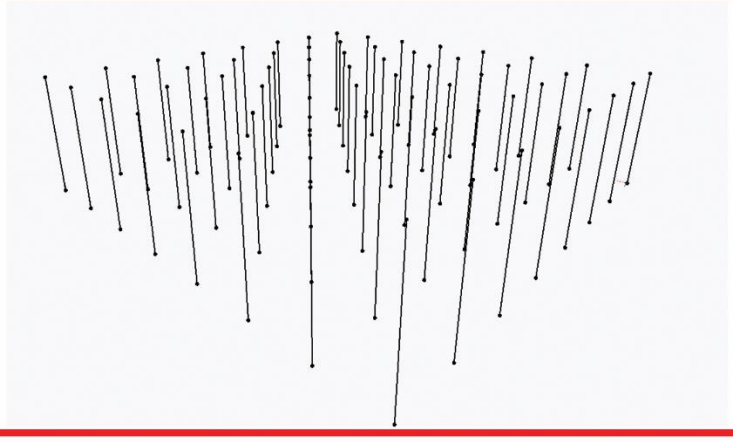
STEP 1: OPEN ETABS AND OPEN DYNAMO FOR REVIT OPEN ETABS FILE “ETABS_SAMPLE_START”
STEP 2: COMPILE THE CODE AND ADD THE .DLL TO DYNAMO
NOTE: “REF” IN THE ETABS API MANUAL MEANS OUTPUT REST MEAN INPUT

ETABS CREATE COLUMNS

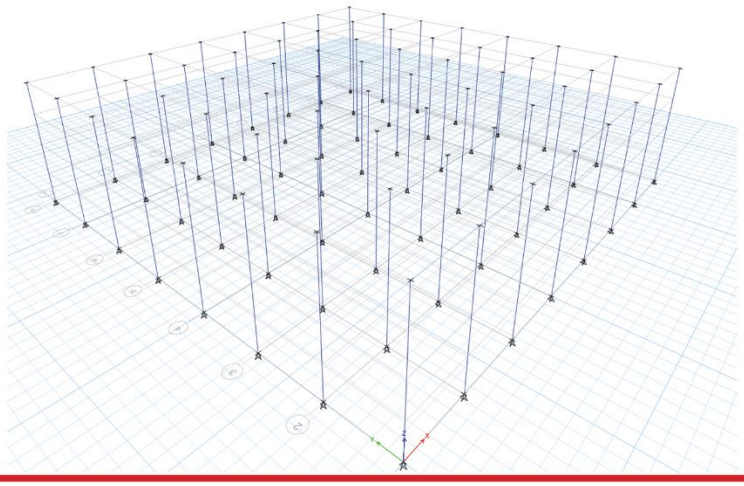
DYNAMO NODES



DYNAMO GEOMETRY



ETABS GEOMETRY



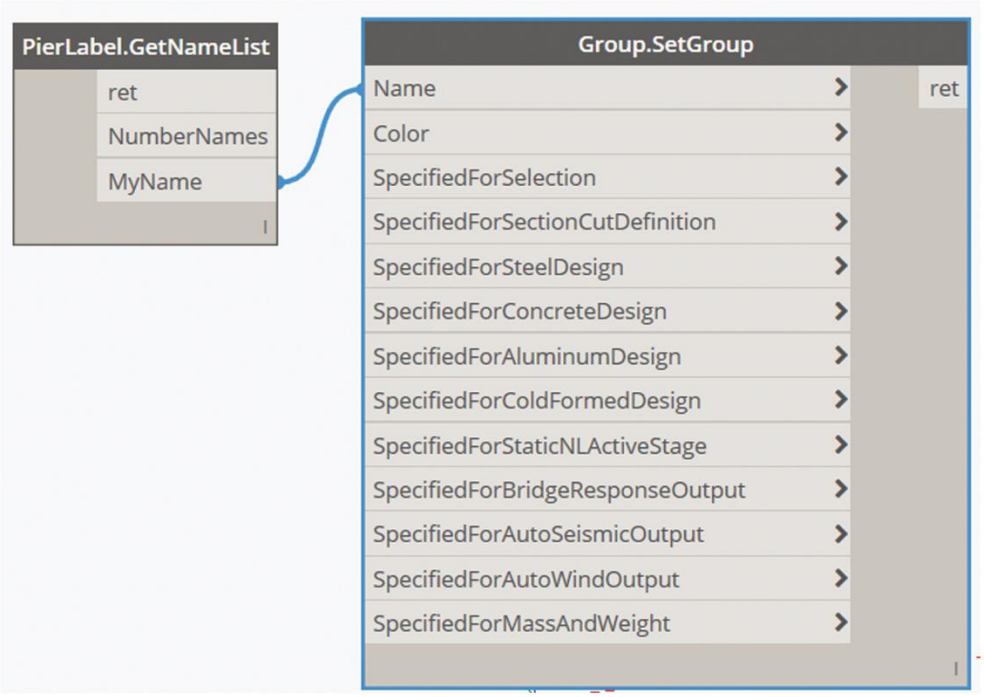
STEPS & NOTES

STEPS: 1. OPEN ANY ETABS MODEL "ETABS CREATE COLUMNS.EDB" OPEN DYNAMO
2. OPEN ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL-
2. DYNAMO POINTS ARE USING CROSS LACING AND DYNAMO LINES CREATED FOR VIZ

CREATE EMPTY GROUPS FROM PIER LABELS FINAL

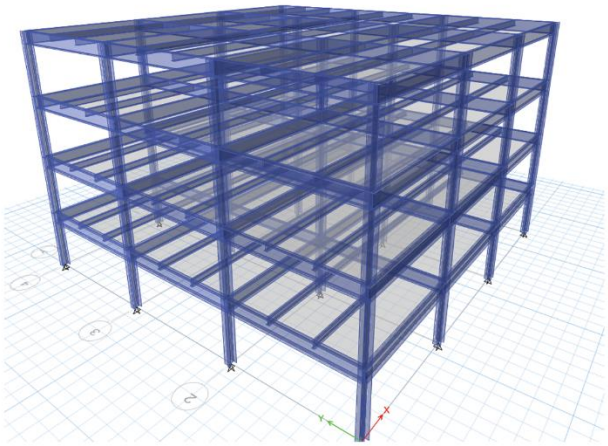
DYNAMO NODES



GETS ALL THE PIER NAMES FROM THE ETABS MODEL

SETS (CREATES) EMPTY GROUPS IN ETABS WITH INPUT PIER NAMES

ETABS GEOMETRY



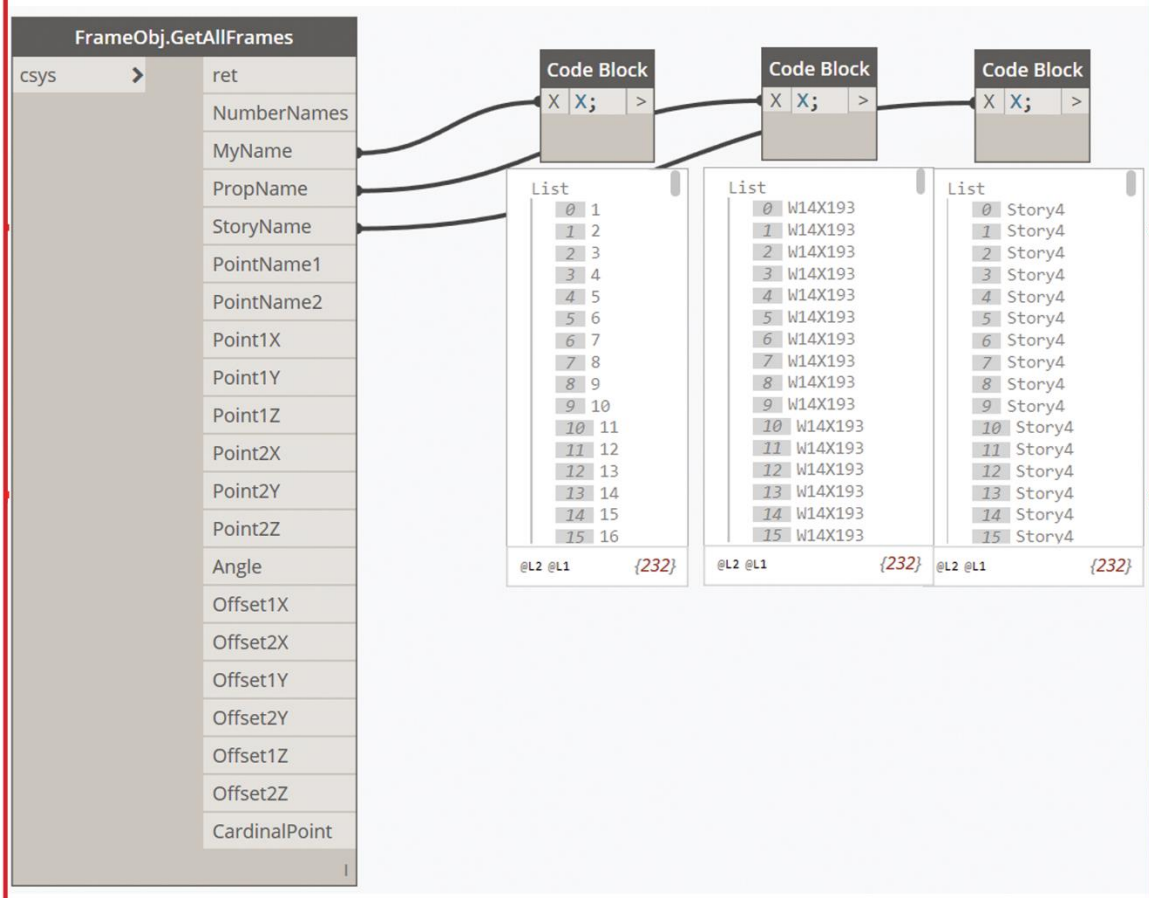
STEPS & NOTES

STEPS: 1. OPEN ETABS MODEL "ETABS_CREATE_EMPTY_GROUPS_FROM_PIER_LABELS_START"
2. ADD THE NODES ABOVE IN DYNAMO

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL-
2. REST OF INPUT FOR SET GROUP ARE DEFAULT AND NEED NO INPUT

ETABS GET STORY ON FRAMES

DYNAMO NODES



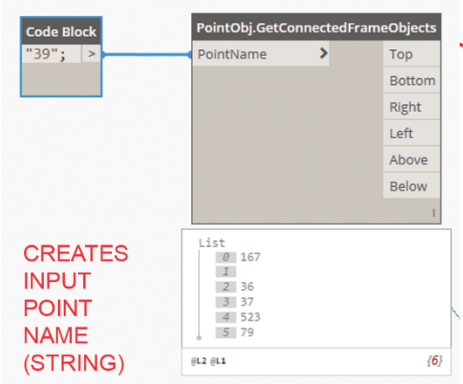
STEPS & NOTES

STEPS: 1. OPEN ETABS AND START A NEW PROJECT. AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL

GET ETABS FRAMES AROUND POINTS

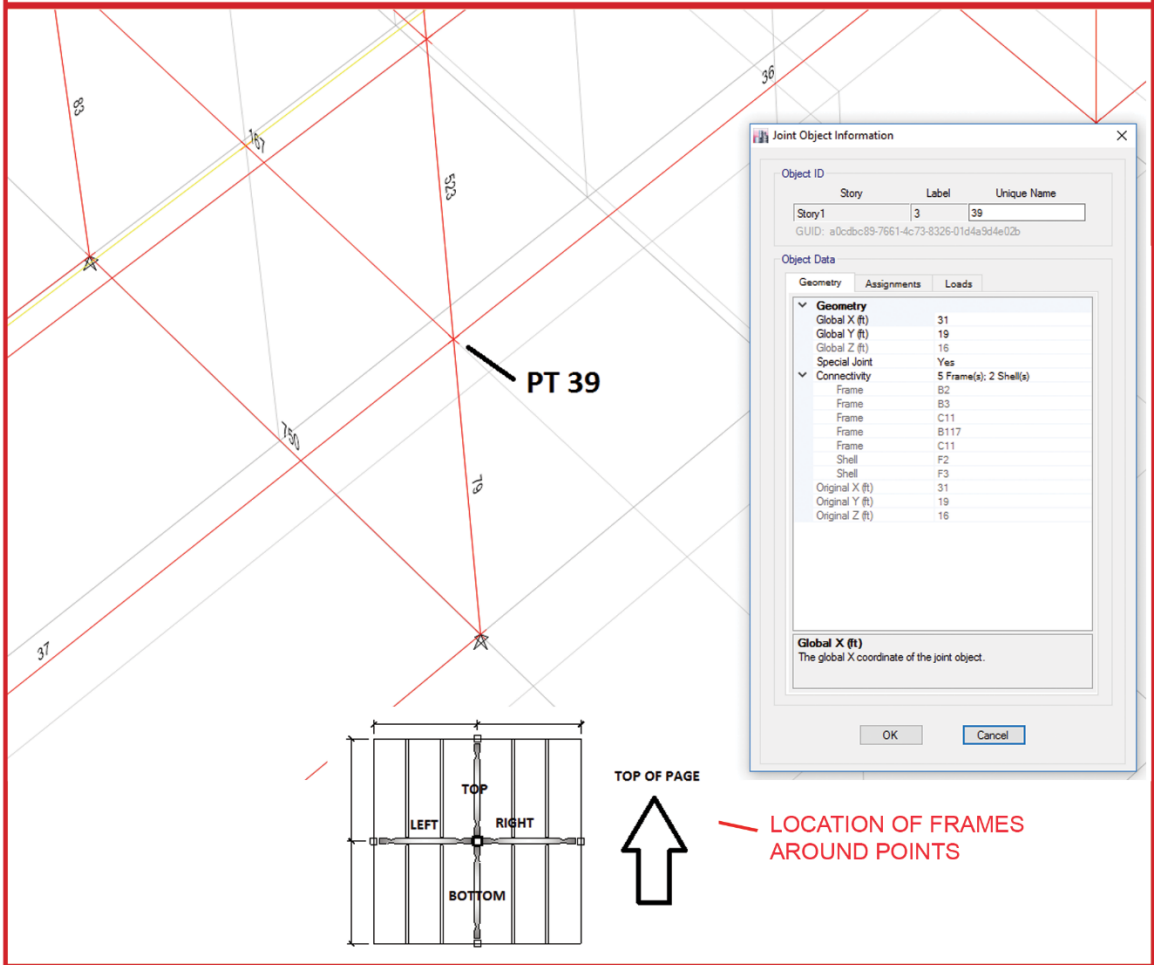
DYNAMO NODES



GETS CONNECTED FRAMES FROM INPUT POINT (FRAMES MUST BE ORTHO TO POINT)

CREATES INPUT POINT NAME (STRING)

ETABS GEOMETRY



TOP OF PAGE

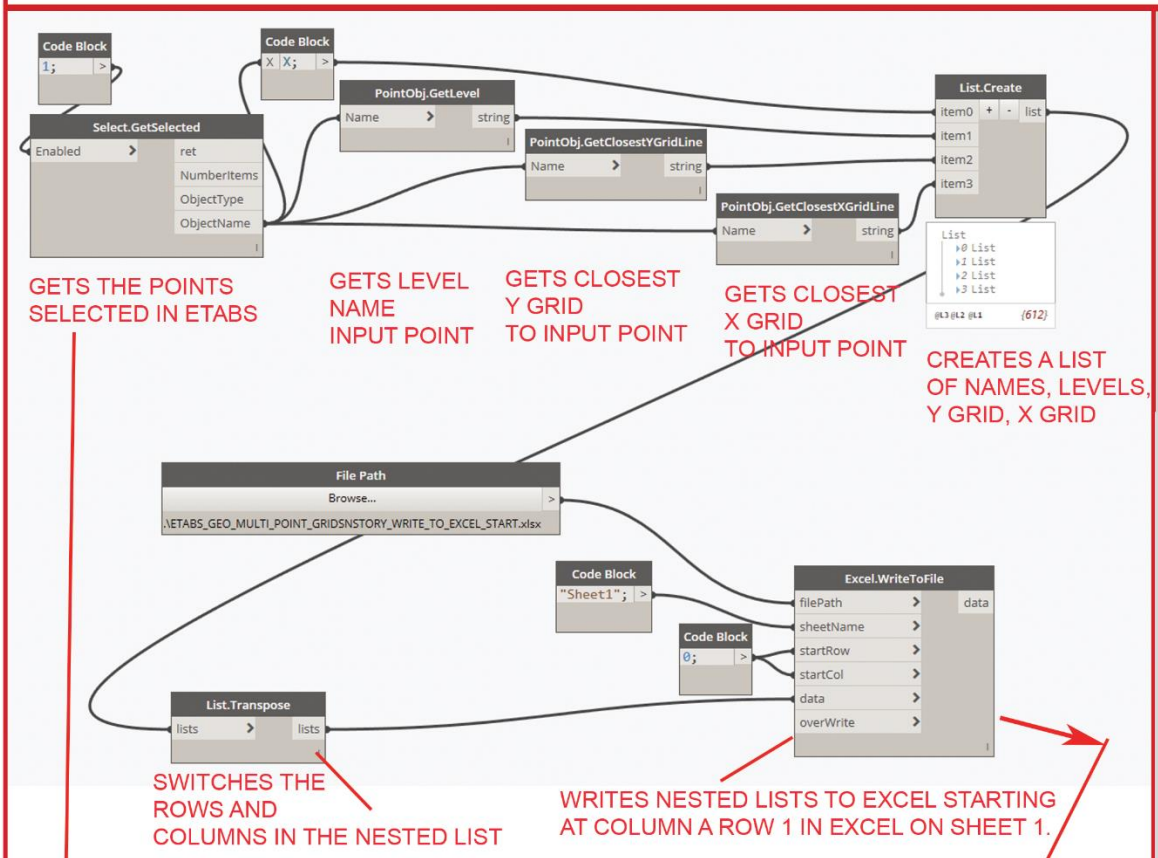
LOCATION OF FRAMES AROUND POINTS

STEPS & NOTES

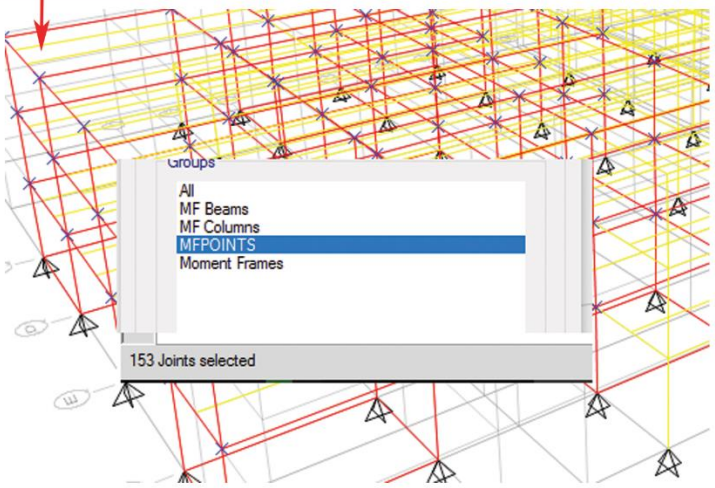
STEPS: 1. OPEN ETABS AND START A NEW PROJECT. AND OPEN DYNAMO
2. ADD THE NODES ABOVE

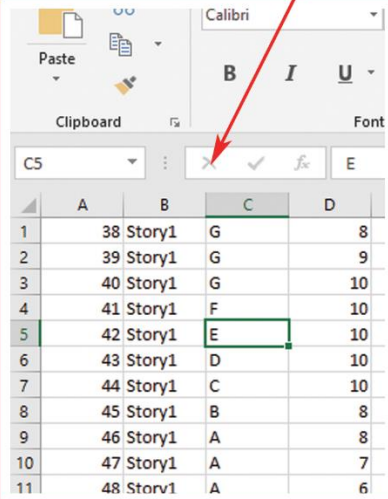
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL
2. ONLY BEAMS ORTHO TO POINT WILL DISPLAY

GETS ETABS GRID AND STORY INFO FROM PTS AND WRITE TO EXCEL



DYNAMO NODES





ETABS GEOMETRY AND EXCEL

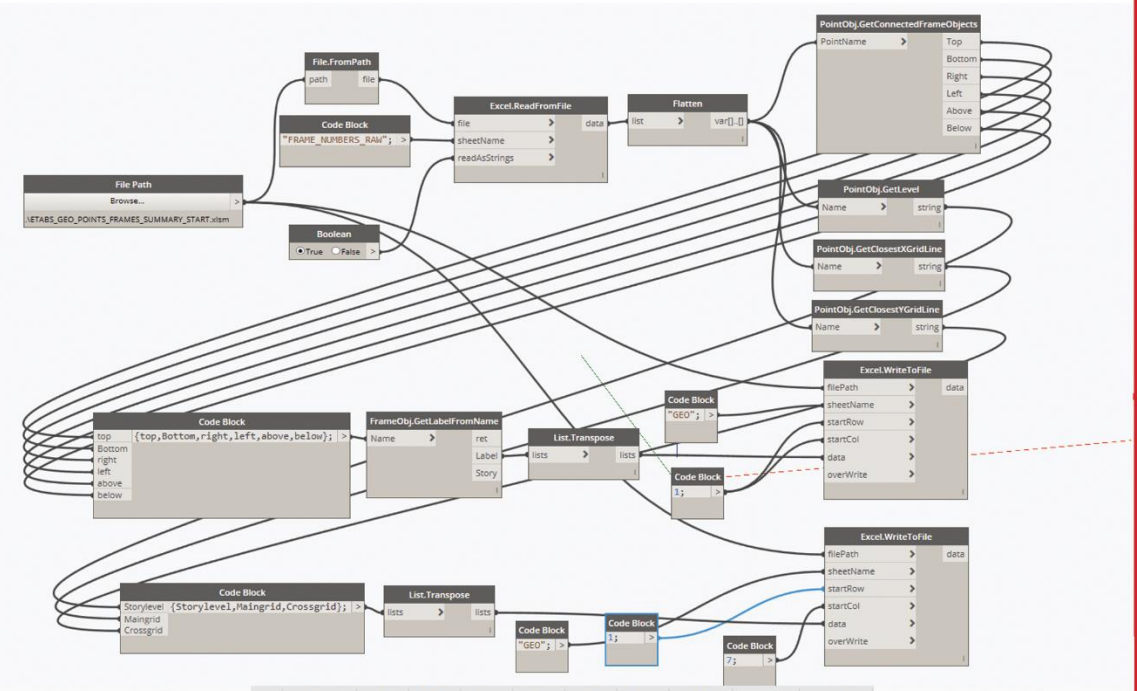
STEPS: 1. OPEN "ETABS_GEO_MULTI_POINT_GRIDSNSTORY_WRITE_TO_EXCEL_FINAL.EDB"
2. OPEN DYNAMO AND ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL
2. THERE ARE MANY WAYS TO SELECT PS AND GET PT NAMES (1 METHOD SHOWN)

STEPS & NOTES

GET ETABS GEO DATA FOR FRAMES AROUND PTS READS AND WRITES TO EXCEL

DYNAMO NODES



ETABS GEOMETRY AND EXCEL RESULTS

	A	B	C	D	E	F	G	H	I	J
1	Unique ID	Top Beam ID	Bottom Beam ID	Right Beam ID	Left Beam ID	Column ID Above	Column ID Below	Story Below Joint	Main Grid	Cross Grid
2	169	B20	B21		B69		C55	Story3	1	C
3	170	B21	B22		B62		C46	Story3	1	D
4	171	B22	B23		B51		C36	Story3	1	E
5	172	B23	B24		B53		C26	Story3	1	F
6	173	B24			B25		C24	Story3	1	G
7	75		B105	B19	B18		C60	Story3	2	B
8	307	B105	B104	B69	B68		C54	Story3	2	C
9	265	B104	B103	B62	B61		C45	Story3	2	D
10	249	B103	B102	B51	B50		C35	Story3	2	E
11	225	B102	B8	B53	B52		C25	Story3	2	F
12	174	B8		B25	B26		C23	Story3	2	G
13	73		B100	B18	B152		C59	Story3	3	B
14	306	B100	B99	B68	B67		C53	Story3	3	C
15	262	B99	B98	B61	B60		C44	Story3	3	D
16	246	B98	B97	B50	B49		C34	Story3	3	E
17	188	B97	B27	B52	B28		C21	Story3	3	F
18	187	B27		B26			C22	Story3	3	G
19	34		B14		B13		C64	Story3	6	A
20	35	B14	B88		B71		C58	Story3	6	B
21	33		B84	B13	B12		C63	Story3	7	A
22	308	B84	B83	B71	B70		C57	Story3	7	B
23	266	B83	B82	B64	B63		C50	Story3	7	C
24	196	B80	B32	B31	B42		C17	Story3	7	F
25	213	B32	B33		B39		C13	Story3	7	G
26	32		B11	B12			C62	Story3	8	A

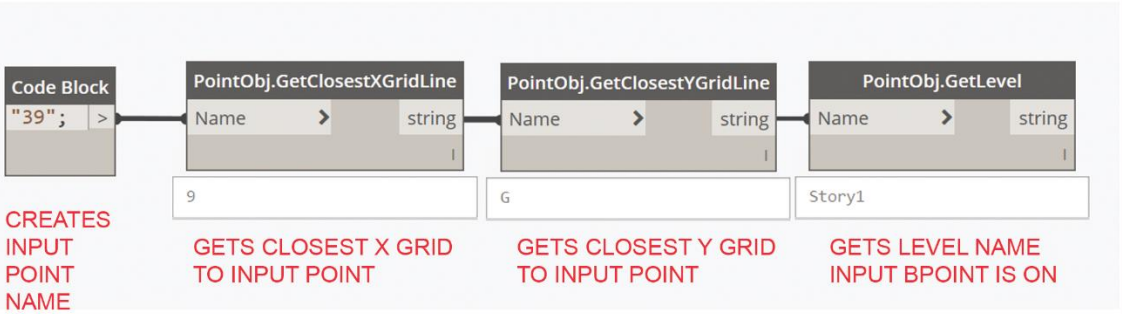
STEPS & NOTES

STEPS: 1. OPEN E"ETABS_GEO_POINTS_FRAMES_SUMMARY". AND OPEN DYNAMO
2. ADD NODES - ADD EXCEL "ETABS_GEO_POINTS_FRAMES_SUMMARY_START" TO DYN.

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL
2. ONLY ORTHO GRIDS FROM DEFINED SYSTEMS SHOWN (SINGLE GRIDS NOT INCLUDED)

GET ETABS ORTHO GRIDS AND LEVEL FROM FROM SINGLE PT

DYNAMO NODES



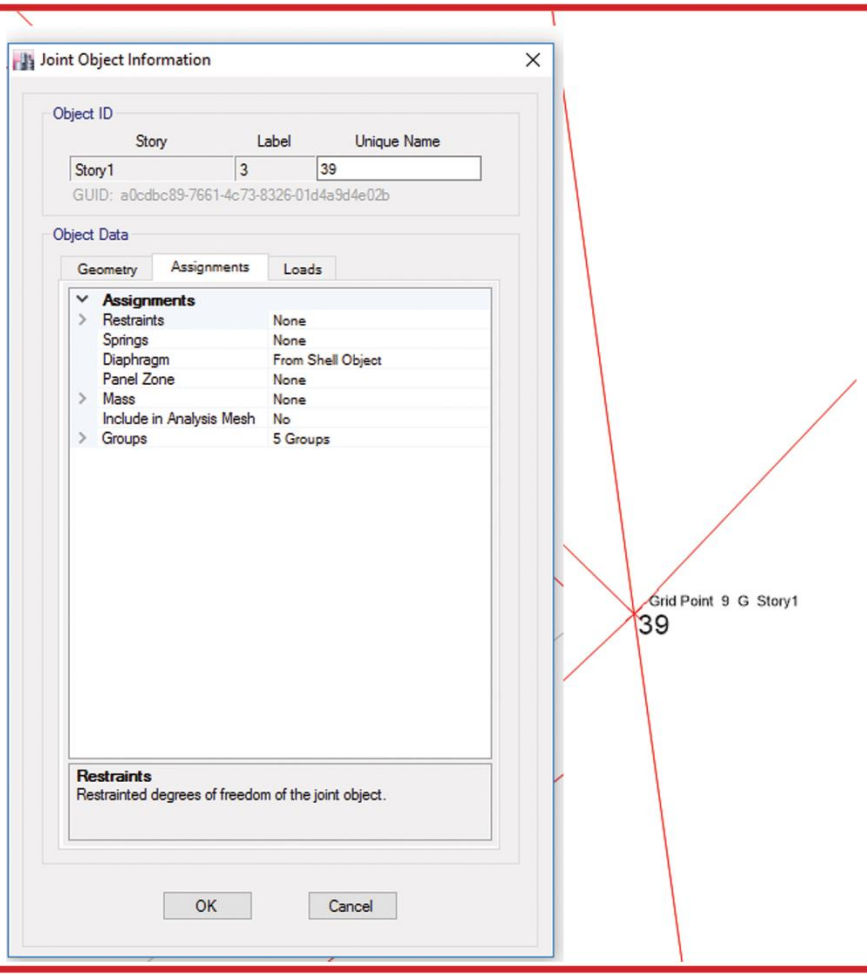
CREATES INPUT POINT NAME (STRING)

GETS CLOSEST X GRID TO INPUT POINT

GETS CLOSEST Y GRID TO INPUT POINT

GETS LEVEL NAME INPUT BPOINT IS ON

ETABS GEOMETRY



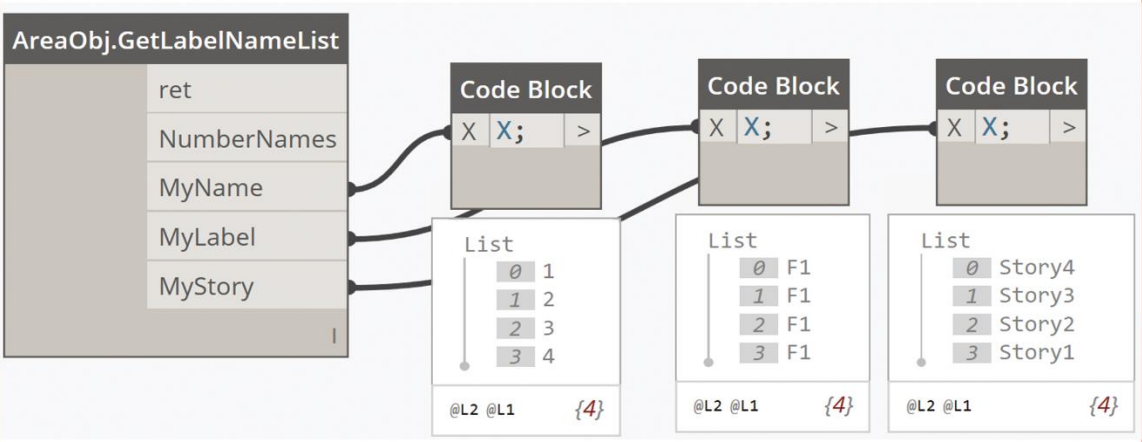
STEPS & NOTES

STEPS: 1. OPEN ETABS AND START A NEW PROJECT. AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL
2. ONLY ORTHO GRIDS FROM DEFINED SYSTEMS SHOWN (SINGLE GRIDS NOT INCLUDED)

ETABS GET STORY ON WALLS

DYNAMO NODES



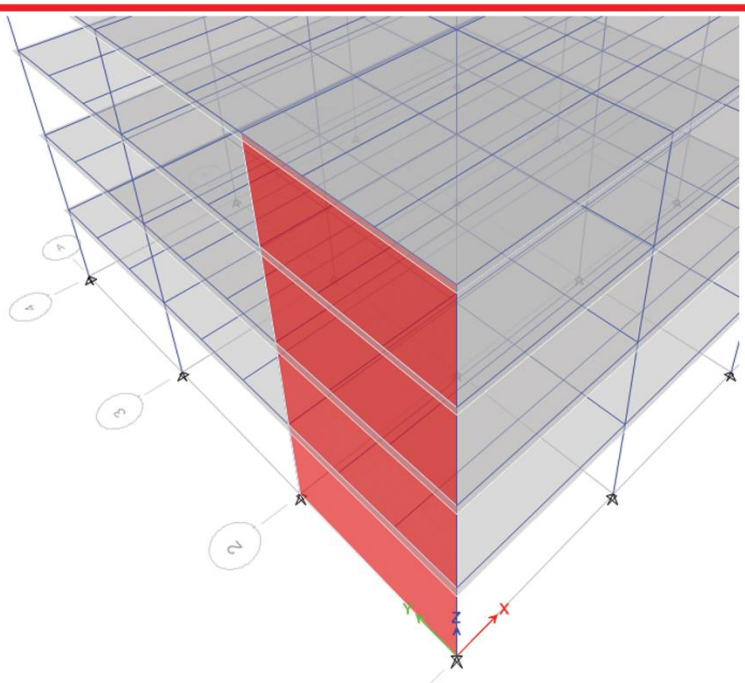
GETS ALL WALL LABELS AND NAMES AND STORIES THAT WALL IS ON IN ETABS

WALL NAMES

WALL LABEL

WALL STORY

ETABS GEOMETRY



STEPS & NOTES

STEPS: 1. OPEN ETABS AND START A NEW PROJECT OR OPEN PROJECT . AND OPEN DYNAMO
2. ADD THE NODES ABOVE

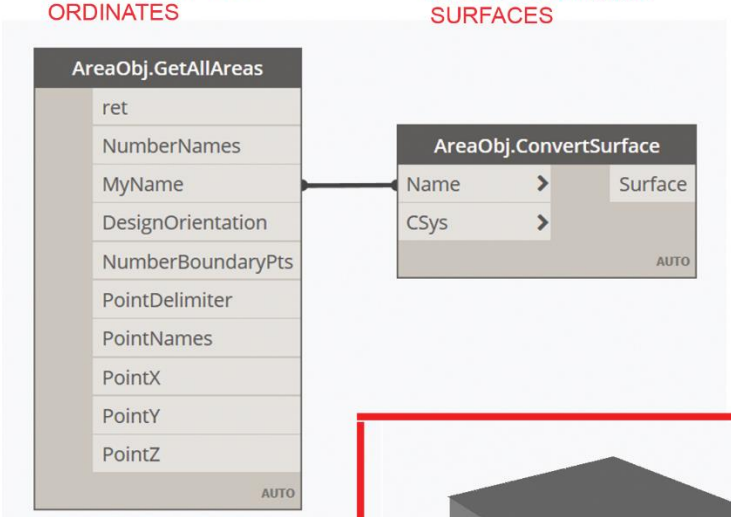
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL

ETABS GET ALL AREAS AS SURFACES IN DYNAMO

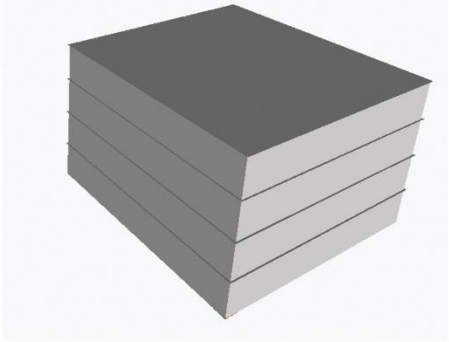
DYNAMO NODES

GETS ALL THE AREA NAMES AND PT CO-ORDINATES

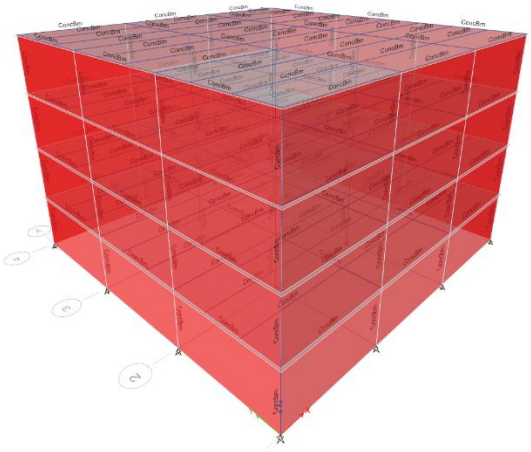
CONVERTS ETABS AREAS TO DYNAMO SURFACES



DYNAMO GEOMETRY



ETABS GEOMETRY



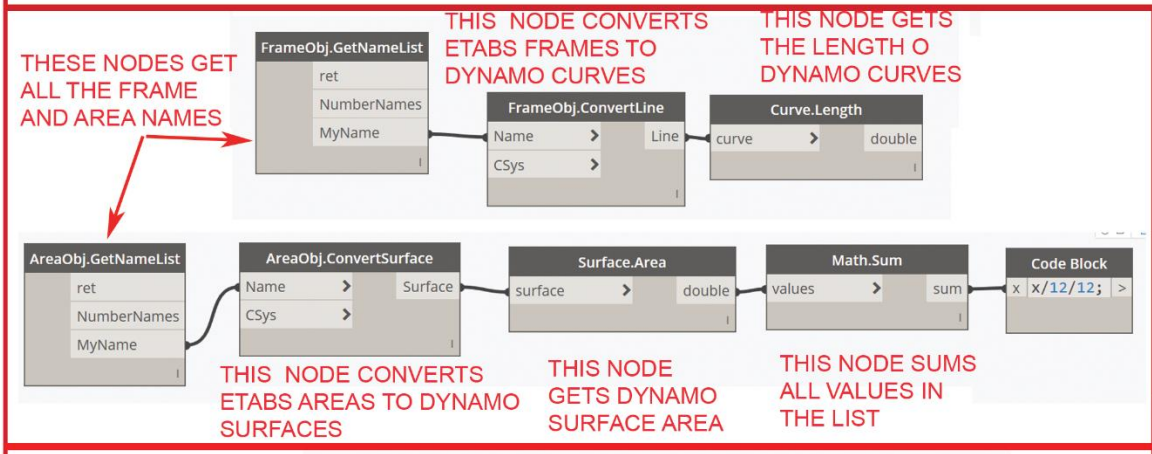
STEPS & NOTES

STEPS: 1. OPEN ETABS MODEL "ETABS_GET_AREAS_FINAL" AND OPEN DYNAMO
2. ADD THE NODES ABOVE

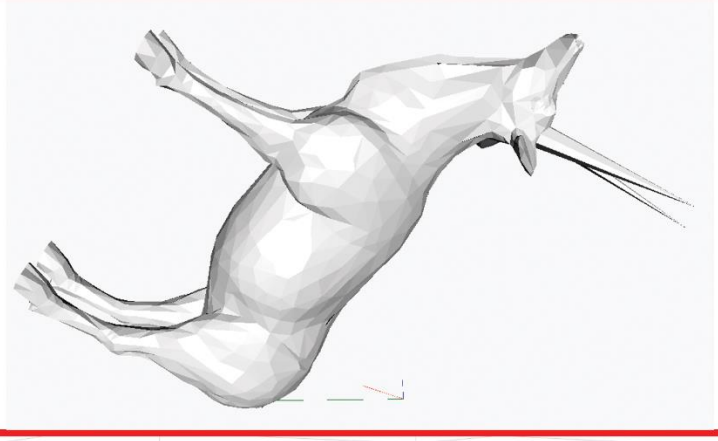
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READ NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OORB DYNAMO NODES TO HELP YOU

GET ETABS FRAME LENGTHS AND AREAS

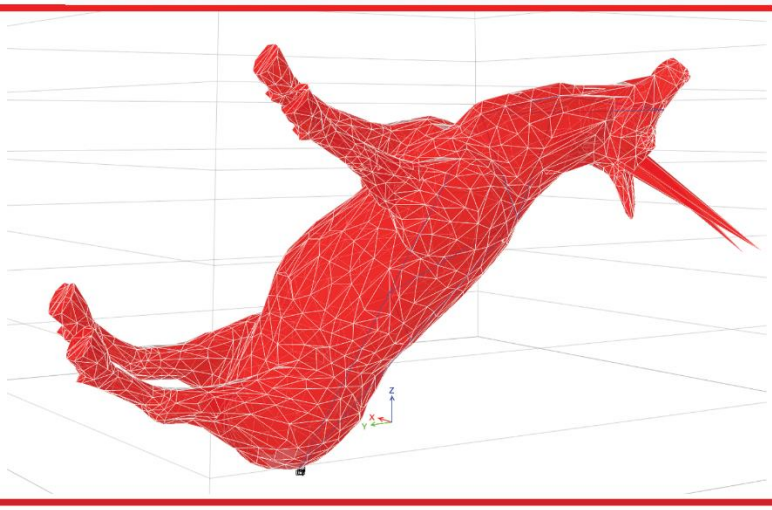
DYNAMO NODES



DYNAMO GEOMETRY



ETABS GEOMETRY



STEPS & NOTES

STEPS: 1. OPEN ANY ETABS MODEL “ETABS_GET_FRAME_AREA_LENGTHS_FINAL.EDB”
2. OPEN DYNAMO AND ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READ NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OOTB DYNAMO NODES TO HELP YOU

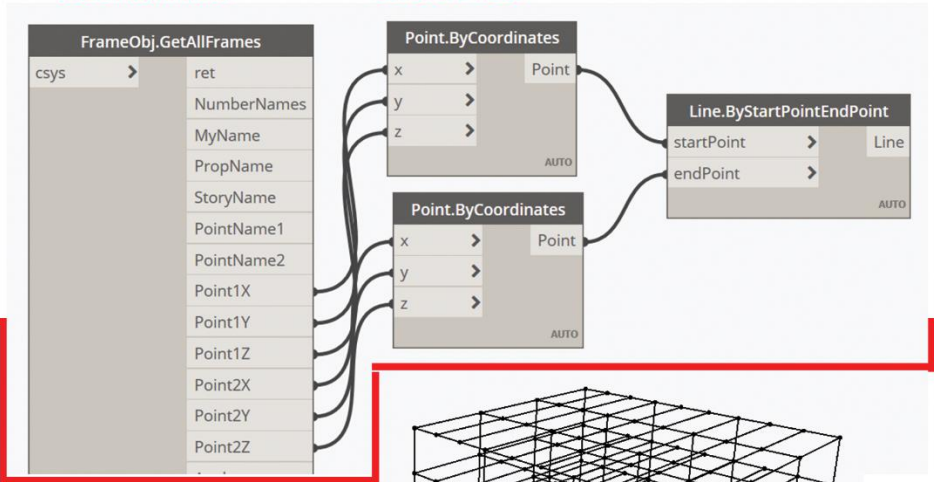
ETABS GET ALL FRAMES AS LINES IN DYNAMO

DYNAMO NODES

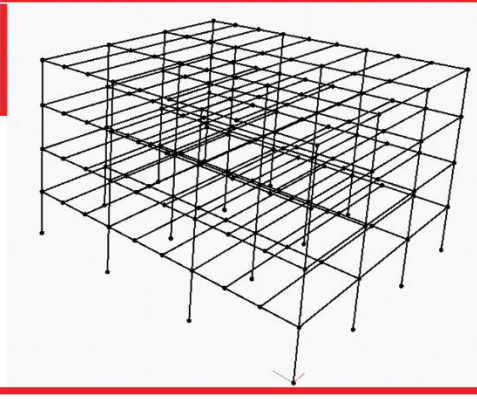
THIS NODE GETS ALL THE FRAMES AND NAMES AND PT COORDINATES

THIS NODE CREATES DYNAMO POINTS BY X,Y,Z COODINATES

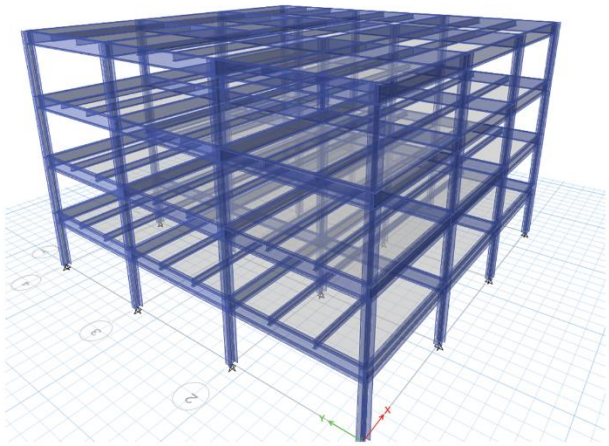
THIS NODE CREATES LINES BY START END POINTS



ETABS GEOMETRY



ETABS GEOMETRY



STEPS & NOTES

STEPS: 1. OPEN ETABS MODEL "ETABS_GET_FRAMES_FINAL" AND OPEN DYNAMO
2. ADD THE NODES ABOVE

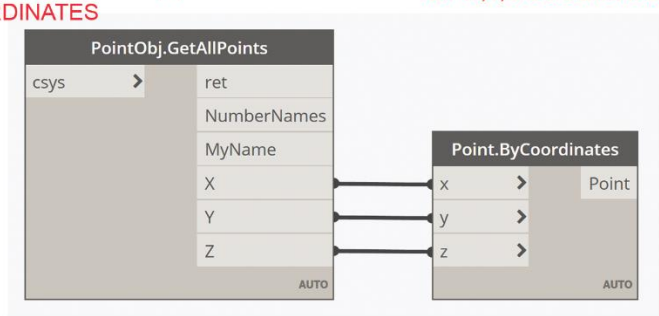
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READD NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OORB DYNAMO NODES TO HELP YOU

ETABS GET ALL POINTS

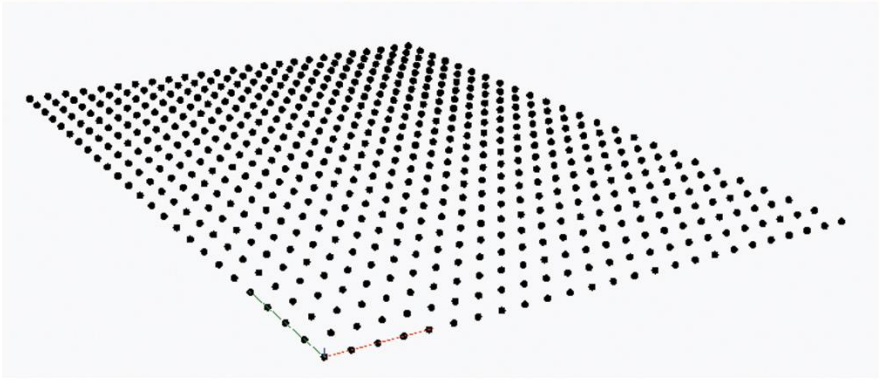
DYNAMO NODES

THIS NODE GETS ALL THE POINTS FROM THE ETABS MODEL AND OUT-PUTS NAMES AND X,Y,Z COORDINATES

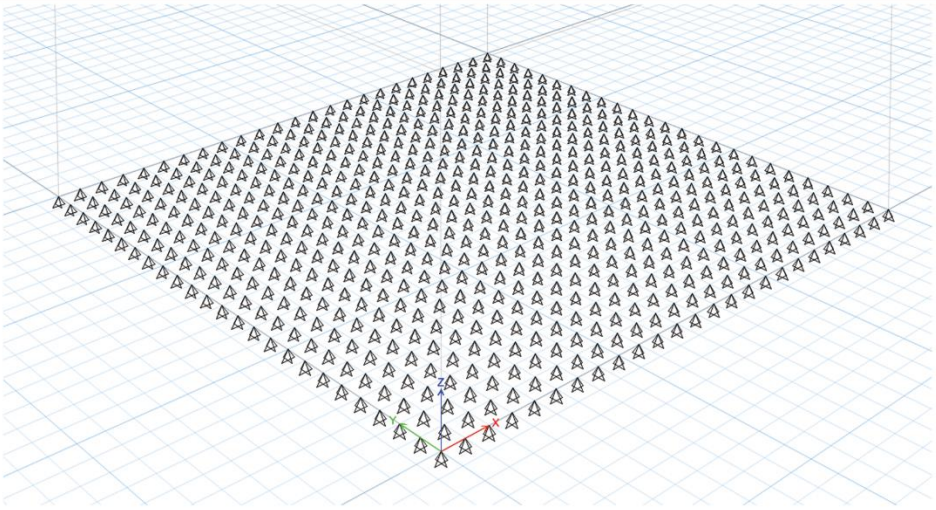
THIS OOTB DYNAMO NODE CREATES DYNAMO POINTS BY X,Y,Z COODINATES



ETABS GEOMETRY



ETABS GEOMETRY

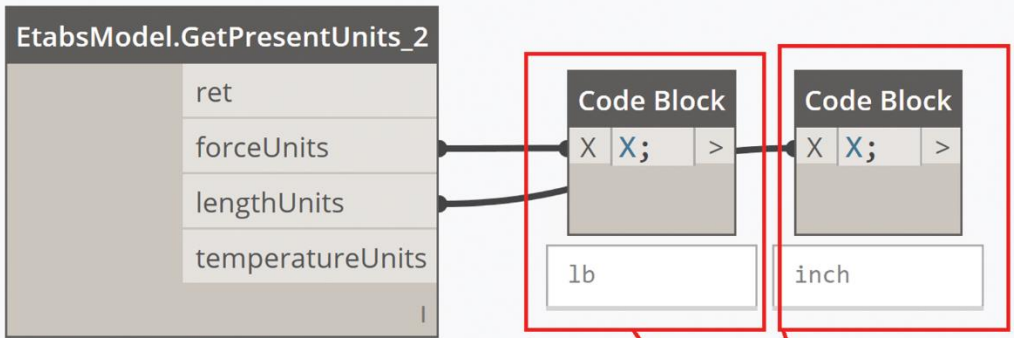


STEPS & NOTES

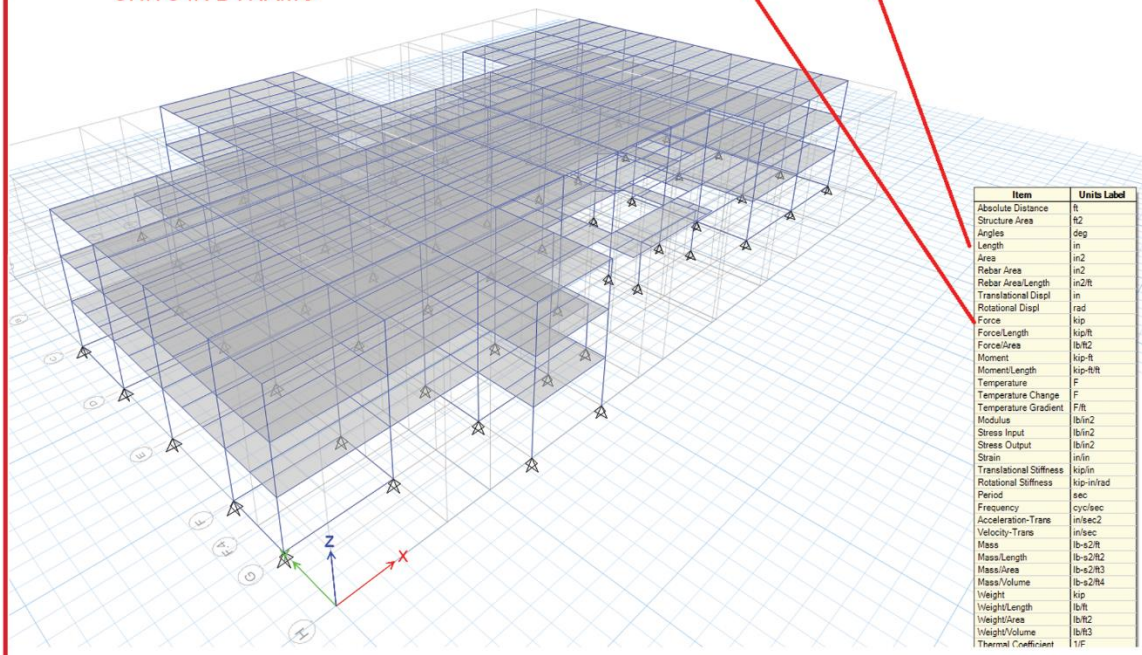
STEPS: 1. OPEN ETABS MODEL "ETABS_GET_POINTS_FINAL" AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READD NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OORB DYNAMO NODES TO HELP YOU

ETABS GET UNITS



GETS PRESENT
UNITS IN DYNAMO



Item	Units Label
Absolute Distance	ft
Structure Area	ft2
Angles	deg
Length	in
Area	in2
Rebar Area	in2
Rebar Area/Length	in2/ft
Translational Displ	in
Rotational Displ	rad
Force	kip
Force/Length	kip/ft
Force/Area	lb/ft2
Moment	kip-ft
Moment/Length	kip-ft/ft
Temperature	F
Temperature Change	F
Temperature Gradient	F/ft
Modulus	lb/in2
Stress Input	lb/in2
Stress Output	lb/in2
Strain	in/in
Translational Stiffness	kip/in
Rotational Stiffness	kip-in/rad
Period	sec
Frequency	cyc/sec
Acceleration-Trans	in/sec2
Velocity-Trans	in/sec
Mass	lb-s2/ft
Mass/Length	lb-s2/ft2
Mass/Area	lb-s2/ft3
Mass/Volume	lb-s2/ft4
Weight	kip
Weight/Length	lb/ft
Weight/Area	lb/ft2
Weight/Volume	lb/ft3
Thermal Coefficient	1/F

NOTE: PRESENT UNITS DYNAMO IS REPORTING
MAY NOT MATCH CURRENT UNITS
IN ETABS

ALWAYS CHECK
"PRESENT UNITS IN DYNAMO"
BEFORE VIEWING RESULTS

DYNAMO NODES AND ETABS MODEL

STEPS: 1. OPEN ETABS
2. AND OPEN DYNAMO AND ADD THE NODES ABOVE
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL ALSO SEE NOTES ABOVE
2. IF THE NODE DOES NOT UPDATE PLACE A NEW NODE ON CANVAS

STEPS & NOTES

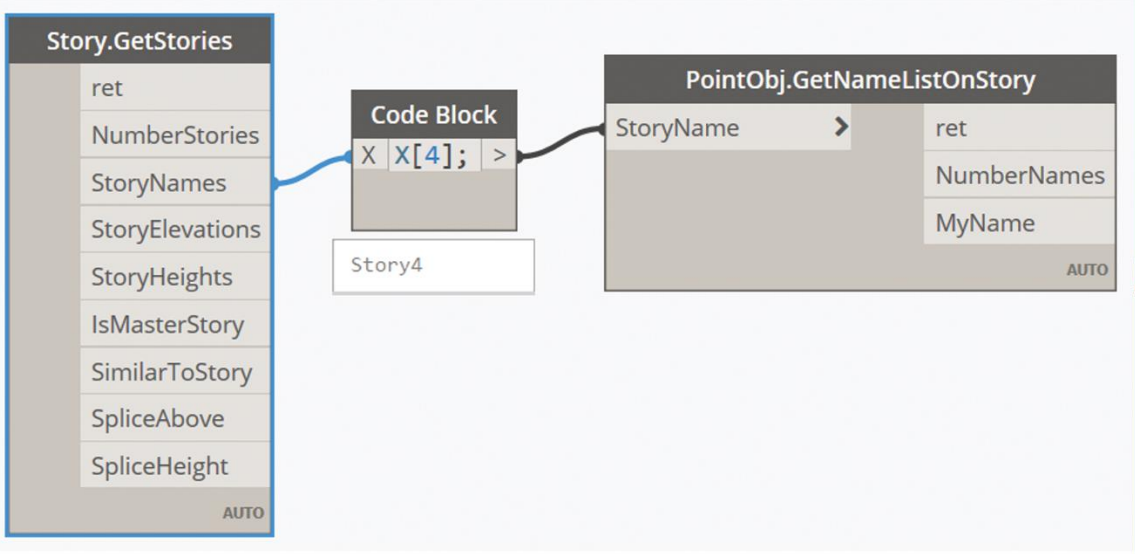
ETABS GET POINTS ON STORY

DYNAMO NODES

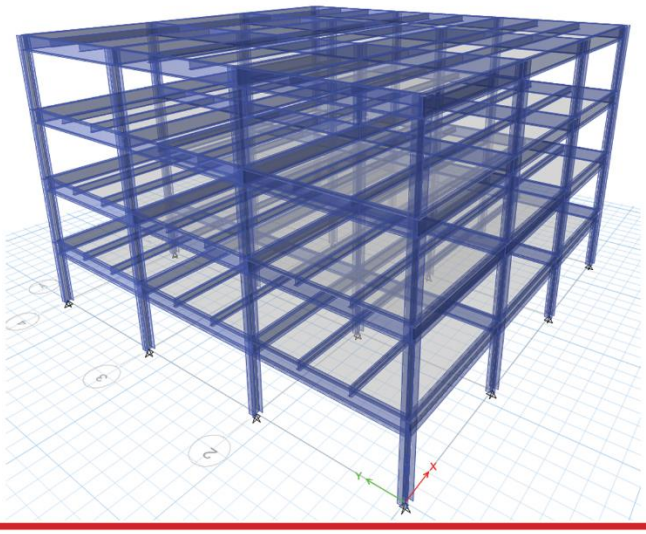
GETS STORY DATA FROM ETABS INCLUDING STORY NAMES

GETS A SINGLE STORY NAME FROM THE LIST

GETS THE POINT NAMES FROM SPECIFIED STORY NAME



ETABS GEOMETRY



STEPS & NOTES

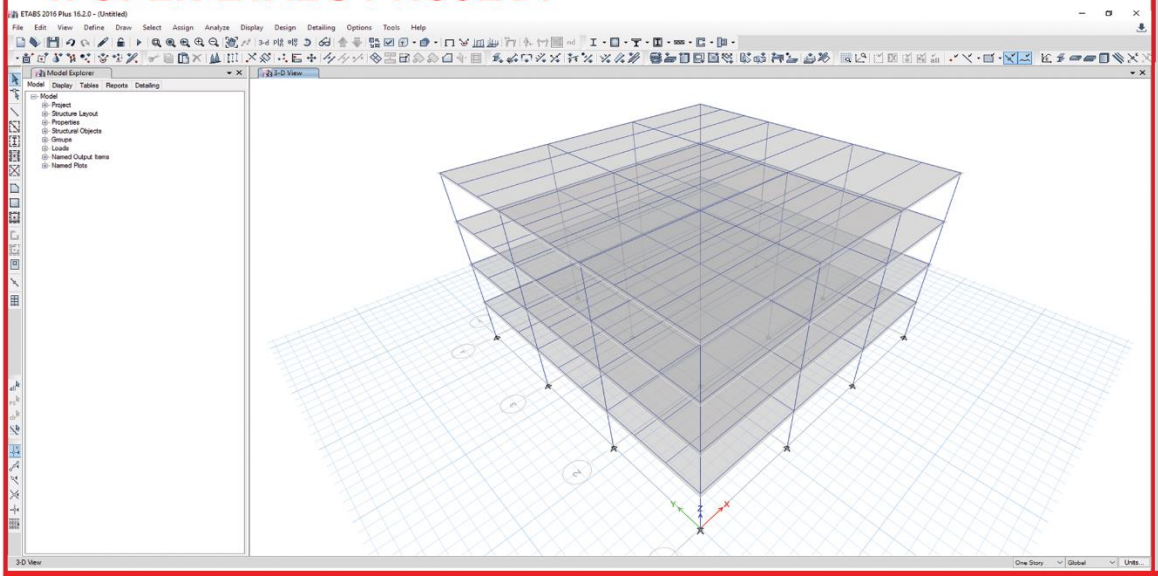
STEPS: 1. OPEN ETABS MODEL "ETABS_GET_POINTS_ON_STORY_FINAL" AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READD NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OORB DYNAMO NODES TO HELP YOU

AUTODESK UNIVERSITY

GETTING STARTED WITH DYNAMO FOR ETABS

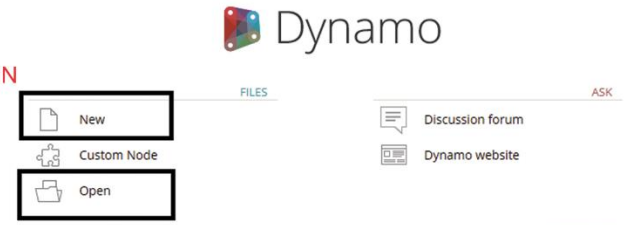
1. OPEN ETABS PROJECT



ETABS OPEN PROJECT

2. OPEN DYNAMO

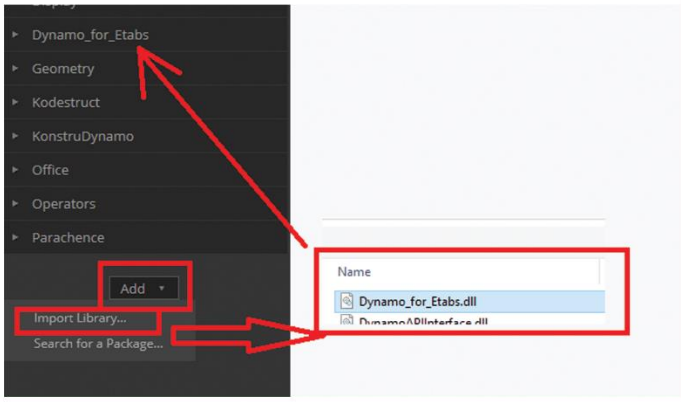
A. OPEN DYNAMO SANDBOX TYP. FOUND IN C:DYNAMO/DYNAMO REVIT
B. START A NEW PROJECT OR OPEN EXSITING PROJECT



DYNAMO

3. ADD DYNAMO FOR ETABS LIBRARY

A. CLICK “ADD” + “IMPORT LIBRARY”
B. BROWSE TO FILE “DYNAMO_FOR_ETABS.DLL (FILE IS TYP. IN SAME DIRECTORY AS DYNAMO SANDBOX PROGRAM
C. HAVE FUN USING DYNAMO FOR ETABS



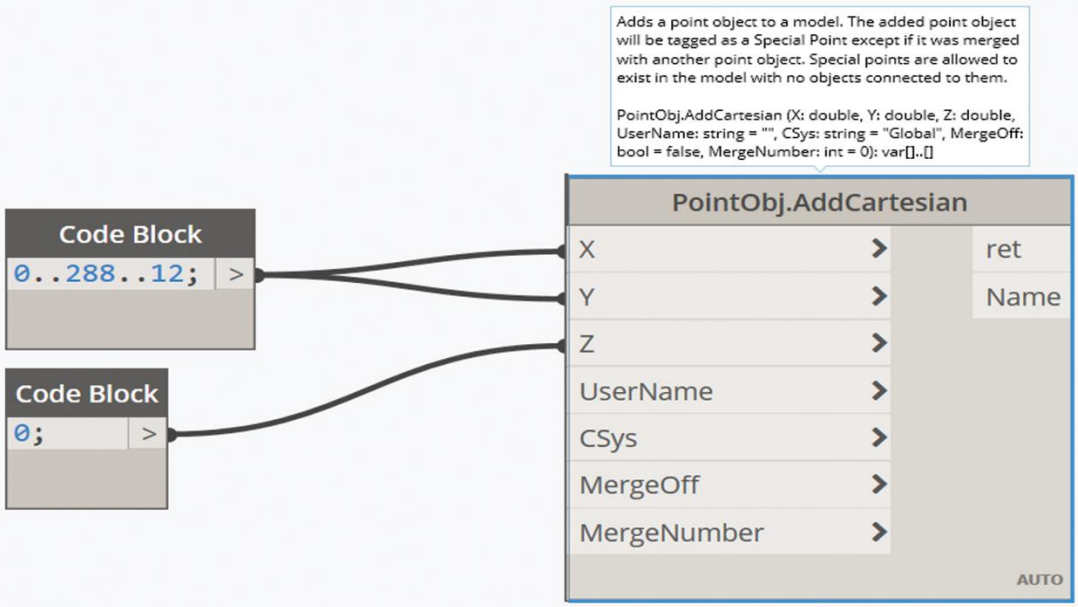
DYNAMO FOR ETABS

NOTES: ETABS MUST BE OPEN BEFORE DYNAMO
OPENING DYNAMO FROM REVIT IS ALSO ACCEPTABLE
SEE I.T. ADMIN IF .DLL COULD NOT BE LOADED OR FOUND
FIND ADDITIONAL DOCUMENTATION ON DYNAMO AT WWW.DYNAMOPRIMER.COM

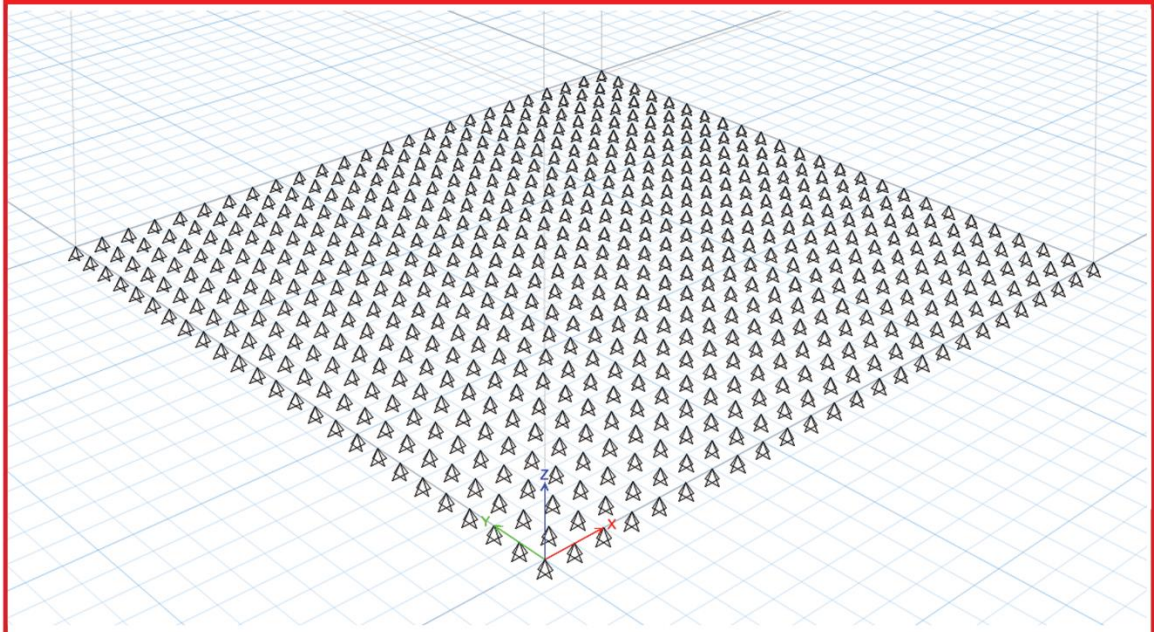
NOTES

ETABS POINTS

DYNAMO NODES



ETABS GEOMETRY

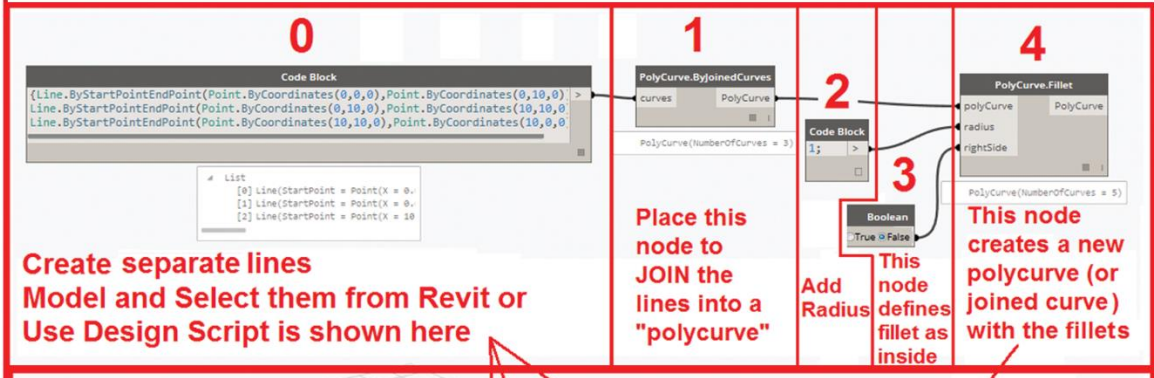


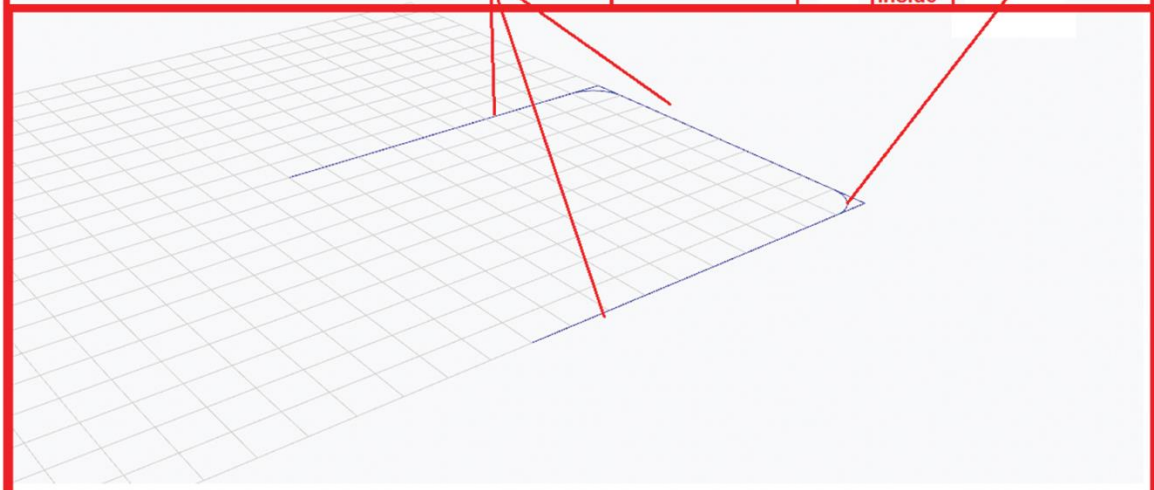
STEPS & NOTES

STEPS: 1. OPEN ETABS AND START A NEW PROJECT. AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL
2. IF THE NODE DOES NOT UPDATE PLACE A NEW NODE ON CANVAS

HOW DYNAMO SELECTS REVIT ELEMENTS

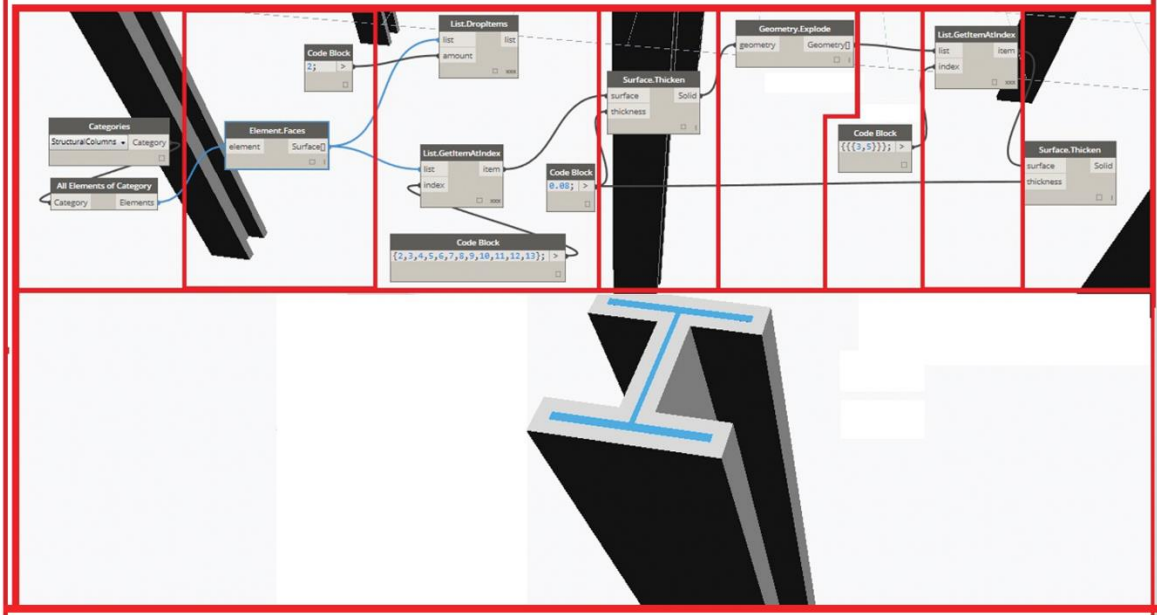




NOTES

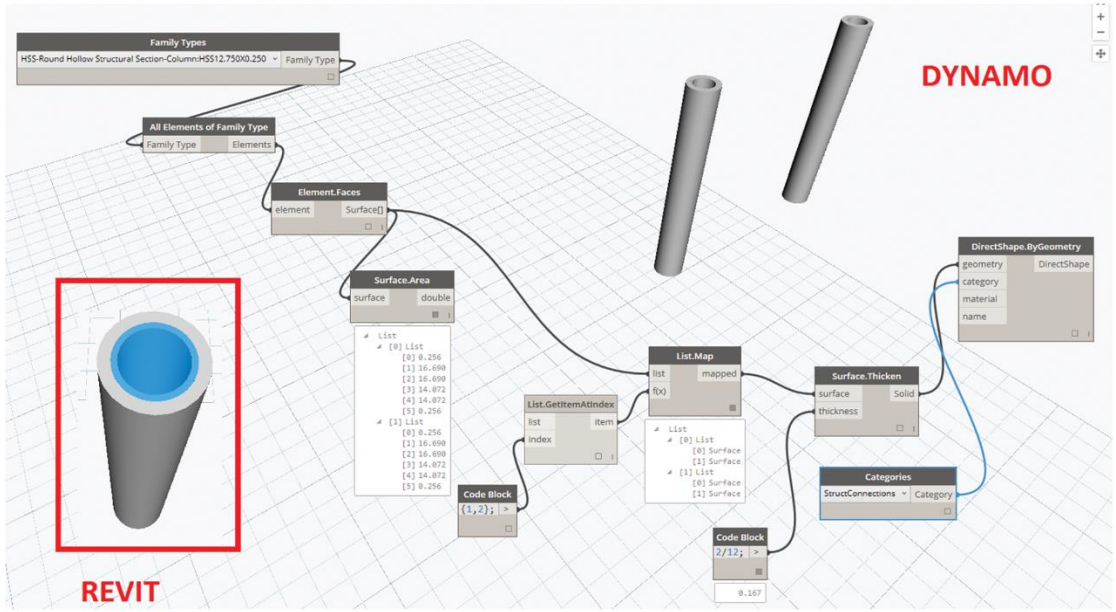
ADD FIREPROOFING TO WIDE FLANGE AND PIPE COLUMNS

WIDE FLANGE



DYNAMO GEOMETRY ONLY

PIPE COLUMN

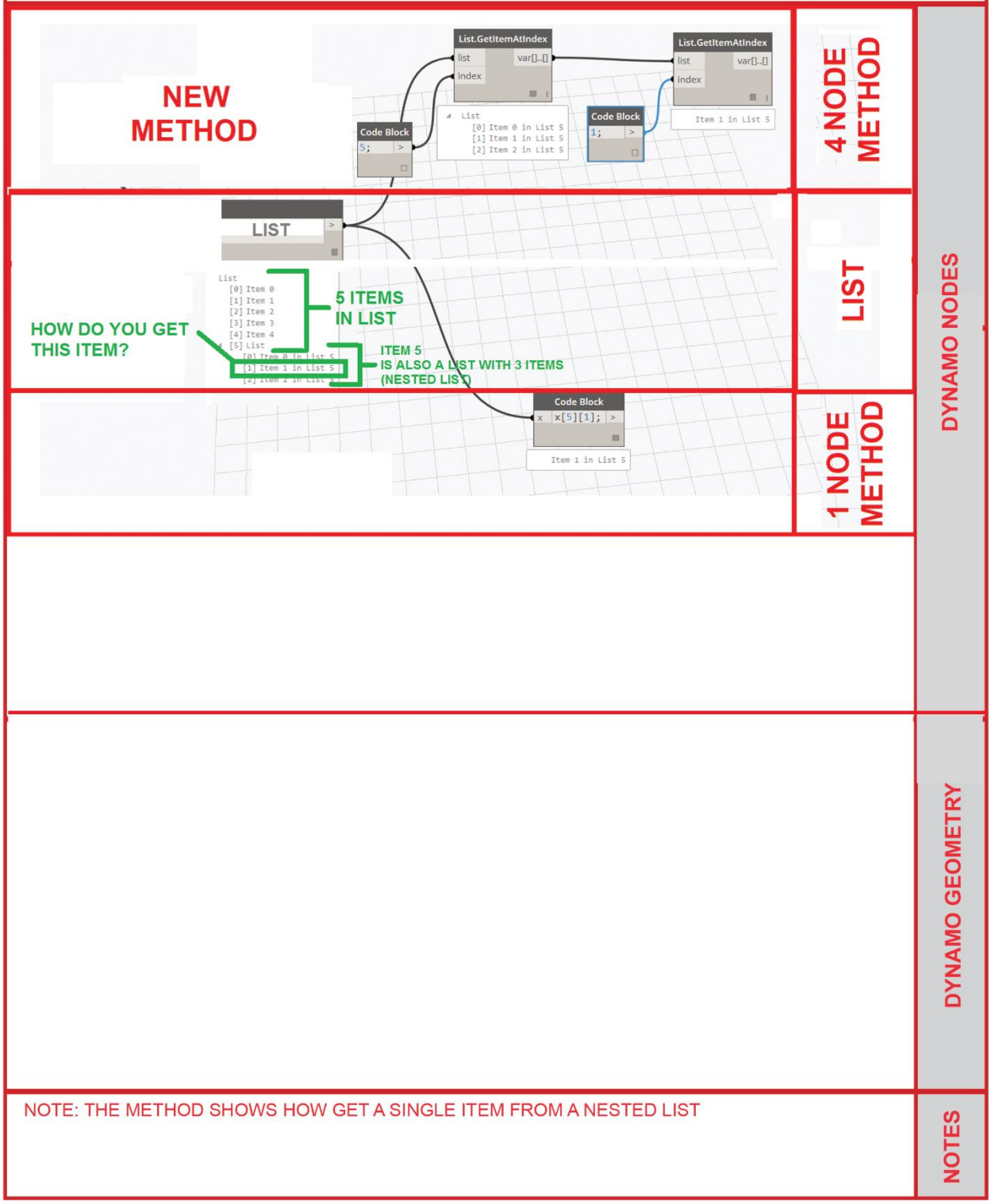


DYNAMO AND REVIT GEOMETRY

STEP 1: OPEN FILE “FIREPROOFING_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT FOR EACH COL
NOTES: THERE ARE MANY WAYS TO BRING DYNAMO GEOMETRY INTO REVIT AND THIS METHOD SHOWS JUST ONE VIA OOTB NODE FOR DIRECT SHAPE FOR PIPE COL,

STEPS & NOTES

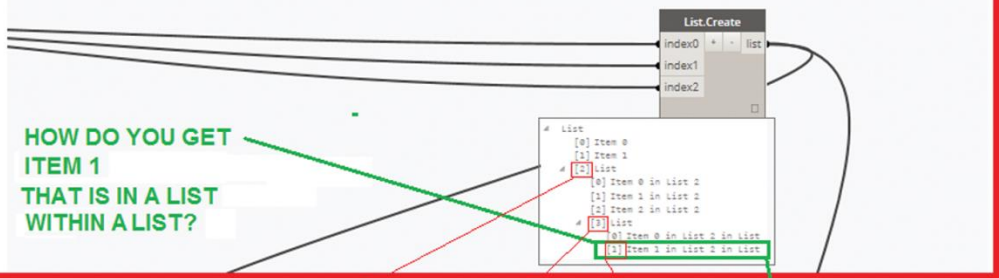
GET ITEM FROM LIST BY DESIGN SCRIPT



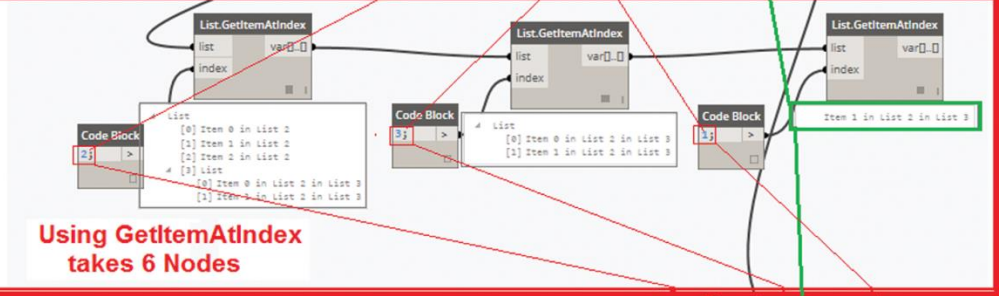
GET ITEMS FROM LIST BY DESIGN SCRIPT

DYNAMO NODES

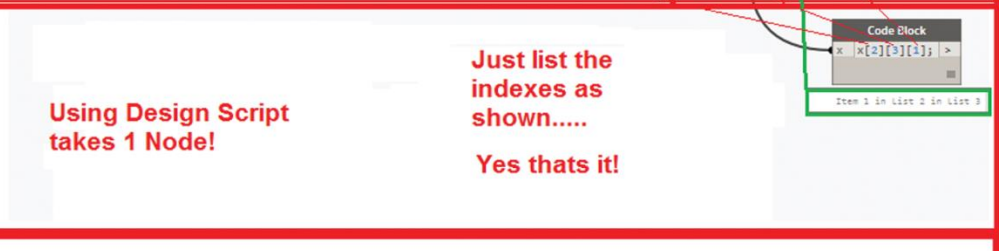
NESTED LIST



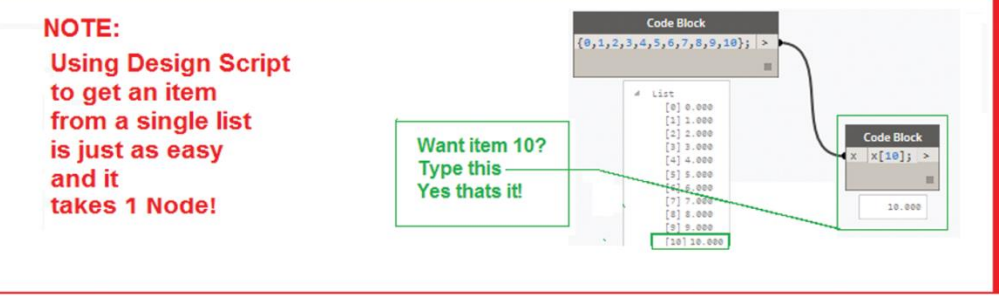
NON DESIGN SCRIPT
6 NODES



DESIGN SCRIPT
1 NODE



SINGLE LIST

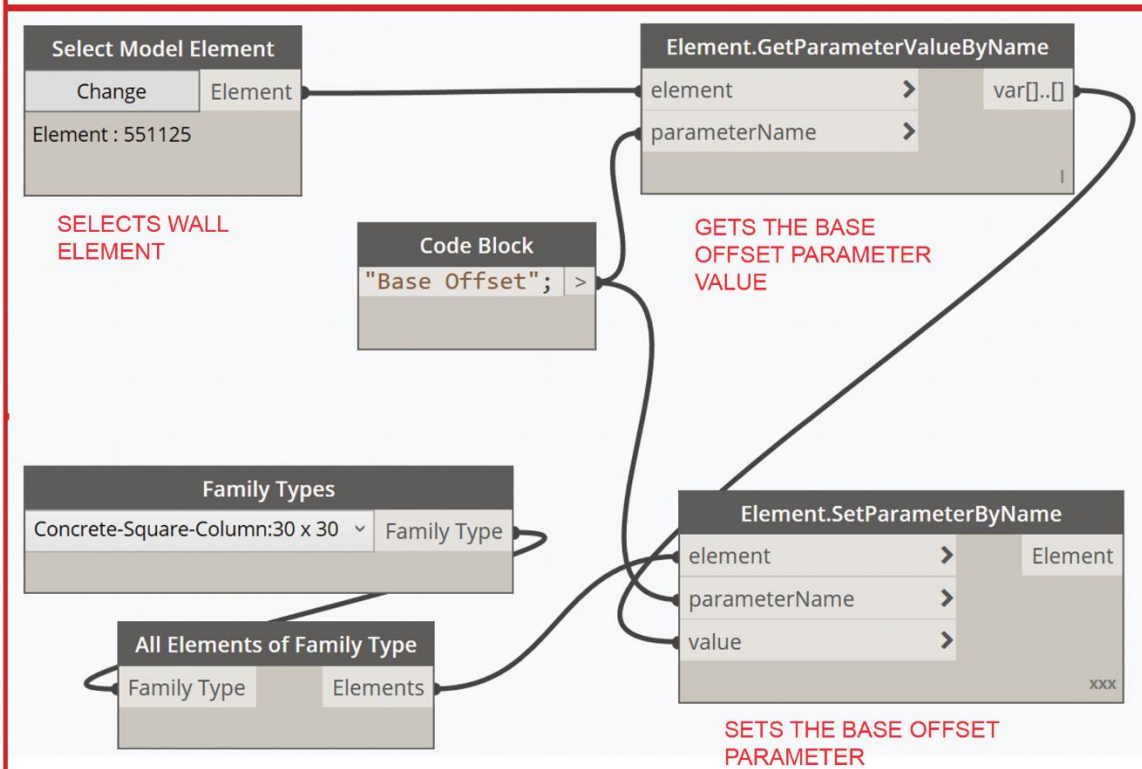


NOTES

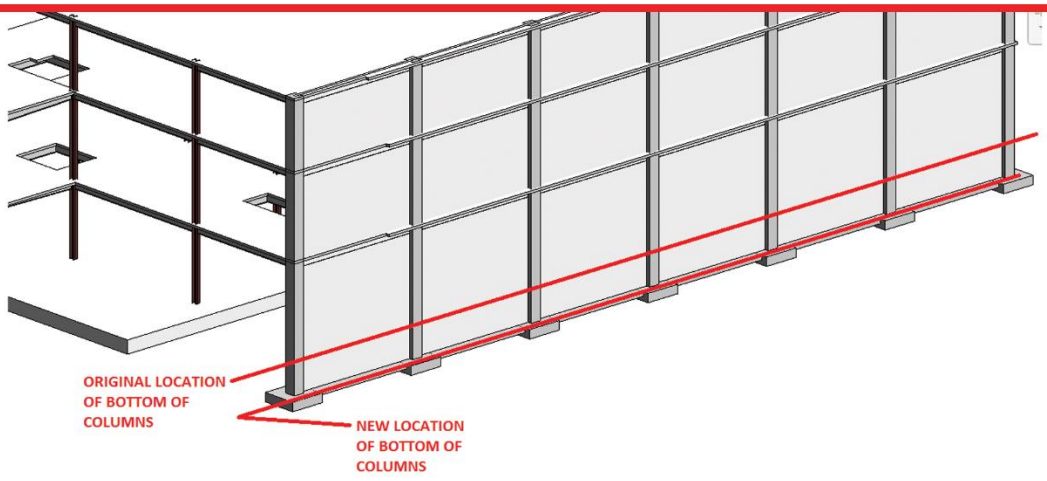
NOTE: THE METHOD SHOWS HOW GET MULTIPLE ITEMS FROM A NESTED LIST

GET AND SET INSTANCE PARAMETERS

DYNAMO GEOMETRY ONLY



REVIT GEOMETRY

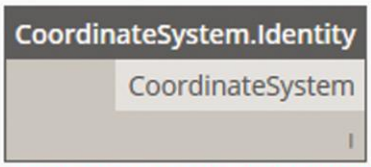


STEPS & NOTES

STEP 1: OPEN FILE "GET_SET_PARAMETERS_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT FOR EACH COL
NOTES: THERE ARE MANY OTHER WAYS TO SELECT THE WALL AND COLUMNS

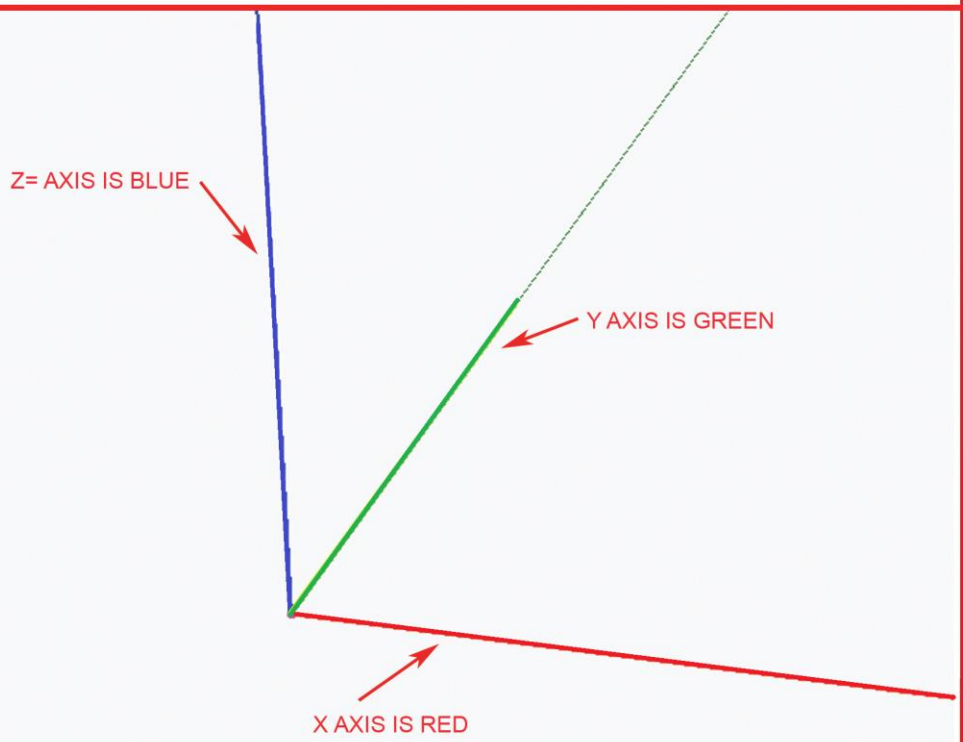
GET THE GLOBAL DYNAMO COORDINATE SYSTEM

DYNAMO NODES



GETS THE GLOBAL COORDINATE SYSTEM OF DYNAMO

DYNAMO GEOMETRY

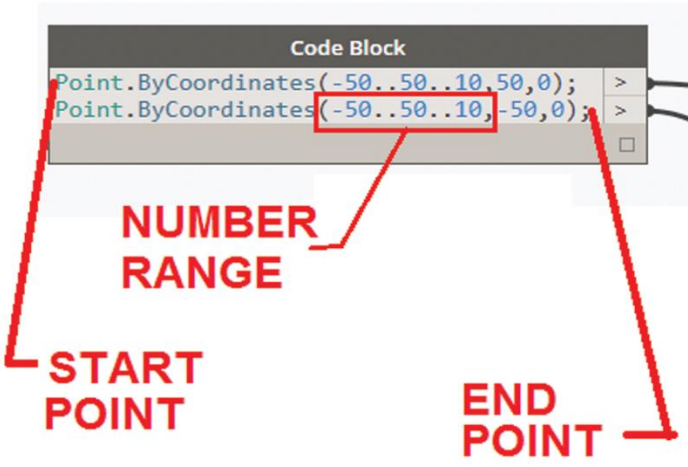


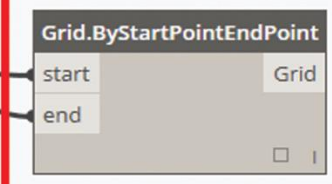
NOTES

NOTES: 1. THINK OF COORDINATE SYSTEMS IN DYNAMO AS “GLOBAL AXIS” OF DYNAMO
2. COORDINATE SYSTEMS COULD BE FOUND FOR DYNAMO ELEMENTS AND COULD BE THOUGHT OF AS “LOCAL AXIS”

GRIDS IN REVIT

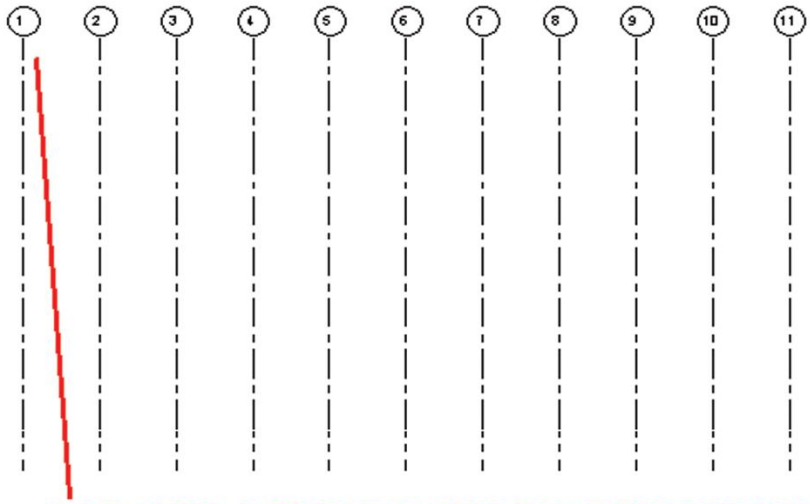
DESIGN SCRIPT





CREATES GRID IN REVIT

DYNAMO GEOMETRY ONLY



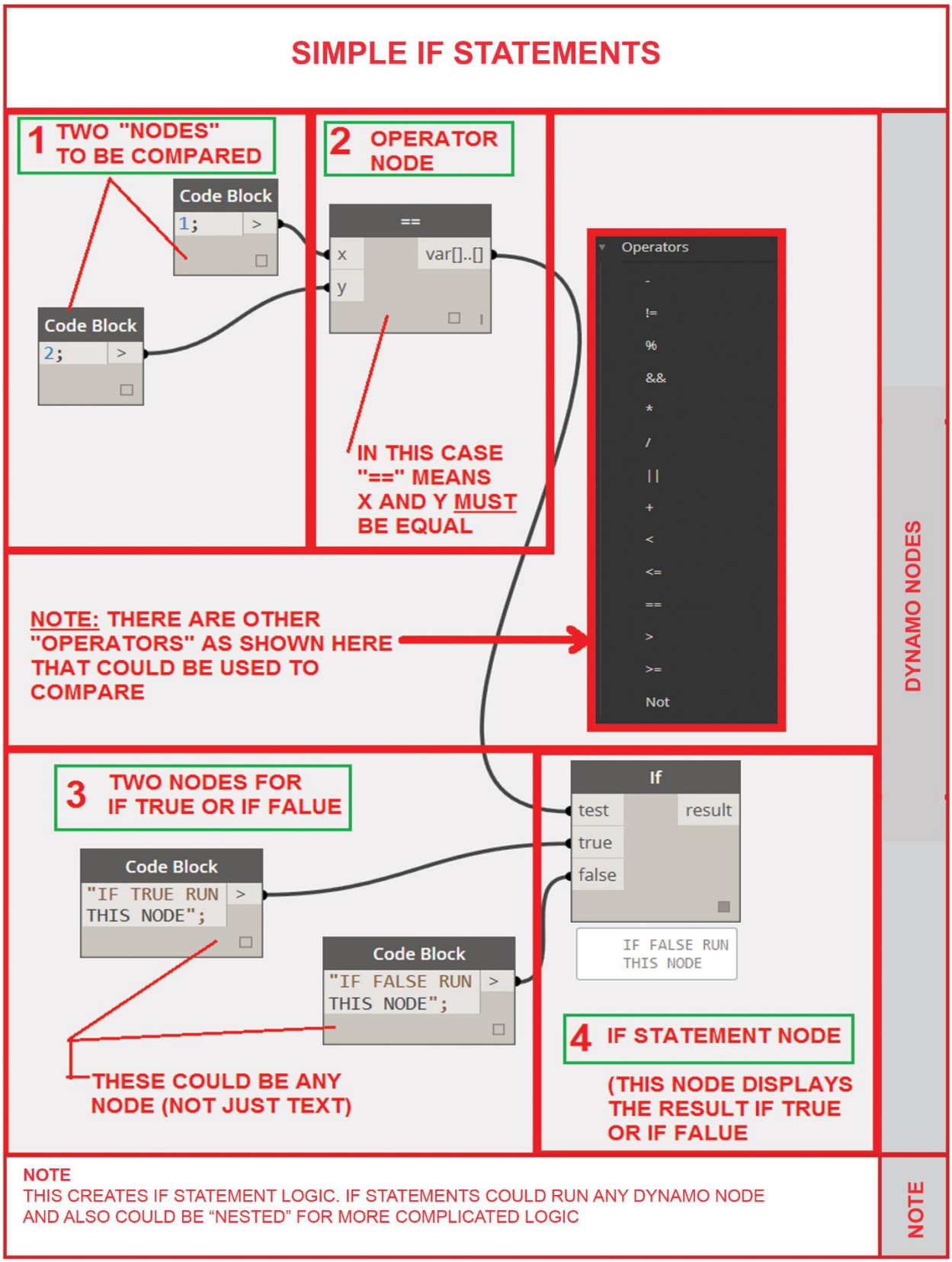
NOTE: IF YOU CHANGE THE NAME OF THE FIRST GRID NUMBER DYNAMOBIM WILL AUTO RENUMBER GRIDS!

REVIT GEOMETRY

STEP 1: OPEN FILE "GRIDS_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT

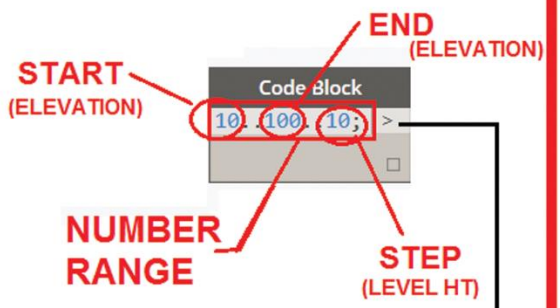
NOTE: DESIGN SCRIPTS ARE USED TO RANGED EXPRESSIONS IN METHOD ABOVE

STEPS & NOTES


SIMPLE IF STATEMENTS
1 TWO "NODES" TO BE COMPARED
Code Block
1;
Code Block
2;
2 OPERATOR NODE
==
x
y
var[]..[]
IN THIS CASE "==" MEANS X AND Y MUST BE EQUAL
Operators
-
!=
%
&&
*
/
||
+
<
<=
==
>
>=
Not
NOTE: THERE ARE OTHER "OPERATORS" AS SHOWN HERE THAT COULD BE USED TO COMPARE
DYNAMO NODES
3 TWO NODES FOR IF TRUE OR IF FALUE
Code Block
"IF TRUE RUN THIS NODE";
Code Block
"IF FALSE RUN THIS NODE";
THESE COULD BE ANY NODE (NOT JUST TEXT)
If
test
true
false
result
IF FALSE RUN THIS NODE
4 IF STATEMENT NODE
(THIS NODE DISPLAYS THE RESULT IF TRUE OR IF FALUE
NOTE
THIS CREATES IF STATEMENT LOGIC. IF STATEMENTS COULD RUN ANY DYNAMO NODE AND ALSO COULD BE "NESTED" FOR MORE COMPLICATED LOGIC
NOTE

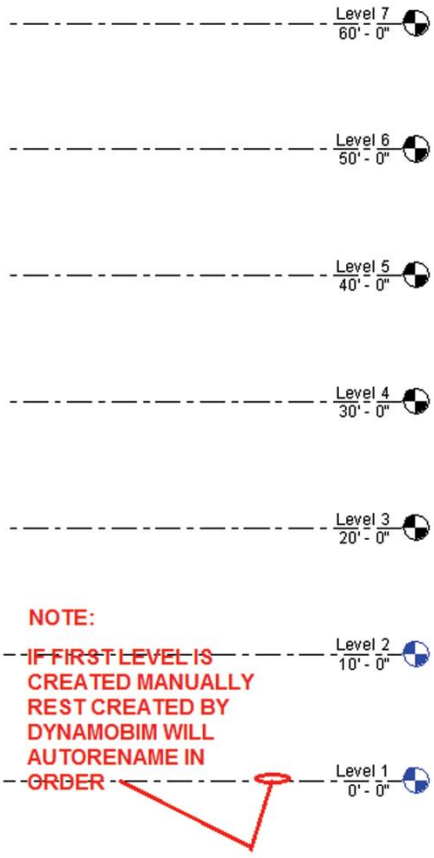
LEVELS IN REVIT

DYNAMOBIM



THIS NODE CREATES
LEVELS BY ELEVATION

REVIT



DYNAMO AND REVIT GEOMETRY

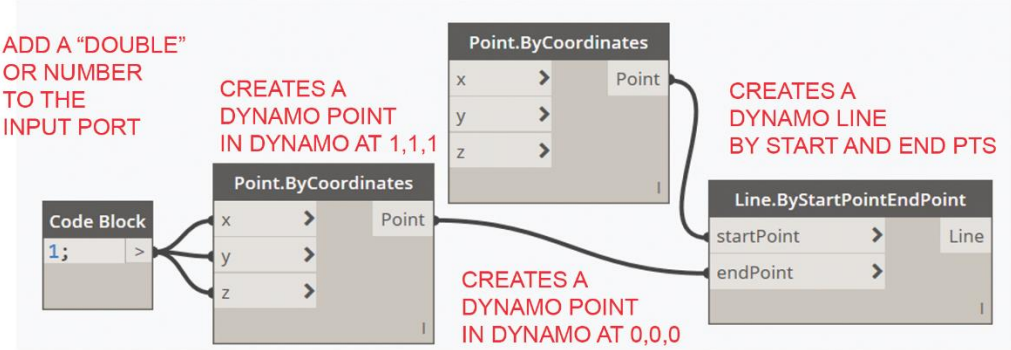
STEP 1: OPEN FILE "LEVELS_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT

NOTE: DESIGN SCRIPTS ARE USED TO RANGED EXPRESSIONS IN METHOD ABOVE

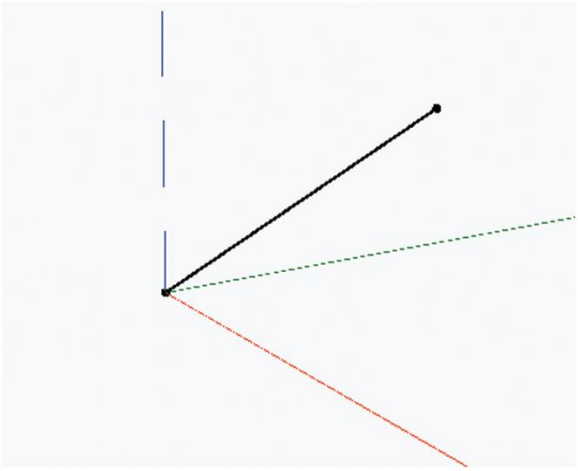
STEPS & NOTES

DYNAMO LINE BY START AND END PTS

DYNAMO NODES



DYNAMO GEOMETRY

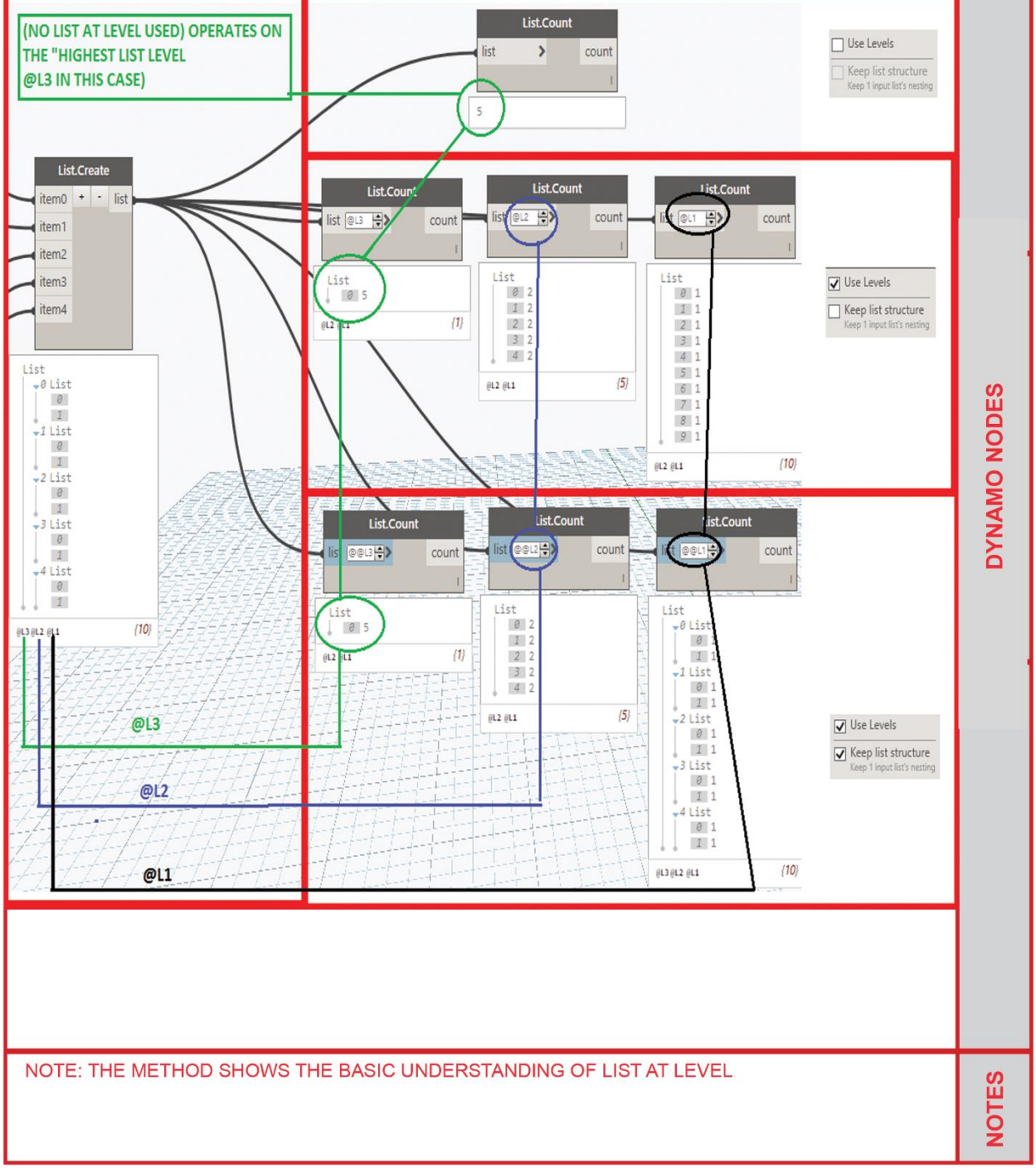


REVIT GEOMETRY

NOTE

NOTE
THIS CREATES A DYNAMO LINE BY END POINTS, AND THERE ARE OTHER WAYS TO CREATE A LINE
DYNAMO REFERS TO STRAIGHT CURVES AS LINES (THEREFORE LINES ARE CURVES)
ALSO NOTE THIS IS NOT REVIT GEOMETRY

BASIC LIST AT LEVEL



NOTE: THE METHOD SHOWS THE BASIC UNDERSTANDING OF LIST AT LEVEL

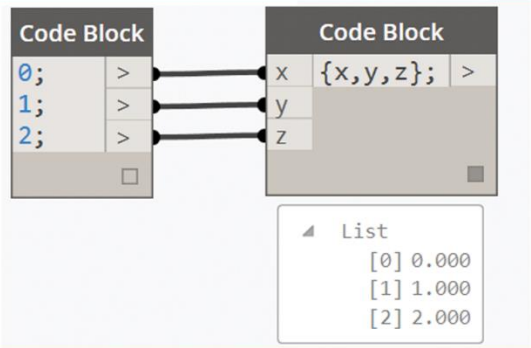
NOTES

CREATE LIST OR LISTS USING DESIGN SCRIPT

DYNAMO NODES SINGLE LIST

{item1,item2,item3,etc...}

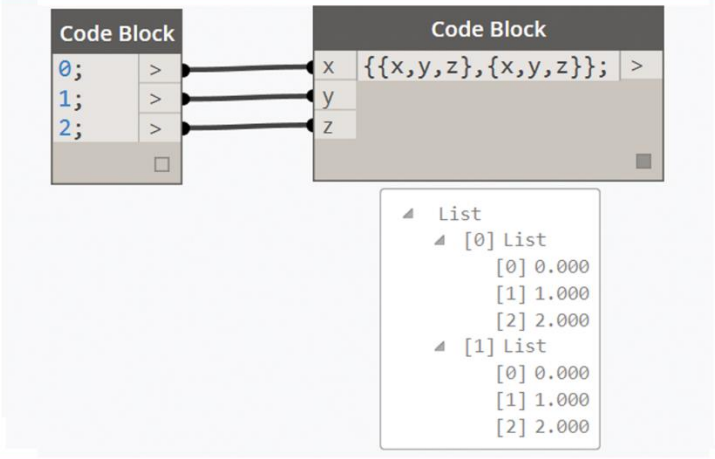
items separated by commas (,)
and closed with curly braces ({...}) as shown



DYNAMO NODES NESTED LIST

{List 1, List 2}

Nested List? Simply add more Curly Braces

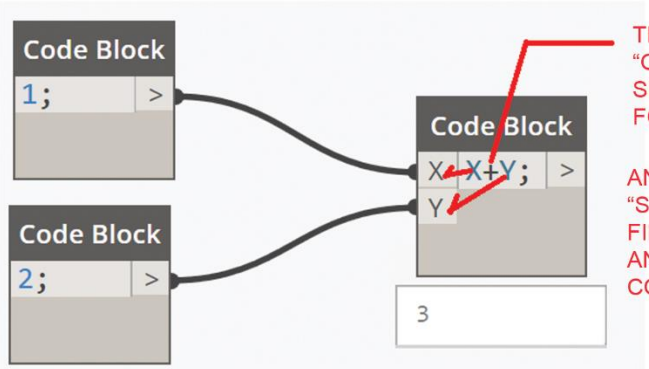


NOTES

NOTE: THE METHOD SHOWS HOW TO CREATE A LIST OR NESTED LIST USING DESIGN SCRIPT AND "{}" CURLY BRACES

MATH VARIABLES AND EQUATIONS

DYNAMO NODES



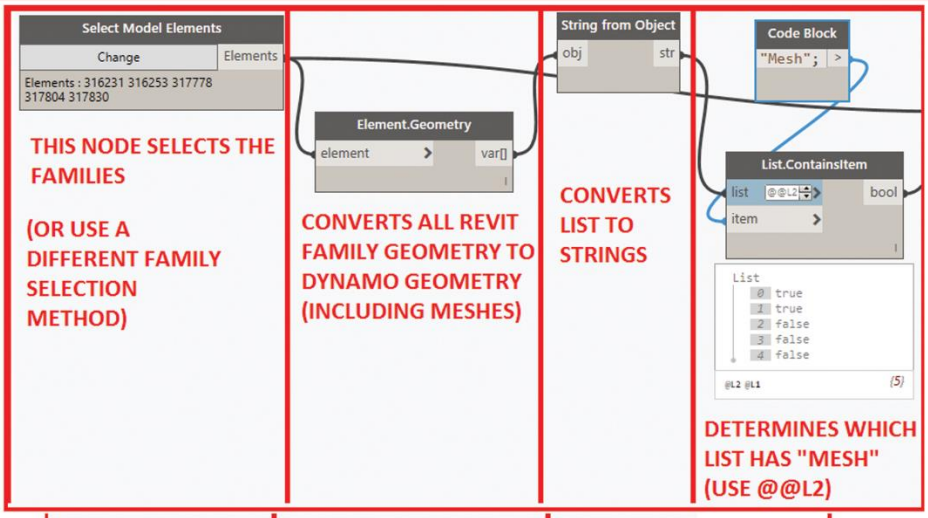
COMMON MATH VARIABLES

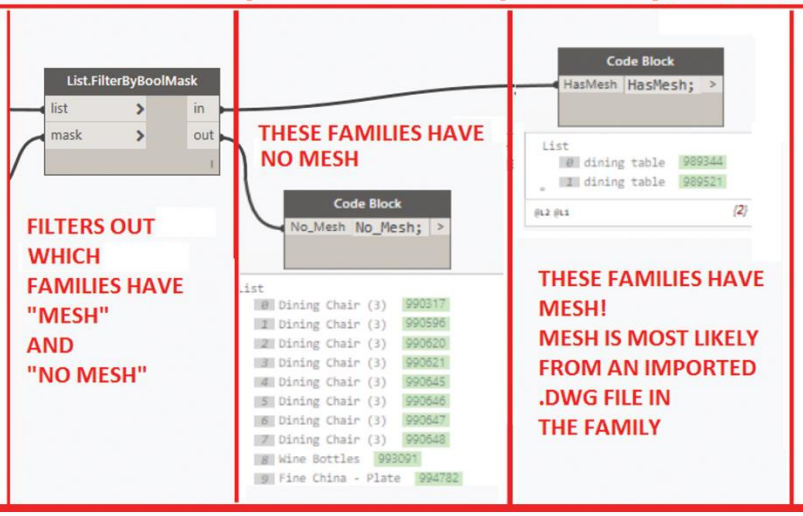
Abs (number)	Log (number)	Round (number, digits)
Abs (integer)	Log (number, logBase)	Sign (number)
Acos	Log10	Sign (integer)
Asin	Max (value1, value2)	Sin
Atan	Max (int1, int2)	Sinh
Atan2	Min (value1, value2)	Sqrt
Average	Min (int1, int2)	Sum
Ceiling	Pow	Tan
Cos	RadiansToDegrees	Tanh
Cosh	Rand	E
DegreesToRadians	Random (seed)	GoldenRatio
DivRem	Random	PI
Exp	RandomList	PiTimes2
Factorial	RemapRange	
Floor	Round (number)	

NOTE

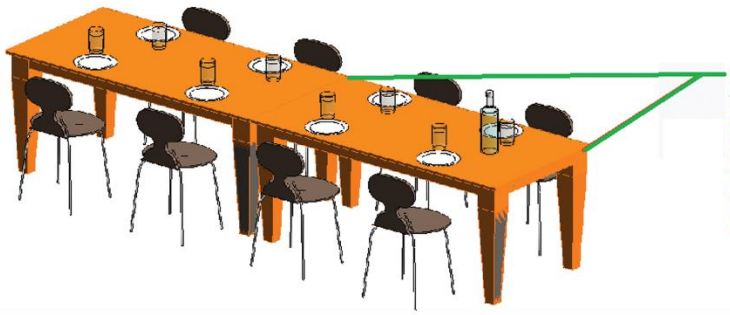
NOTE
THIS CREATES AN EQUATION USING THE CODE BLOCK. ANY VARIABLE THAT IS NOT DEFINED IS PLACED IN THE INPUT PORT AND MOST OPERATORS COULD BE USED AS WELL AS THE FUNCTIONS SHOWN.

FIND FAMILIES THAT HAVE EMBEDDED MESHES/DWG





DYNAMO NODES



BUSTED!!! :)
THESE DINING TABLE FAMILIES CONTAIN MESHES WHICH ARE IMPORTED DWG'S

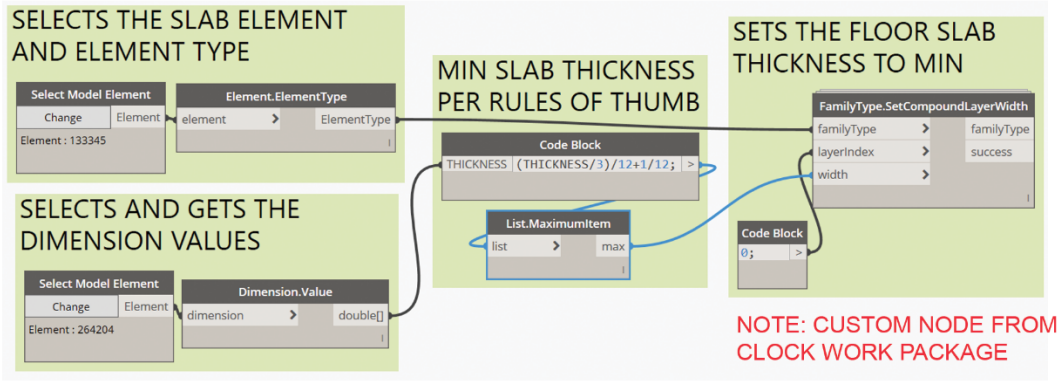
REVIT GEOMETRY

STEP 1: OPEN FILE "MESHFAMILYEMBED_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: SOME FAMILIES ALWAYS CONTAIN MESHES SUCH AS TOPO AND RPC
METHOD WILL NOT FIND MESHES THAT ARE HIDDEN OR NOT VISIBLE

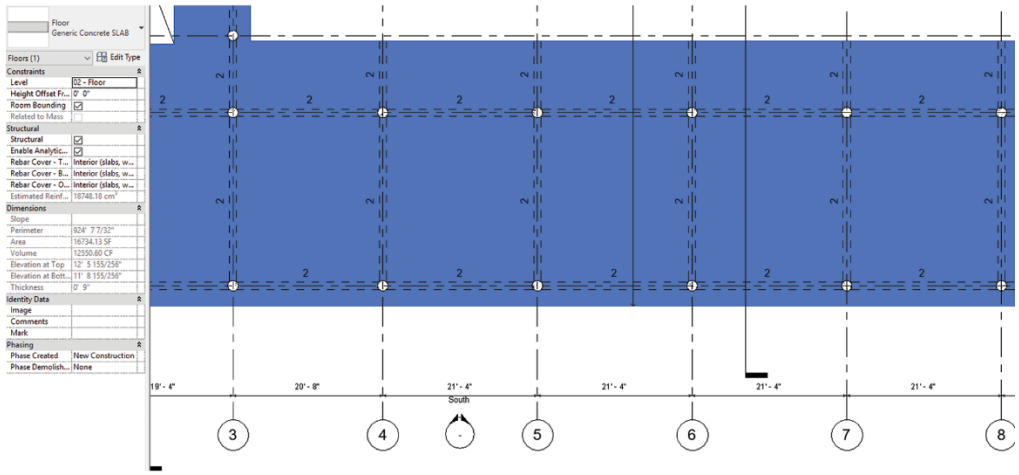
STEPS & NOTES

SETTING MIN CONCRETE FLOOR THICKNESS USING ENGINEERING LOGIC

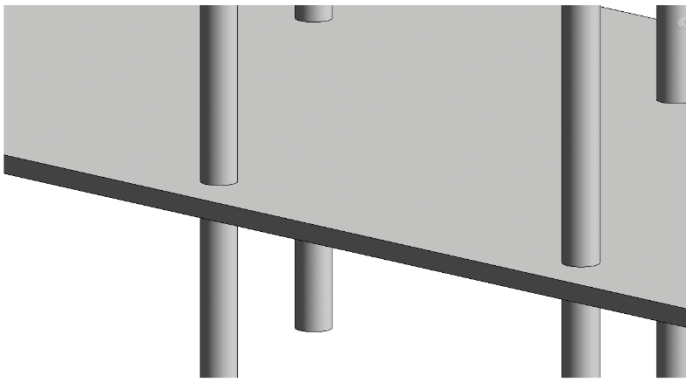
DYNAMO NODES



REVIT GEOMETRY



REVIT GEOMETRY



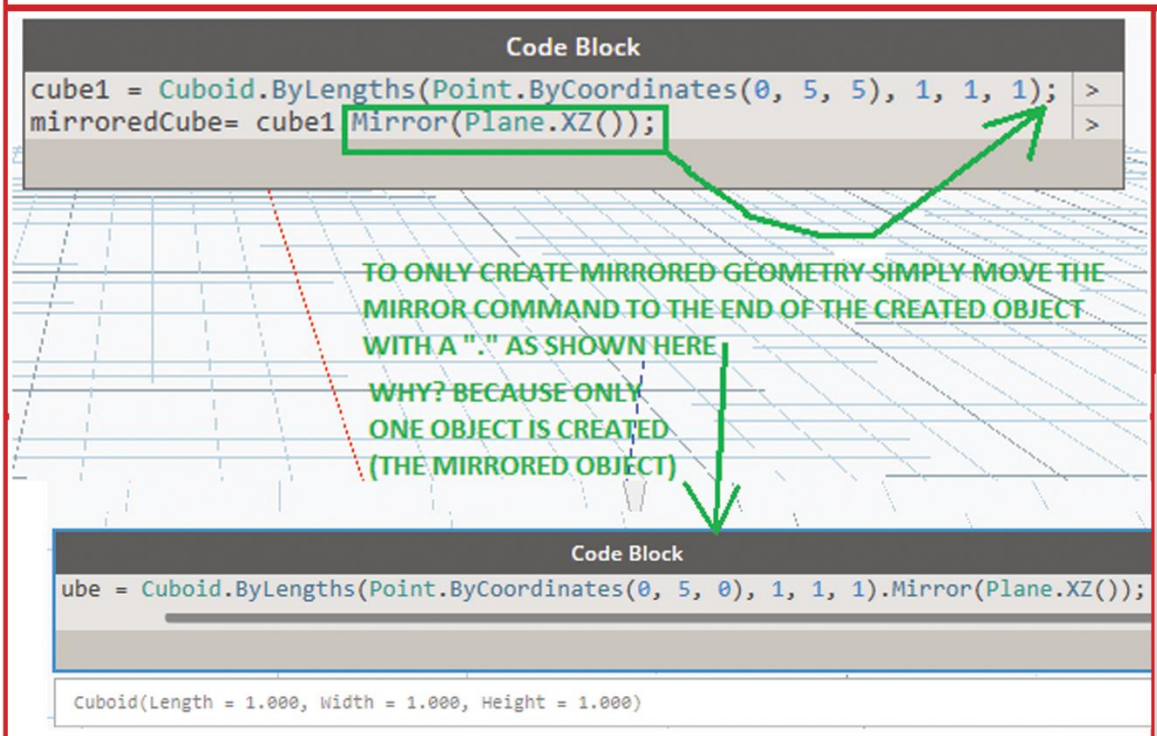
NOTE

NOTE

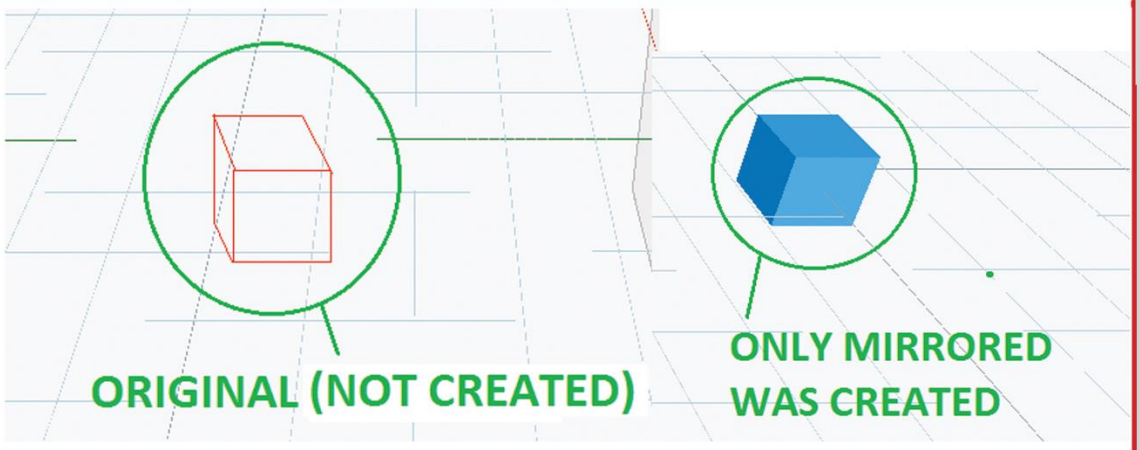
CHANGE THE SLAB THICKNESS BASED ON THE LONGEST DIMENSION IN THE SELECTED DIMENTION STRING USING SIMPLE ENGINEERING LOGIC. THIS HELPS GET A “ROUGH” IDEA OF SLAB THICKNESS EARLY IN DESIGN. THIS METHOD COULD BE APPLIED TO MOST SYSTEM FAMILIES.

MIRROR DYNAMO GEOMETRY BY DESIGN SCRIPT

DYNAMO NODES



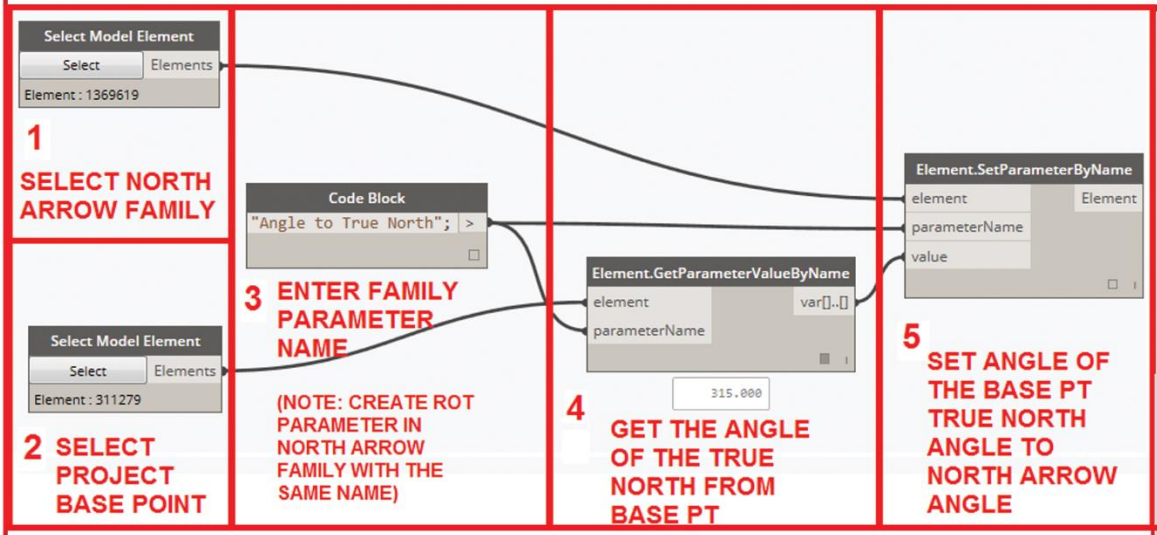
DYNAMO GEOMETRY

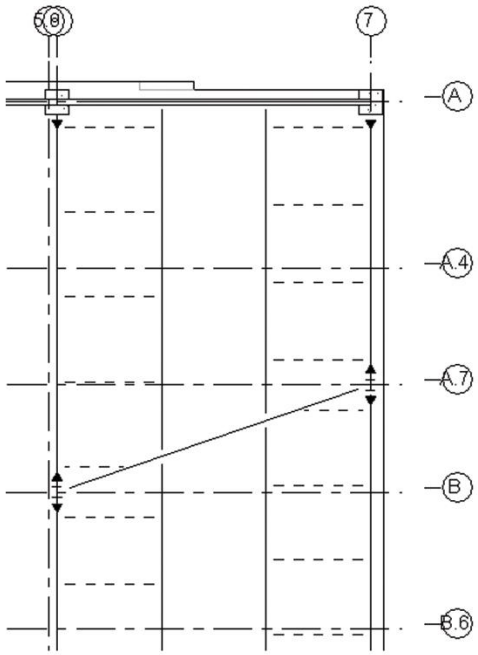


NOTES

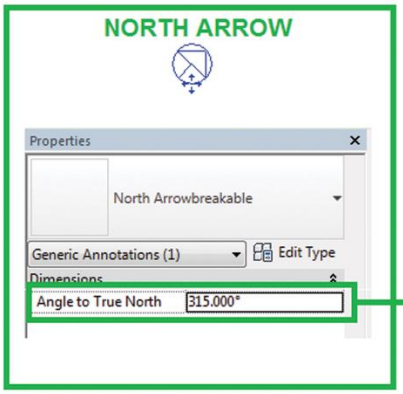
NOTE: THIS METHOD COULD BE USED FOR OTHER GEOMETRY MODIFICATIONS SUCH AS SCALE, EXPLODE, ETC. IT COULD ALSO BE USED ON OTHER GEOMETRY SUCH AS CUBIODS. TO DISCOVER WHAT OTHER MODIFICATIONS COULD BE MADE TO THE DYNAMO GEOMETRY SIMPLY ADD A "." AFTER THE GEOMETRY

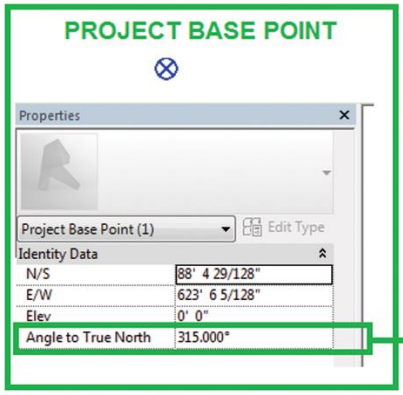
KEEP NORTH ARROW ALIGED WITH TRUE NORTH





PROJECT NORTH PLAN VIEW





WILL STAY EQUAL

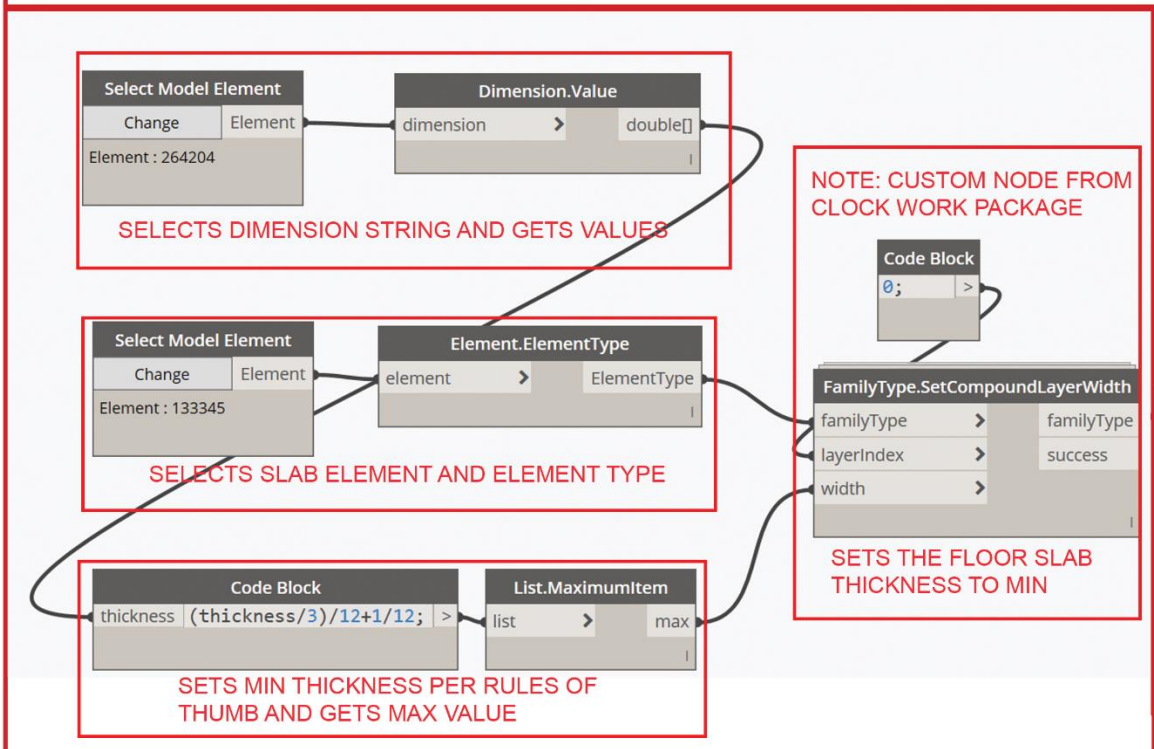
REVIT GEOMETRY

STEP 1: OPEN FILE "NORTH_ARROW_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: CREATE A NORTH ARROW FAMILY WITH A ROTATION PARAMETER

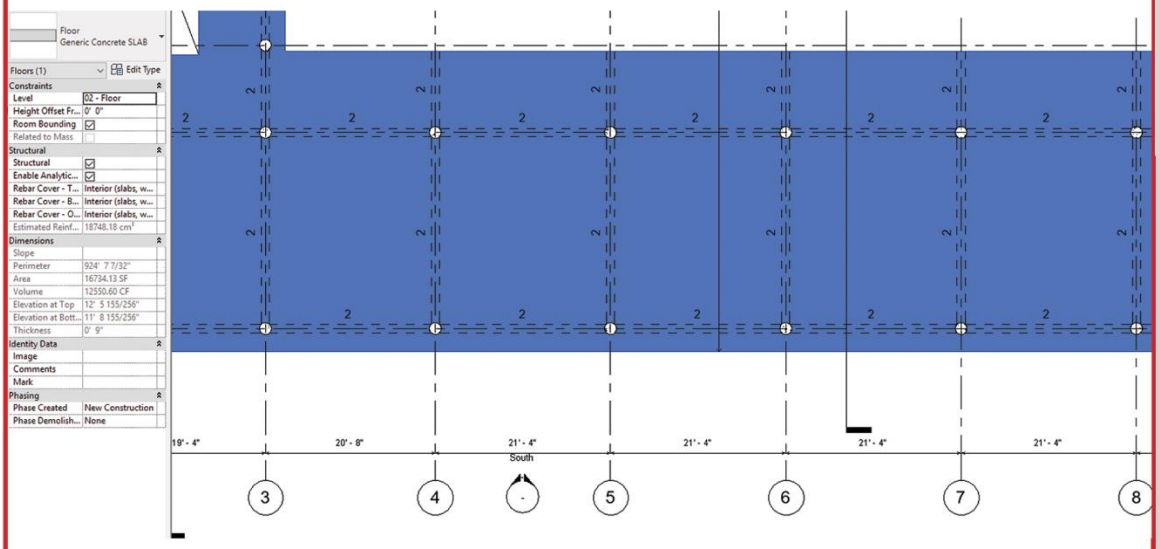
STEPS & NOTES

SETTING MIN CONCRETE FLOOR THICKNESS USING ENGINEERING LOGIC

DYNAMO NODES



REVIT GEOMETRY

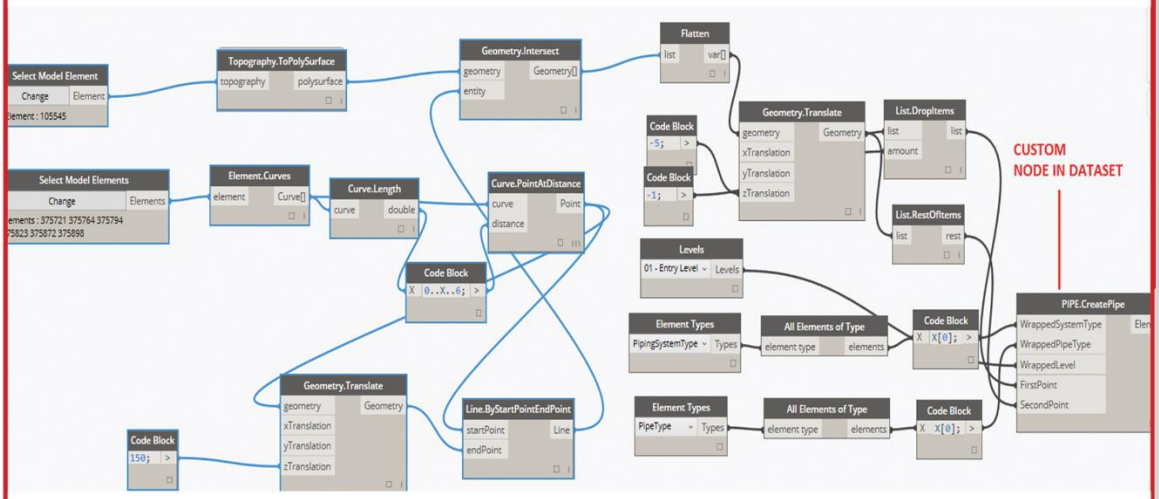


STEPS

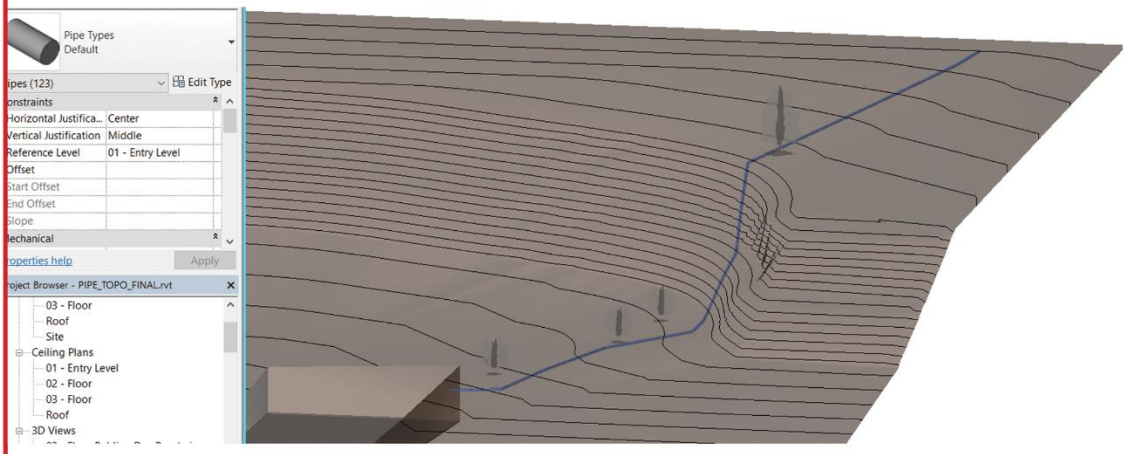
STEP 1: OPEN “ONE_WAY_BEAM_SLAB_SYSTEM_START.RVT”
STEP 2: OPEN NEW DYNAMO AND ADD NODES
STEP 2: SELECT SLAB AND SELECT LOWER DIMENSION STRING W/ “SELECT” AND RUN DYNAMO

CREATE PIPING ON TOPO IN 3D

DYNAMO NODES



REVIT GEOMETRY

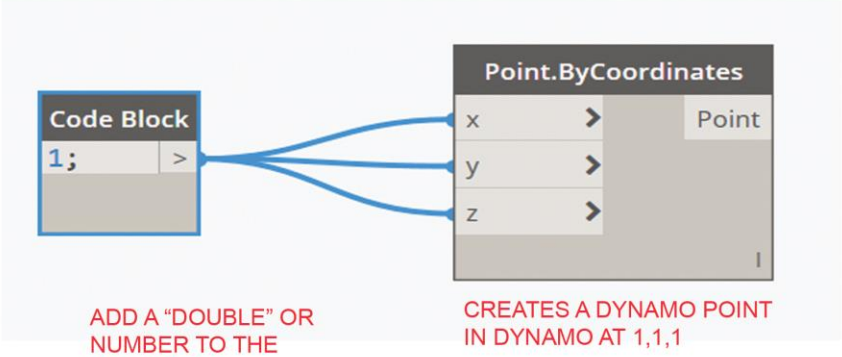


STEPS & NOTES

STEP 1: OPEN REVIT SAMPLE PROJECT “PIPE_TOPO_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: THIS METHOD PLACES MODEL LINES ON TOPO AND CREATES MEP PIPING

DYNAMO POINT

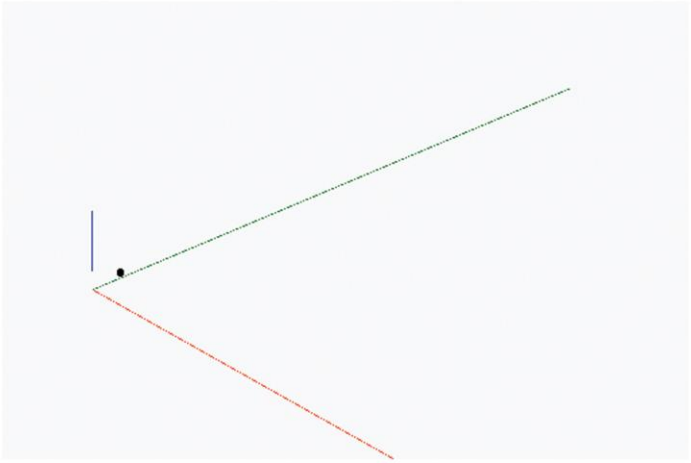
DYNAMO NODES



ADD A "DOUBLE" OR NUMBER TO THE INPUT PORT

CREATES A DYNAMO POINT IN DYNAMO AT 1,1,1

DYNAMO GEOMETRY



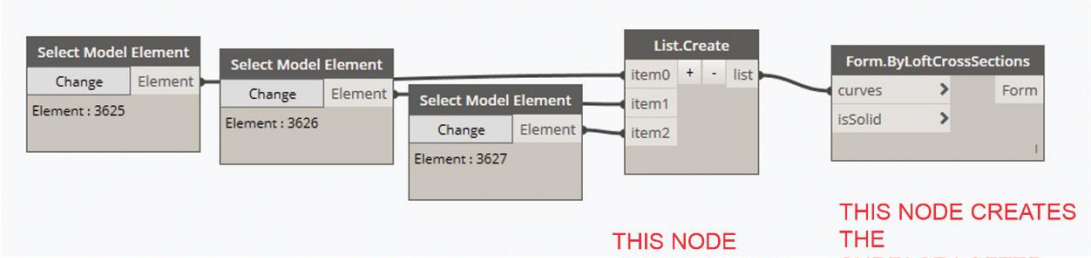
REVIT GEOMETRY

NOTE

NOTE
THIS CREATES A DYNAMO POINT AT X,Y,Z BY DEFAULT (NO DATA ENTERED INTO THE INPUT PORTS)
THEN THE POINT WOULD BE CREATED AT 0,0,0
ALSO NOTE THIS IS NOT!!!! REVIT GEOMETRY (NO REVIT POINTS WERE CREATED!)

CREATING SURFACES WITH PROFILE ORDER

DYNAMO NODES

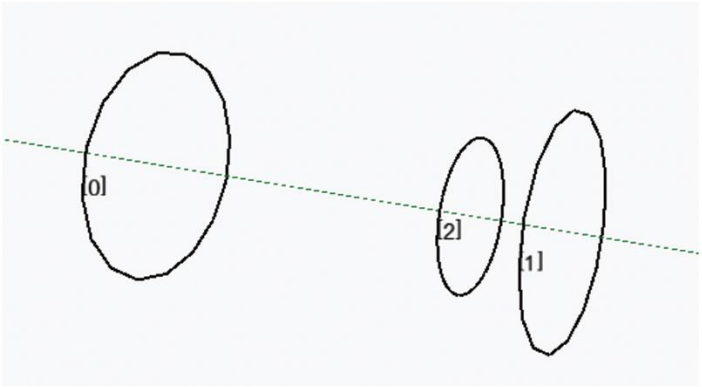


THESE NODES SELECT THE PROFILE CURVES

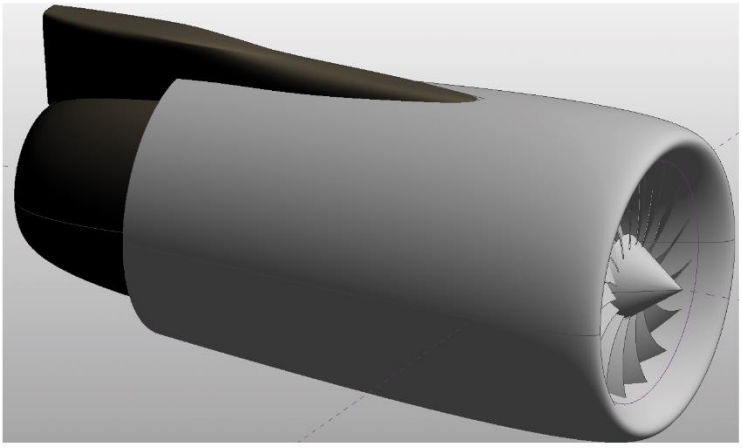
THIS NODE CREATES A LIST IN THE CORRECT PROFILE ORDER

THIS NODE CREATES THE SURFACE LOFTED OVER THE CORRECT PROFILE ORDER

DYNAMO GEOMETRY



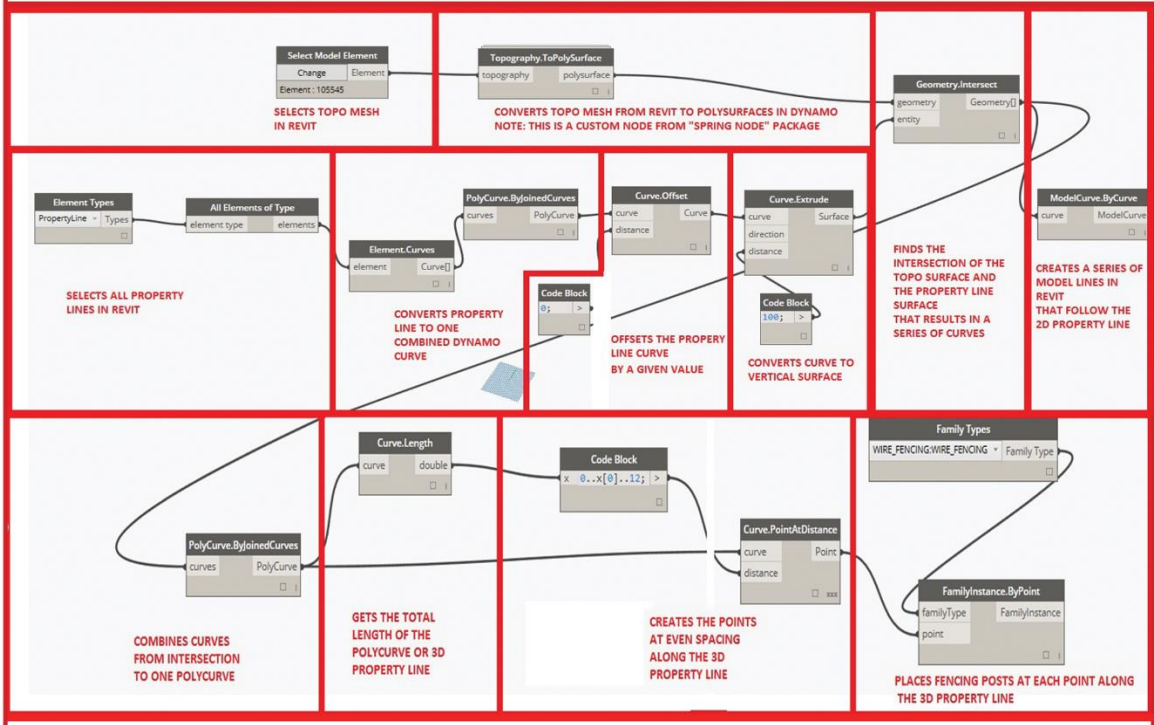
REVIT GEOMETRY

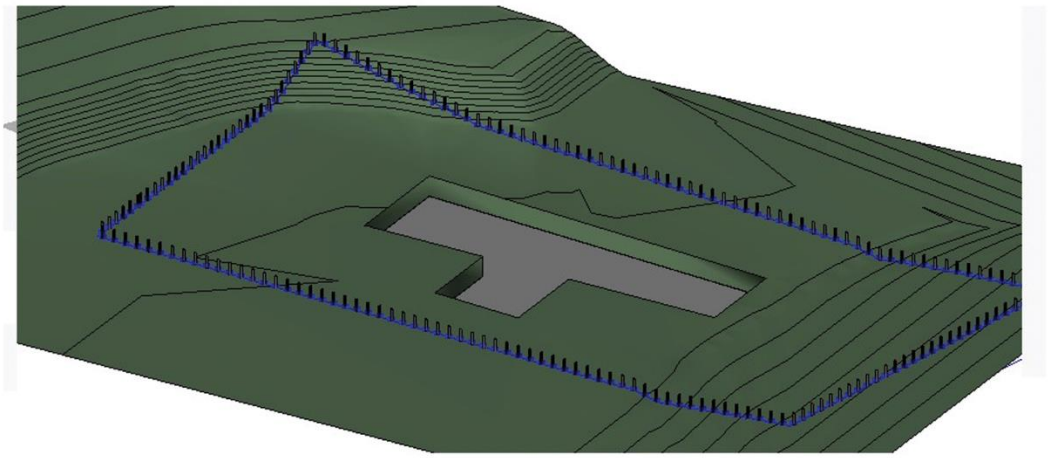


STEPS & NOTES

STEP 1: OPEN REVIT FILE “PROFILEORDER_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE AND ADD NODES AS SHOWN
STEP 3: SELECT ELEMENT 0,1,2 IN THAT ORDER USING THE “SELECT” NODE AND RUN
NOTE: THE REVIT MASSING FAMILY DOES NOT ALLOW FOR PROFILES TO BE SELECTED IN ORDER

CREATE PROPERTY LINES ON TOPO IN 3D

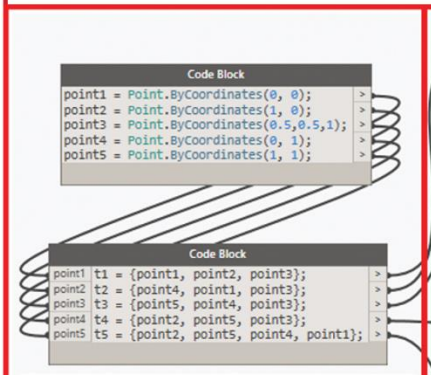




STEP 1: OPEN REVIT SAMPLE PROJECT "PROPERTYLINES_3D_START_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: PROPERTY LINES IN REVIT ARE 2D AND THIS METHOD TURNS THEM INTO 3D ELEMENTS WITH MODEL LINES AND CREATES THEM TO FOLLOW TOPO

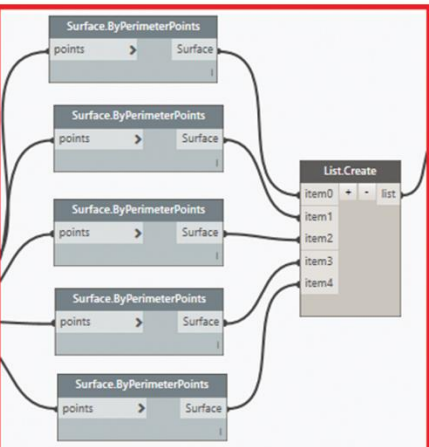
STEPS & NOTES

SOLID: 4 SIDED PYRAMID



THESE NODES CREATES THE 5 POINTS FOR THE TETRAHEDRON AND ARRANGES THEM IN LISTS TO DEFINE VERTICES OF FACES

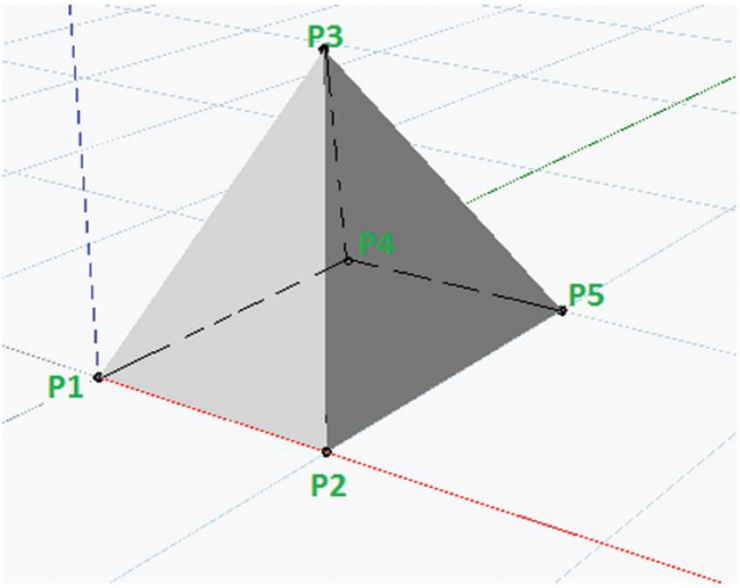
NOTE THAT THIS EXAMPLE USES A PYRAMID THAT IS 1 UNIT X 1 UNIT X 1 UNIT



THESE NODES CREATE THE FACES FROM THE VERTICES (5 TOTAL FACES) AND CREATES A LIST

THIS NODE CREATES THE SOLID PYRAMID FROM THE 5 FACES (MUST MAKE A CLOSED SHAPE TO MAKE A SOLID)

DYNAMO NODES

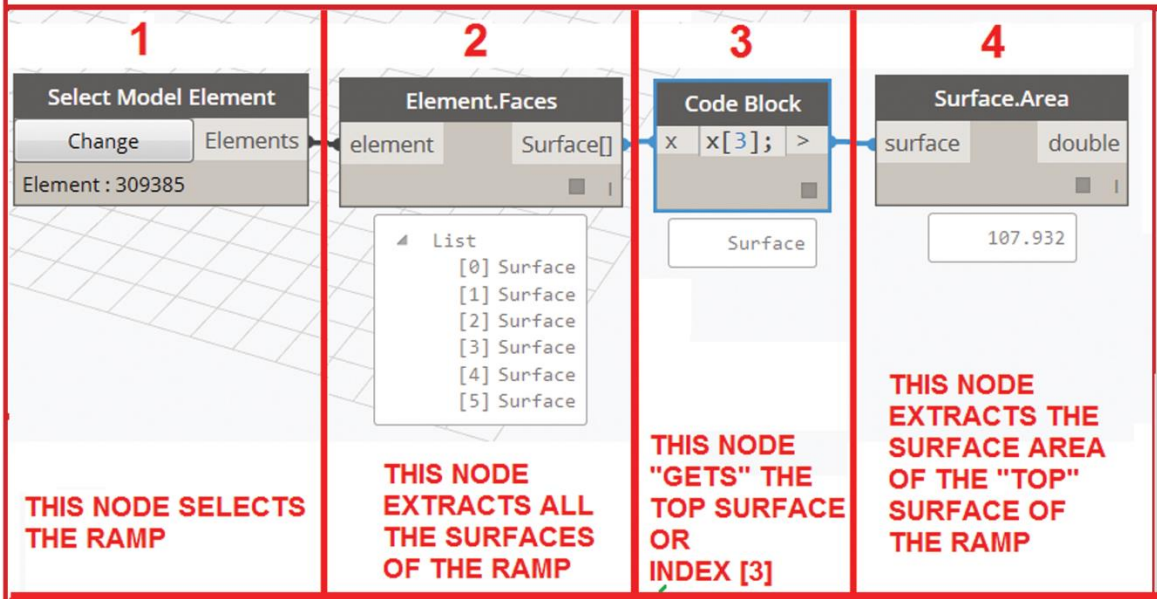


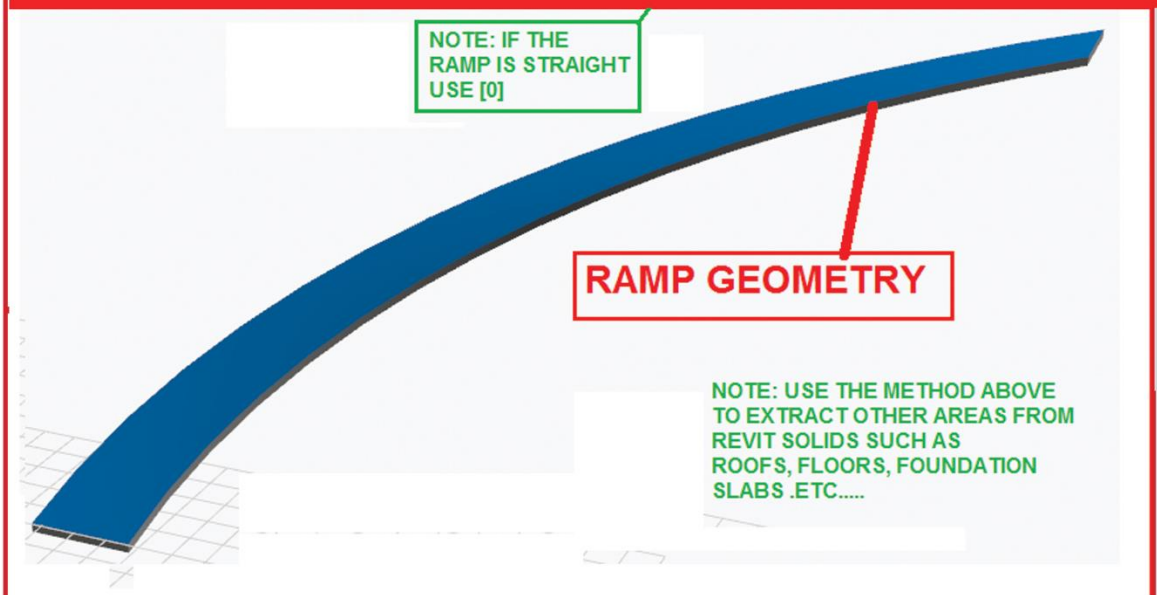
DYNAMO GEOMETRY

NOTE
THIS CREATES A PRYAMID IN DYNAMO AT 1X1X1

NOTE

SURFACE AREA OF RAMPS

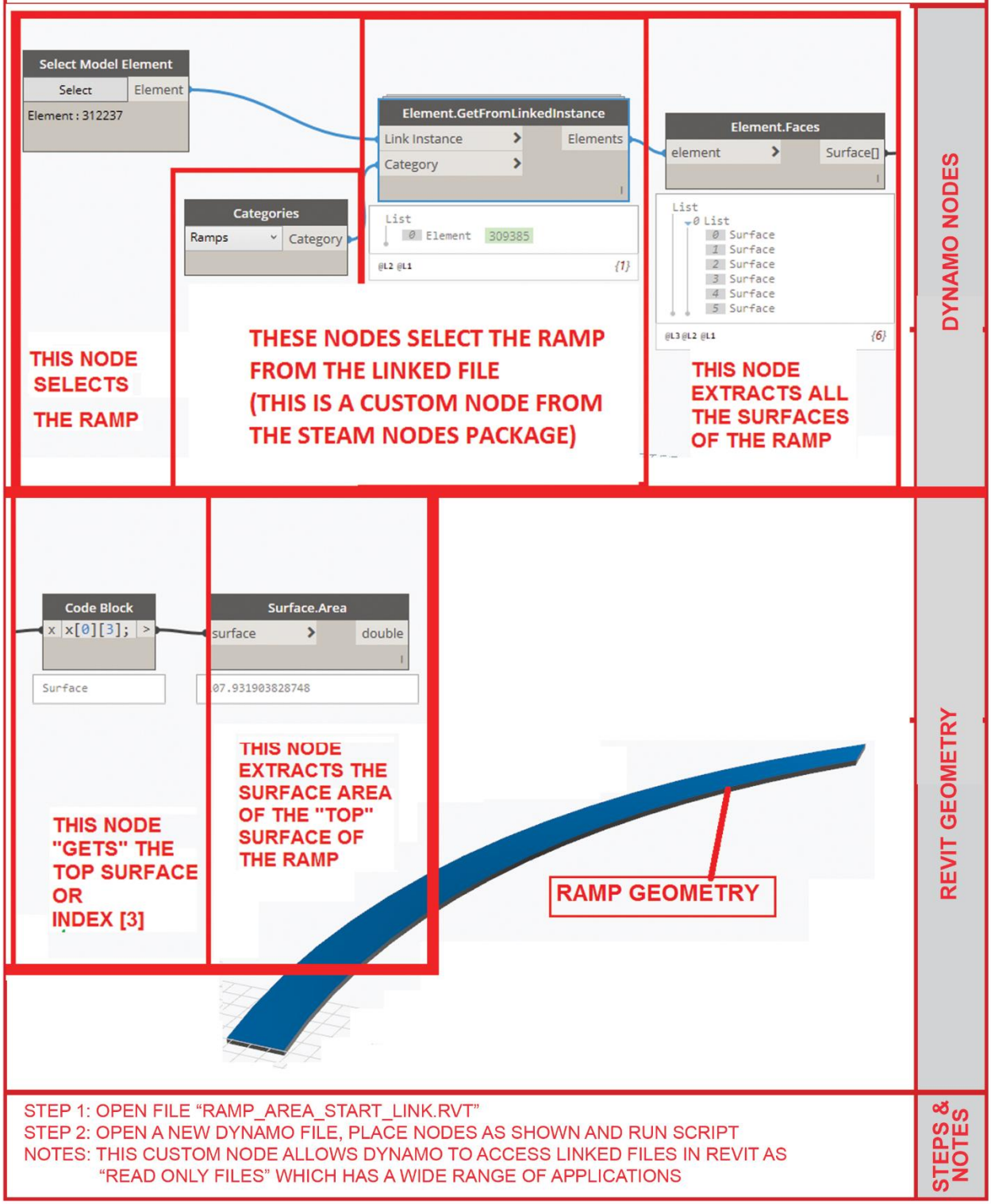




STEP 1: OPEN FILE "RAMP_AREA_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: TO GET THE AREA OF THE SIDES AND BOTTOMS, SIMPLY DELETE THE TOP SURFACE AREA FROM THE TOTAL SURFAFE AREA

STEPS & NOTES

SURFACE AREA OF RAMP FROM A LINKED FILE



CREATE RANGED EXPRESSION (LISTS OF NUMBERS IN A SEQUENCE)

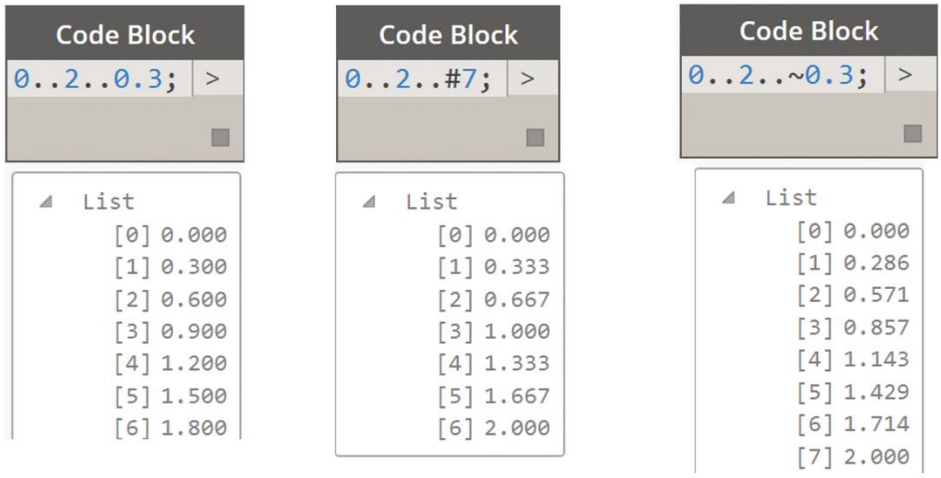
A..B..αC

(3 entries separated by two periods "..")

- **A** START of the Number RANGE
- **B** END of the Number RANGE
- **C** Step or Amount depending on α

α
- Blank = Step (Not to exceed end range value)
- # = Amount (equal steps from start to end result)
- ~ = Step (Estimate such that end range value results)

DYNAMO NODES



STEPS & NOTES

NOTES: IN THE FIRST LIST [7] WAS NOT GENERATED B/C IT EXCEEDS "B" WITH IS THE MAX VALUE
COMMON FORMAT IS TO USE "A..B (NO 'C'), IF C IS BLANK THEN IT DEFAULTS TO 1
EX: A..B..1
ALSO, NOT ALL RANGED EXPRESSIONS ARE SHOWN

A Range Expression

Creates a
List of Numbers in a Sequence

FORMAT

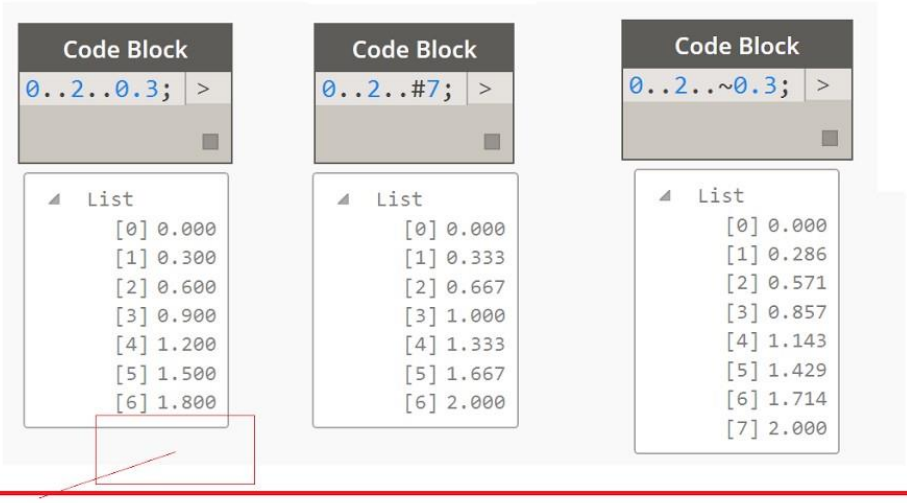
A..B..αC

(3 entries separated by two periods "..")

- **A** START of the Number RANGE
- **B** END of the Number RANGE
- **C** Step or Amount depending on α

α
- Blank = Step (Not to exceed end range value)
- # = Amount (equal steps from start to end result)
- ~ = Step (Estimate such that end range value results)

EXAMPLES

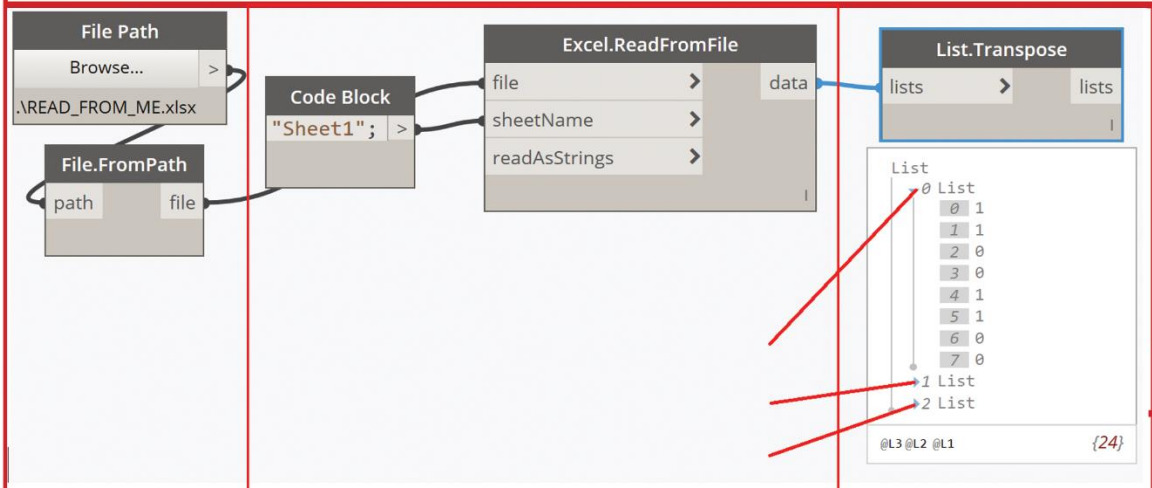


NOTES

Note:
[7] 2.100
was not generated
because it exceeds B
which is the
maximum range

Note:
Sometimes you will see
A..B (no C)
which means if C is blank then
it defaults to 1
ex: A..B..1

READ RAW DATA FROM EXCEL



SELECTS THE EXISTING EXCEL FILE VIA FILE PATH

READS THE RAW DATA FROM EXISTING EXCEL SPREADSHEET

TRANSPOSES THE RAW DATA LISTS FROM EXCEL

DYNAMO NODES

1	0	1
1	1	1
0	1	1
0	0	1
1	1	0
1	0	0
0	0	0
0	1	0

RAW EXCEL SPREADSHEET DATA

EXCEL

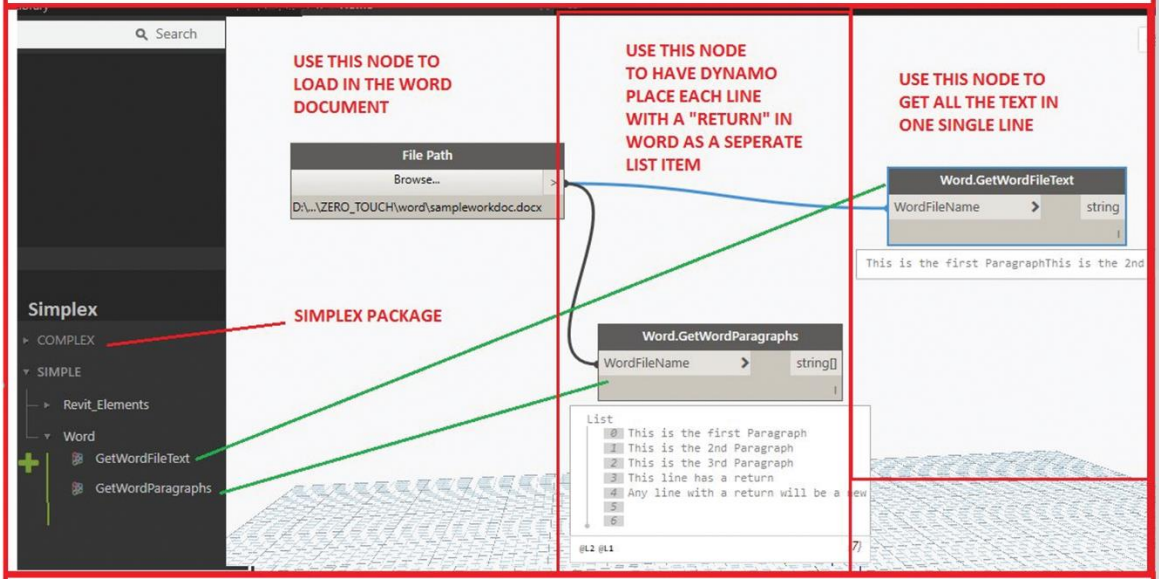
NOTE

"FILE.FROMPATH" NODE MUST BE USED WHAT READING DATA FROM EXCEL AND DATA FROM EXCEL IS READ AS ROW THEN COLUMNS HENCE THE USE OF THE TRANSFORM NODE

NOTE

READ TEXT FROM MS WORD DOCUMENTS (.DOCX)

DYNAMO NODES



MS WORD

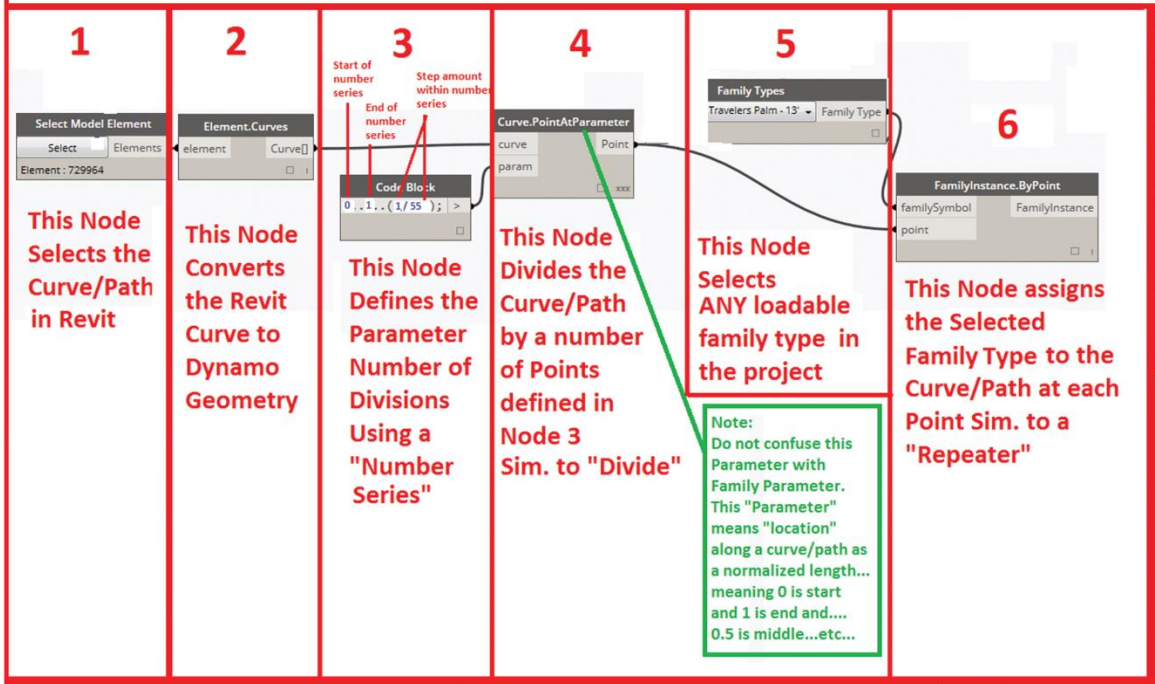
This is the first Paragraph¶
This is the 2nd Paragraph¶
This is the 3rd Paragraph¶
This line has a return¶
Any line with a return will be a new item in a list¶
¶

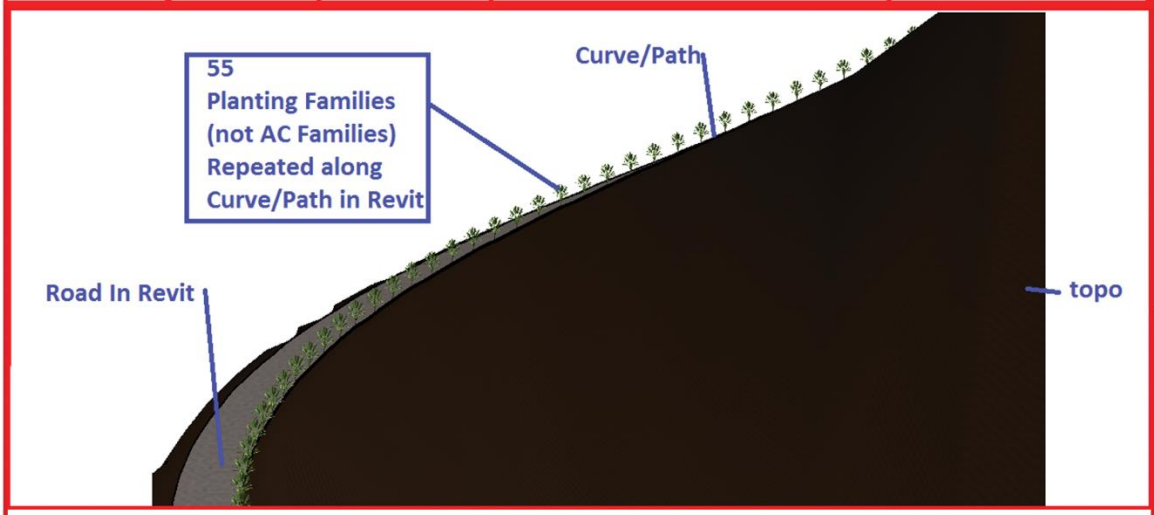
Note: This workflow was intended for non-complex formated word documents

STEPS & NOTES

STEP 1: OPEN THE REVIT SAMPLE FILE “rst_advanced_sample_project.rvt”
STEP 2: START AND NEW DYNAMO FILE AND ADD NODE SHOWN
STEP 3: SELECT THE SAMPLE FILE “READ_TEXT_FROM_WORD.DOCX” FROM THE “PATH” NODE
NOTE: CUSTOM NODES COULD BE FOUND IN THE “SIMPLEX” DYNAMO PACKAGE

REPEAT A LOADABLE FAMILY NOT AC



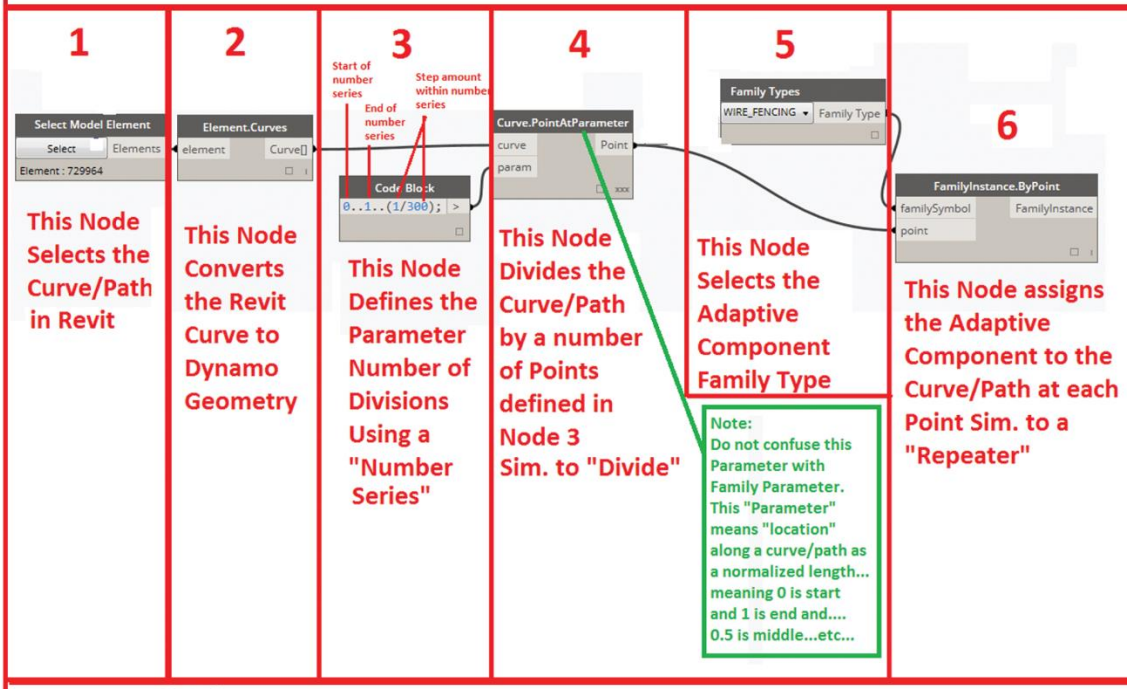


STEP 1: OPEN REVIT SAMPLE PROJECT "REPEATER_LIMIT_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: DYNAMO ALLOWS LOADABLE FAMILIES TO BE PLACED IN REPEATER PATTERNS

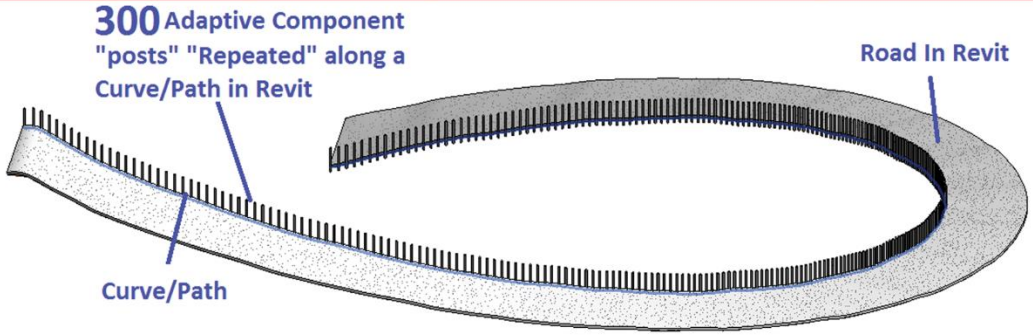
STEPS & NOTES

DIVIDE A PATH GREATER THAN 200 LIMIT FROM REVIT

DYNAMO NODES



REVIT GEOMETRY

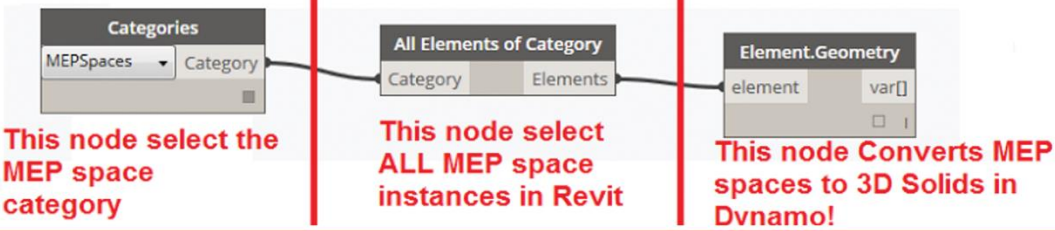


STEPS & NOTES

STEP 1: OPEN REVIT SAMPLE PROJECT “REPEATER_LIMIT_300_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: DYNAMO ALLOWS LOADABLE FAMILIES TO BE PLACED IN REPEATER PATTERNS GREATER THAN THE LIMIT OF REVIT DIVIDED PATH AND ARRAY

VIEW REVIT 3D MEP SPACES IN DYNAMO

DYNAMO NODES

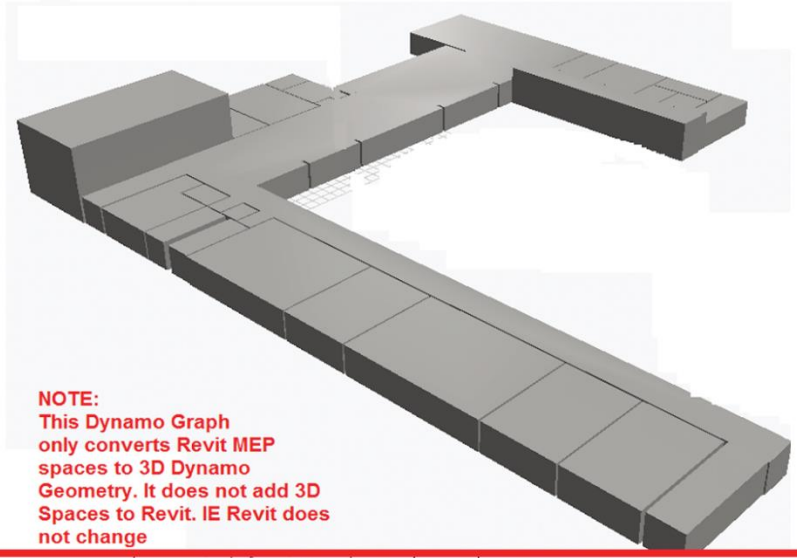


This node select the MEP space category

This node select ALL MEP space instances in Revit

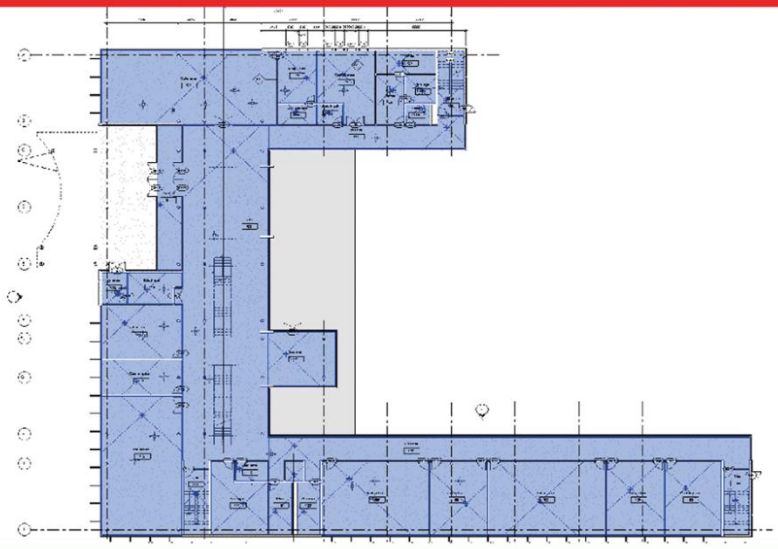
This node Converts MEP spaces to 3D Solids in Dynamo!

DYNAMO GEOMETRY



NOTE:
This Dynamo Graph only converts Revit MEP spaces to 3D Dynamo Geometry. It does not add 3D Spaces to Revit. IE Revit does not change

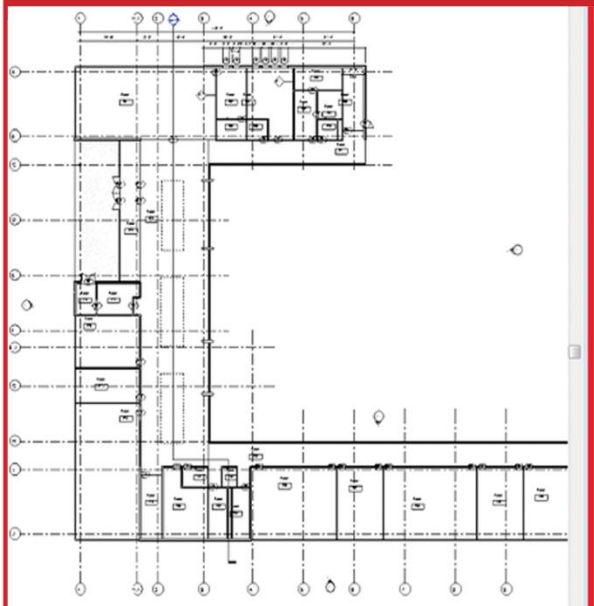
REVIT GEOMETRY



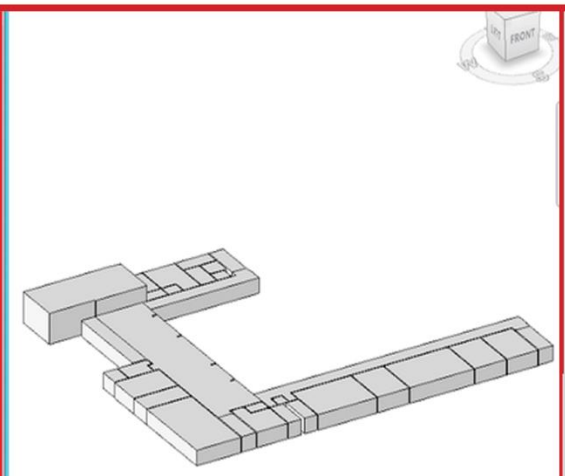
STEPS & NOTES

STEP 1: OPEN REVIT SAMPLE PROJECT “rac_advanced_sample_project.rvt”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: MEP SPACES IN REVIT ARE 2D ELEMENTS, THIS METHOD CONVERTS THE ROOMS TO 3D ELEMENTS IN DYNAMO ONLY

REVIT 3D MEP SPACES VIA IMPORT INSTANCE

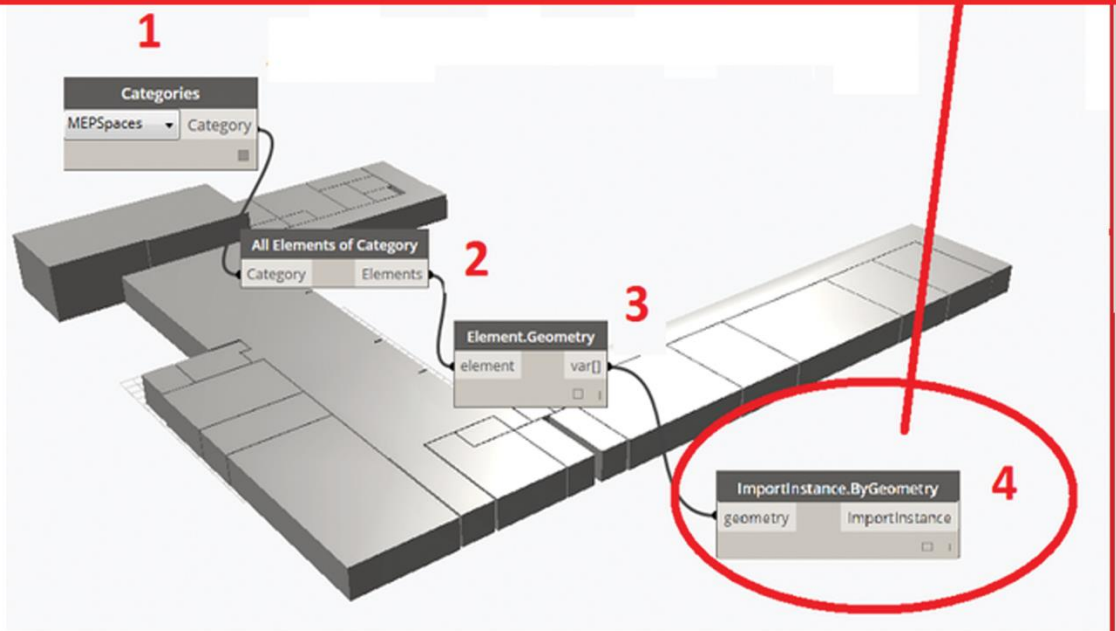


Revit Plan View



3D Geometry of MEP SPACES
Revit 3D View

REVIT GEOMETRY



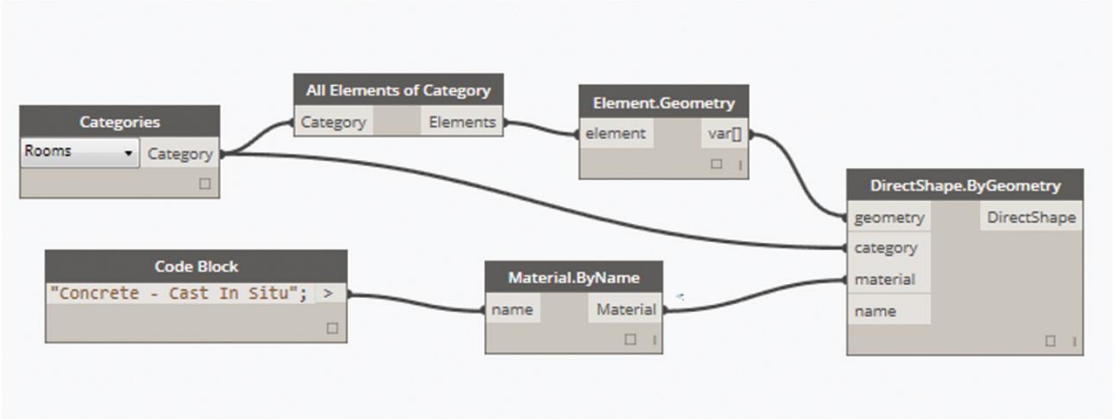
DYNAMO GEOMETRY AND NODES

STEP 1: OPEN REVIT SAMPLE PROJECT “rac_advanced_sample_project.rvt”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: MEP SPACES IN REVIT ARE 2D ELEMENTS, THIS METHOD CONVERTS THE ROOMS TO 3D
ALSO THERE ARE MANY OTHER METHODS TO GET DYNAMO GEOMETRY INTO REVIT

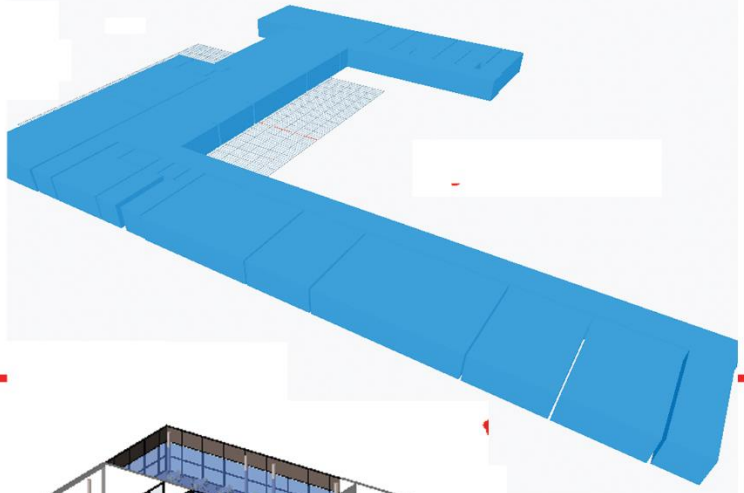
STEPS & NOTES

REVIT 3D ROOMS VIA DIRECT SHAPE

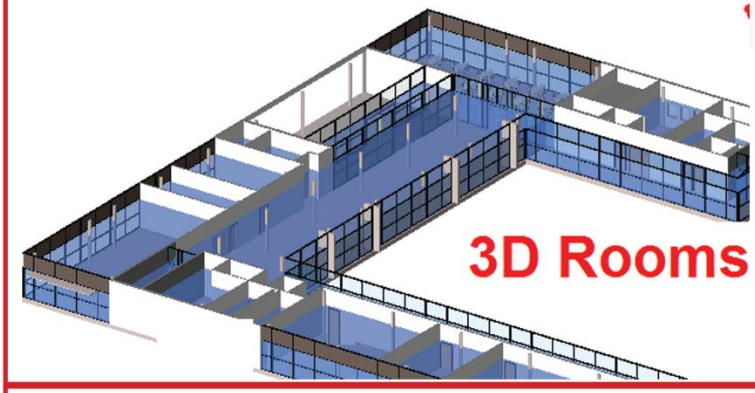
DYNAMO NODES



DYNAMO GEOMETRY



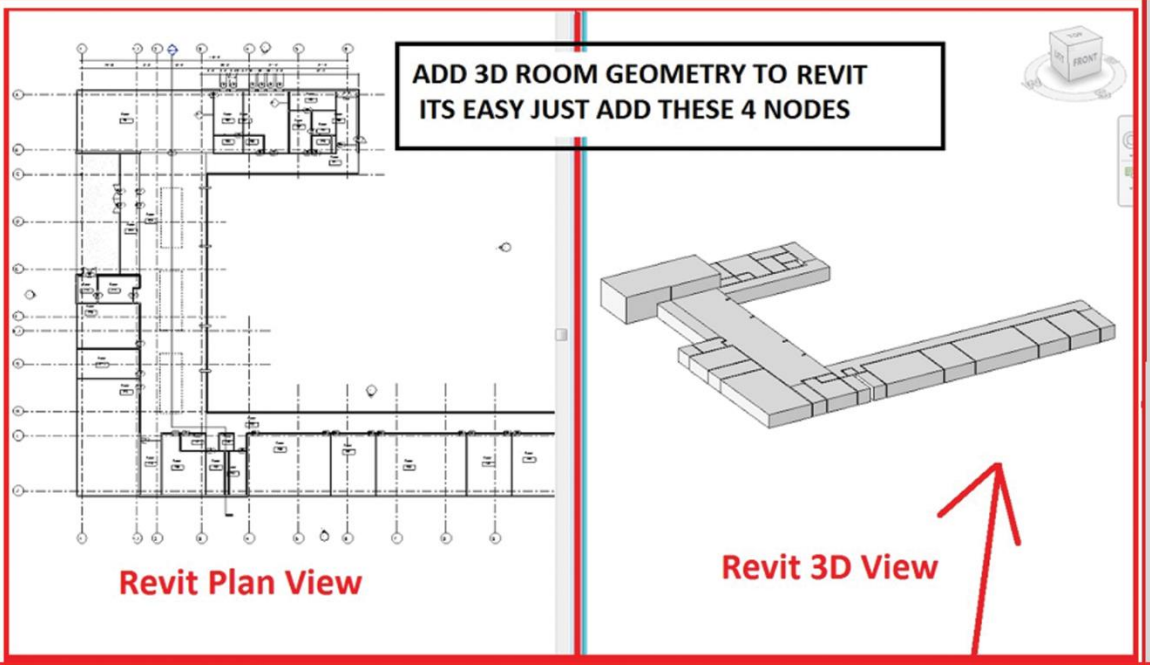
REVIT GEOMETRY



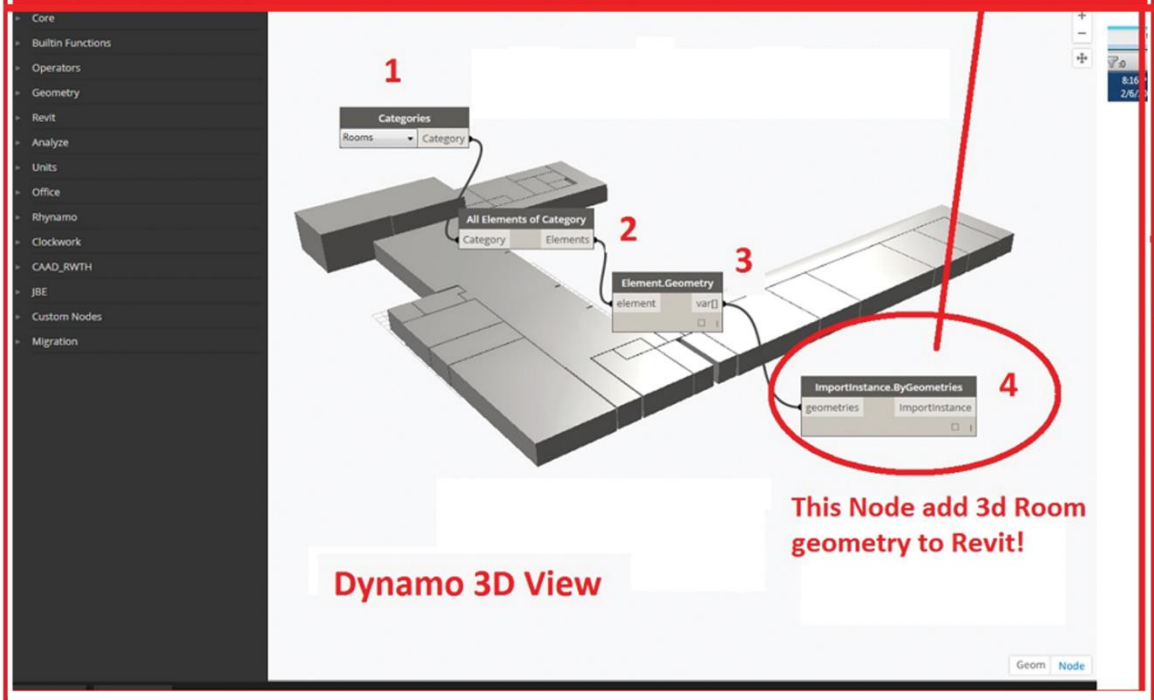
STEPS & NOTES

STEP 1: OPEN REVIT SAMPLE PROJECT “rac_advanced_sample_project.rvt”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: ROOMS IN REVIT ARE 2D ELEMENTS, THIS METHOD CONVERTS THE ROOMS TO 3D
ALSO THERE ARE MANY OTHER METHODS TO GET DYNAMO GEOMETRY INTO REVIT

REVIT 3D ROOMS VIA IMPORT INSTANCE



REVIT GEOMETRY



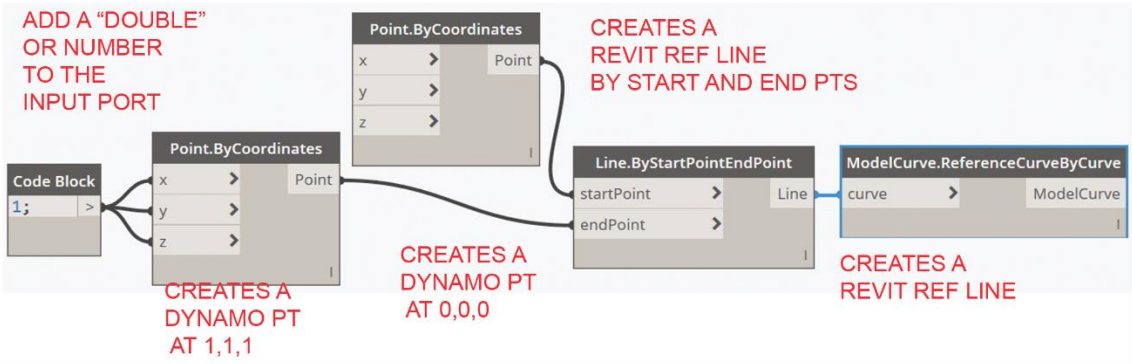
DYNAMO GEOMETRY AND NODES

STEP 1: OPEN REVIT SAMPLE PROJECT “rac_advanced_sample_project.rvt”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: ROOMS IN REVIT ARE 2D ELEMENTS, THIS METHOD CONVERTS THE ROOMS TO 3D
ALSO THERE ARE MANY OTHER METHODS TO GET DYNAMO GEOMETRY INTO REVIT

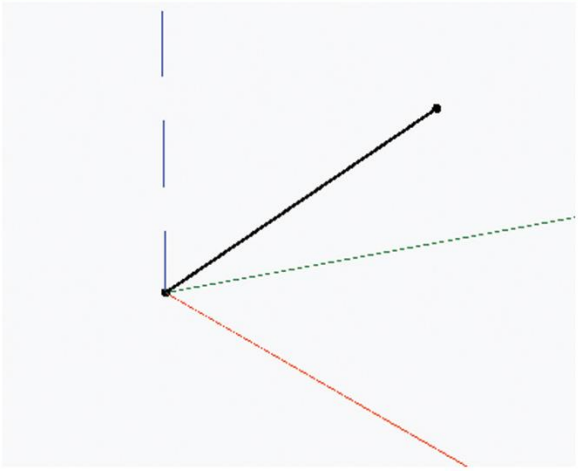
STEPS & NOTES

REVIT REFERENCE CURVE BY DYNAMO LINE

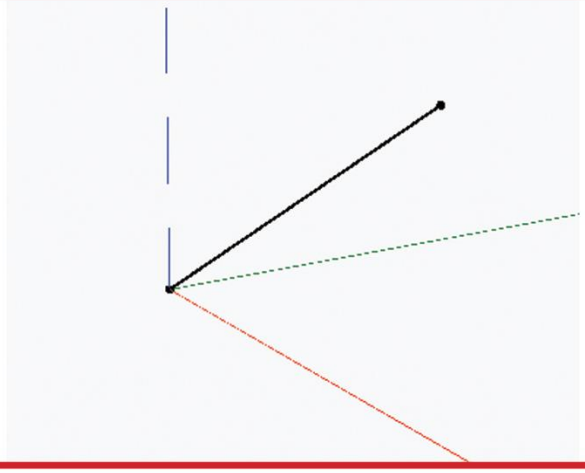
DYNAMO NODES



DYNAMO GEOMETRY



REVIT GEOMETRY

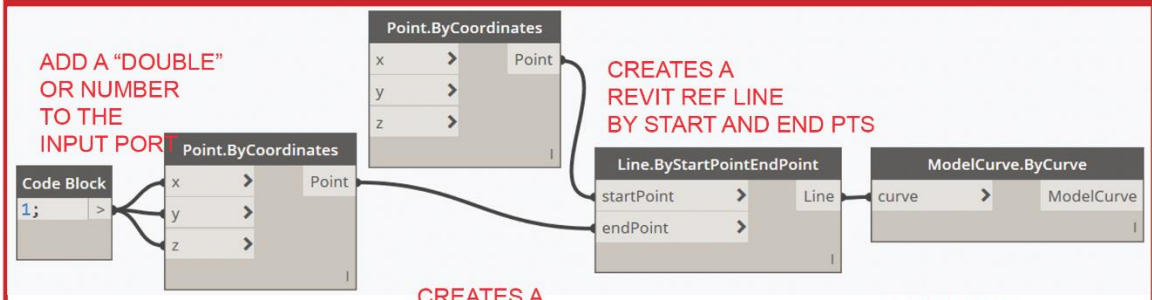


NOTE

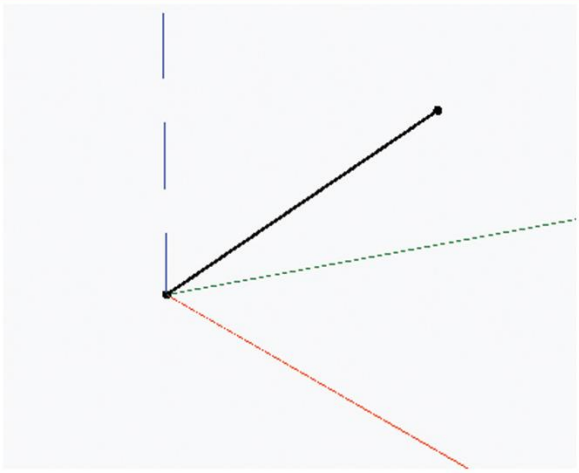
NOTE
THIS CREATES A REVIT REFERENCE LINE BY DYNAMO LINE AND ONLY WORKS IN MASSING OR AC FAMILY TEMPLATES.

REVIT MODEL CURVE BY DYNAMO LINE

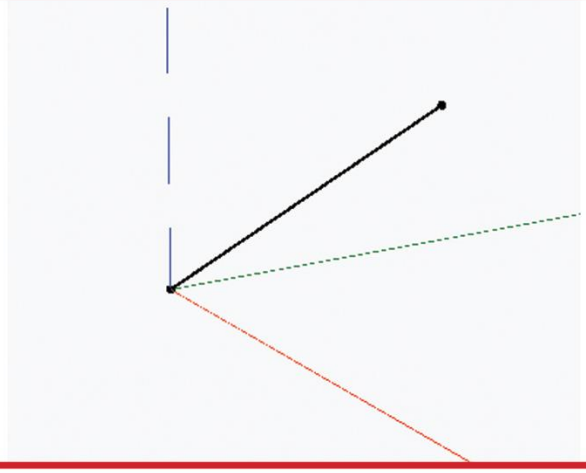
DYNAMO NODES



DYNAMO GEOMETRY



REVIT GEOMETRY

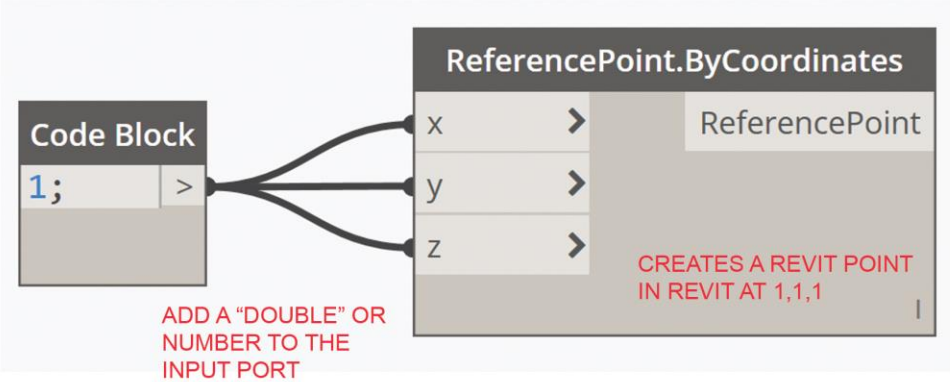


NOTE

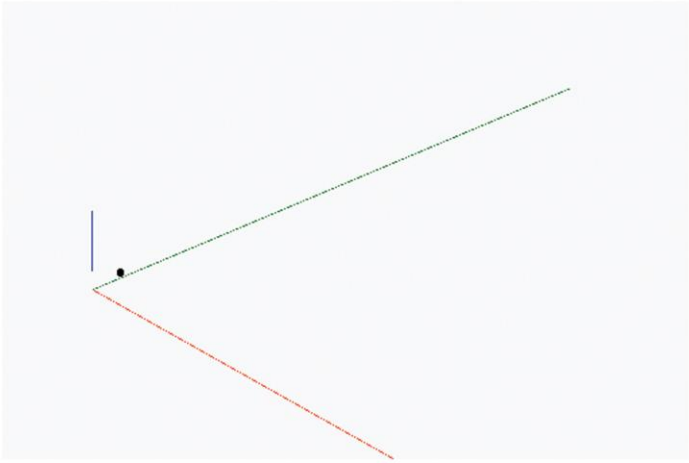
NOTE
THIS CREATES A REVIT MODEL LINE BY DYNAMO LINE

REVIT REFERENCE POINT IN MASS OR AC FAMILY

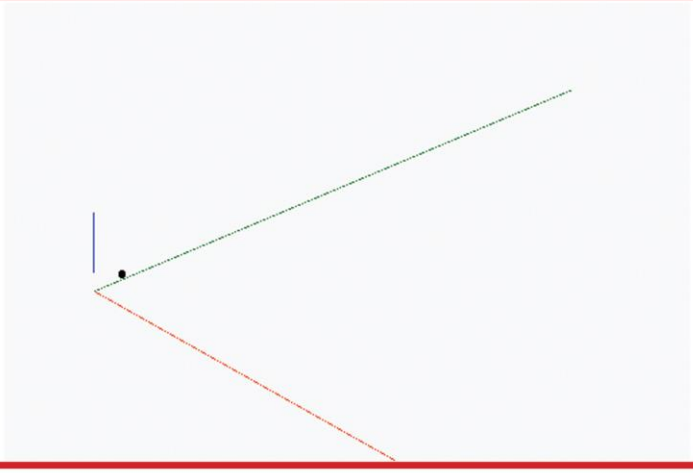
DYNAMO NODES



DYNAMO GEOMETRY



REVIT GEOMETRY

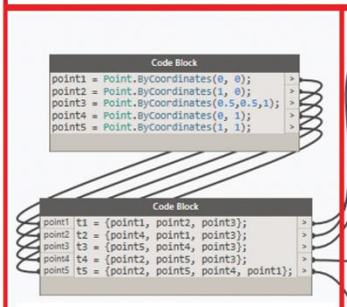


NOTE

NOTE
THIS CREATES A REVIT POINT AT X,Y,Z BY DEFAULT (NO DATA ENTERED INTO THE INPUT PORTS)
THEN THE POINT WOULD BE CREATED AT 0,0,0
ALSO, ONLY WORKS WITH THE MASSING OR AC FAMILY TEMPLATES

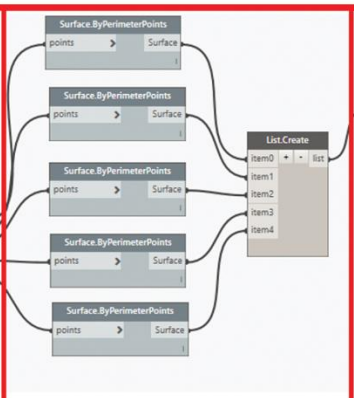
REVIT 4 SIDED PYRAMID

DYNAMO NODES

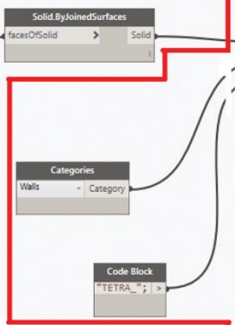


THESE NODES CREATES THE 5 POINTS FOR THE TETRAHEDRON AND ARRANGES THEM IN LISTS TO DEFINE VERTICES OF FACES

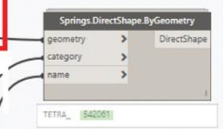
NOTE THAT THIS EXAMPLE USES A PYRAMID THAT IS 1 UNIT X 1 UNIT X 1 UNIT



THESE NODES CREATE THE FACES FROM THE VERTICES (5 TOTAL FACES) AND CREATES A LIST

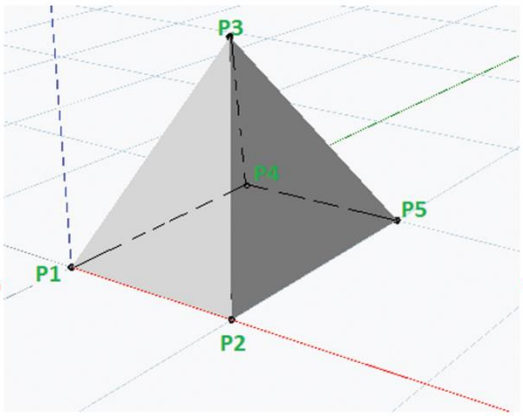


THIS NODE CREATES THE SOLID PYRAMID FROM THE 5 FACES (MUST MAKE A CLOSED SHAPE TO MAKE A SOLID)

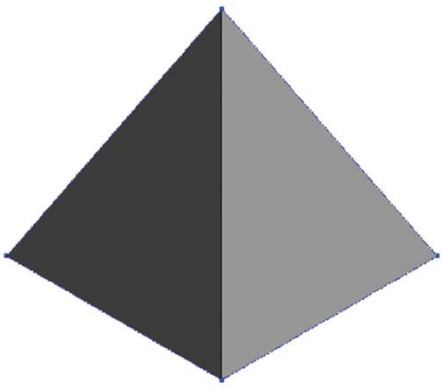


THESE NODES TAKE THE SOLID TETRAHEDRON IN DYNAMO AND CREATES A REVIT FAMILY (IN THIS CASE IN THE WALL CATEGORY) THIS CUSTOM NODE IS FROM THE "SPRINGS" PACKAGE

DYNAMO GEOMETRY



REVIT GEOMETRY

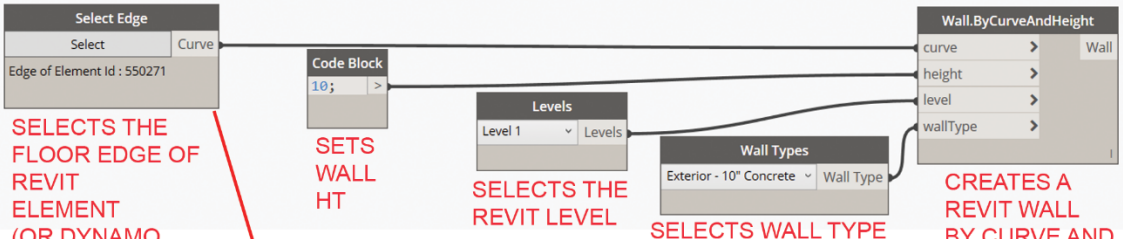


NOTE

NOTE
THIS CREATES A PRYAMID IN DYNAMO THEN IN REVIT AT 1X1X1

REVIT WALL BY CURVE AND HT

DYNAMO NODES



SELECTS THE FLOOR EDGE OF REVIT ELEMENT (OR DYNAMO CURVE COULD BE

SETS WALL HT

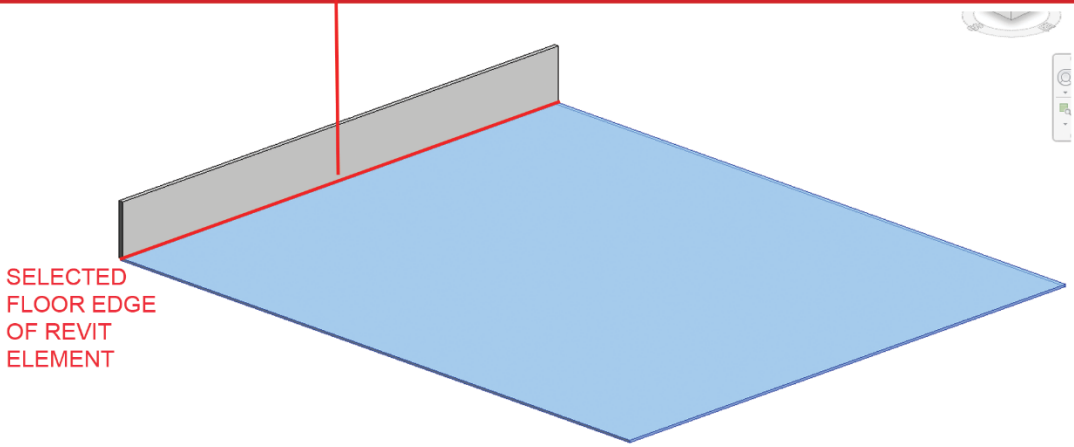
SELECTS THE REVIT LEVEL

SELECTS WALL TYPE

CREATES A REVIT WALL BY CURVE AND HT

DYNAMO GEOMETRY

REVIT GEOMETRY



SELECTED FLOOR EDGE OF REVIT ELEMENT

NOTE

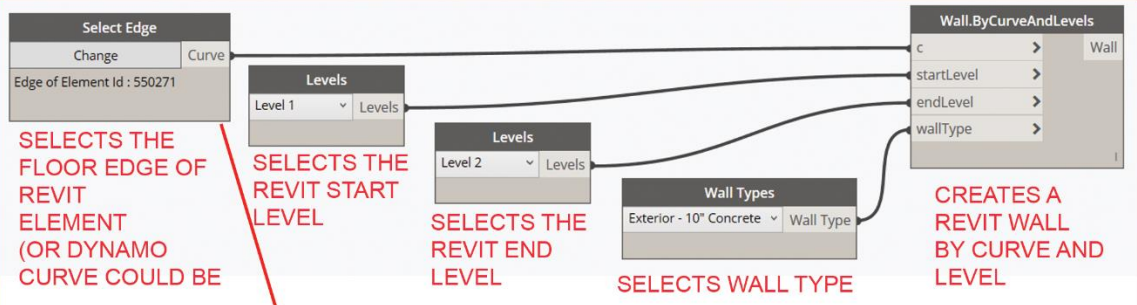
NOTES

THIS CREATES A REVIT (ARCH NOT STRUCTURAL) WALL BY CURVE AND HT

MOST CURVES COULD BE USED TO PLACE THE WALL FROM REVIT OR FROM DYNAMO

REVIT WALL BY CURVE AND LEVEL

DYNAMO NODES



SELECTS THE FLOOR EDGE OF REVIT ELEMENT (OR DYNAMO CURVE COULD BE

SELECTS THE REVIT START LEVEL

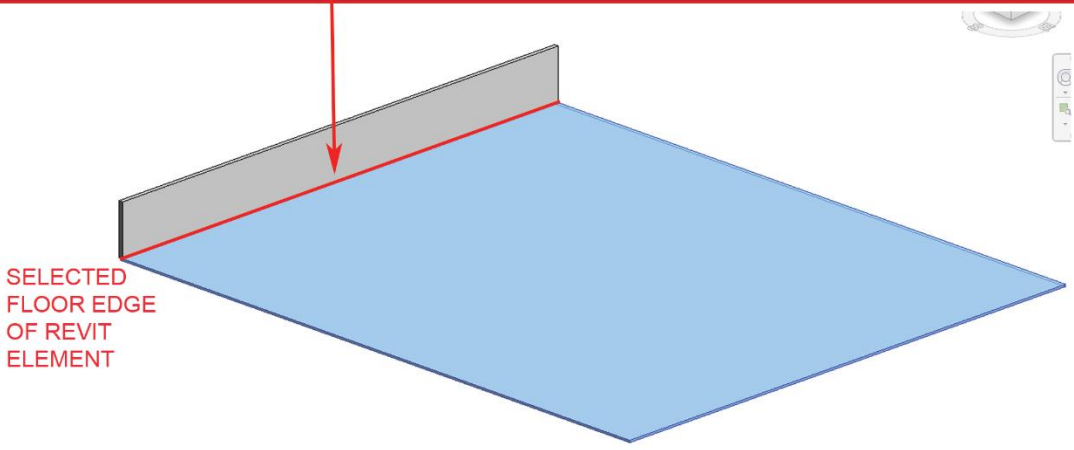
SELECTS THE REVIT END LEVEL

SELECTS WALL TYPE

CREATES A REVIT WALL BY CURVE AND LEVEL

DYNAMO GEOMETRY

REVIT GEOMETRY



SELECTED FLOOR EDGE OF REVIT ELEMENT

NOTE

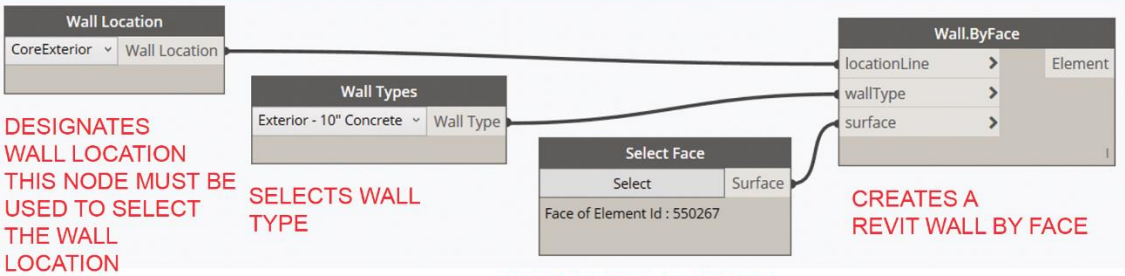
NOTES

THIS CREATES A REVIT (ARCH NOT STRUCTURAL) WALL BY CURVE AND LEVEL

MOST CURVES COULD BE USED TO PLACE THE WALL FROM REVIT OR FROM DYNAMO

REVIT WALL BY FACE

DYNAMO NODES



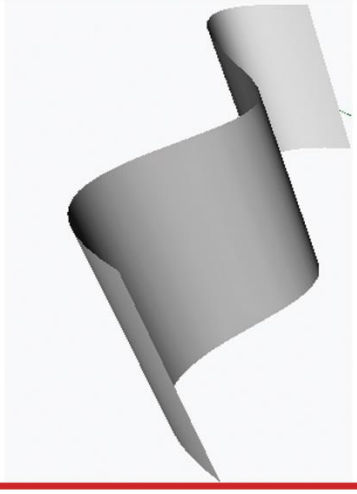
DESIGNATES WALL LOCATION THIS NODE MUST BE USED TO SELECT THE WALL LOCATION

SELECTS WALL TYPE

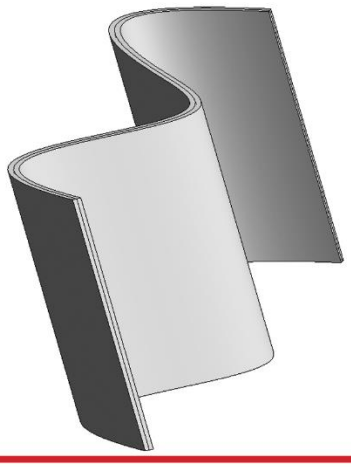
SELECTS THE SURFACE FACE IN REVIT

CREATES A REVIT WALL BY FACE

DYNAMO GEOMETRY



REVIT GEOMETRY



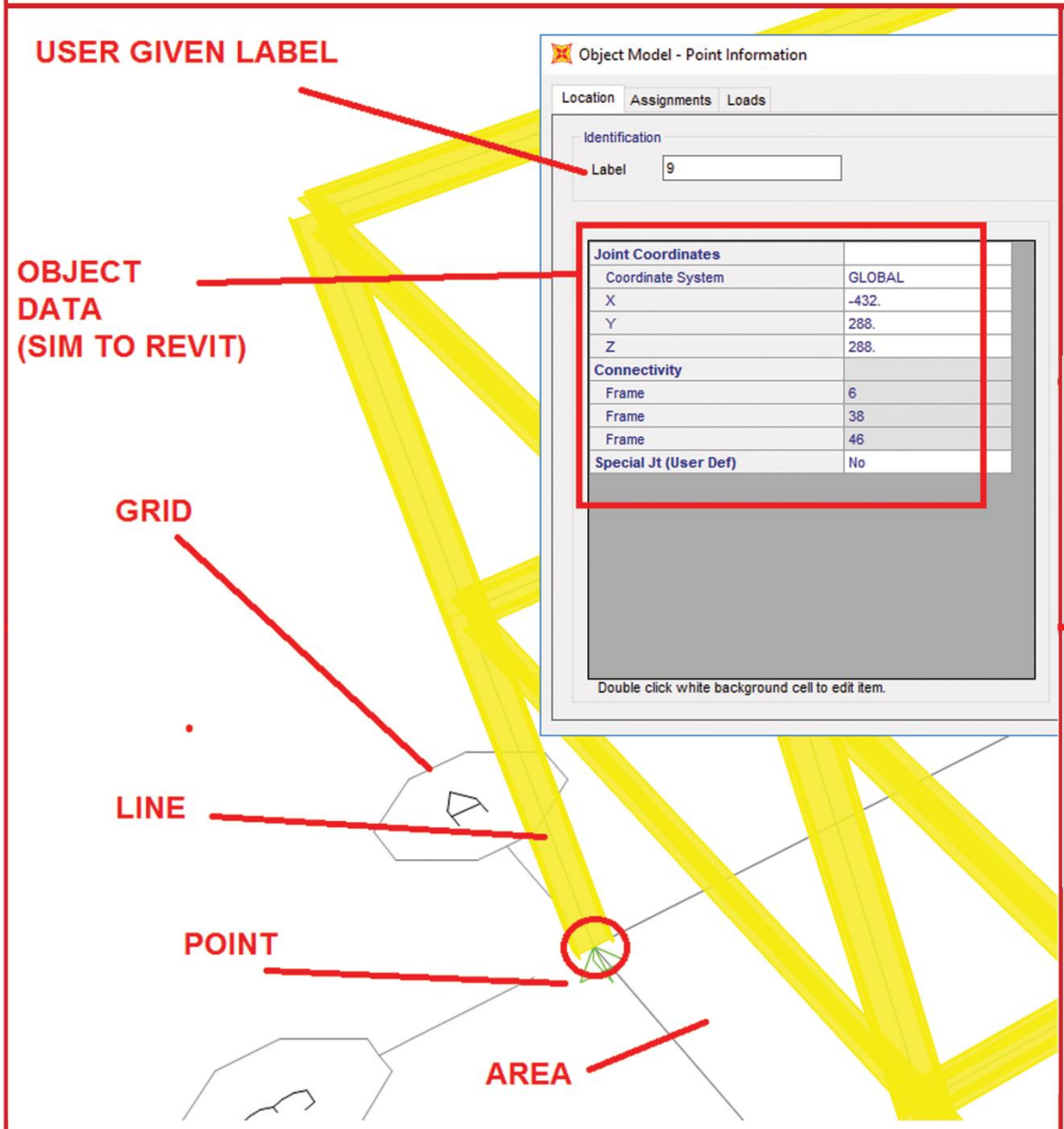
NOTE

NOTES

THIS CREATES A REVIT WALL BY FACE

ANY SURFACE COULD BE USED TO PLACE THE WALL FROM REVIT OR FROM DYNAMO

ANATOMY OF SAP



SAP PROPERTIES

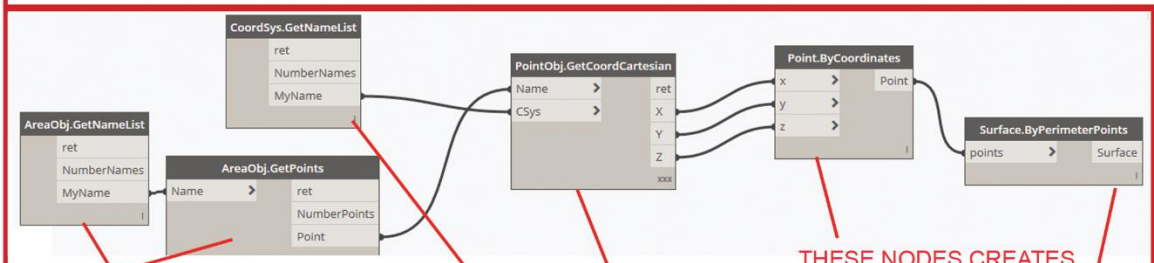
SAP ANATOMY

NOTES: THERE ARE ONLY 3 MAIN ELEMENTS IN SAP WITH SUB CATEGORIES
1. FRAMES MAKE UP COLUMNS, BEAMS, BRACES ETC
2. JOINTS MAKE UP NODES
3. AREAS MAKE UP SLABS AND WALLS

NOTES

SAP GET ALL AREA AS SURFACES IN DYNAMO

DYNAMO NODES



THESE NODES GET ALL THE AREAS AND NAMES AND PT NAMES

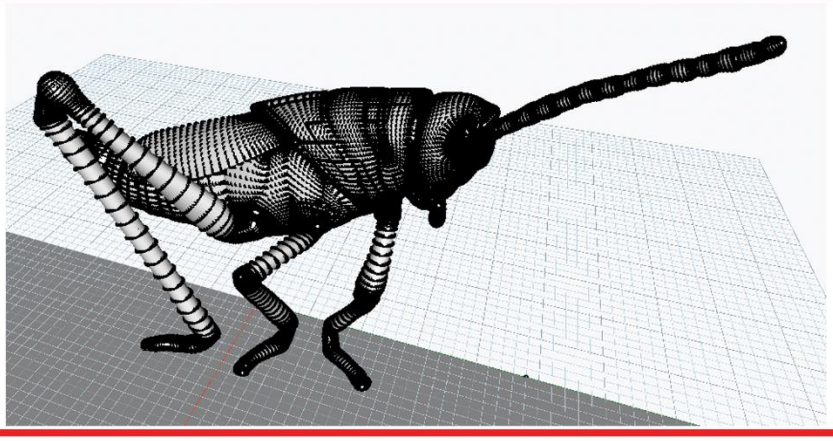
THIS NODE GETS CSYS NAME

THESE NODES GET X,Y,Z OF SAP POINTS

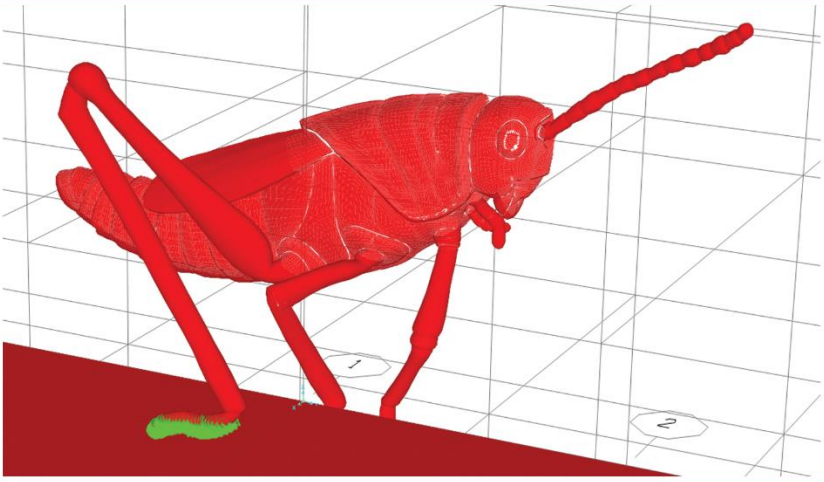
THESE NODES CREATES DYNAMO POINTS FROM X,Y,Z INPUT

THIS NODE CREATES DYNAMO SURFACES BY PERIMETER POINTS

DYNAMO GEOMETRY



SAP GEOMETRY



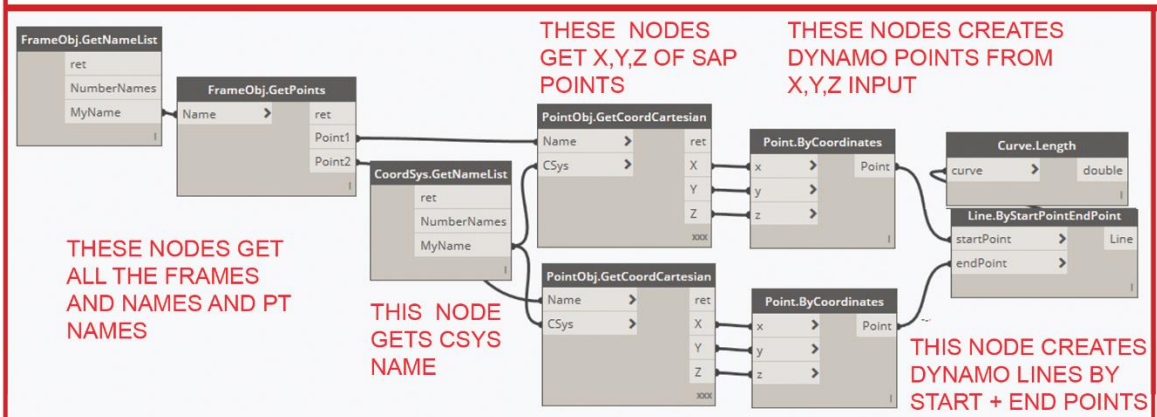
STEPS & NOTES

STEPS: 1. OPEN ANY SAP MODEL AND OPEN DYNAMO (CRICKET02 MODEL SHOWN)
2. ADD THE NODES ABOVE

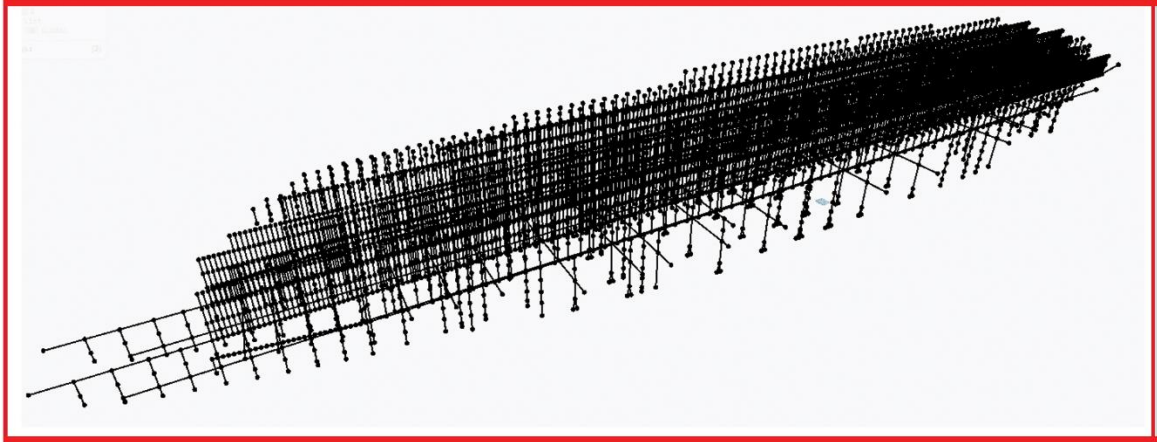
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READD NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OOTB DYNAMO NODES TO HELP YOU

SAP GET LENGTHS OF ALL FRAMES

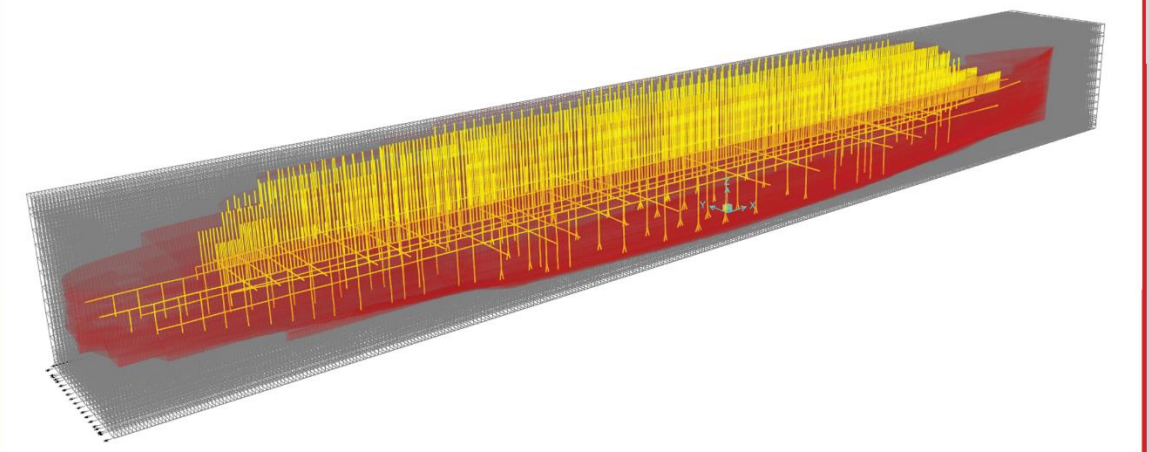
DYNAMO NODES



DYNAMO GEOMETRY



ETABS GEOMETRY



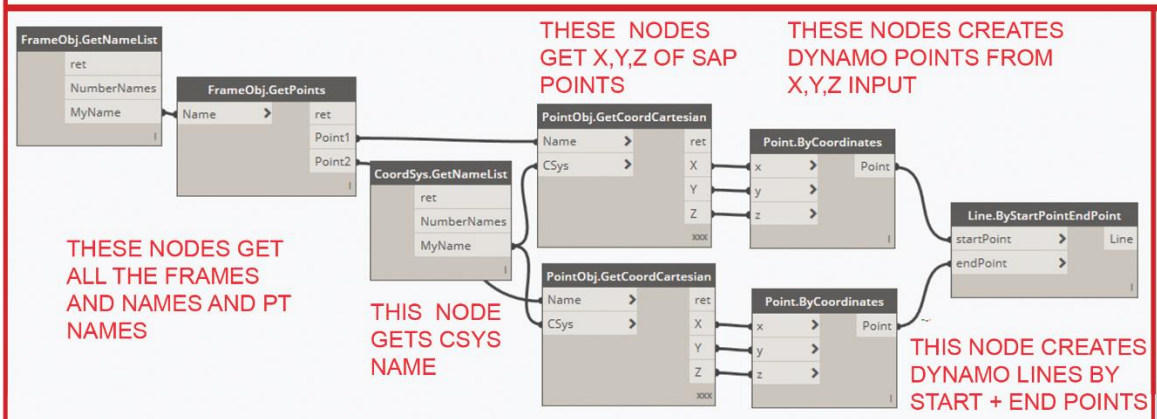
STEPS & NOTES

STEPS: 1. OPEN ANY ETABS MODEL “QM_FINAL.sdb” AND OPEN DYNAMO
2. ADD THE NODES ABOVE

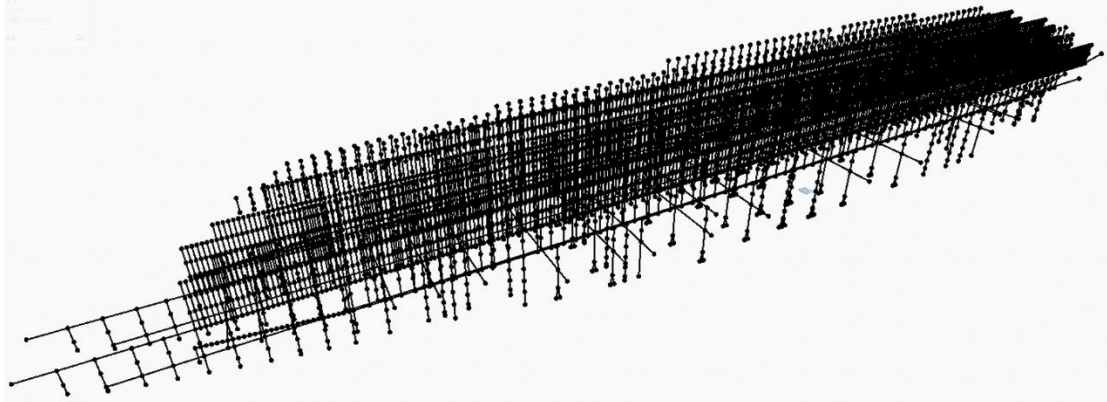
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READ NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OOTB DYNAMO NODES TO HELP YOU

SAP GET ALL FRAMES AS LINES IN DYNAMO

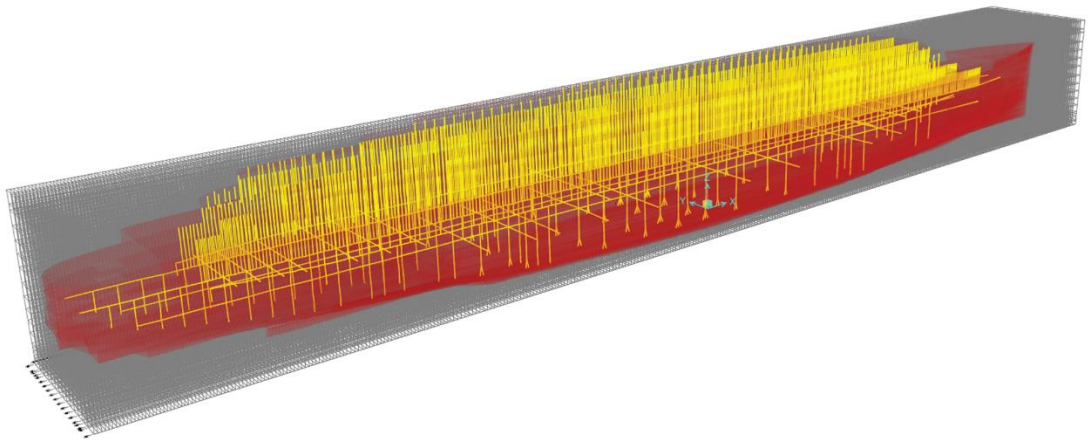
DYNAMO NODES



DYNAMO GEOMETRY



ETABS GEOMETRY



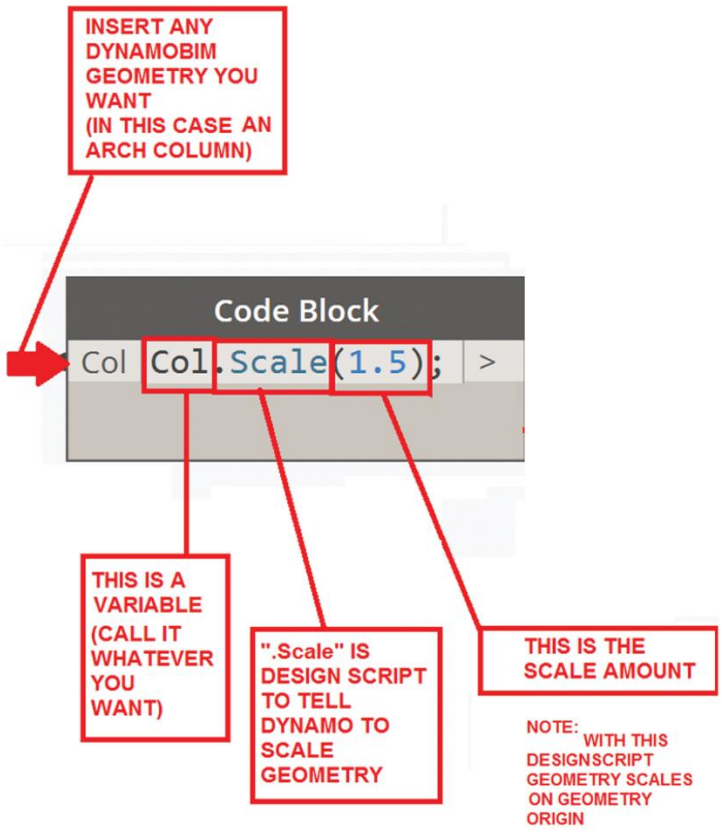
STEPS & NOTES

STEPS: 1. OPEN ANY ETABS MODEL AND OPEN DYNAMO
2. ADD THE NODES ABOVE

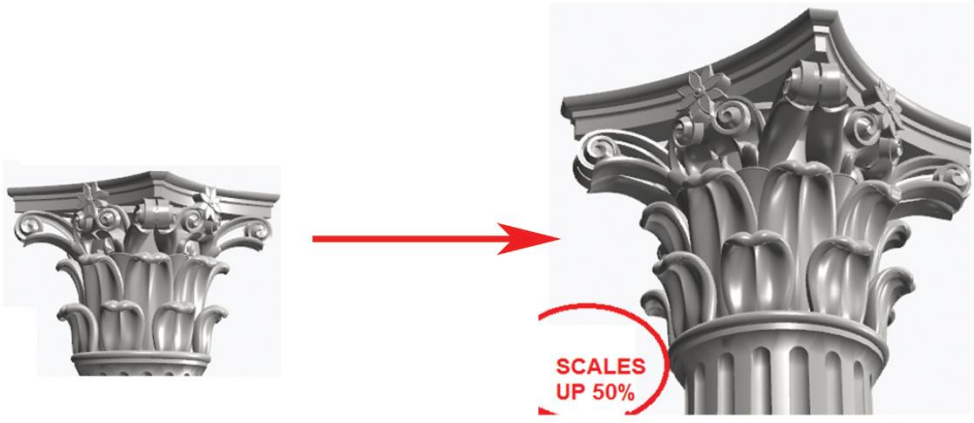
NOTES: 1. BEST IF DYNAMO FOR ETABS IS RUN IN MANUAL- READD NODE IF ITS NOT UPDATING
2. DONT FORGET TO USE ALL THOSE OTHER OOTB DYNAMO NODES TO HELP YOU

SCALE BY DESIGN SCRIPT

DYNAMO NODES



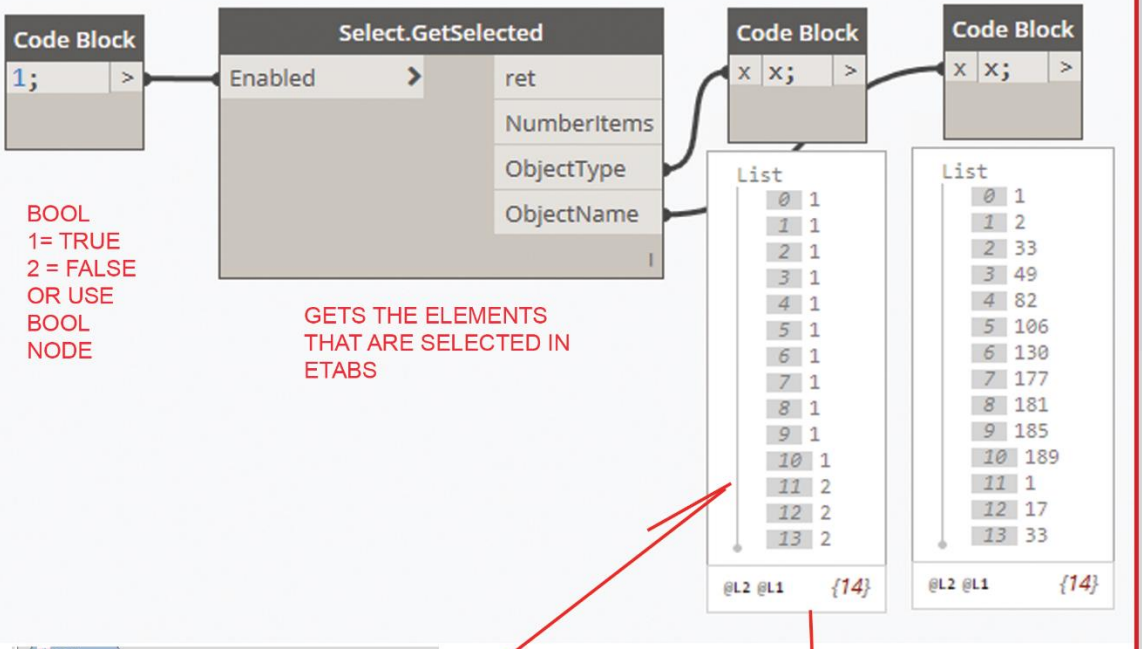
DYNAMO GEOMETRY

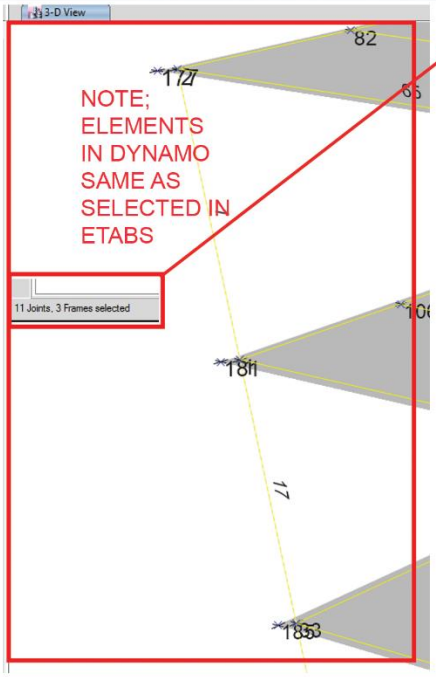


NOTES

NOTE: THE METHOD SHOWS HOW TO SCALE ANY DYNAMO GEOMETRY USING 1 SIMPLE LINE OF DESIGN SCRIPT CODE. REVIT IS NOT INVOLVED WITH THIS EXAMPLE

SELECT ELEMENTS VIA DYNAMO WHEN SELECTED IN ETABS





Member name	Value
Point	1
Frame	2
Area	3
Solid	6

OBJECT TYPE ENUMS
SEE TABLE
FOR WHAT THE NUMBERS
REPRESENT

DYNAMO NODES ETABS AND ENUM OBJECT TYPE TABLE

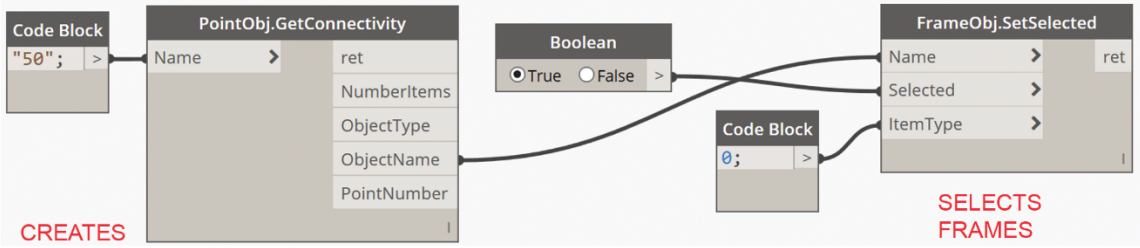
STEPS: 1. OPEN ETABS MODEL AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: USE CAUTION WHEN USING THIS METHOD TO SELECT ELEMENTS VIA DYNAMO. IF "1" INPUT IS NOT CHANGED - OUTPUT DOES NOT CHANGE EVEN IF ETABS SELECTION CHANGES

STEPS & NOTES

SELECT FRAME ELEMENTS CONNECTED TO POINTS IN ETABS

DYNAMO NODES



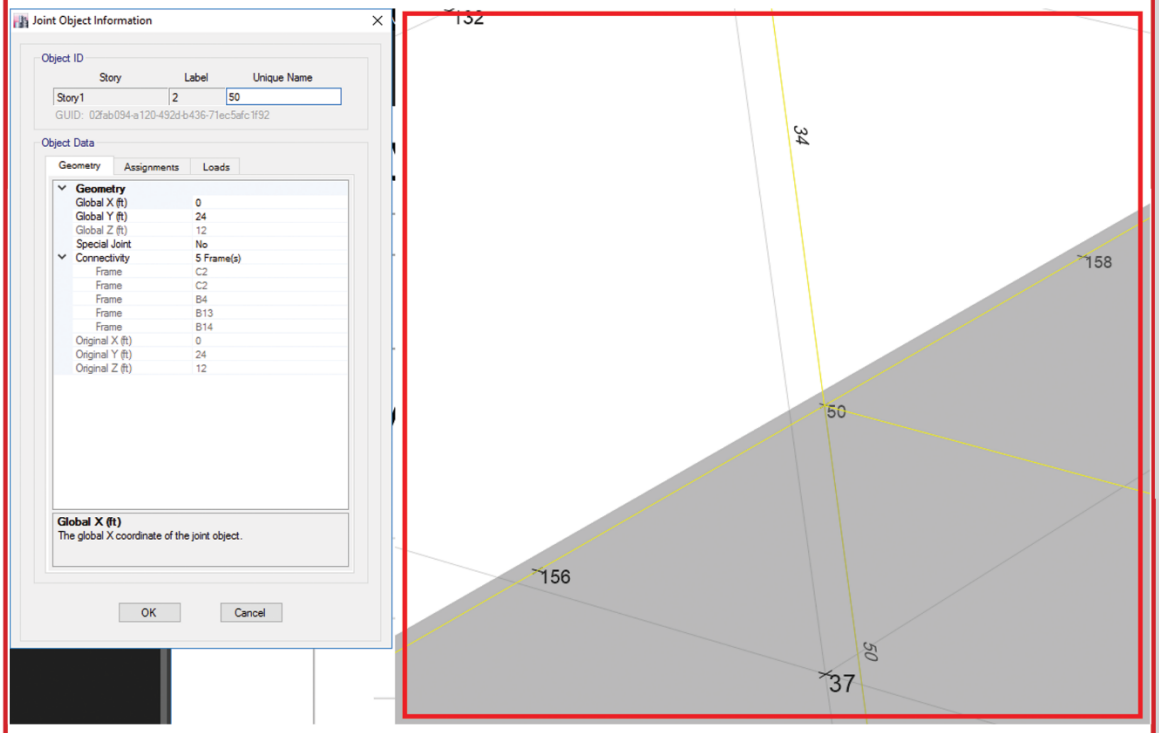
CREATES INPUT POINT NAME (STRING)

GETS ELEMENTS CONNECTED TO POINT

SETS BOOL FOR SELECTED AND OBJECT ITEM TYPE

SELECTS FRAMES IN ETABS CONNECTED TO POINT

ETABS GEOMETRY

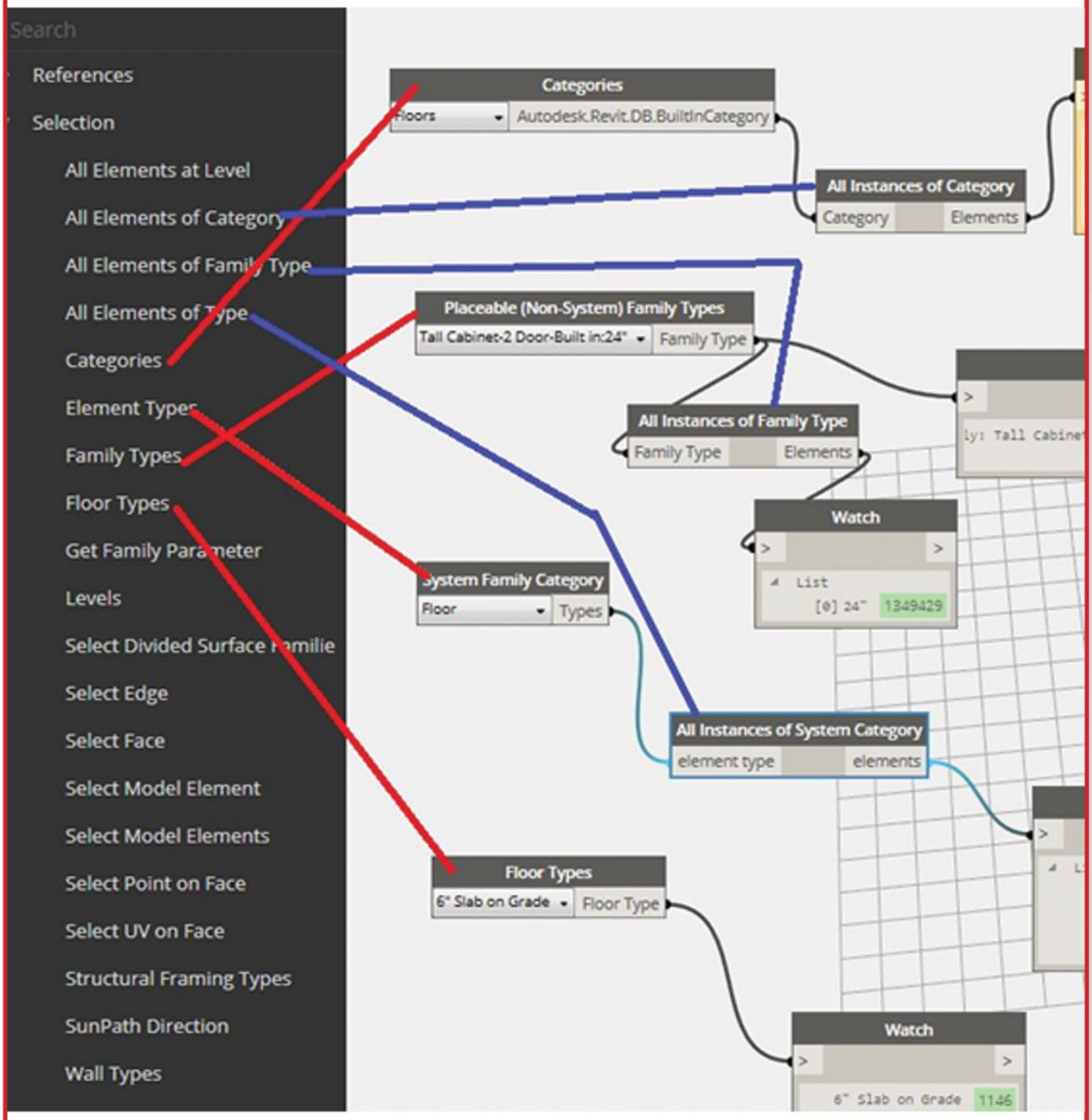


STEPS & NOTES

STEPS: 1. OPEN ETABS “SELECT FRAME ELEMENTS CONNECTED TO POINTS” AND OPEN DYNAMO
2. ADD THE NODES ABOVE

NOTES: THIS EXAMPLE SHOWS ONLY FRAMES CONNECTED IF OTHER TYPES CONNECTED SUCH AS AREAS USE THE “AREAOBJ.SETSELECTED NODE

SELECTION NODE NAMING



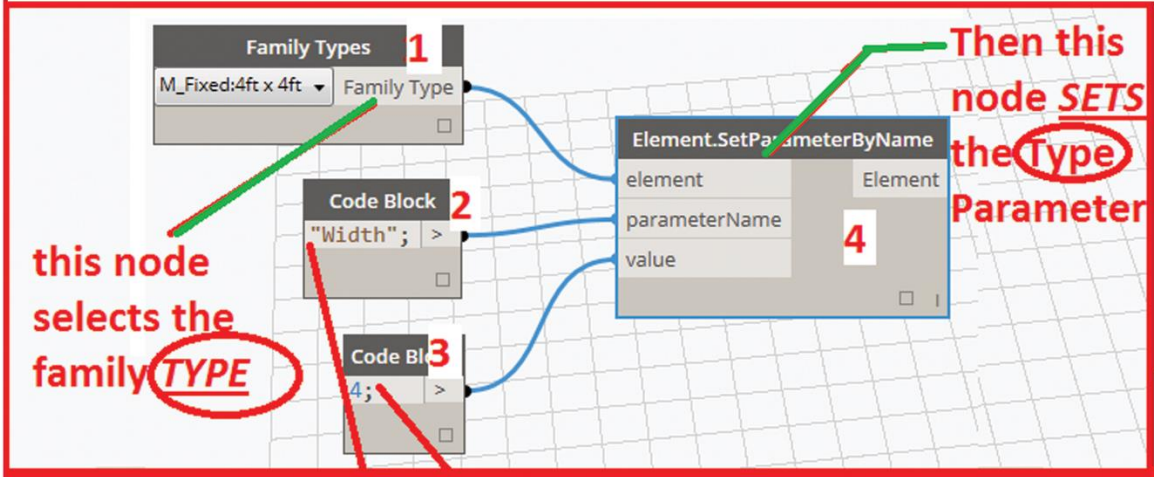
DYNAMO NODES

NOTE: THE NODES SHOWN HAVE BEEN RENAMED FROM THE ORIGINAL NAMES OF THE OOTB SELECTION NODES TO HELP CLARIFY WHICH NODES SELECT WHICH REVIT FAMILIES OR TYPES OR CATEGORIES

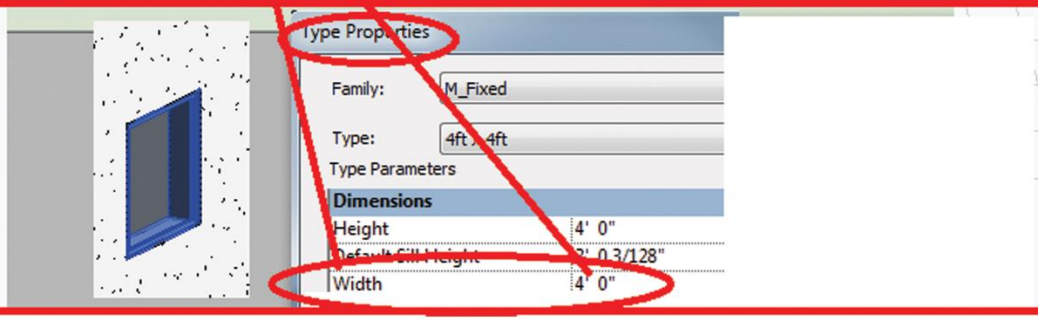
STEPS & NOTES

SET TYPE PARAMETER IN A LOADABLE FAMILY

DYNAMO NODES



REVIT GEOMETRY

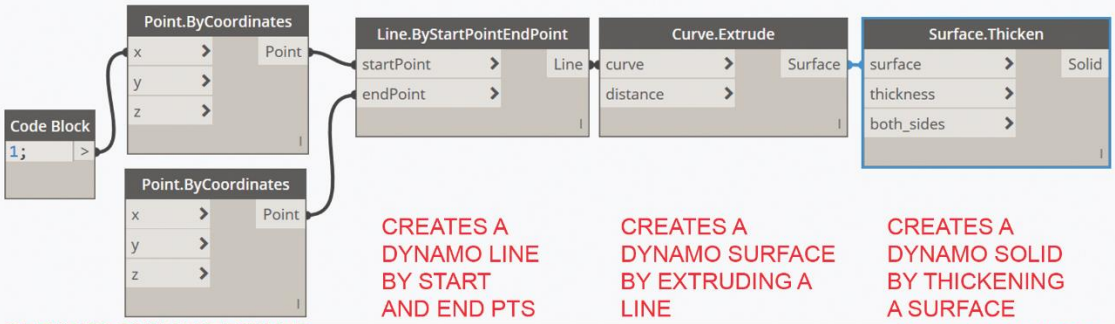


STEPS & NOTES

STEP 1: OPEN FILE "SET_TYPE_PARAMETER_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: THIS METHOD WILL NOT WORK FOR A SYSTEM FAMILY

DYNAMO SOLID BY THICKEN

DYNAMO NODES



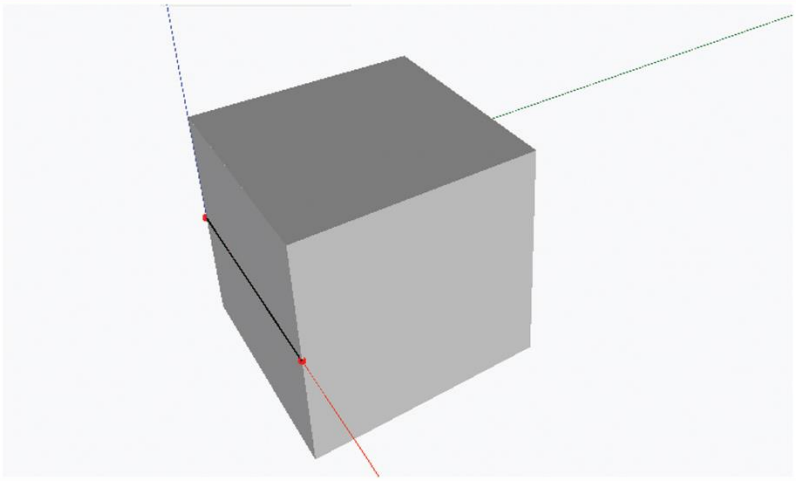
CREATES DYNAMO POINTS

CREATES A DYNAMO LINE BY START AND END PTS

CREATES A DYNAMO SURFACE BY EXTRUDING A LINE

CREATES A DYNAMO SOLID BY THICKENING A SURFACE EQUALLY ON BOTH SIDES

DYNAMO GEOMETRY



REVIT GEOMETRY

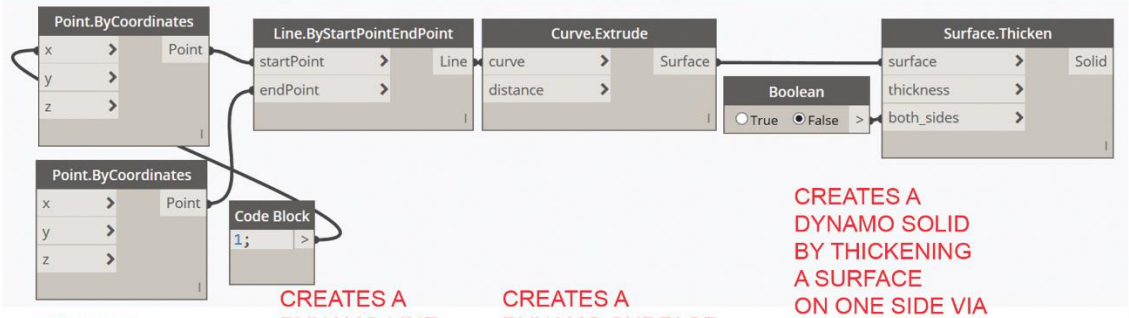
NOTE

NOTE

THIS CREATES A DYNAMO SOLID. THERE ARE OTHER WAYS TO CREATE SOLIDS. ALSO, THE SURFACE IS THICKENED IN THE POSITIVE DIRECTION WITH A THICKNESS DEFAULT OF 1. ALSO TRY NEG VALUES OR CHANGING FROM TWO SIDED THICKEN TO ONE SIDED THICKEN

DYNAMO SOLID BY THICKEN - 1 SIDE

DYNAMO NODES



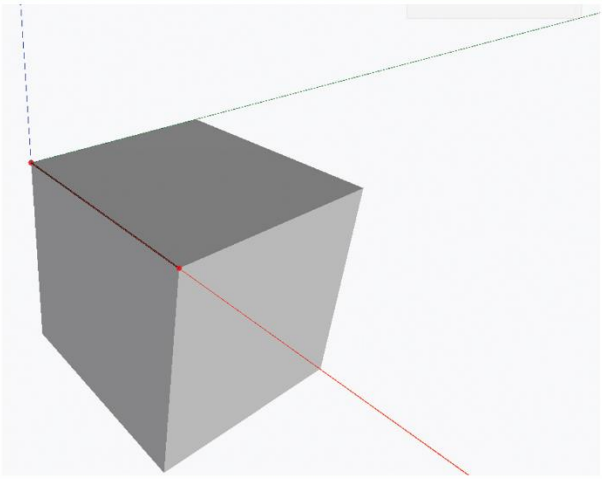
CREATES DYNAMO POINTS

CREATES A DYNAMO LINE BY START AND END PTS

CREATES A DYNAMO SURFACE BY EXTRUDING A LINE

CREATES A DYNAMO SOLID BY THICKENING A SURFACE ON ONE SIDE VIA BOOL = FALSE

DYNAMO GEOMETRY



REVIT GEOMETRY

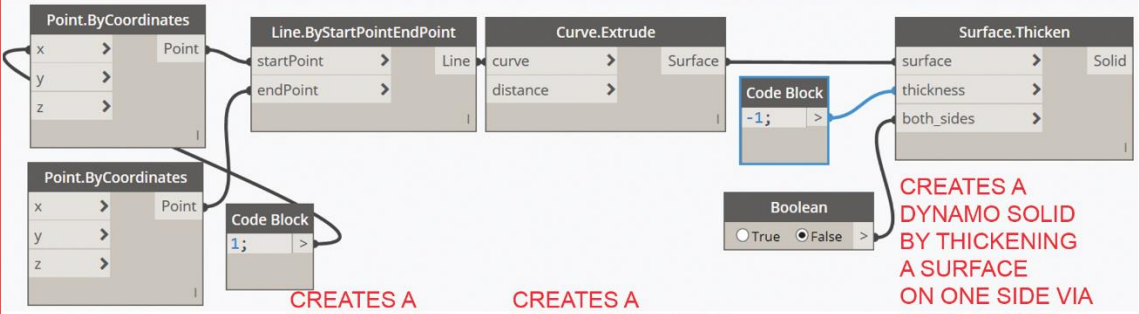
NOTE

NOTE

THIS CREATES A DYNAMO SOLID. THERE ARE OTHER WAYS TO CREATE SOLIDS. ALSO, THE SURFACE IS THICKENED IN THE POSITIVE DIRECTION WITH A THICKNESS DEFAULT OF 1. ALSO TRY NEG VALUES OR CHANGING FROM TWO SIDED THICKEN TO ONE SIDED THICKEN

DYNAMO SOLID BY THICKEN - 1 SIDE - NEG THICKNESS

DYNAMO NODES



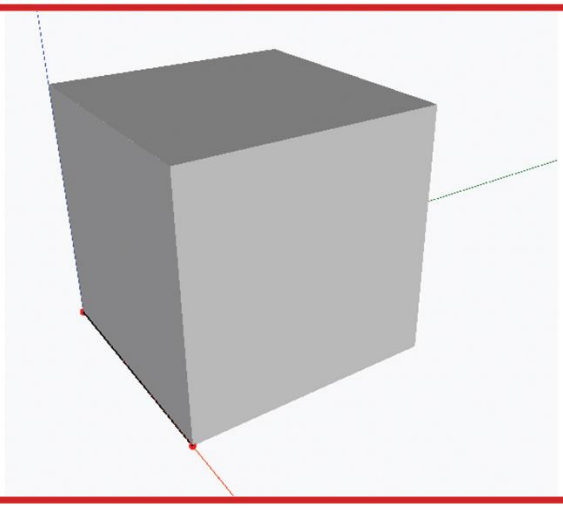
CREATES DYNAMO POINTS

CREATES A DYNAMO LINE BY START AND END PTS

CREATES A DYNAMO SURFACE BY EXTRUDING A LINE

CREATES A DYNAMO SOLID BY THICKENING A SURFACE ON ONE SIDE VIA BOOL = FALSE AND NEGATIVE THICKNESS

DYNAMO GEOMETRY



REVIT GEOMETRY

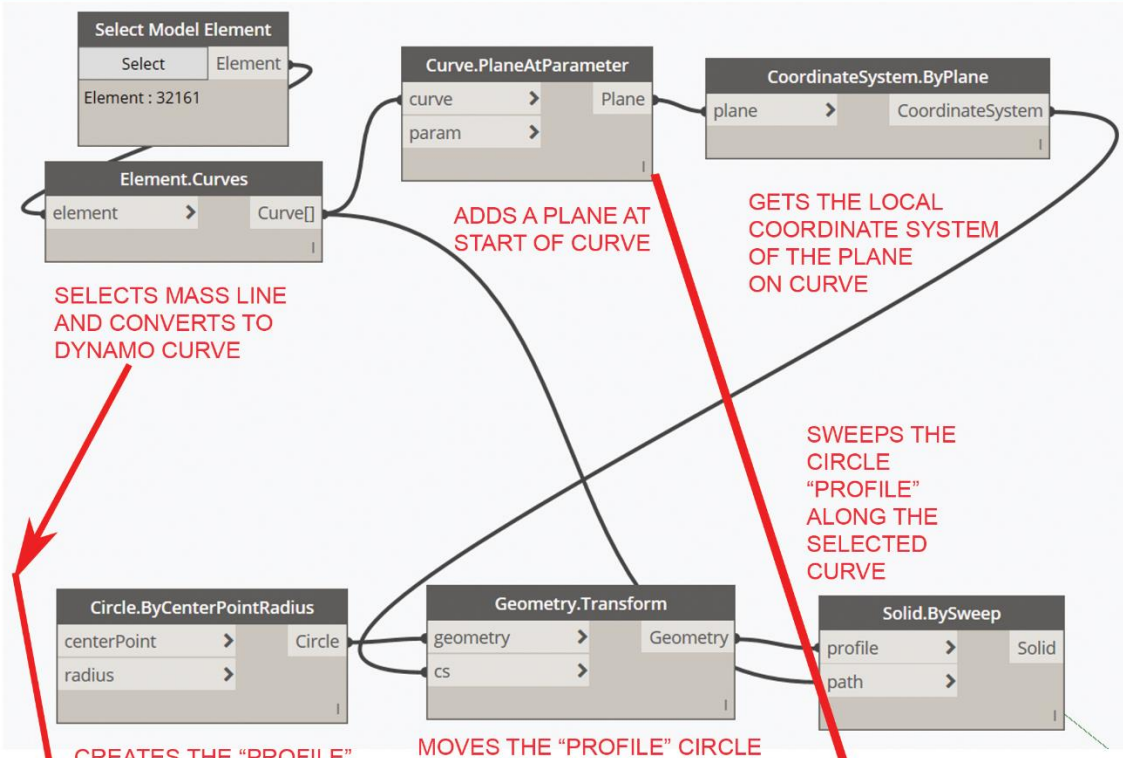
NOTE

NOTE

THIS CREATES A DYNAMO SOLID. THERE ARE OTHER WAYS TO CREATE SOLIDS. ALSO, THE SURFACE IS THICKENED IN THE POSITIVE DIRECTION WITH A THICKNESS DEFAULT OF 1. ALSO TRY NEG VALUES OR CHANGING FROM TWO SIDED THICKEN TO ONE SIDED THICKEN

DYNAMO SOLID : SWEEP PROFILE (CIRCULAR)

DYNAMO NODES



SELECTS MASS LINE AND CONVERTS TO DYNAMO CURVE

ADDS A PLANE AT START OF CURVE

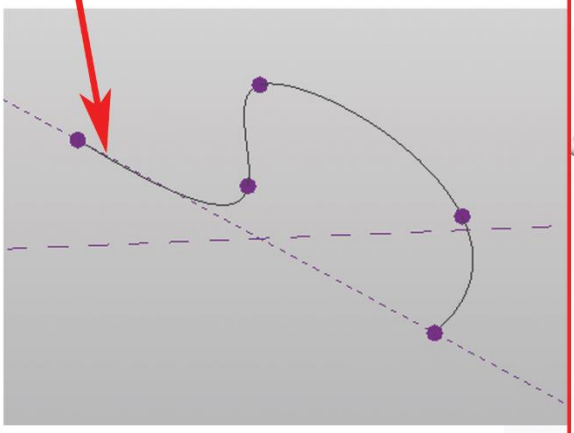
GETS THE LOCAL COORDINATE SYSTEM OF THE PLANE ON CURVE

SWEEPS THE CIRCLE "PROFILE" ALONG THE SELECTED CURVE

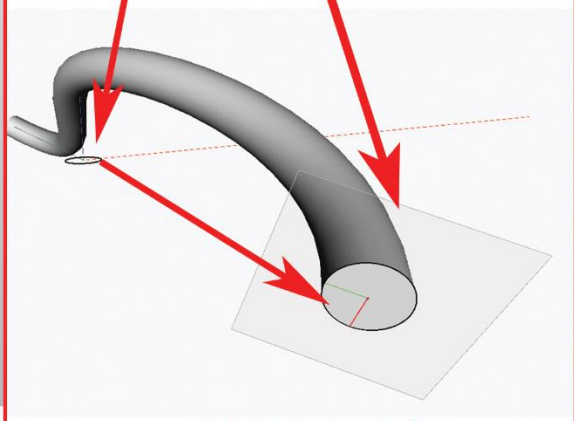
CREATES THE "PROFILE" CIRCLE AT THE GLOBAL COORDINATE 0,0,0

MOVES THE "PROFILE" CIRCLE FROM 0,0,0 IN GLOBAL COORDINATES TO THE LOCAL COORDINATES OF PLANE ON CURVE

REVIT DYNAMO GEOMETRY



REVIT MASS CURVE GEOMETRY



DYNAMO GEOMETRY

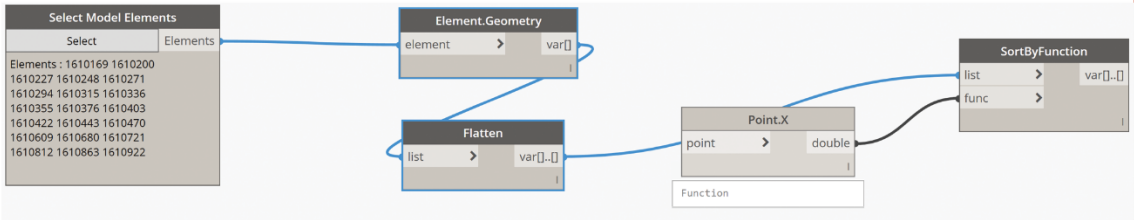
NOTE

NOTES

CREATES A SOLID BY SWEEPING A PROFILE ALONG A CURVE. ANY CURVE WILL WORK AND ANY CLOSED PROFILE COULD BE USED. CIRCLE WAS USED IN THIS CASE

REORDER LISTS OF POINTS BY ORDINATE

DYNAMO NODES



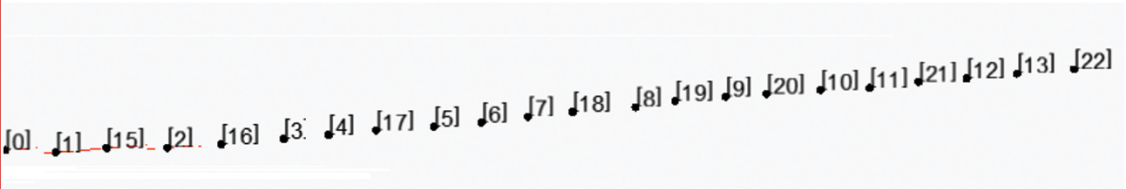
SELECTS ALL THE REVIT POINTS IN NO PARTICULAR ORDER

CONVERTS REVIT POINTS TO DYNAMO POINTS AND FLATTENS LIST

SETS THE X COORDINATE OF POINTS AS THE SORT FUNCTION

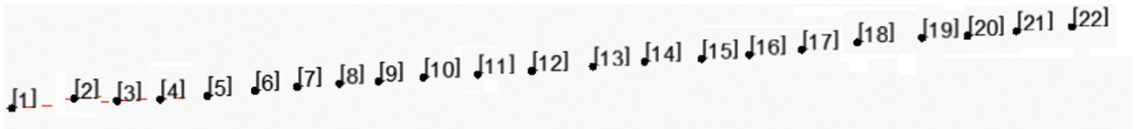
SORTS OR REORGANIZES THE LIST BY "FUNCTION" IN THIS CASE "X" COORDINATE

DYNAMO GEOMETRY



ORIGINAL ORDER OF POINTS
NOTICE THE POINTS ARE "OUT OF ORDER"

DYNAMO GEOMETRY



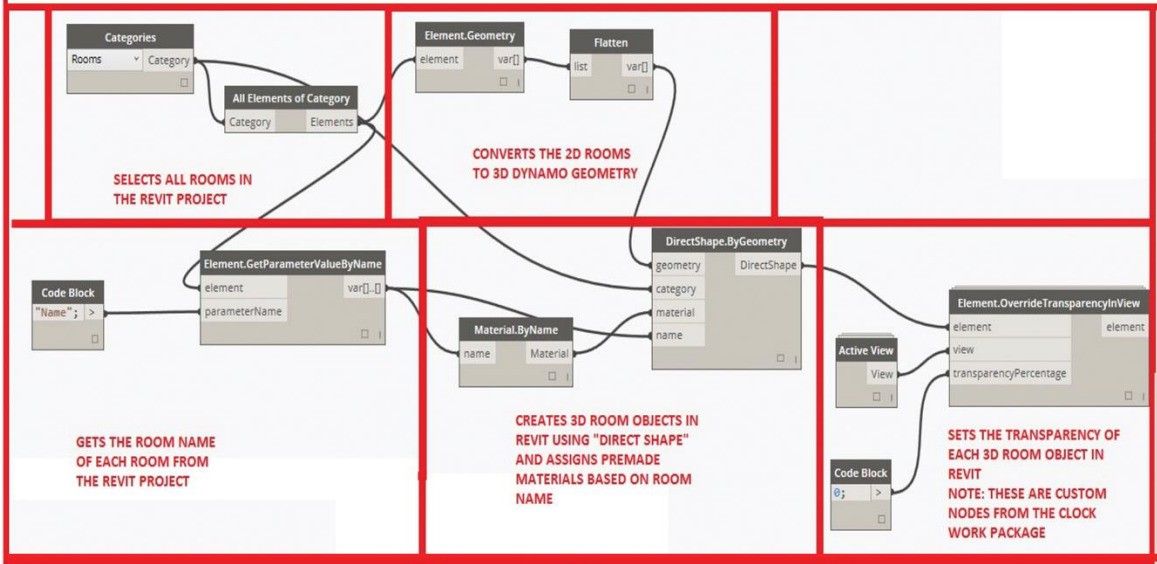
NEW ORDER OF POINTS
NOTICE THE POINTS ARE "IN ORDER" IN THE X DIRECTION

NOTE

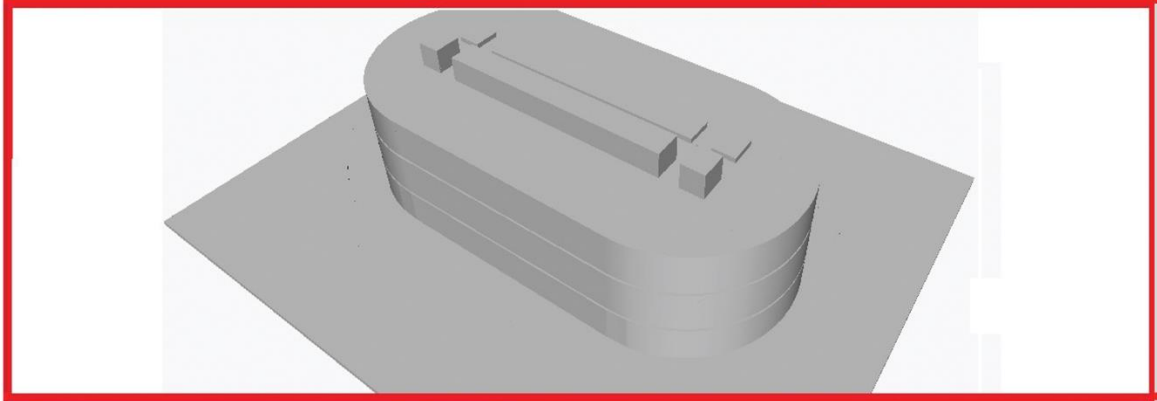
NOTE
FUNCTIONS ARE CREATED WHEN NOT ALL THE INPUT PORTS CONTAIN INPUT WIRES SUCH AS THE POINTS.X NODE IN THIS CASE. THE POINT.X IS USED AS A "CRITERIA" TO REORDER THE LIST. LIST BY FUNCTION ONLY WORKS IF THE FUNCTION IS RELATED TO THE LIST.

STACKING DIAGRAMS USING 3D ROOMS

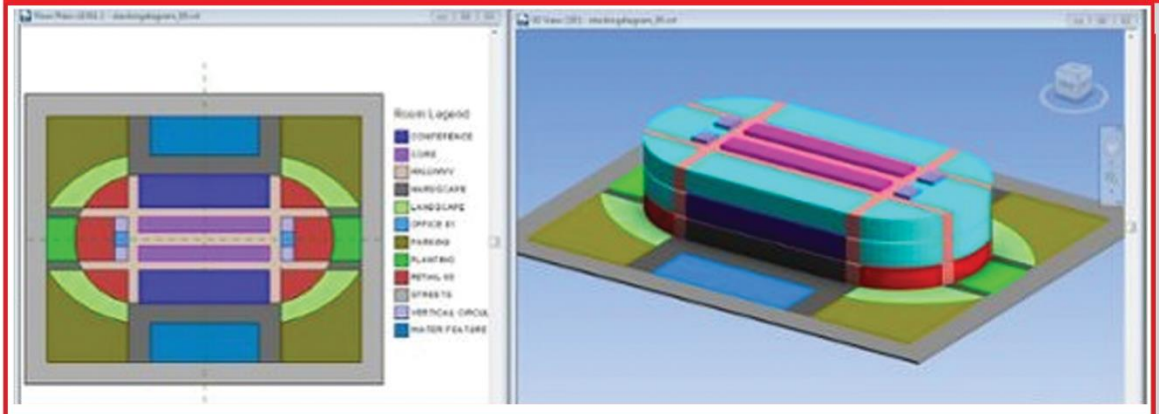
DYNAMO NODES



DYNAMO GEOMETRY



REVIT GEOMETRY

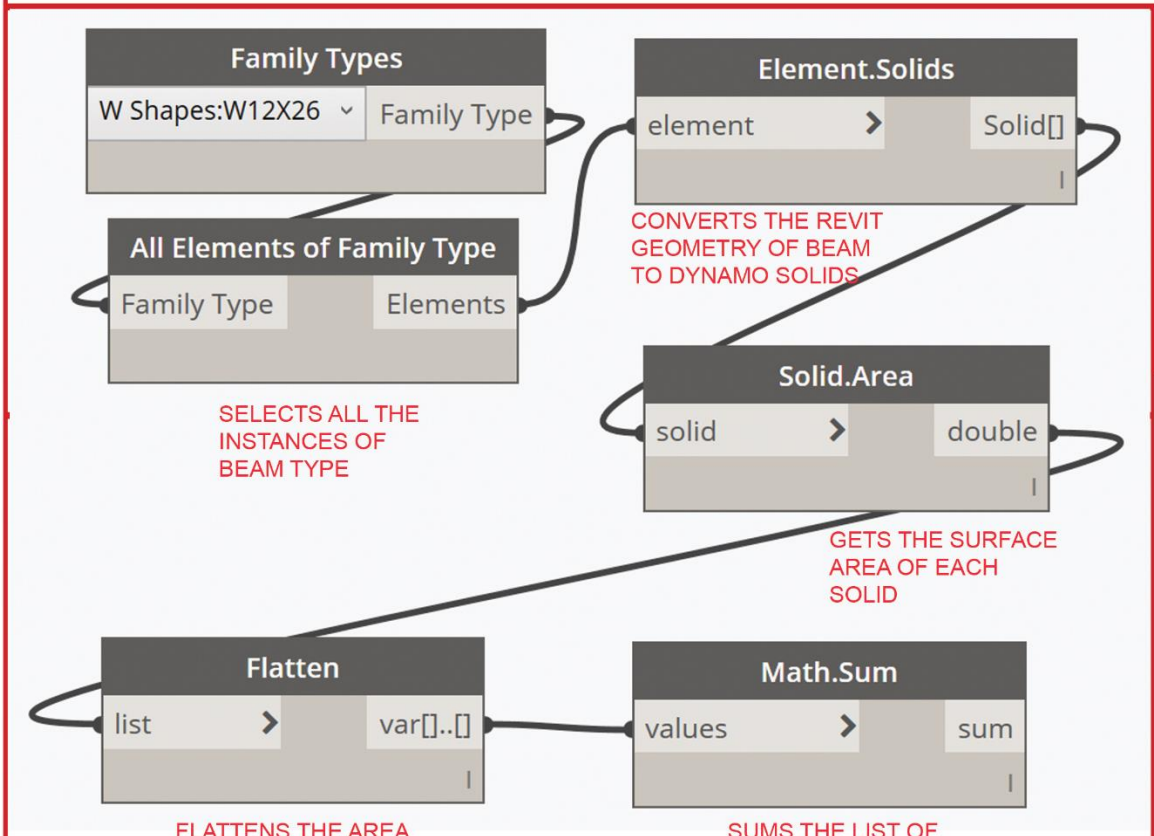


STEPS & NOTES

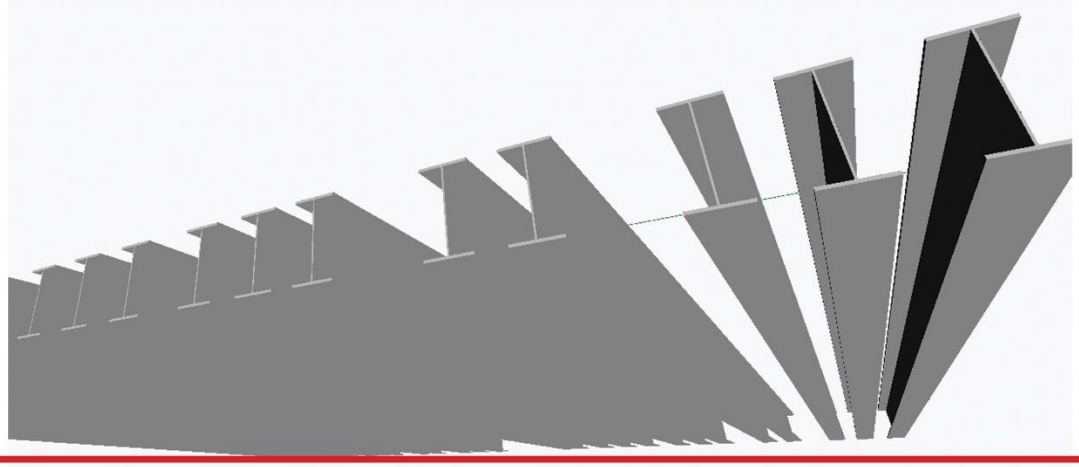
STEP 1: OPEN FILE “STACKING_DIAGRAMS_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT

NOTES: COLO/MATERIALS WILL SOMETIMES NEED TO BE ADJUSTED OR MAPPED

TOTAL SURFACE AREA OF STRUCTURAL BEAMS



DYNAMO NODES



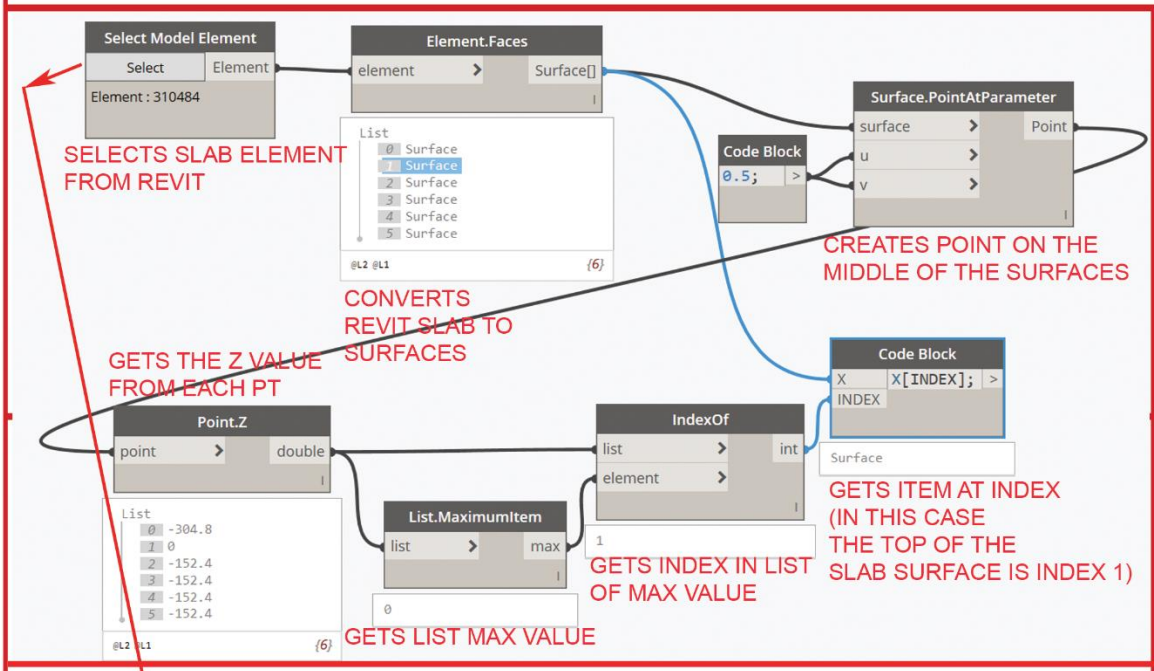
DYNAMO GEOMETRY

STEP 1: OPEN FILE "BEAM_AREA_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: ALT. METHOD IS TO EXTRACT SOLID AND GET SURFACE AREA
AND COULD BE USED ON MOST REVIT SOLID AND SURFACE ELEMENTS

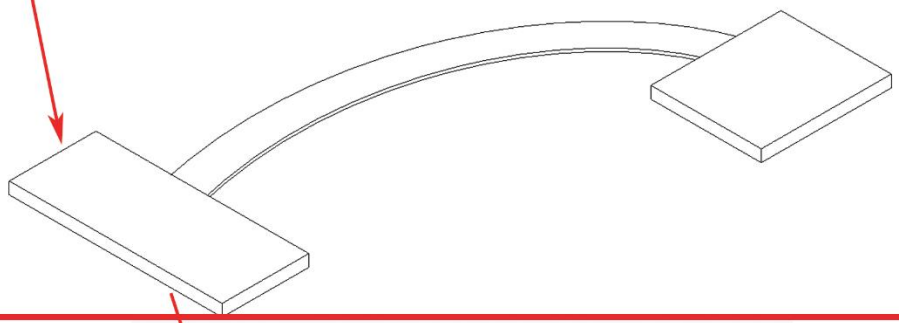
STEPS & NOTES

GET TOP SURFACE OF SLAB IN REVIT

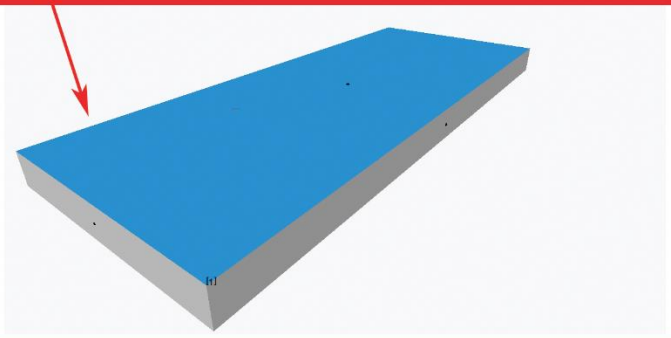
DYNAMO NODES



REVIT GEOMETRY



DYNAMO GEOMETRY

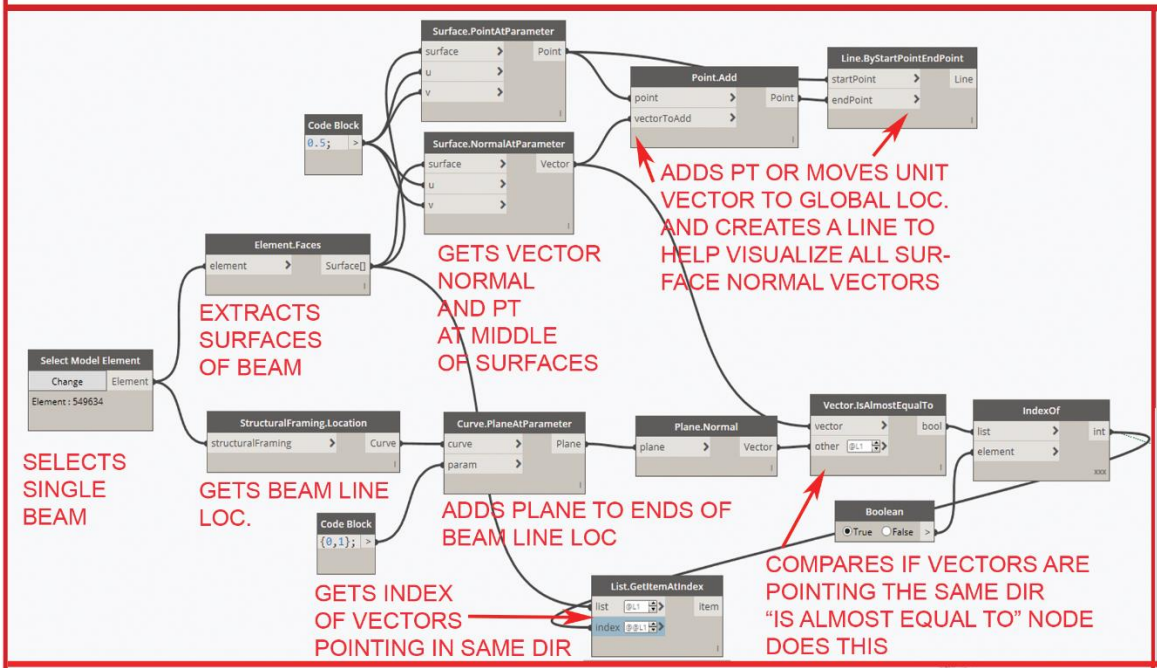


NOTES

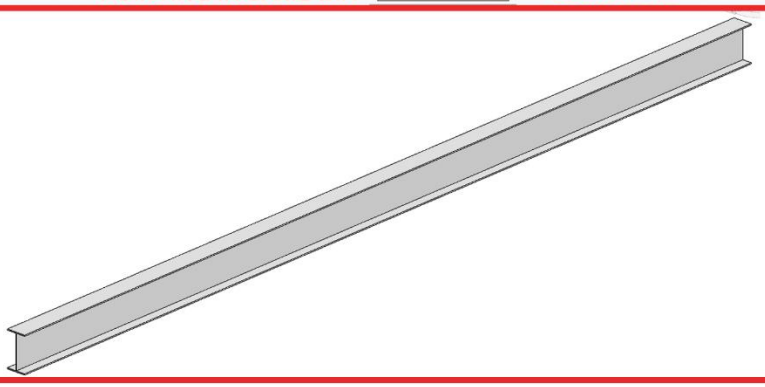
NOTES: 1. GETTING TOP SURFACE OF A SLAB IN REVIT ONLY WORKS IN THIS EXAMPLE IF THE SLAB TOP AND BOTTOM SURFACES ARE HORIZONTAL.
2. THE TOP SURFACE OF A SLAB IS NOT ALWAYS AT INDEX 1

GET SURFACES AT ENDS OF A REVIT BEAM

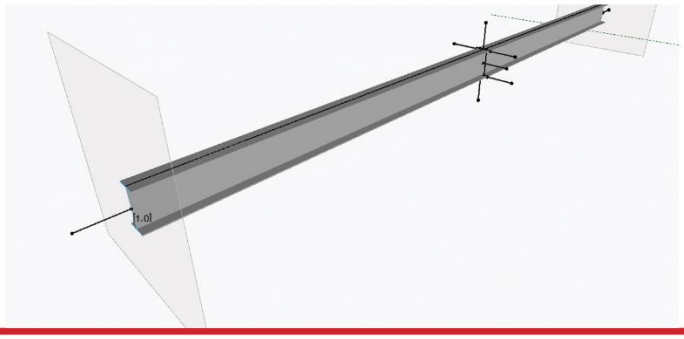
DYNAMO NODES



REVIT GEOMETRY



DYNAMO GEOMETRY

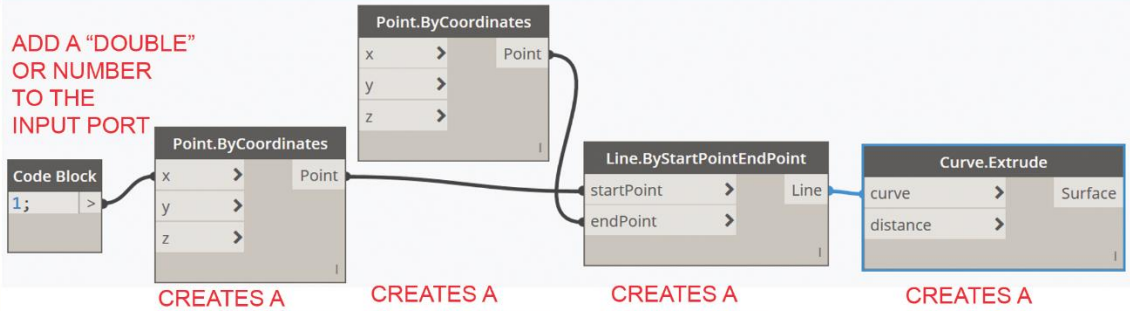


NOTES

NOTES: 1. GETTING THE END SURFACES IN THE EXAMPLE ONLY WORKS ON A SINGLE BEAM
2. THIS LOGIC COULD BE USED FOR MANY OTHER ADVANCED GEOMETRY ANALYTICS

DYNAMO SURFACE BY CURVE EXTRUDE

DYNAMO NODES



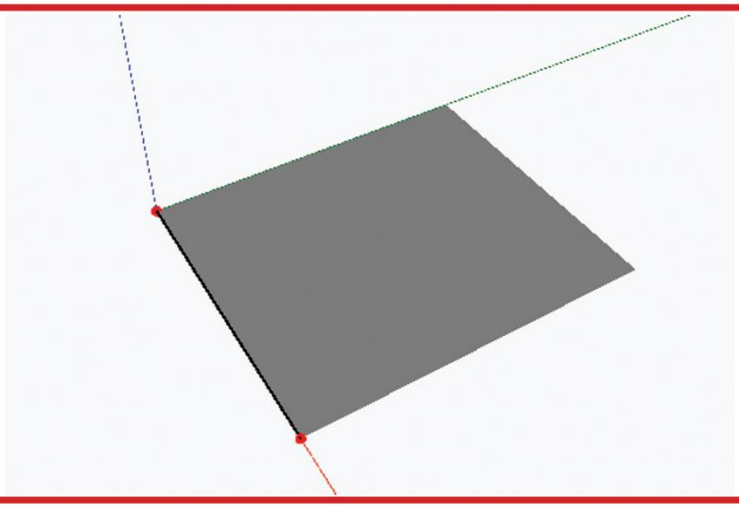
CREATES A DYNAMO POINT IN DYNAMO AT 1,1,1

CREATES A DYNAMO POINT IN DYNAMO AT 0,0,0

CREATES A DYNAMO LINE BY START AND END PTS

CREATES A DYNAMO SURFACE BY EXTRUDING A LINE

DYNAMO GEOMETRY



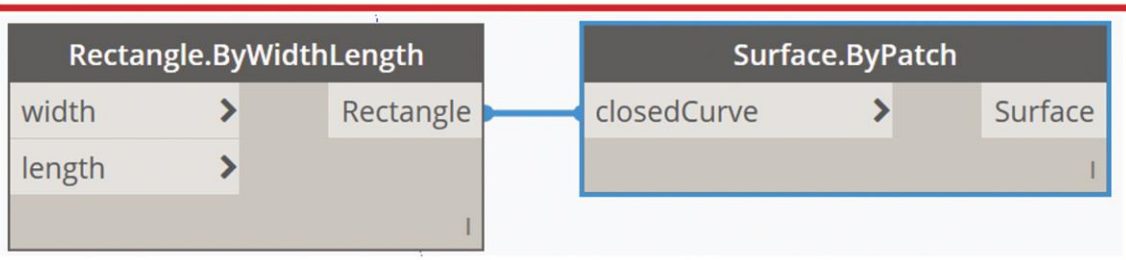
REVIT GEOMETRY

NOTE

NOTE
THIS CREATES A DYNAMO SURFACE BY EXTRUDING THE LINE (CURVE). THERE ARE OTHER WAYS TO CREATE SURFACES. ALSO, THE CURVE IS EXTRUDED IN THE POSITIVE DIRECTION OF THE CURVES LOCAL AXIS WITH A DISTANCE DEFAULT OF 1. ALSO TRY NEG VALUES.

DYNAMO SURFACE BY PATCH FROM CLOSED CURVES

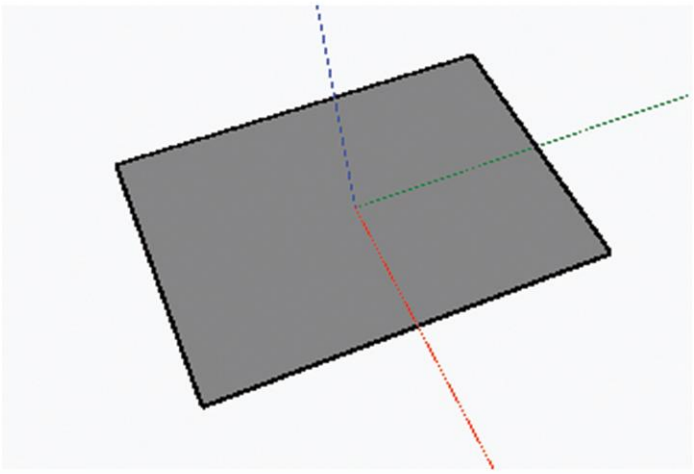
DYNAMO NODES



CREATES A RECTANGLE AT WIDTH AND LENGTH = 1

CREATES A SURFACE BY "FILLING IN" CLOSED PERIMETER CURVES

DYNAMO GEOMETRY



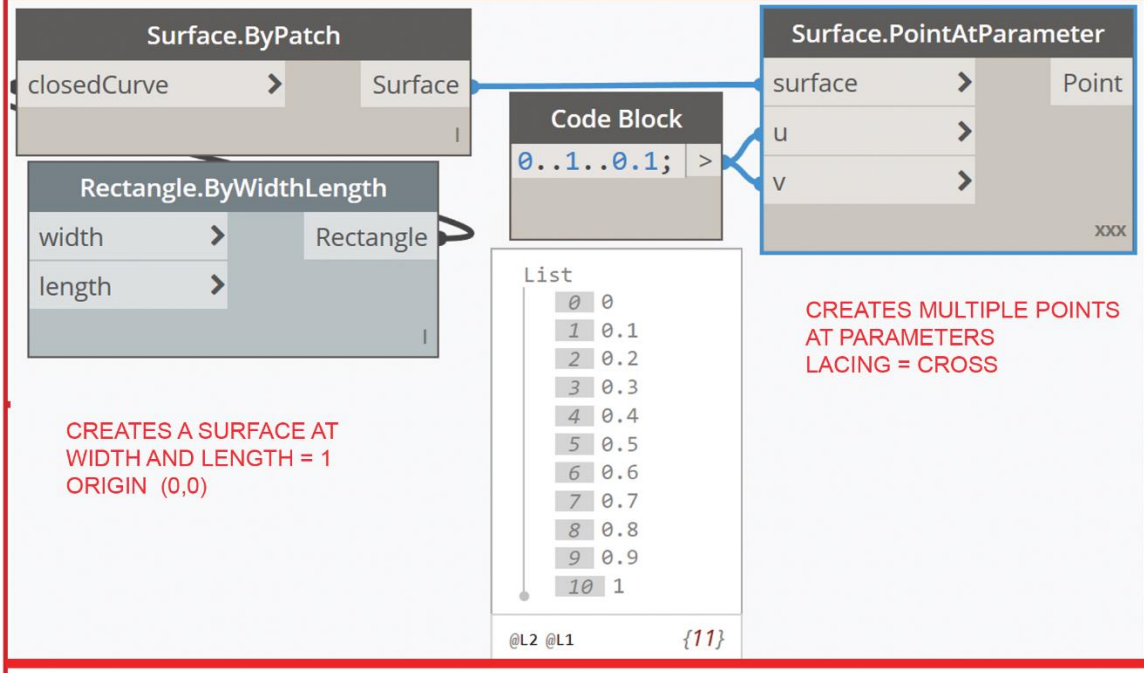
REVIT GEOMETRY

NOTE

NOTE
THIS CREATES A DYNAMO SURFACE BY COLLECING THE PERMETER CURVES OF THE RECTANGLE AND "FILLING" IN THE THE CURVES WITH A SURFACE. ALSO NOTE THAT THE CURVES MUST BE CLOSED FOR "PATCH" TO WORK AND A RECTANGLE IS A COLLECTION OF CLOSED CURVES

SURFACE MULTIPLE PTS AT PARAMETERS LACING CROSS

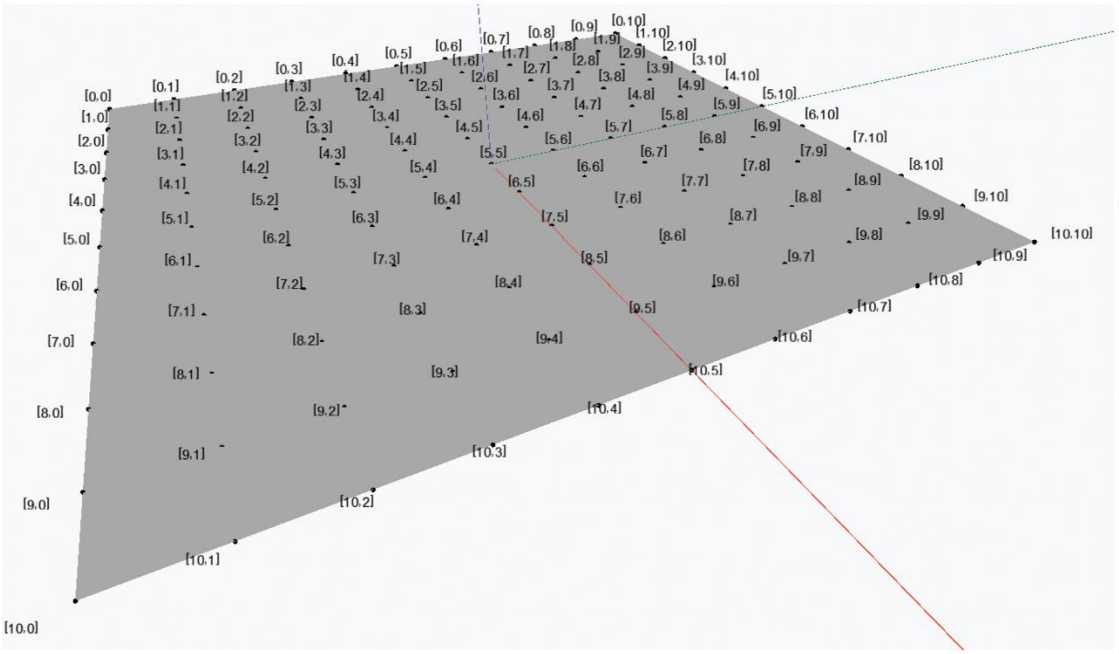
DYNAMO NODES



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES MULTIPLE POINTS
AT PARAMETERS
LACING = CROSS

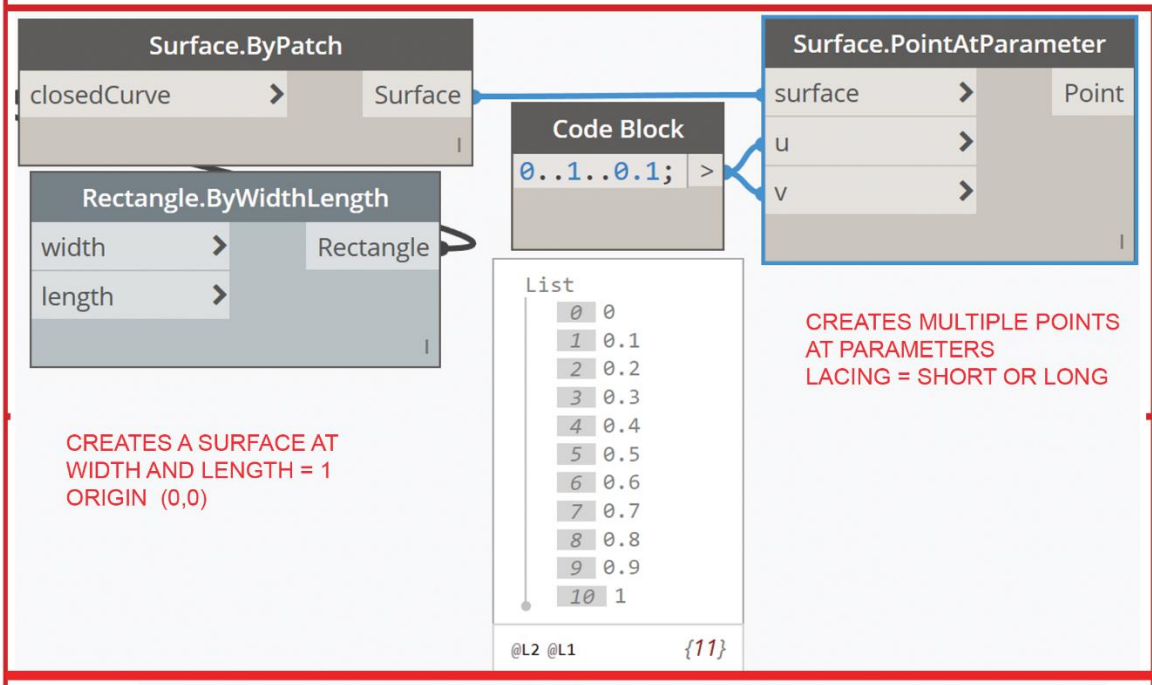
DYNAMO GEOMETRY



NOTE

NOTE
THIS CREATES MULTIPLE POINTS
AT PARAMETERS LACING = CROSS PRODUCT

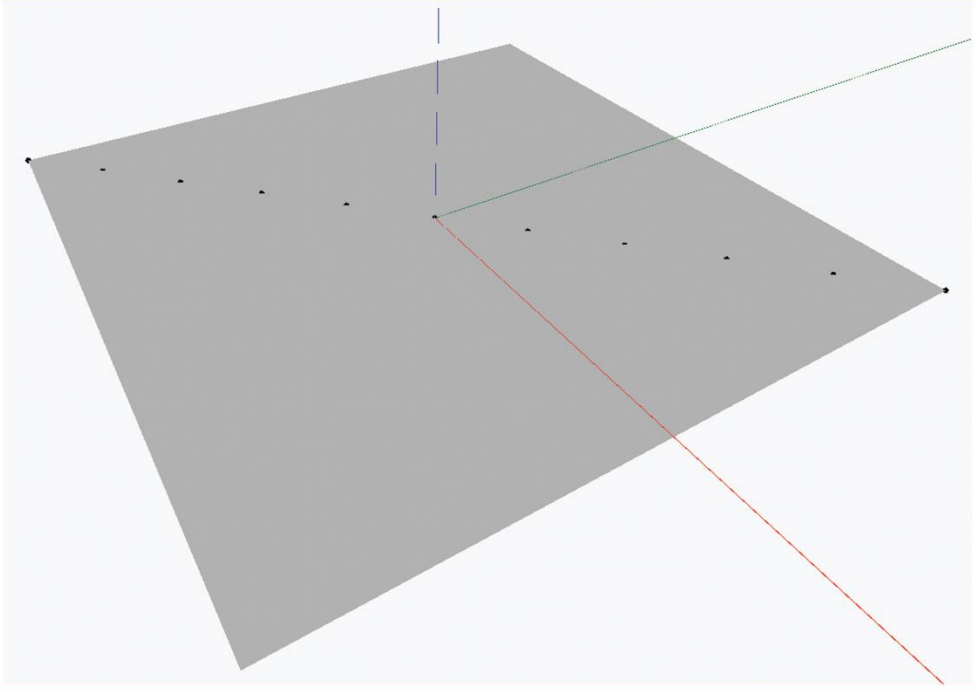
SURFACE MULTIPLE PTS AT PARAMETERS LACING SHORT



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES MULTIPLE POINTS
AT PARAMETERS
LACING = SHORT OR LONG

DYNAMO NODES

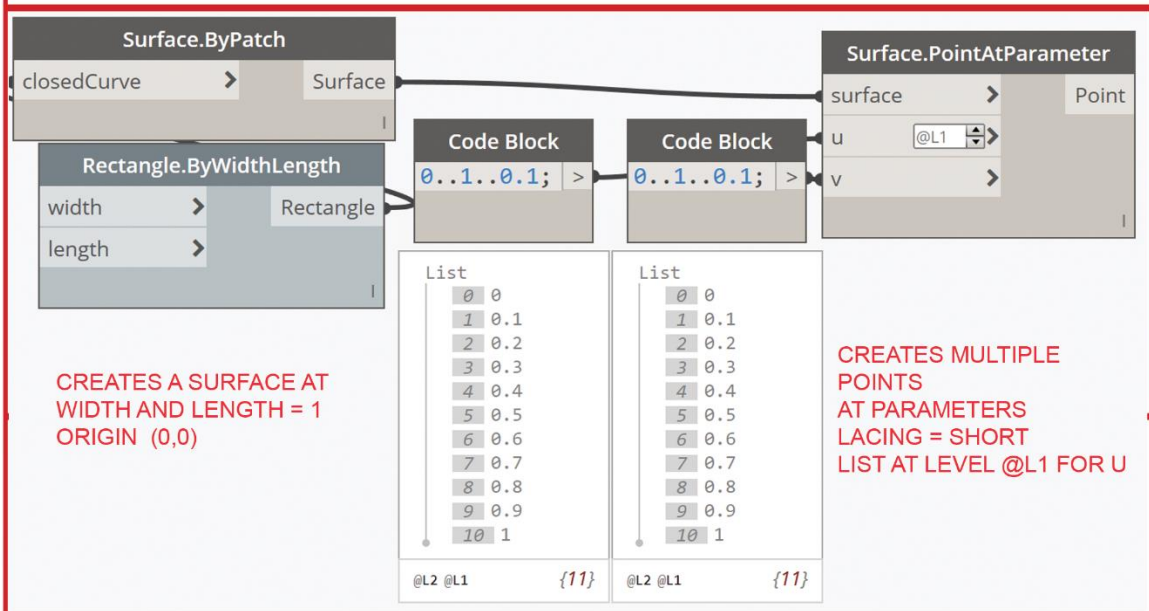


DYNAMO GEOMETRY

NOTE
THIS CREATES MULTIPLE POINTS
AT PARAMETERS LACING = SHORT OR LONG

NOTE

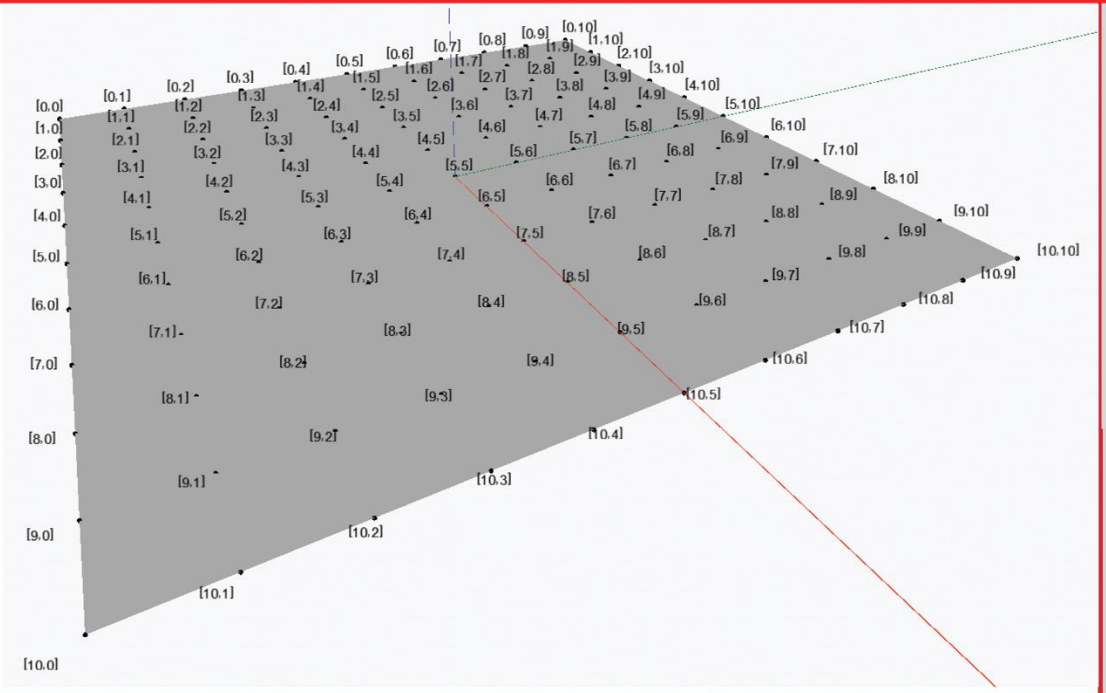
SURFACE MULTIPLE PTS AT PARAMETERS LIST AT LEVEL U



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES MULTIPLE
POINTS
AT PARAMETERS
LACING = SHORT
LIST AT LEVEL @L1 FOR U

DYNAMO NODES

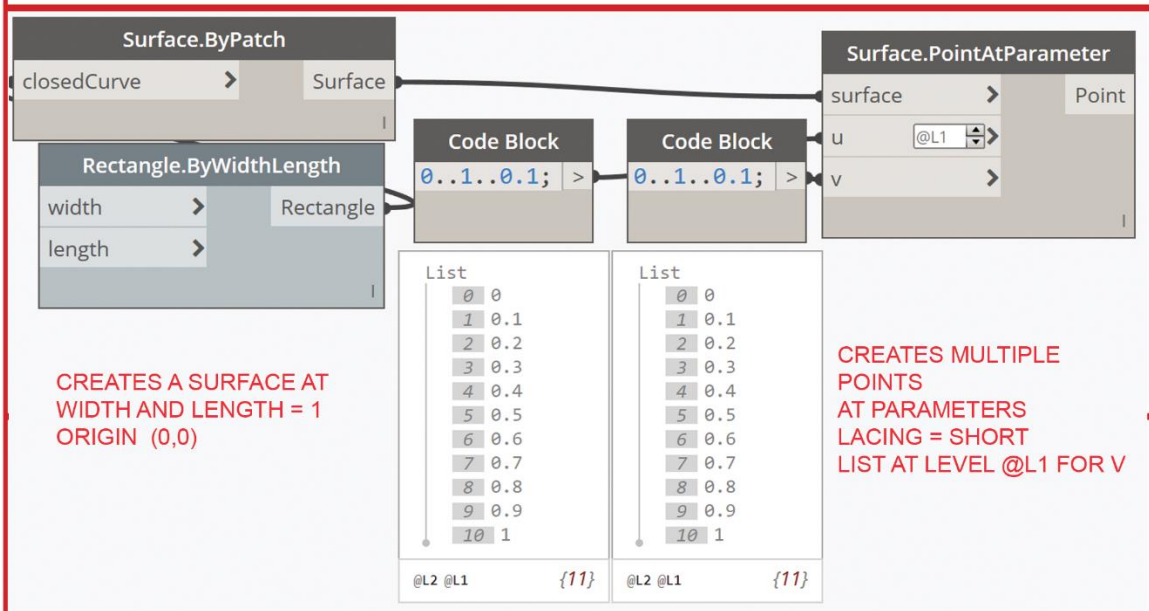


DYNAMO GEOMETRY

NOTE
THIS CREATES MULTIPLE POINTS
AT PARAMETERS LACING = SHORT AND LIST AT LEVEL @L1 AT U
ALSO NOTE THAT LIST AT LEVEL YIELDS THE SAME RESULT AT LACING CROSS PRODUCT

NOTE

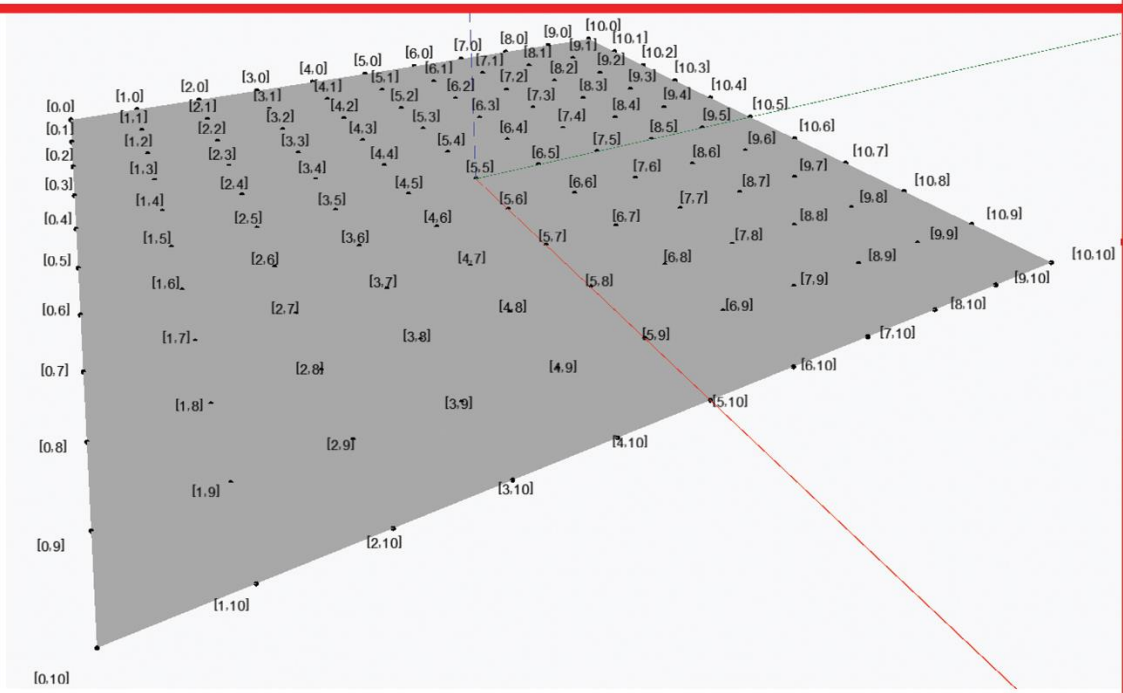
SURFACE MULTIPLE PTS AT PARAMETERS LIST AT LEVEL V



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES MULTIPLE
POINTS
AT PARAMETERS
LACING = SHORT
LIST AT LEVEL @L1 FOR V

DYNAMO NODES



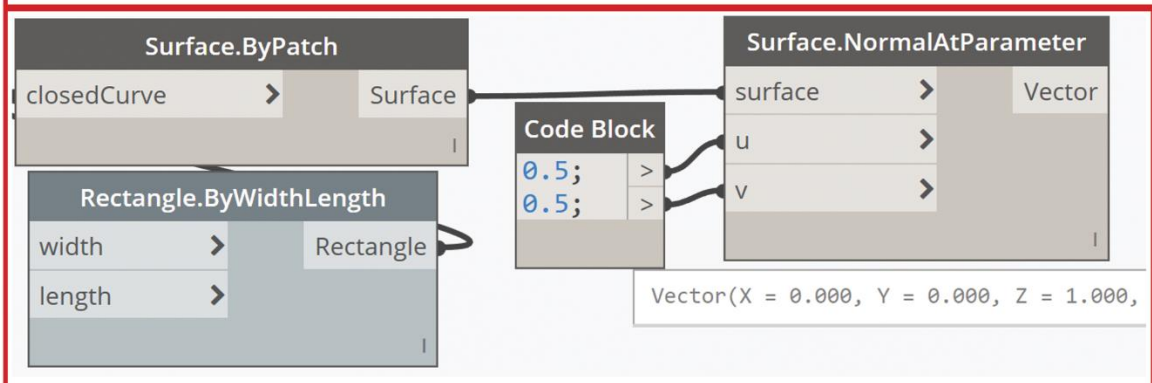
DYNAMO GEOMETRY

NOTE
THIS CREATES MULTIPLE POINTS
AT PARAMETERS LACING = SHORT AND LIST AT LEVEL @L1 AT V

NOTE

DYNAMO SURFACE NORMAL AT PARAMETER U=.5 V =.5

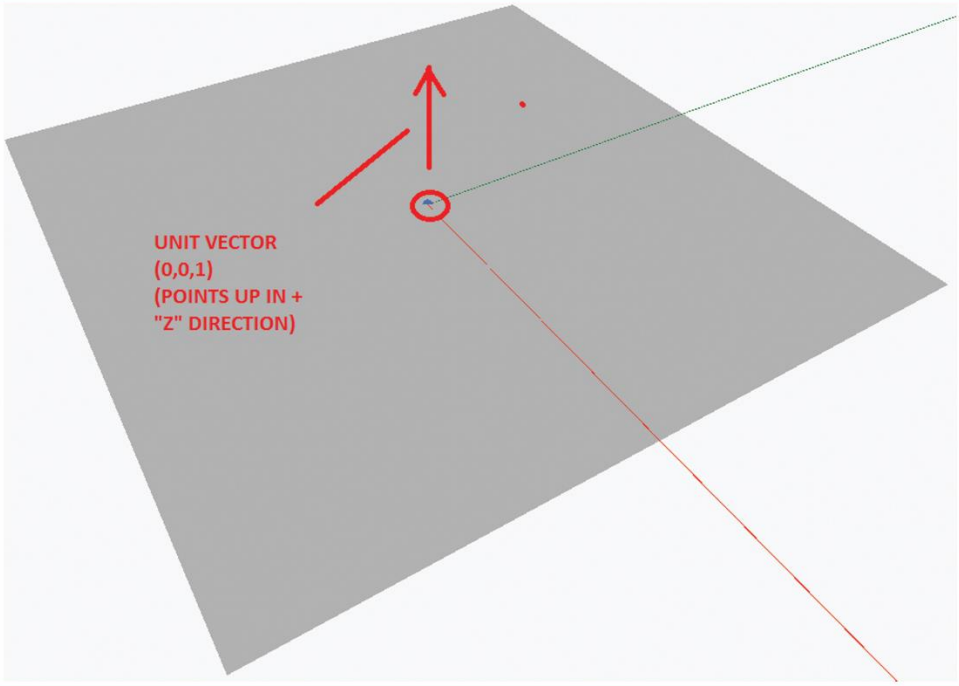
DYNAMO NODES



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

GETS THE NORMAL
(UNIT VECTOR) ON A
SURFACE
AT
U = 0.5
V = 0.5

DYNAMO GEOMETRY

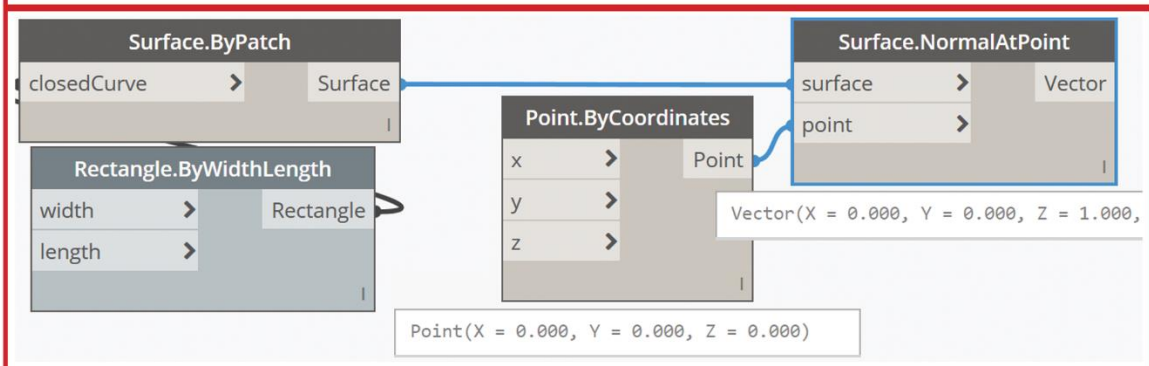


NOTE

NOTE
THIS GETS THE NORMAL UNIT VECTOR AT A SPECIFIC U V PARAMETER ON A SURFACE
ALSO NOTE THAT THE U V PARAMETER MAY BE DIFFERENT WITH A REVIT SURFACE

DYNAMO SURFACE NORMAL AT POINT (0,0,0)

DYNAMO NODES

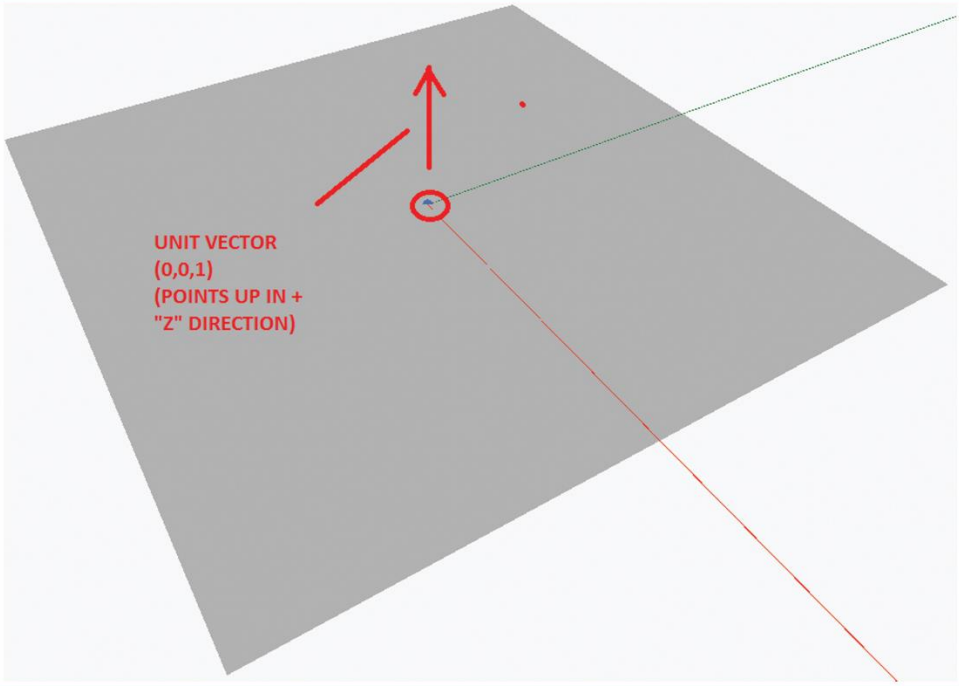


CREATES A SURFACE AT WIDTH AND LENGTH = 1 ORIGIN (0,0)

CREATES A POINT AT 0,0,0

GETS THE NORMAL (UNIT VECTOR) AT SPECIFIC POINT

DYNAMO GEOMETRY

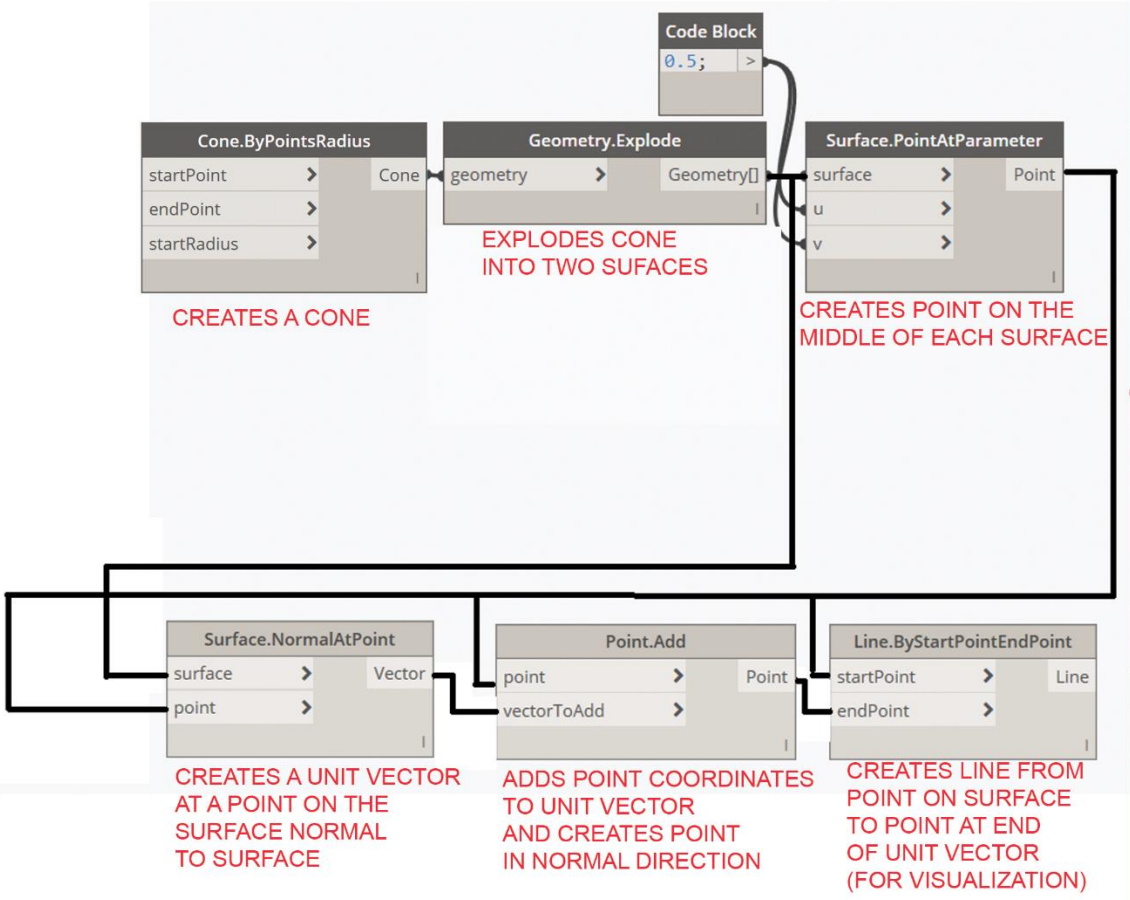


NOTE

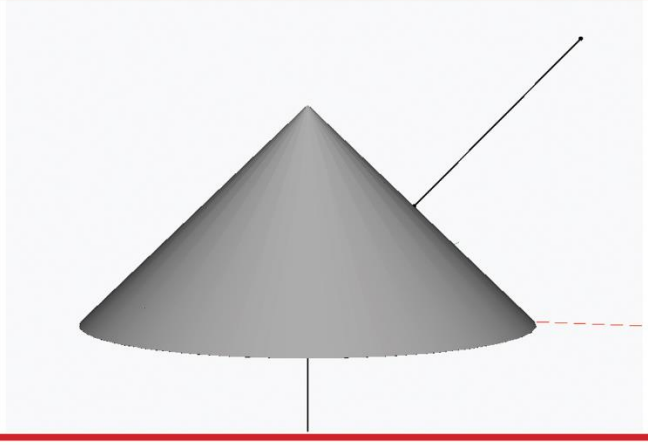
NOTE
THIS GETS THE NORMAL UNIT VECTOR AT A SPECIFIC POINT ON A SURFACE
ALSO NOTE THAT THE POINT MUST BE ON THE SURFACE

GET THE UNIT VECTOR THAT IS NORMAL TO A POINT HOSTED ON A COMPLEX SURFACE

DYNAMO NODES



DYNAMO GEOMETRY

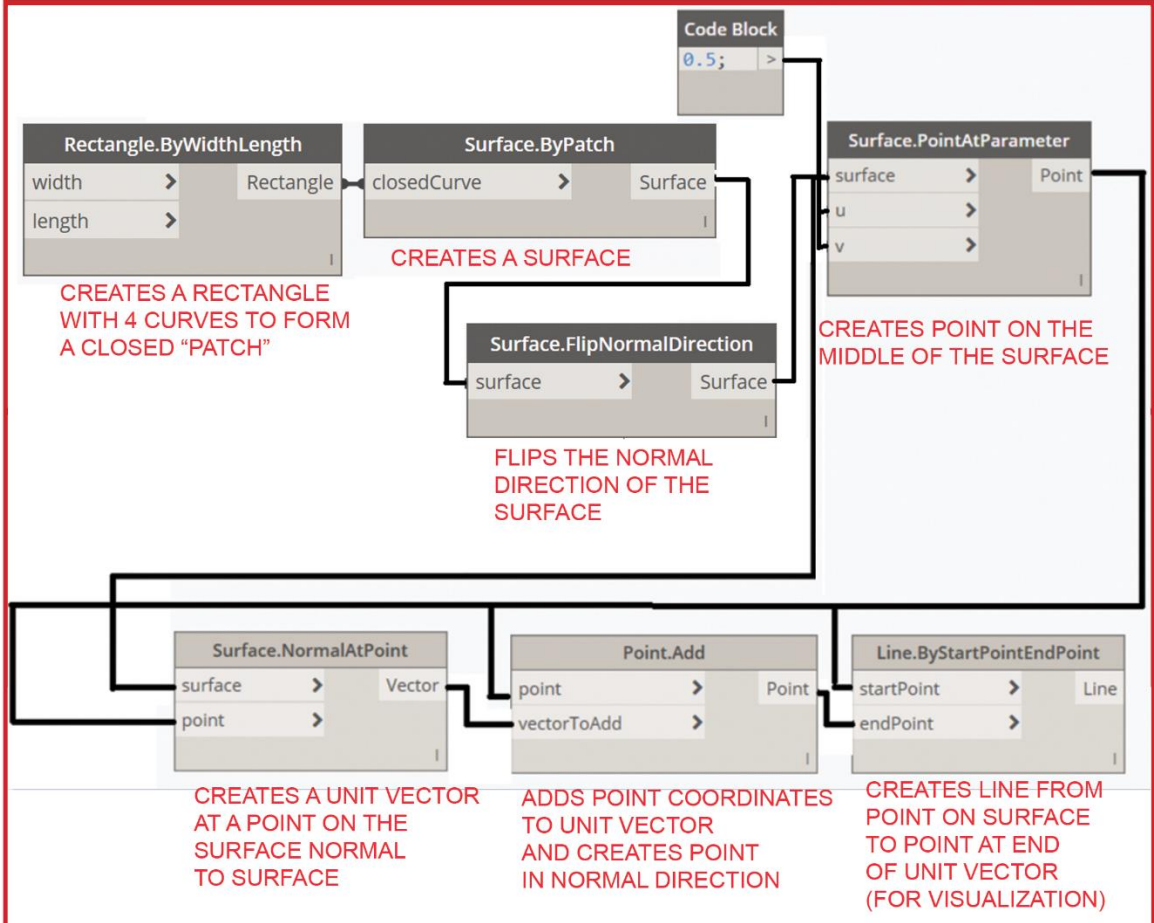


NOTES

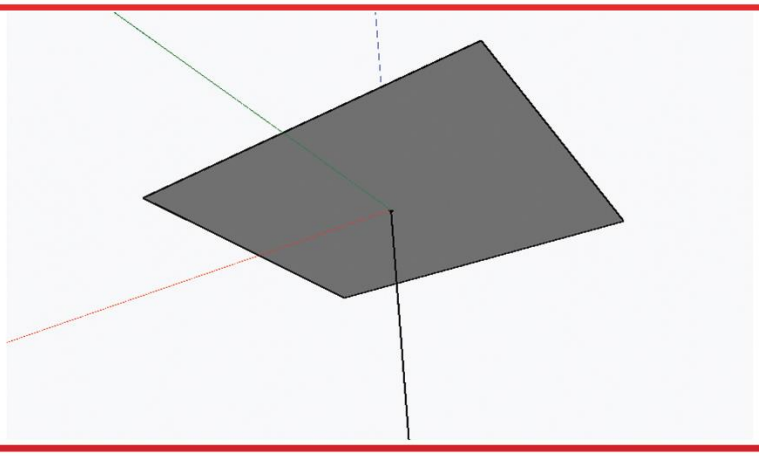
NOTES: 1. GETTING THE UNIT VECTOR NORMAL TO A SURFACE HELPS DETERMINE WHICH DIRECTION THE SURFACE IS FACING.
2. THE NORMAL UNIT VECTOR POINT OUT FROM THE POSITIVE FACE OF THE SURFACE

FLIP SURFACE NORMAL ON A SIMPLE SURFACE

DYNAMO NODES



DYNAMO GEOMETRY

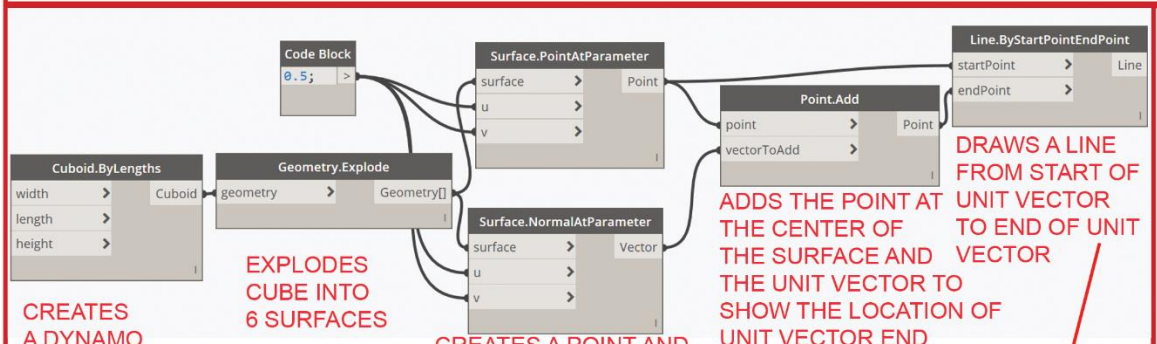


NOTES

NOTES: 1. GETTING THE UNIT VECTOR NORMAL TO A SURFACE HELPS DETERMINE WHICH DIRECTION THE SURFACE IS FACING.
2. THE NORMAL UNIT VECTOR POINTS OUT FROM THE NEGATIVE FACE OF THE SURFACE

SHOW UNIT VECTOR LOCATIONS FROM SURFACE NORMAL

DYNAMO NODES



CREATES A DYNAMO CUBE OF 1X1X1

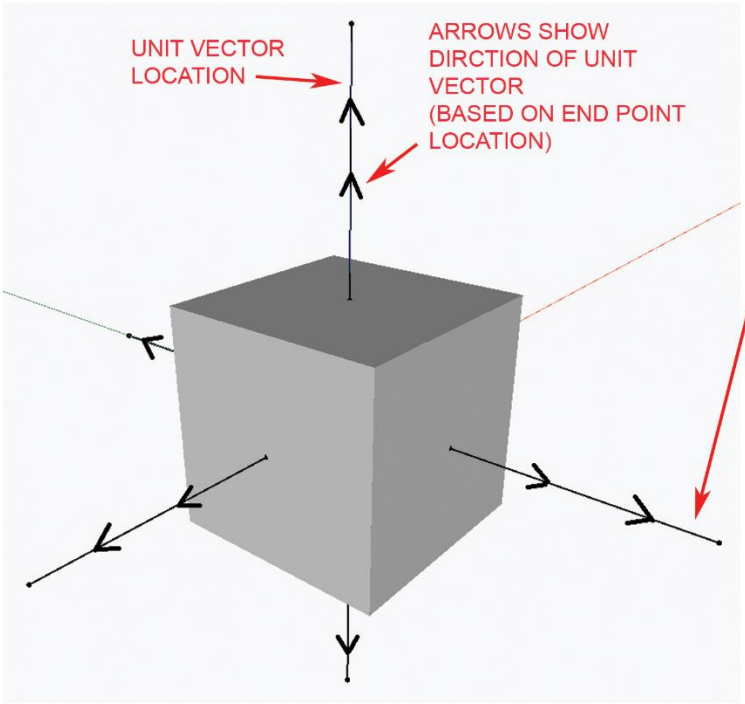
EXPLODES CUBE INTO 6 SURFACES

CREATES A POINT AND A UNIT VECTOR AT CENTER OF SURFACE

ADDS THE POINT AT THE CENTER OF THE SURFACE AND THE UNIT VECTOR TO SHOW THE LOCATION OF UNIT VECTOR END

DRAWS A LINE FROM START OF UNIT VECTOR TO END OF UNIT VECTOR

DYNAMO GEOMETRY

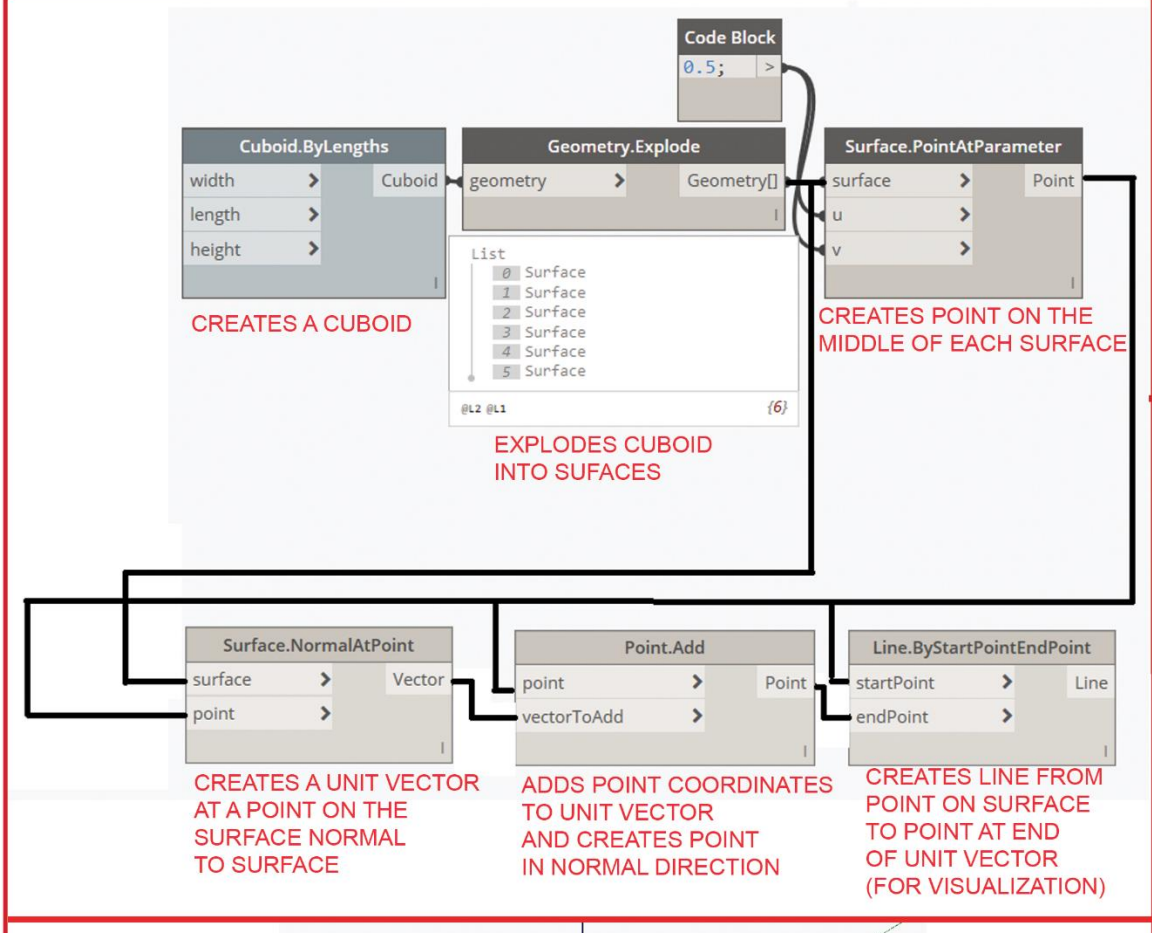


NOTES

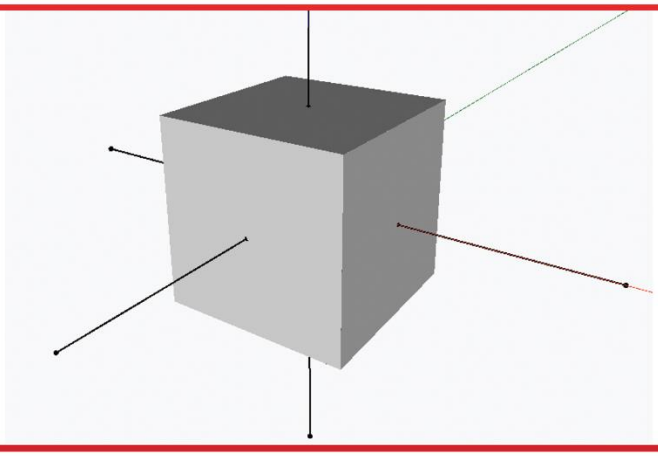
NOTES: THE POINT OF THIS EXAMPLE IS TO SHOW HOW TO GET THE VECTOR NORMAL TO A SURFACE AND HOW TO “SHOW” THE UNIT VECOR AS A LINE WITH DIRECTION SINCE DYNAMO DOES NOT “DRAW” VECTORS

GET THE UNIT VECTOR THAT IS NORMAL TO A POINT HOSTED ON A SIMPLE SURFACE

DYNAMO NODES



DYNAMO GEOMETRY

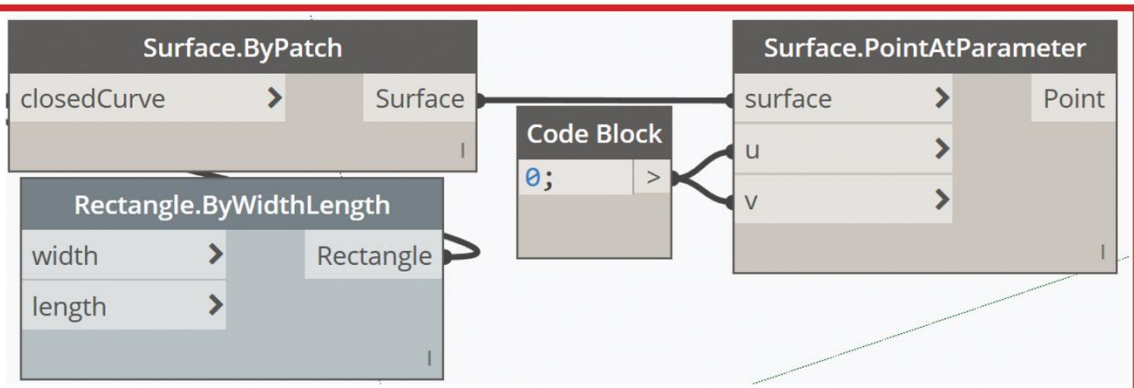


NOTES

NOTES: 1. GETTING THE UNIT VECTOR NORMAL TO A SURFACE HELPS DETERMINE WHICH DIRECTION THE SURFACE IS FACING.
2. THE NORMAL UNIT VECTOR POINT OUT FROM THE POSITIVE FACE OF THE SURFACE

DYNAMO SURFACE SINGLE PT AT PARAMETER U=0 V= 0

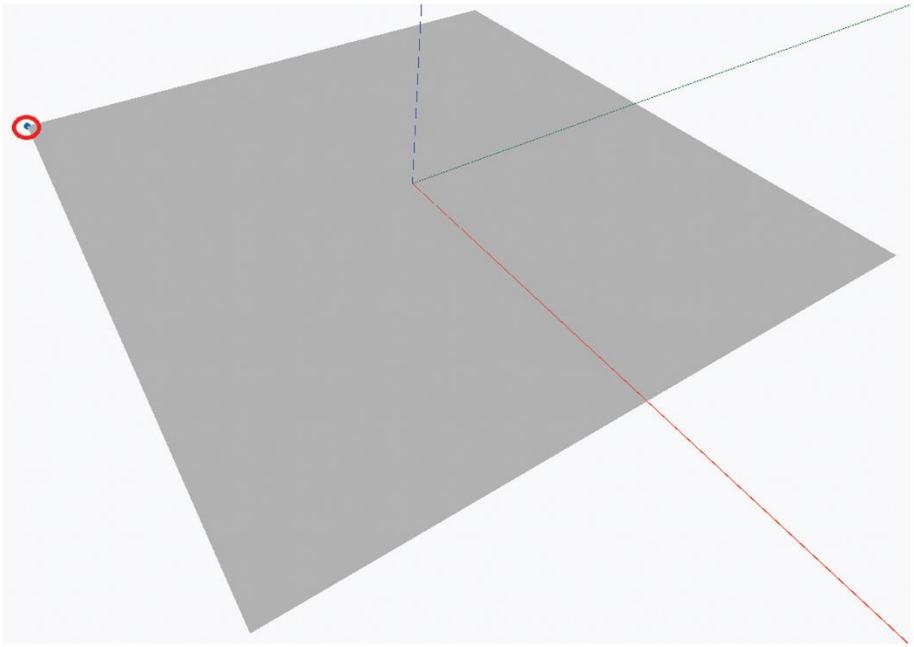
DYNAMO NODES



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES A POINT AT
PARAMETER
U = 0
V = 0

DYNAMO GEOMETRY

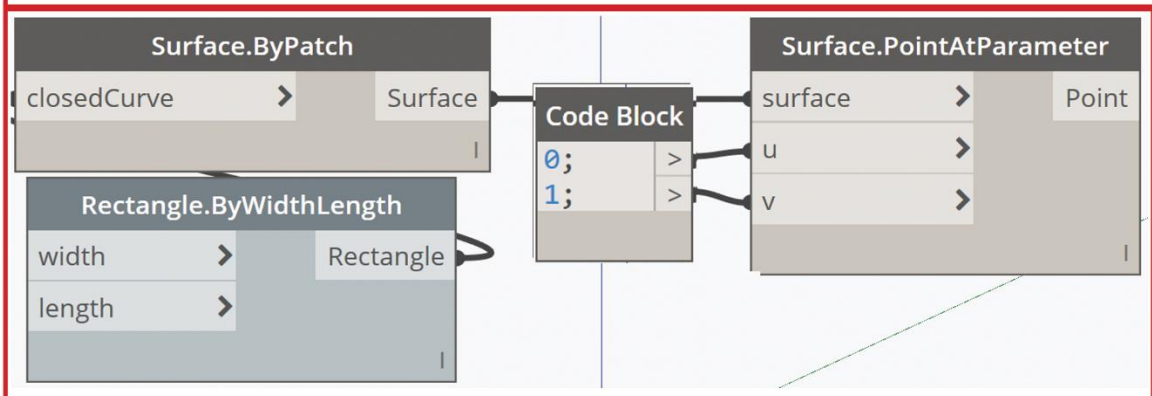


NOTE

NOTE
THIS CREATES A DYNAMO POINT(S) AT POINT AT PARAMETER(S) ON A SURFACE.
ALSO NOTE THAT PARAMETERS FOR SURFACES ARE DEFINED BY U AND V COORDINATES AND RANGE FROM 0 TO 1

DYNAMO SURFACE SINGLE PT AT PARAMETER U=0 V= 1

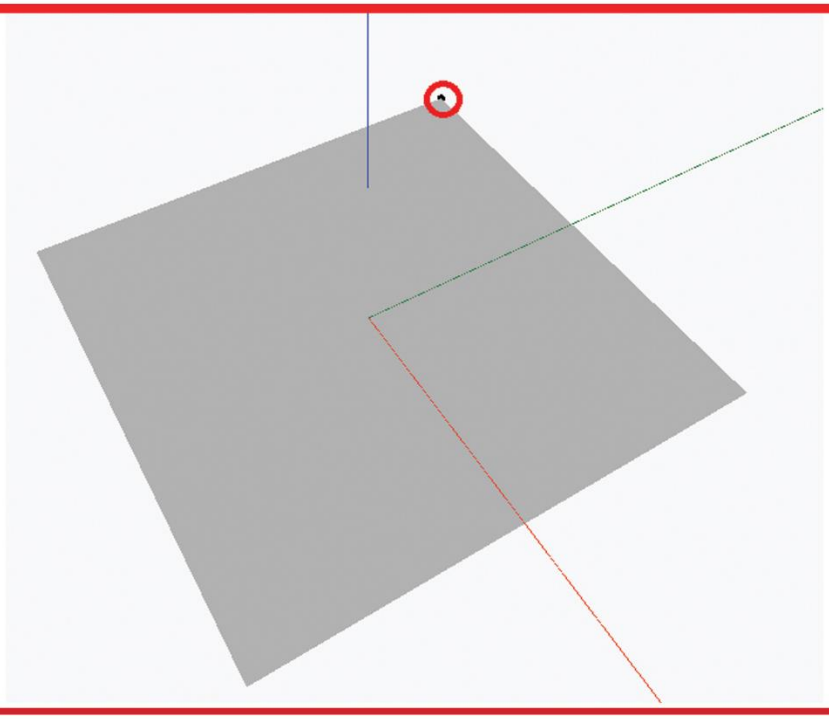
DYNAMO NODES



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES A POINT AT
PARAMETER
U = 0
V = 1

DYNAMO GEOMETRY

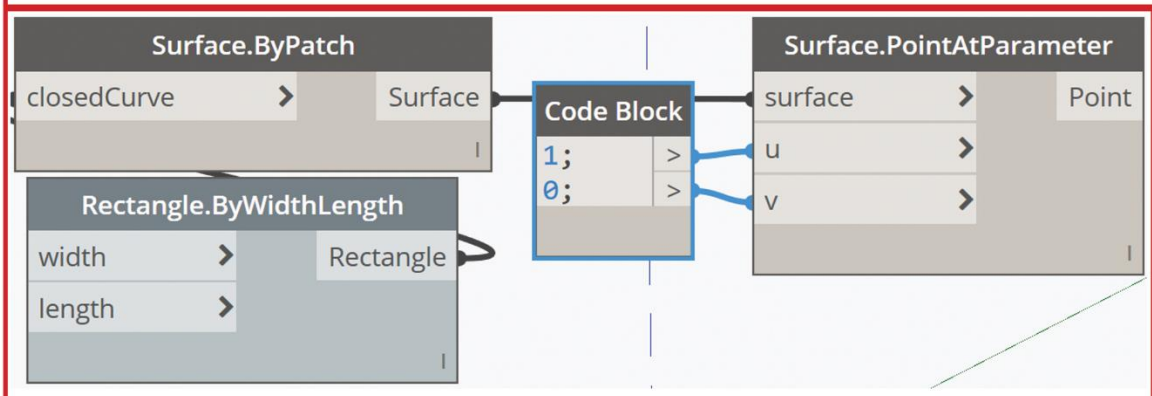


NOTE

NOTE
THIS CREATES A DYNAMO POINT(S) AT POINT AT PARAMETER(S) ON A SURFACE.
ALSO NOTE THAT PARAMETERS FOR SURFACES ARE DEFINED BY U AND V COORDINATES AND RANGE FROM 0 TO 1

DYNAMO SURFACE SINGLE PT AT PARAMETER U=1 V= 0

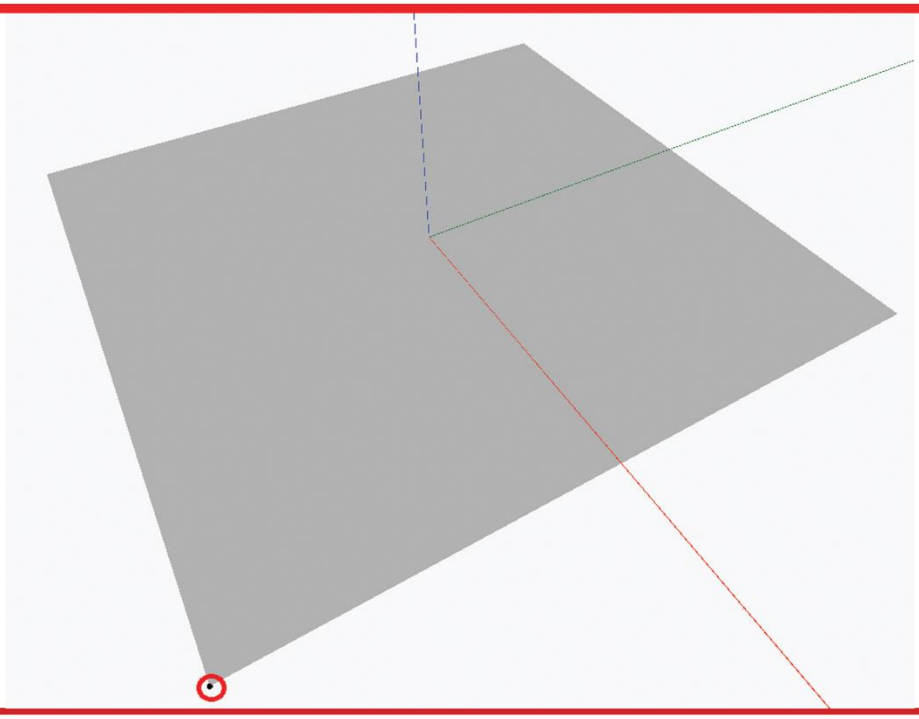
DYNAMO NODES



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES A POINT AT
PARAMETER
U = 1
V = 0

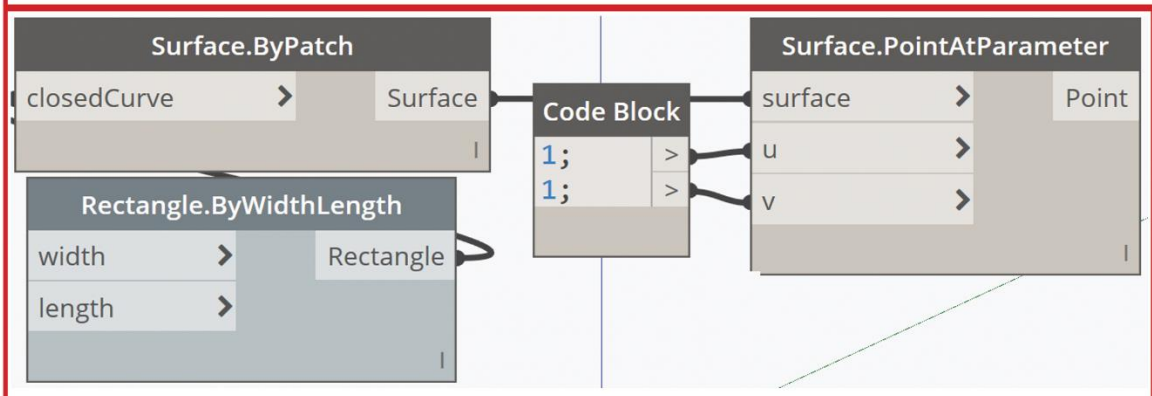
DYNAMO GEOMETRY



NOTE

NOTE
THIS CREATES A DYNAMO POINT(S) AT POINT AT PARAMETER(S) ON A SURFACE.
ALSO NOTE THAT PARAMETERS FOR SURFACES ARE DEFINED BY U AND V COORDINATES AND RANGE FROM 0 TO 1

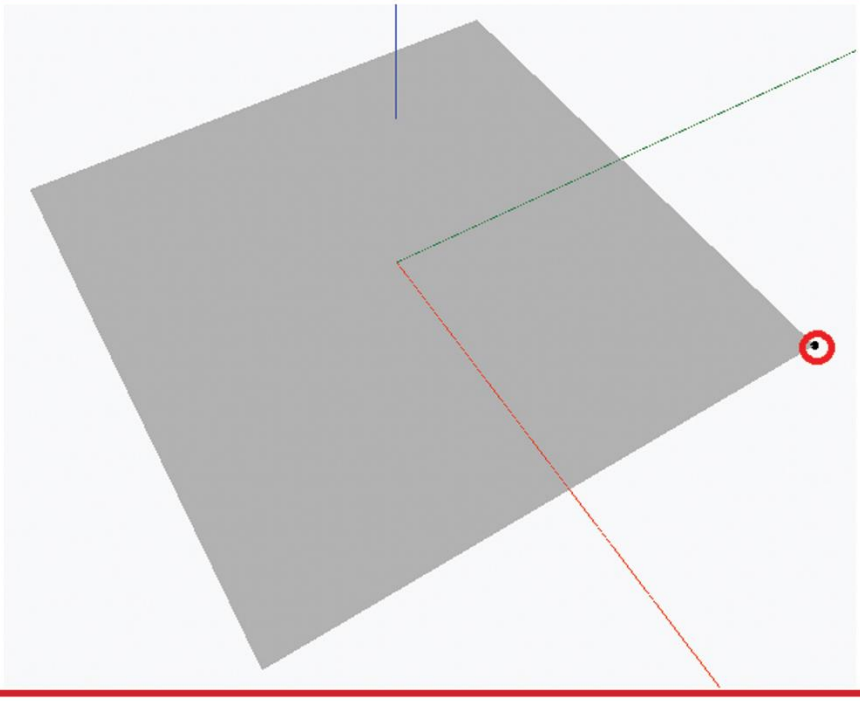
DYNAMO SURFACE SINGLE PT AT PARAMETER U=1 V= 1



DYNAMO NODES

CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES A POINT AT
PARAMETER
U = 1
V = 1



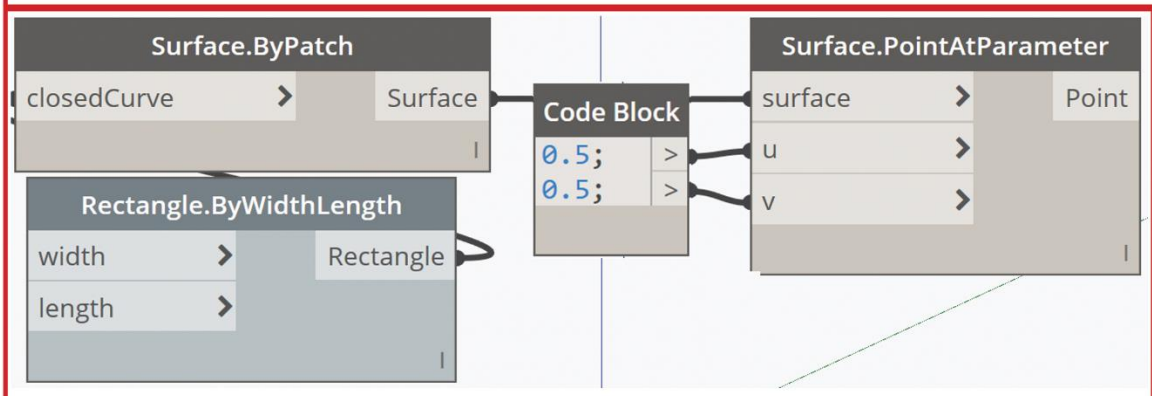
DYNAMO GEOMETRY

NOTE
THIS CREATES A DYNAMO POINT(S) AT POINT AT PARAMETER(S) ON A SURFACE.
ALSO NOTE THAT PARAMETERS FOR SURFACES ARE DEFINED BY U AND V COORDINATES AND RANGE FROM 0 TO 1

NOTE

DYNAMO SURFACE SINGLE PT AT PARAMETER U=0.5 V= 0.5

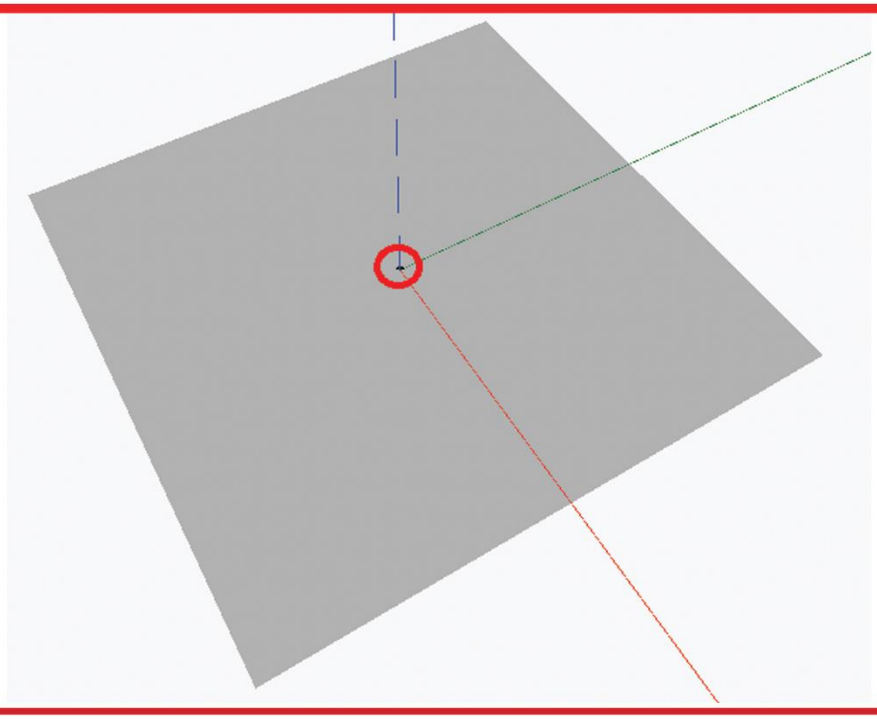
DYNAMO NODES



CREATES A SURFACE AT
WIDTH AND LENGTH = 1
ORIGIN (0,0)

CREATES A POINT AT
PARAMETER
U = 0.5
V = 0.5

DYNAMO GEOMETRY

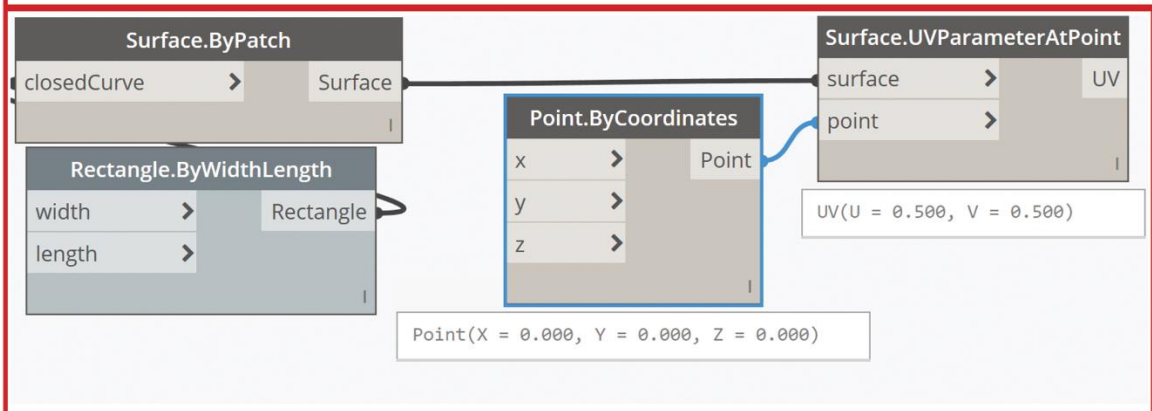


NOTE

NOTE
THIS CREATES A DYNAMO POINT(S) AT POINT AT PARAMETER(S) ON A SURFACE.
ALSO NOTE THAT PARAMETERS FOR SURFACES ARE DEFINED BY U AND V COORDINATES AND RANGE FROM 0 TO 1

DYNAMO SURFACE UV PARAMETER AT POINT

DYNAMO NODES

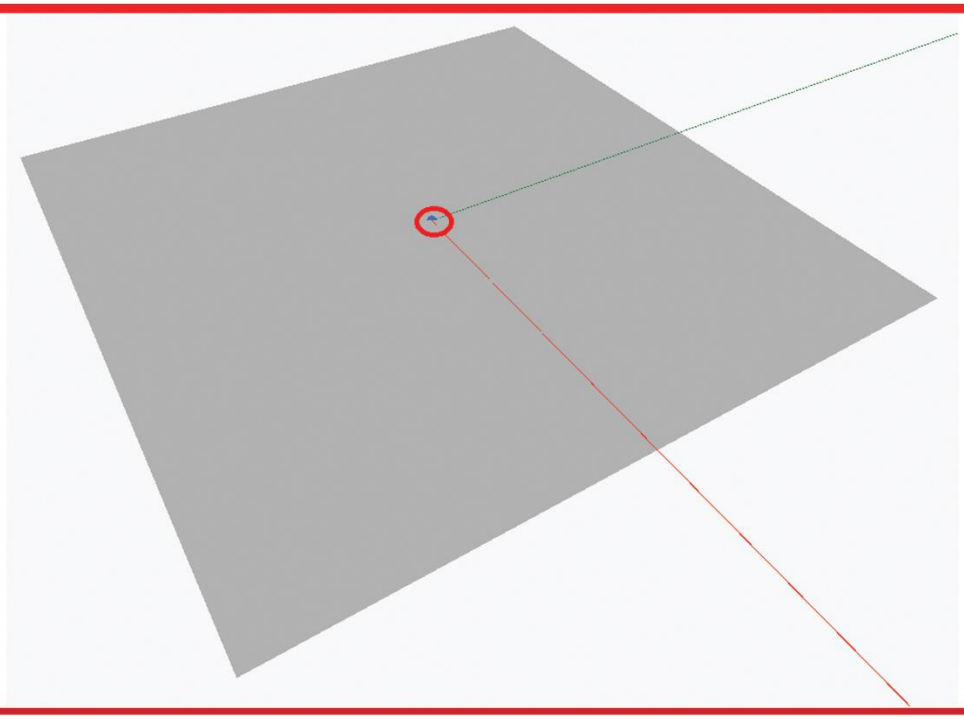


CREATES A SURFACE AT WIDTH AND LENGTH = 1 ORIGIN (0,0)

CREATES A POINT AT 0,0,0

GETS THE UV PARAMETER AT SPECIFIC POINT

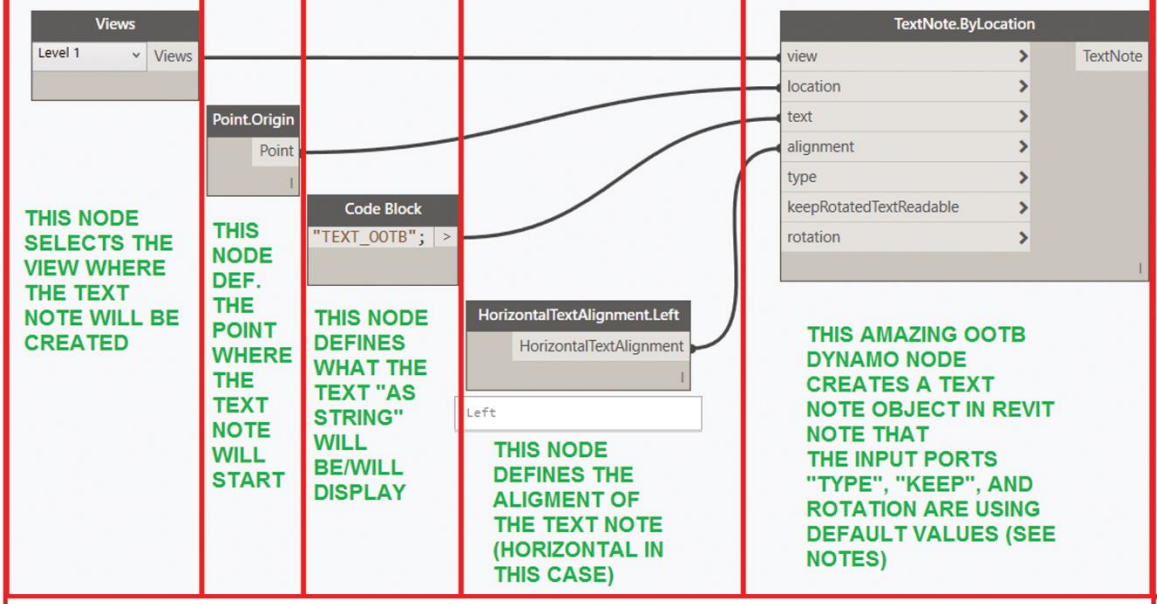
DYNAMO GEOMETRY

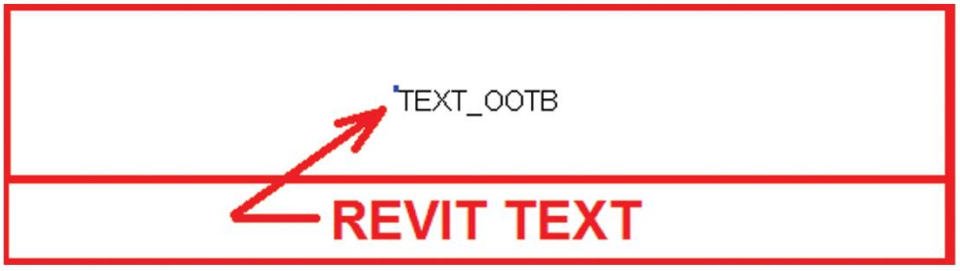


NOTE

NOTE
THIS GETS THE U V COORDINATES AT A SPECIFIC POINT ON A SURFACE
ALSO NOTE THAT THE POINT MUST BE ON THE SURFACE

TEXT NOTES



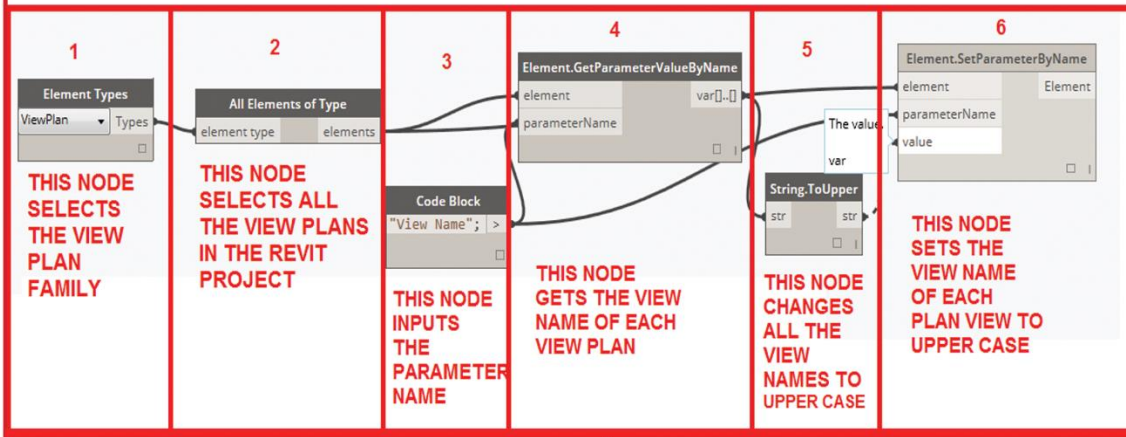


NOTE
THIS CREATES TEXT NOTES IN REVIT USING OOTB NODES

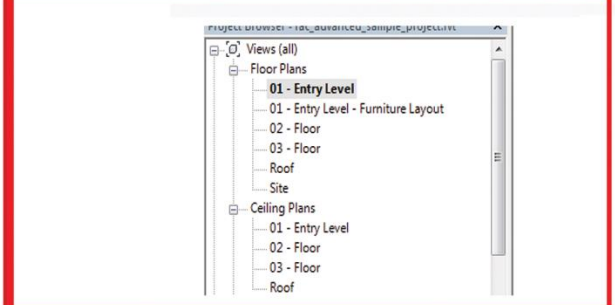
NOTE

TEXT TO UPPERCASE PLAN VIEW NAMES START

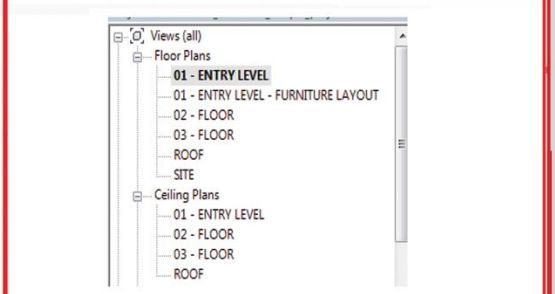
DYNAMO NODES



REVIT VIEW BROWSER



VIEW NAMES BEFORE



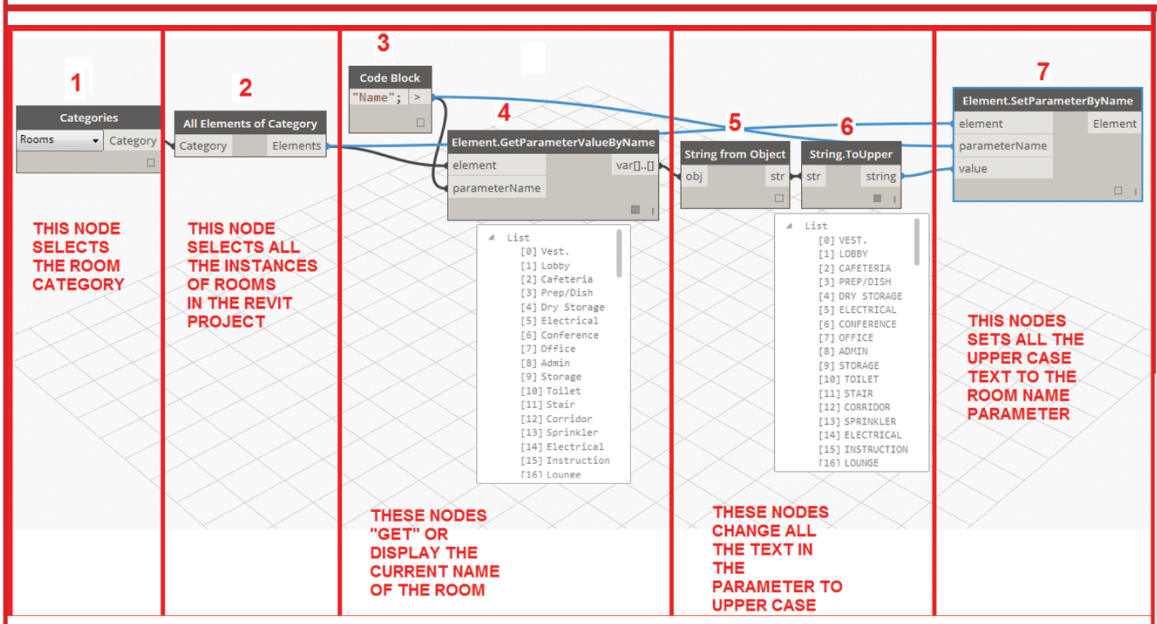
VIEW NAMES AFTER

STEPS & NOTES

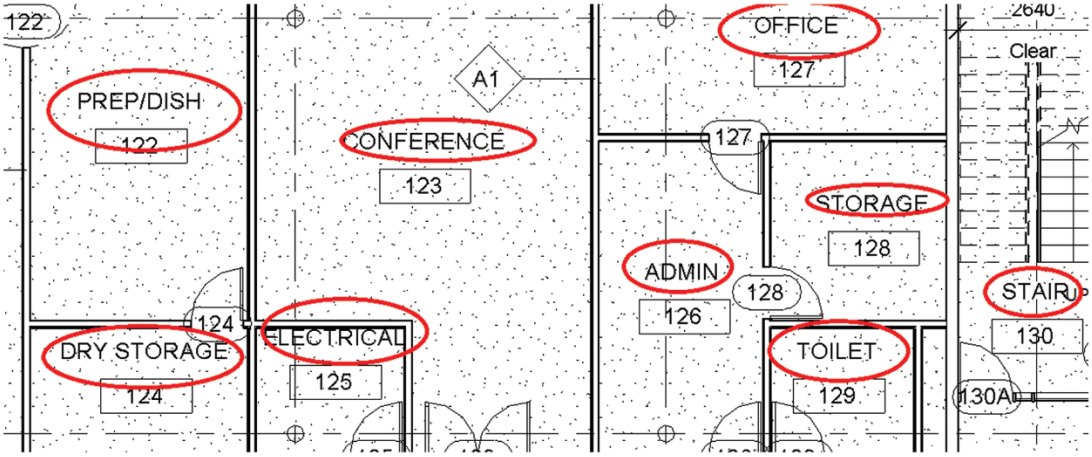
STEP 1: OPEN REVIT SAMPLE PROJECT “TEXT_TO_UPPERCASE_PLAN_VIEW_NAMES_START.RVT”
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: THE METHOD ABOVE WORKS WELL WHEN CHANGING MANY VIEW NAMES TO UPPER CASE

TEXT TO UPPERCASE SHEET NAMES

DYNAMO NODES



REVIT VIEW

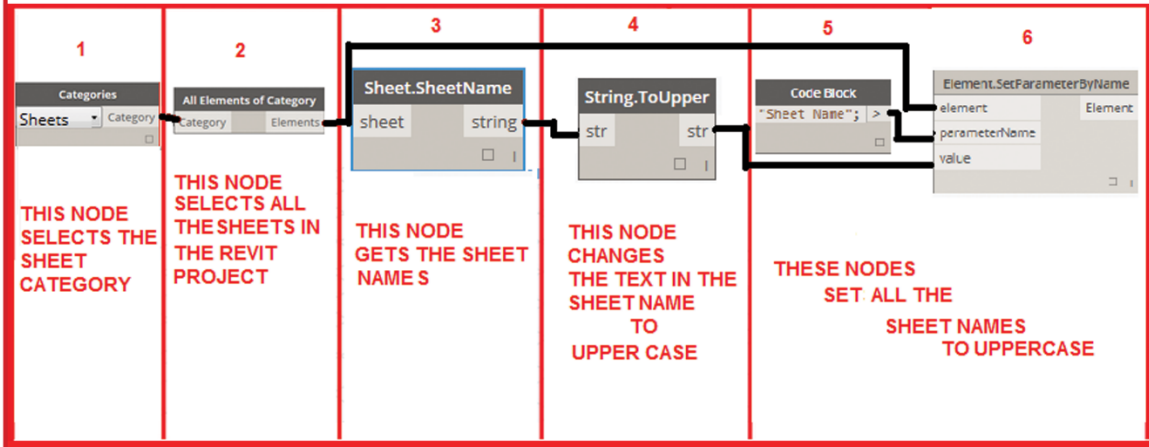


STEPS & NOTES

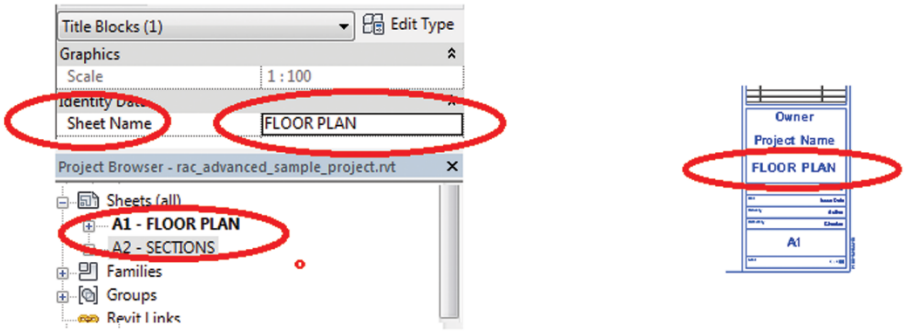
STEP 1: OPEN REVIT SAMPLE PROJECT "TEXT_TO_UPPERCASE_ROOM_TEXT_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: THE METHOD ABOVE WORKS WELL WHEN CHANGING MANY ROOM TEXT NOTES TO UPPER CASE

TEXT TO UPPERCASE SHEET NAMES

DYNAMO NODES



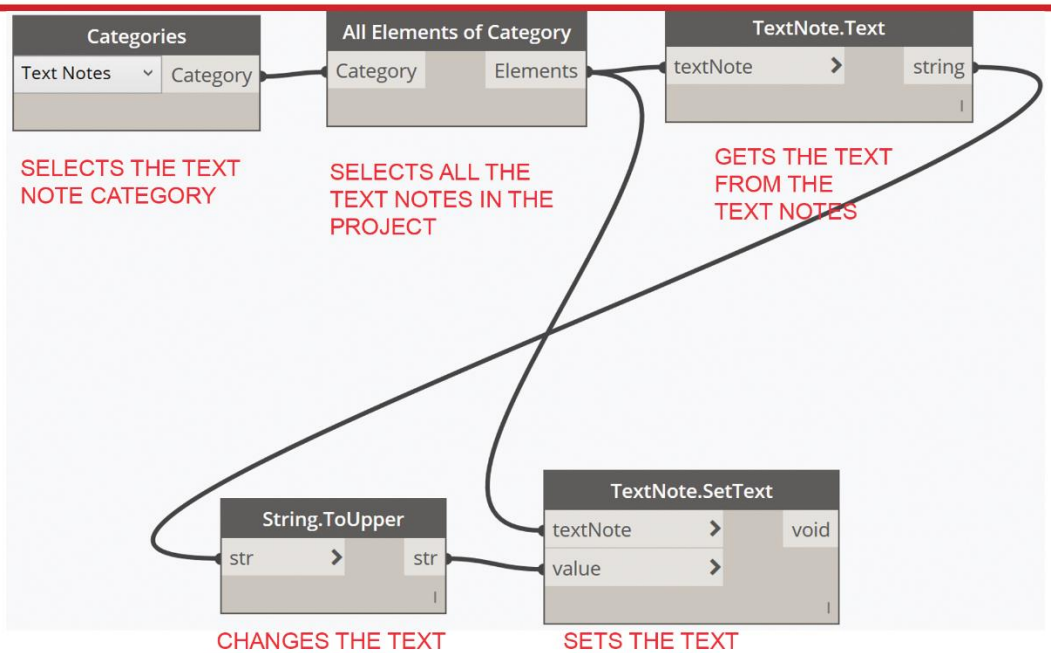
REVIT VIEW BROWSER



STEPS & NOTES

STEP 1: OPEN REVIT SAMPLE PROJECT "TEXT_TO_UPPERCASE_SHEET_NAMES_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: THE METHOD ABOVE WORKS WELL WHEN CHANGING MANY SHEET NAMES TO UPPER CASE

TEXT TO UPPERCASE TEXT NOTES



DYNAMO NODES

Exterior overhead canopy. See structural sheets for additional information/details

BEFORE CASE CHANGE

EXTERIOR OVERHEAD CANOPY. SEE STRUCTURAL SHEETS FOR ADDITIONAL INFORMATION/DETAILS

AFTER CASE CHANGE

REVIT VIEW

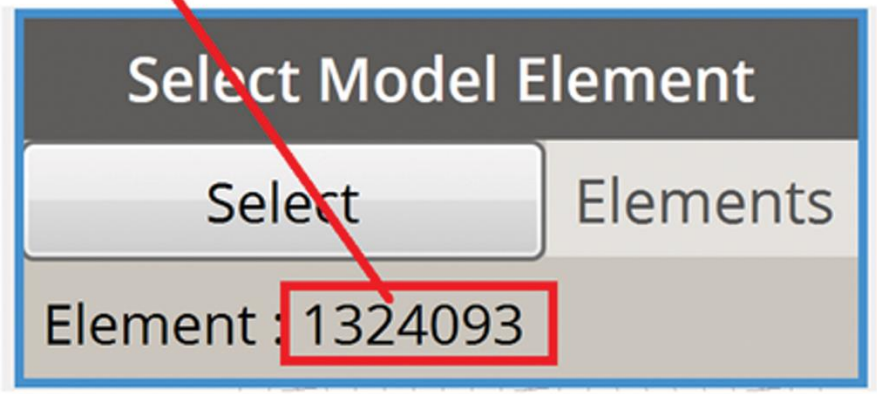
STEP 1: OPEN REVIT SAMPLE PROJECT "TEXT_TO_UPPERCASE_TEXT_NOTE_START.RVT"
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTES: THE METHOD ABOVE WITH CHANGE ALL TEXT NOTES TO UPPER CASE, REVIT'S UPPER CASE FUNCTION ONLY ALLOWS ONE TEXT NOTE TO BE CHANGED AT A TIME

STEPS & NOTES

HOW DYNAMO SELECTS REVIT ELEMENTS

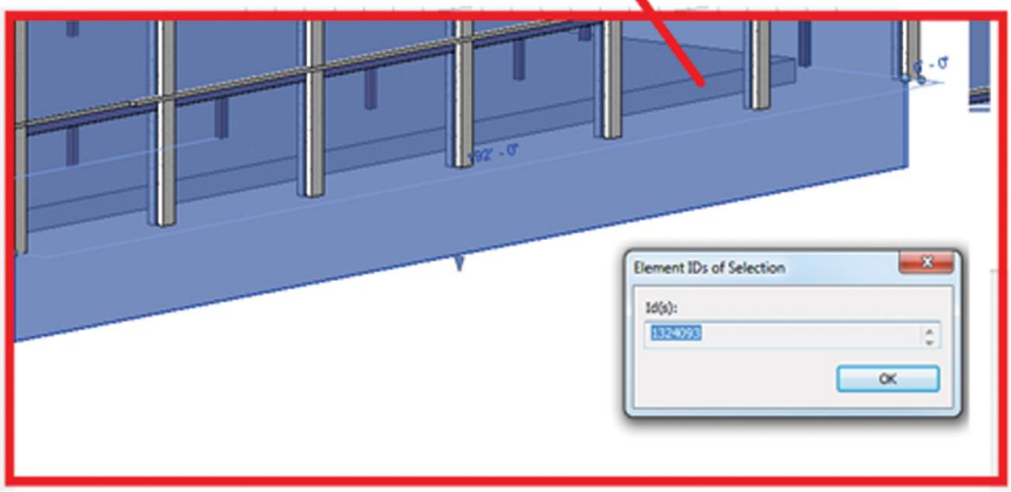
DYNAMO NODES

When you select a Revit Element using DynamoBIM it displays the Element ID



REVIT GEOMETRY

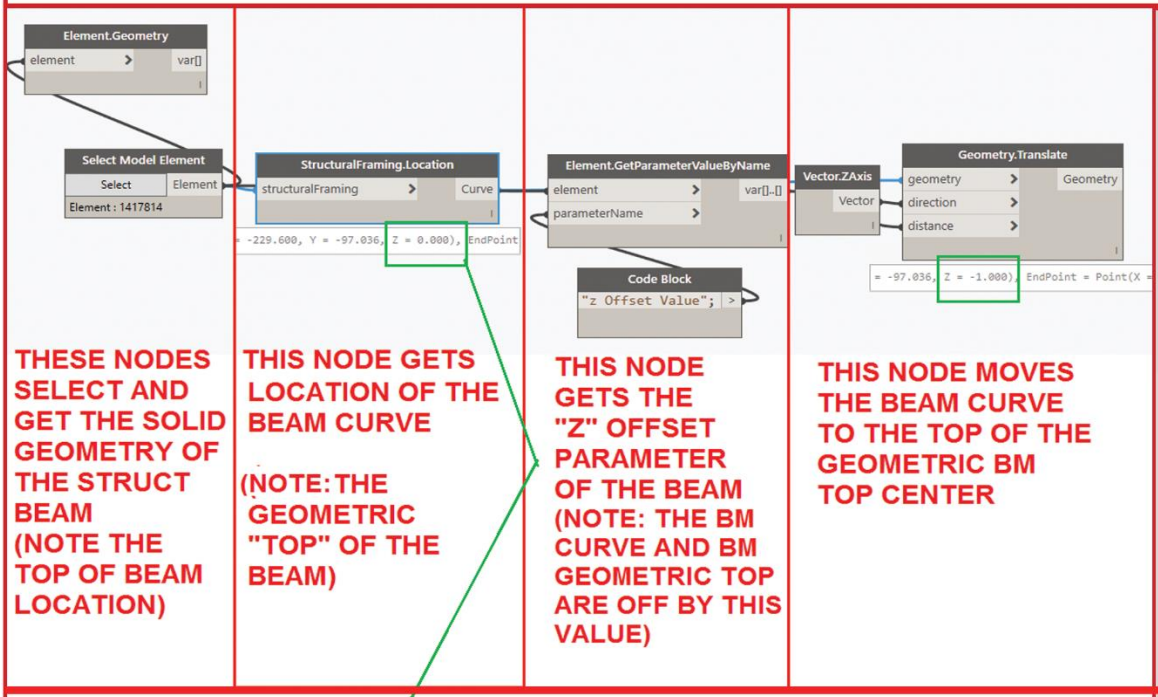
When you select a Revit Element using Revit it turns it BLUE

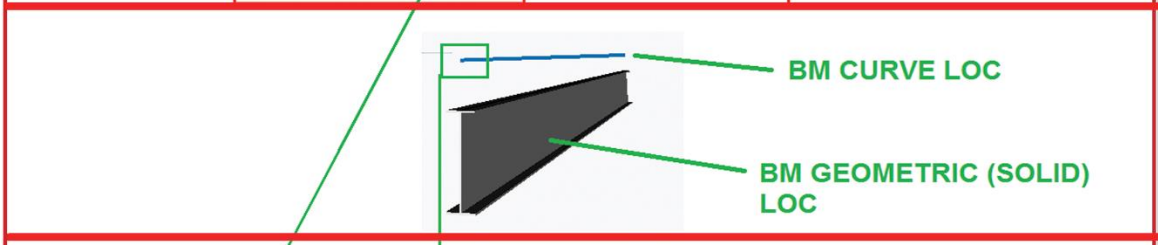


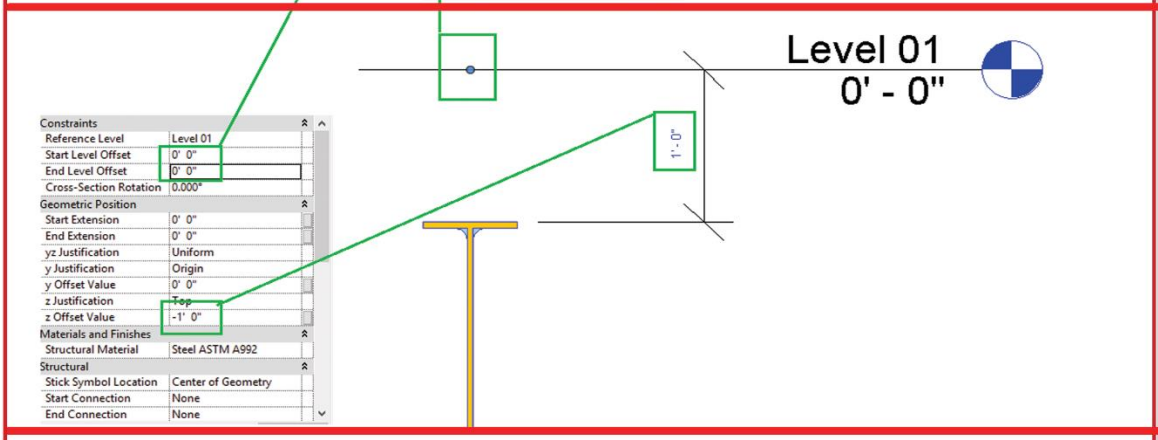
STEPS & NOTES

NOTE: THIS SHOWS HOW DYNAMO SELECTS REVIT ELEMENTS, ONCE THE REVIT ID IS DISPLAYED IN DYNAMO THEN DYNAMO HAS SELECTED THE REVIT ELEMENT

TRUE LOCATION OF CURVE OF BEAMS





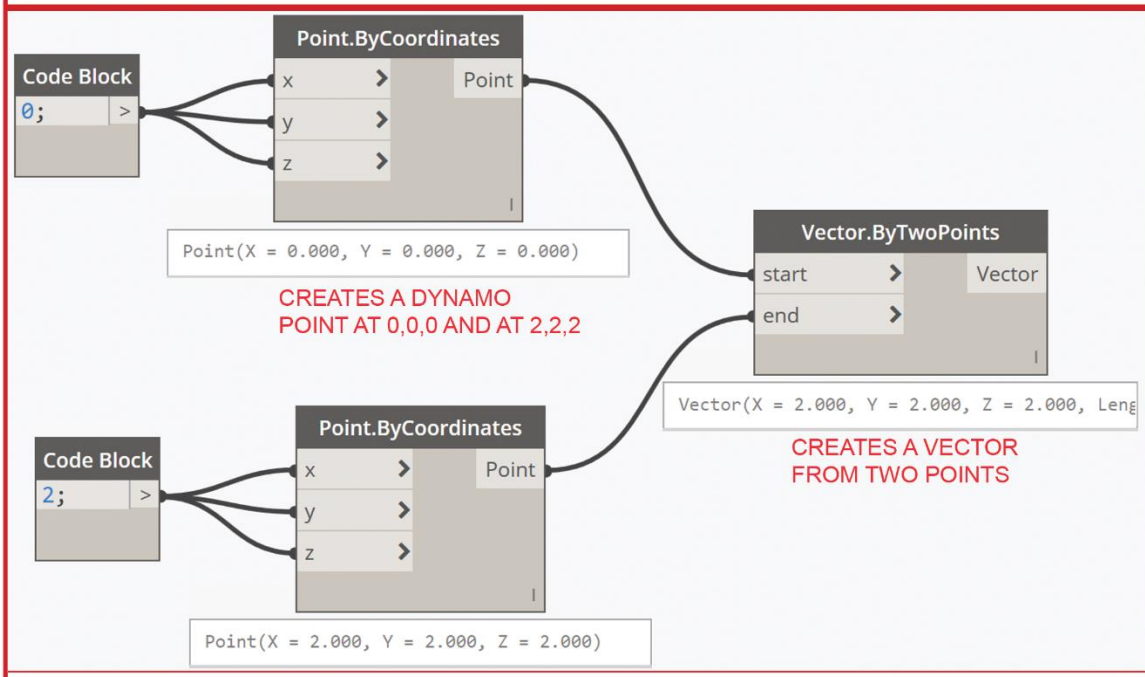


THE BEAM CURVE LOCATION WILL NOT BE AT THE BEAM GEOMETRIC (SOLID) JUSTIFICATION LOC (TOP CENTER IN THIS CASE) IF THE "Z" OFFSET VALUE IS NON-ZERO, THEREFORE, YOU MUST CORRECT THE BEAM CURVE LOC BY THE METHOD ABOVE.

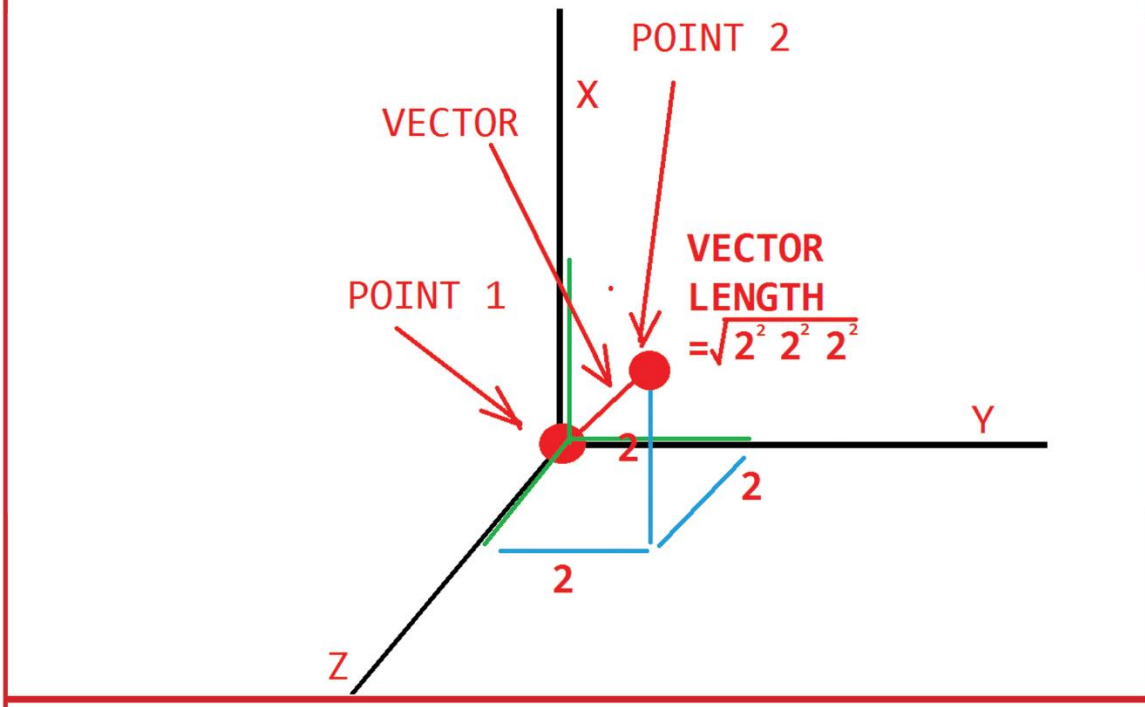
Also note that this method shown above will not work if your beam reference work plane is not horizontal. In that case you would need to change the vector input from "z" to another vector that is perpendicular to your work plane but this case is not that common.

STEPS & NOTES

CREATE VECTOR BY TWO POINTS



DYNAMO NODES



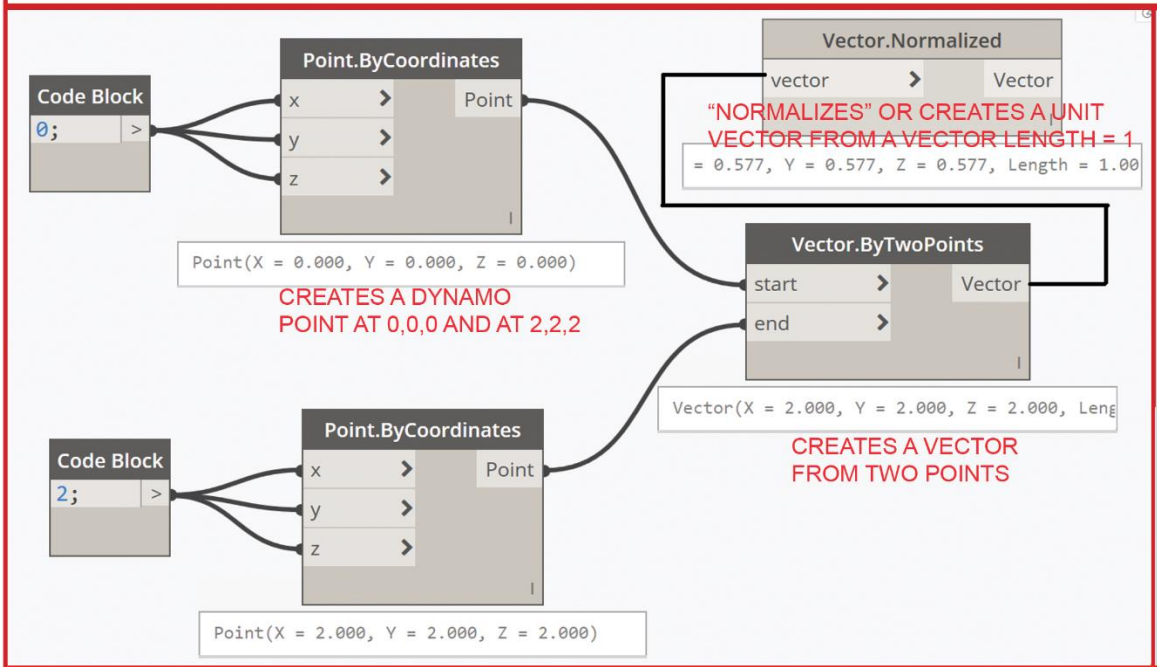
DYNAMO GEOMETRY

NOTES: 1. VECTOR SHOWN IS NOT A UNIT VECTOR, UNIT VECTORS HAVE A LENGTH = 1
2. VECTORS (AS SHOWN) COULD DEFINED BY TWO POINTS A START AND END
VECTORS ARE GENERALLY USED TO DESCRIBE A DIRECTION

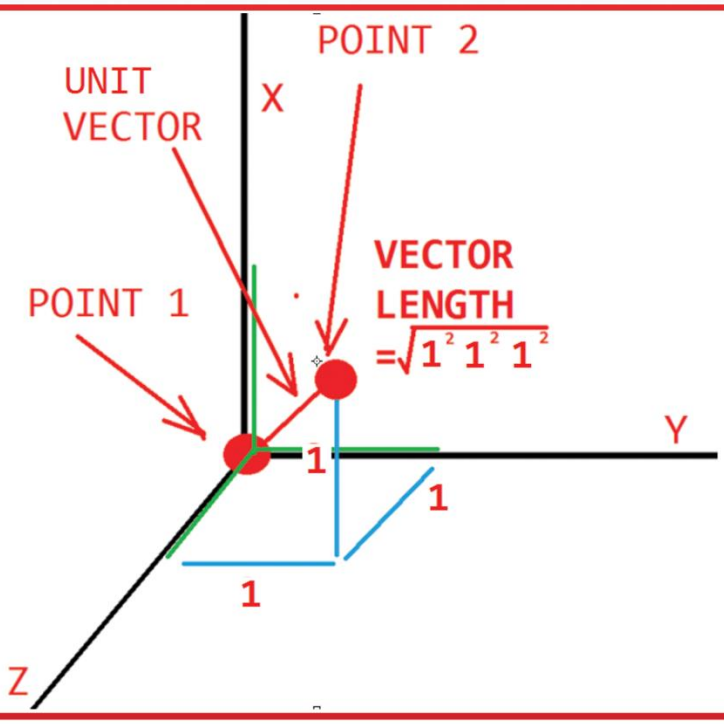
NOTES

CREATE UNIT VECTOR FROM VECTOR VIA NORMALIZE

DYNAMO NODES



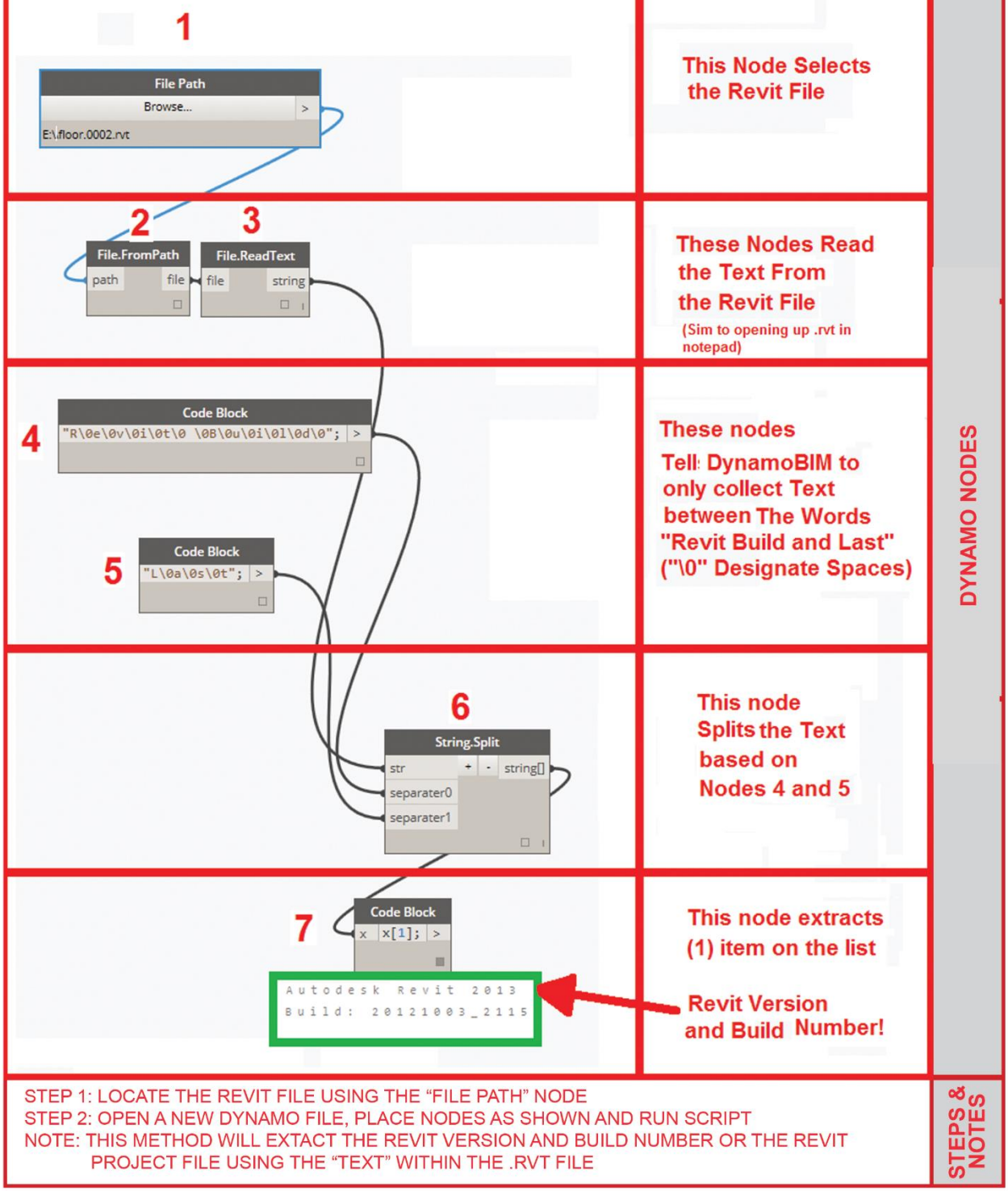
DYNAMO GEOMETRY



NOTES

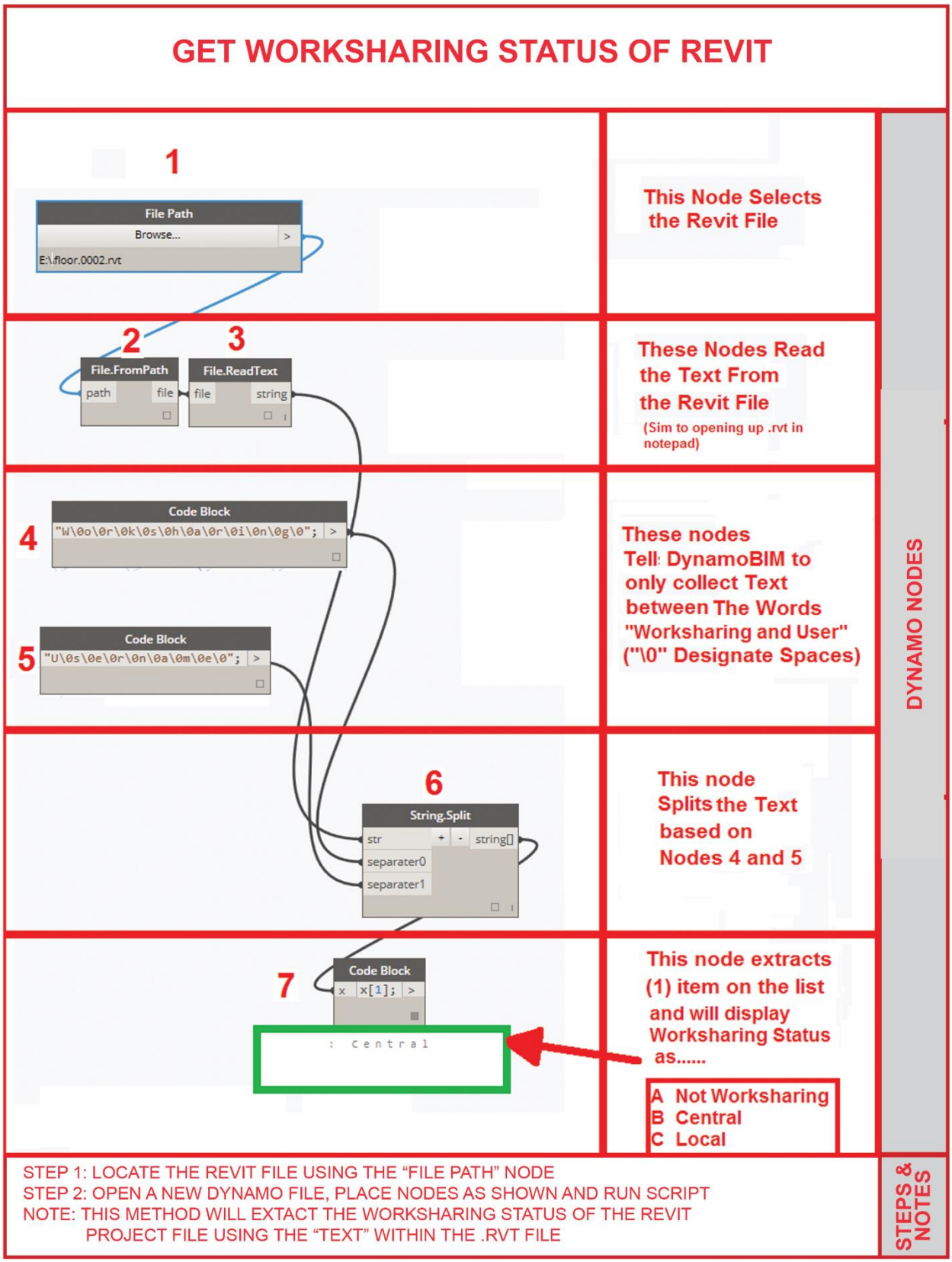
NOTES: 1. VECTOR SHOWN IS A UNIT VECTOR, UNIT VECTORS HAVE A LENGTH = 1
2. VECTORS (AS SHOWN) COULD DEFINED BY TWO POINTS A START AND END
VECTORS ARE GENERALLY USED TO DESCRIBE A DIRECTION

GET REVIT VERSION AND BUILD



STEP 1: LOCATE THE REVIT FILE USING THE “FILE PATH” NODE
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: THIS METHOD WILL EXTACT THE REVIT VERSION AND BUILD NUMBER OR THE REVIT PROJECT FILE USING THE “TEXT” WITHIN THE .RVT FILE

STEPS & NOTES


GET WORKSHARING STATUS OF REVIT
1
File Path
Browse...
E:\floor.0002.rvt
This Node Selects the Revit File
2
File.FromPath
path
file
3
File.ReadText
file
string
These Nodes Read the Text From the Revit File
(Sim to opening up .rvt in notepad)
4
Code Block
"W\0o\0r\0k\0s\0h\0a\0r\0i\0n\0g\0";
5
Code Block
"U\0s\0e\0r\0n\0a\0m\0e\0";
These nodes Tell DynamoBIM to only collect Text between The Words "Worksharing and User" ("\0" Designate Spaces)
6
String.Split
str
string[]
separater0
separater1
This node Splits the Text based on Nodes 4 and 5
7
Code Block
x
x[1];
: Central
This node extracts (1) item on the list and will display Worksharing Status as.....
A Not Worksharing
B Central
C Local
DYNAMO NODES
STEP 1: LOCATE THE REVIT FILE USING THE “FILE PATH” NODE
STEP 2: OPEN A NEW DYNAMO FILE, PLACE NODES AS SHOWN AND RUN SCRIPT
NOTE: THIS METHOD WILL EXTACT THE WORKSHARING STATUS OF THE REVIT PROJECT FILE USING THE “TEXT” WITHIN THE .RVT FILE
STEPS & NOTES

BES219753-L