String Theory—Dynamo for Absolute Beginners

Jason Howden
CEO
@RTVTools

Class summary

No coding or Dynamo experience required. This presentation will get you started with the power of automation using Dynamo.

We will explore the Dynamo interface and discover some powerful timesaving workflows so you can spend more time on design.

Key learning objectives

At the end of this class, you will be able to:

- Understand how to use Dynamo and navigate the interface;
- Where to find the best learning materials;
- How to create your first Dynamo script; and
- How to create a script to randomize a façade, and automate workset management in Revit.

Dynamo Overview

This is not Dynamo!



but some do think it’s magic!...

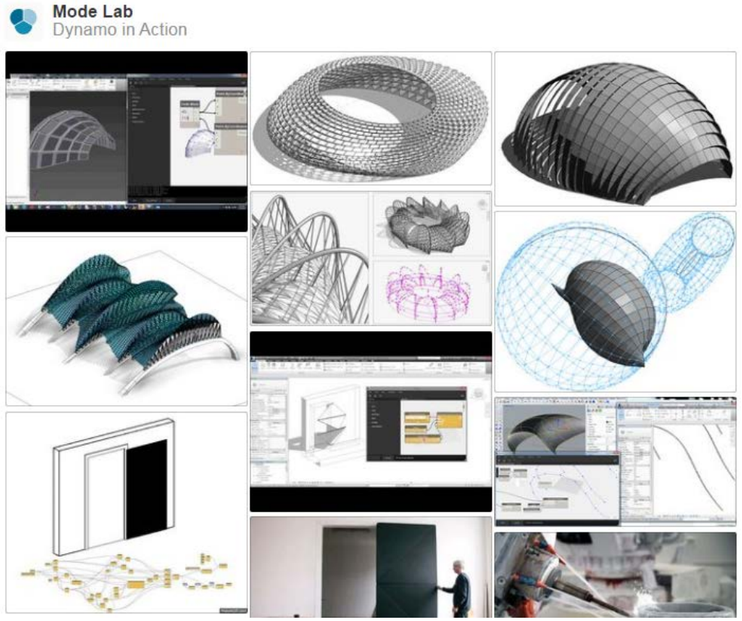
So what is Dynamo?

- Is a software application (Dynamo Studio) and a plugin for Revit (Dynamo);
- The code is open source;
- Is a Visual Programming editor;
- Where “Nodes” are connected with “Wires” to other “Nodes” to create and execute an overall program.

So what can I use Dynamo for?

A wide range of processes and activities in Revit can be automated or assisted by using Dynamo including;

- Geometry;
- Parameter and Data manipulation;
- View and Sheet creation;
- Model management and audits; and
- whatever your imagination aspires to explore.



Dynamo Examples: Source dynamoprimer.com

So how do you get started?

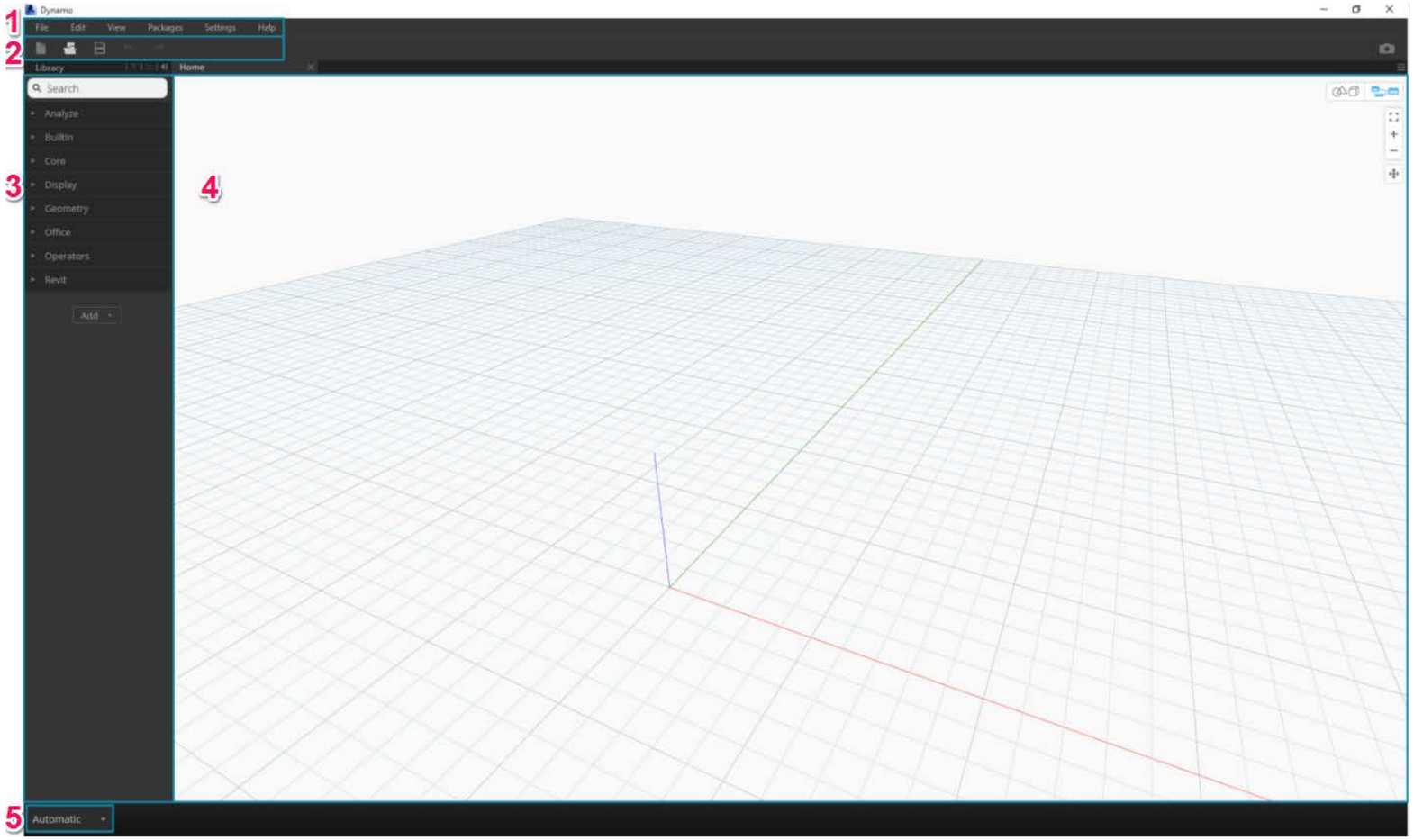
There are many places where you can find useful resources to learn Dynamo, but my favourites are;

- DynamoPrimer.com;
- DynamoNodes.com;
- Archi+Lab.net;
- DynamoPackages.com;
- DyanmoBIM.org; and
- Google

Dynamo Interface

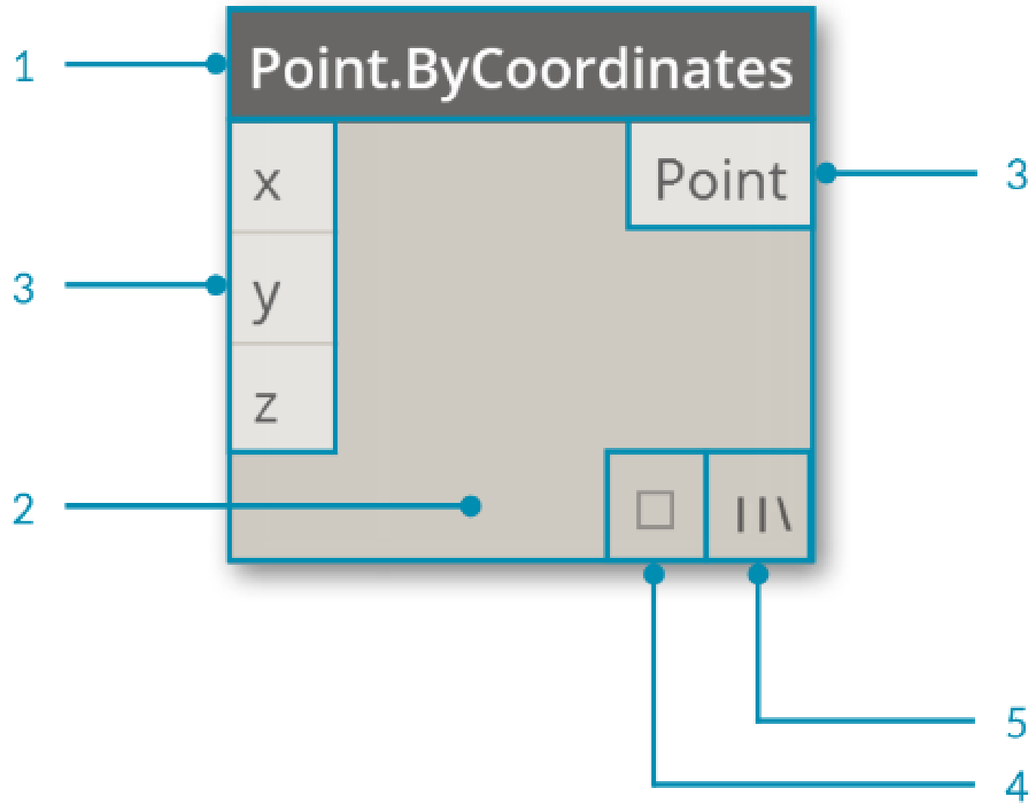
Dynamo User Interface (UI)

1. Menus;
2. Toolbar;
3. Library;
4. Workspace; and
5. Execution Bar



Dynamo Node

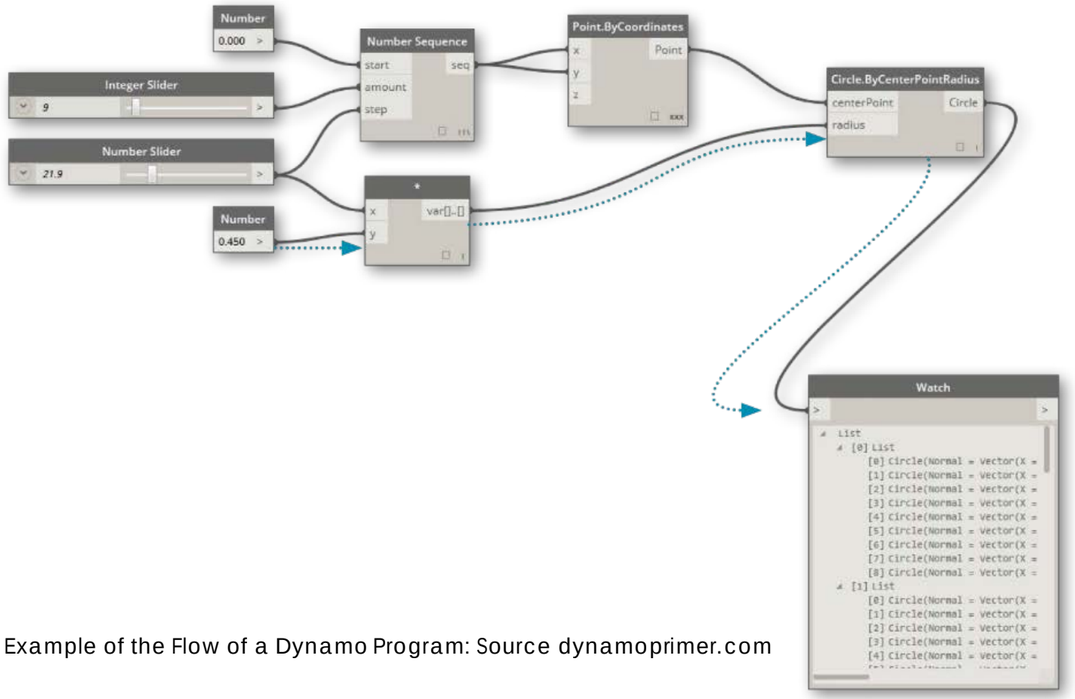
1. Name;
2. Main Body;
3. Part (Input and Output Ports);
4. Data Preview; and
5. Lacing Icon



Dynamo Node: Source dynamoprimer.com

Dynamo Wires

- Connect Nodes to each other;
- Direct or create the Programs “flow”;
- Think of them as actual wires but carrying data not electricity.

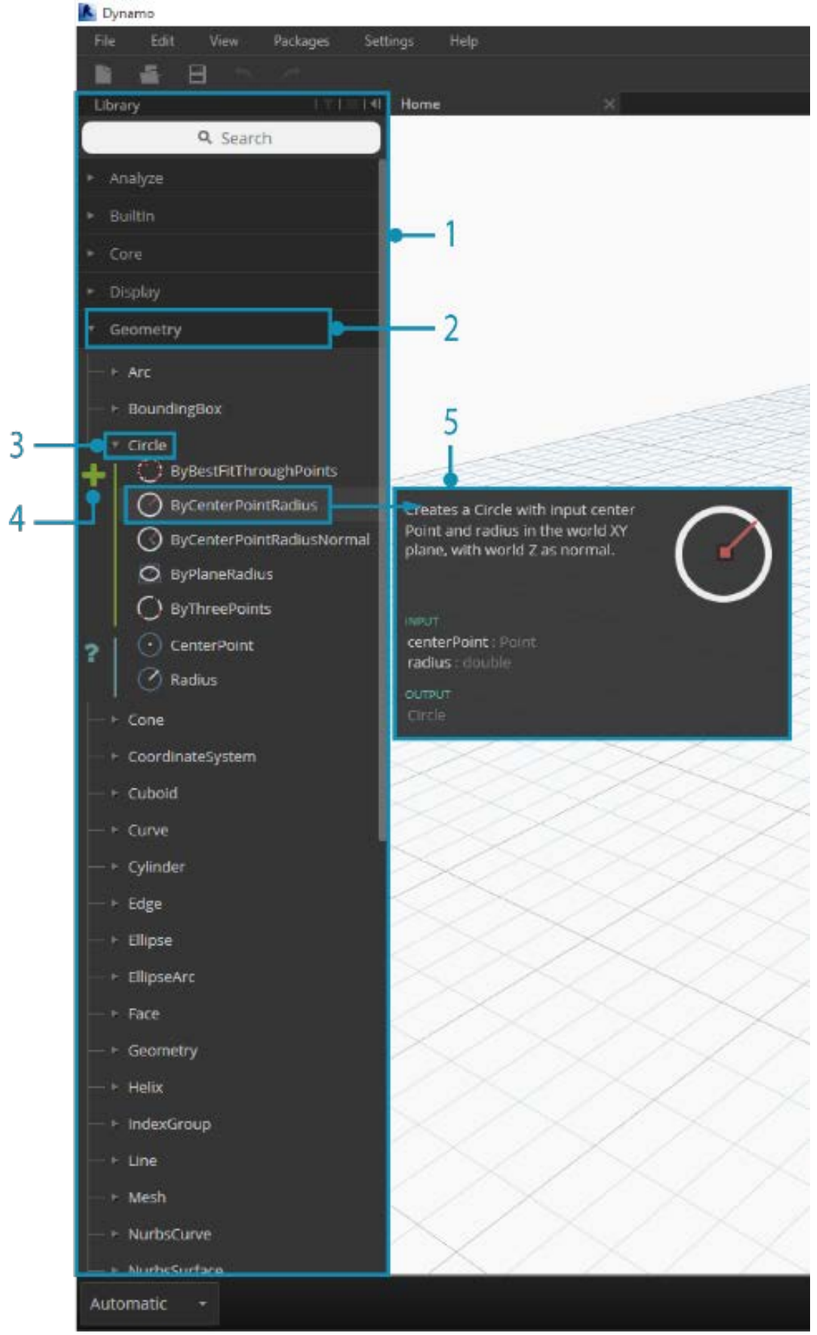


Example of the Flow of a Dynamo Program: Source dynamoprimer.com

Dynamo Library

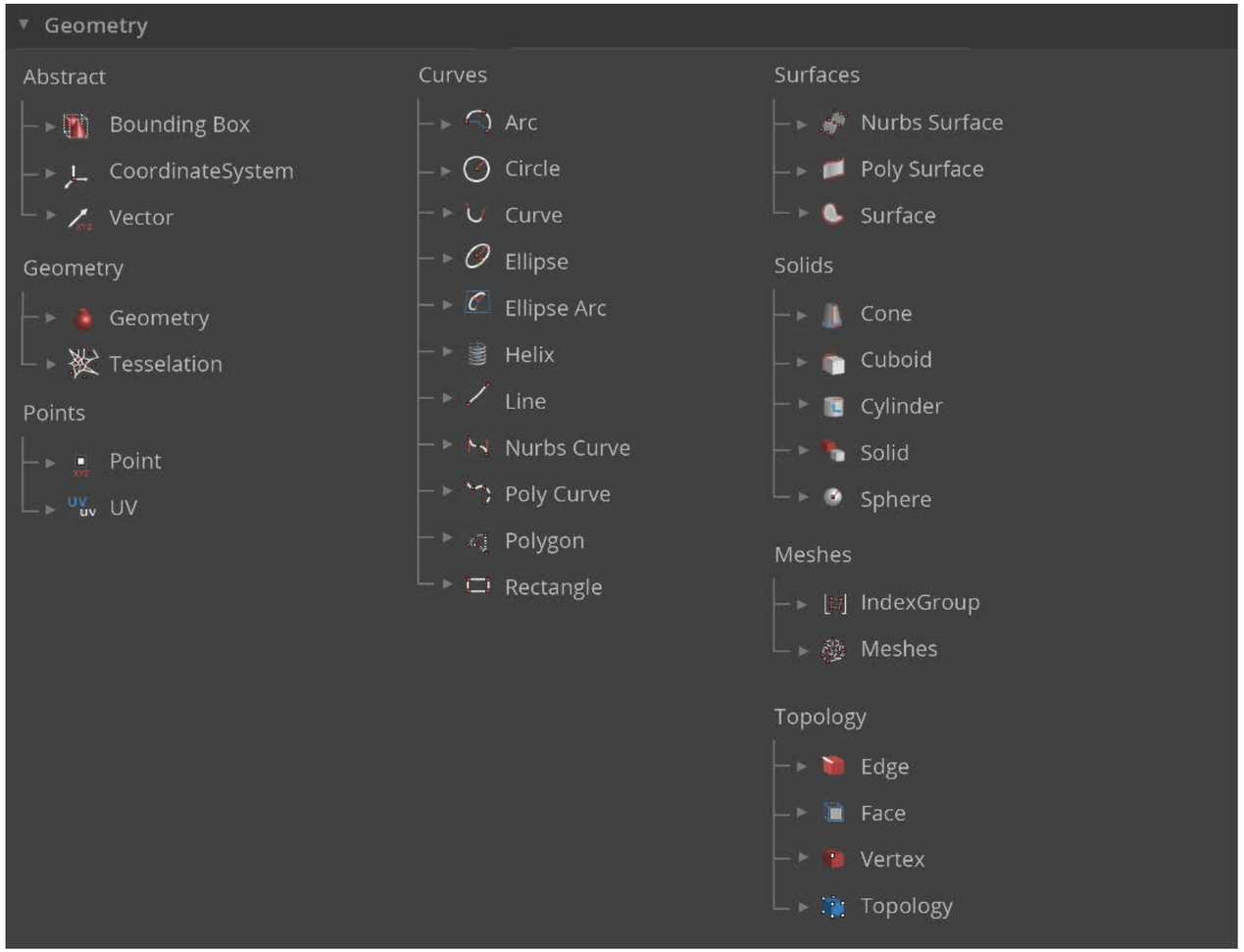
1. The Library;
2. A Library or Package;
3. A Category;
4. A Sub-Category; and
5. A Node

Note: the Search Bar



Building ‘Blocks’ of Dynamo

- Data Blocks;
- Geometry Blocks;
- List Blocks (possibly the most useful); and
- Revit Specific Blocks

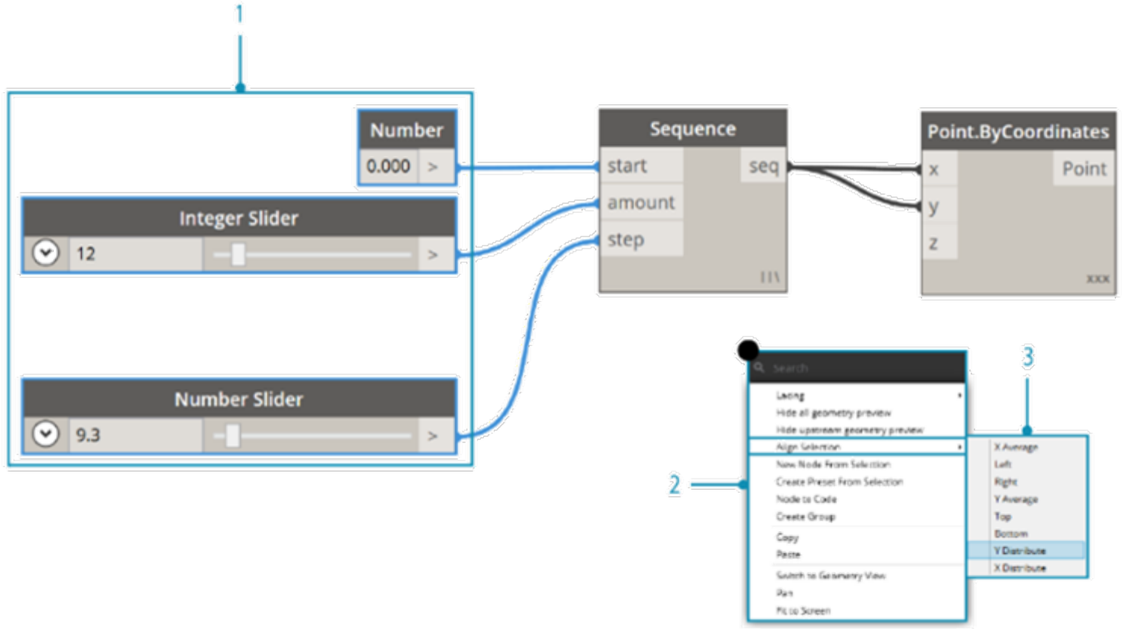


Dynamo Geometry Nodes: Source dynamoprimer.com

Keeping it clean

Program Management - Alignment

1. Keep your programs organised;
   “trust me you’ll know what I mean in 3 months time!”
2. Align common Nodes into groups;
3. **Remember:** the ‘right-click’ functions;

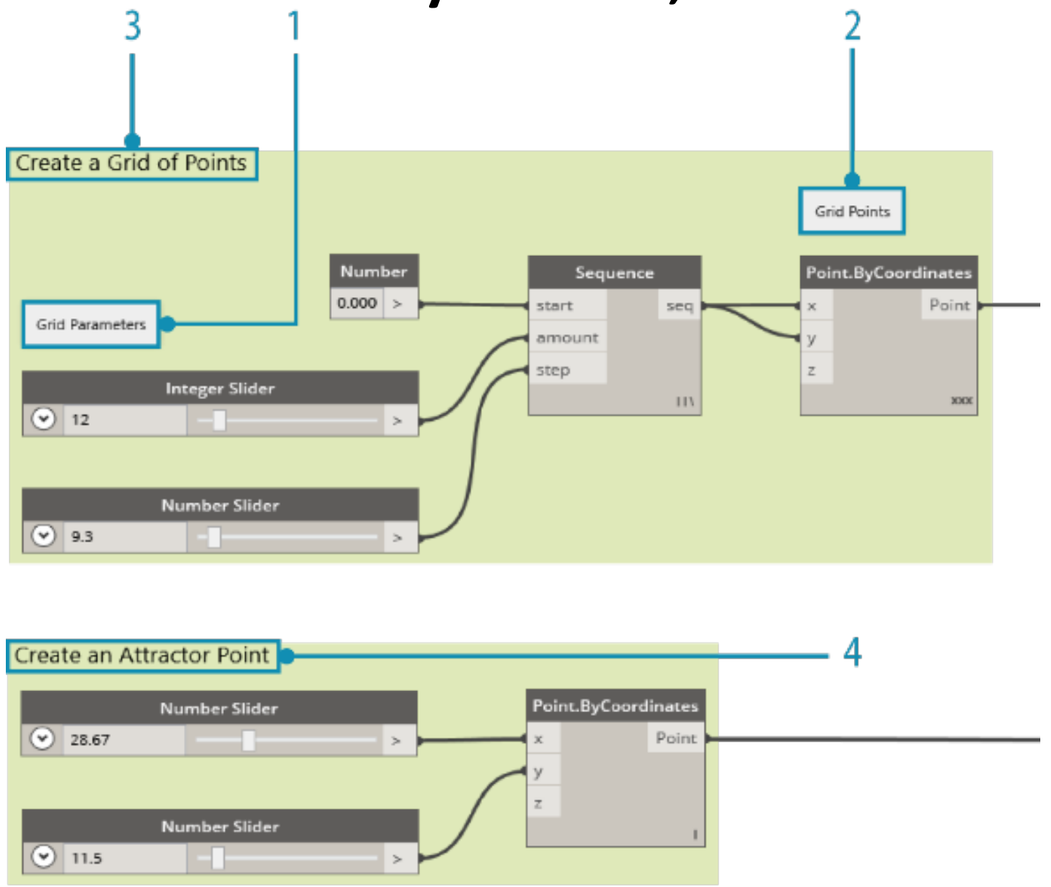


Dynamo Alignment: Source dynamoprimer.com

Program Management - Grouping

Grouping and Notes are invaluable and allow you to;

- Leave ‘bread crumbs’ for other users;
- To remind you of your logic at the time you started the program; and
- To quickly identify which parts relate to each other.

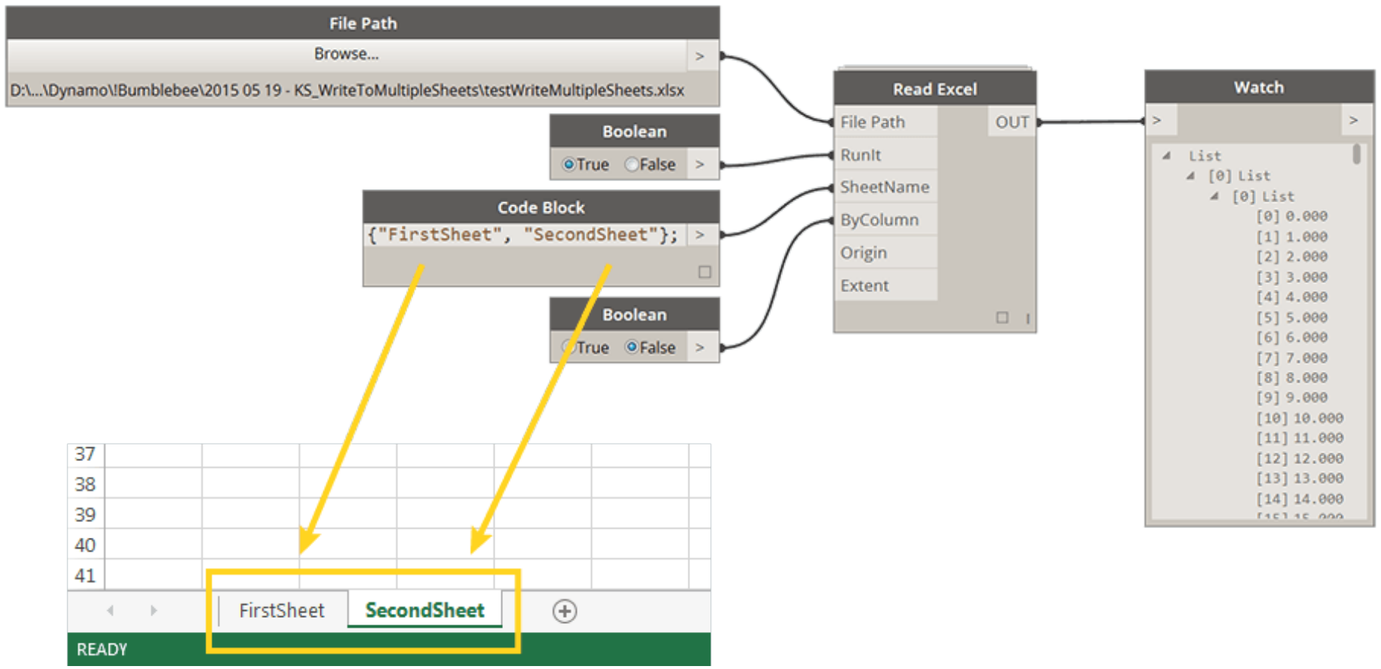


Dynamo Groups: Source dynamoprimer.com

Extending Dynamo “out of the box”

Custom Packages – Bumblebee

- My No.1 favourite addition to Dynamo;
- Excel and Dynamo = BIM Heaven;
- Provides enhanced Excel to Dynamo functions;
- A must have package in your library.

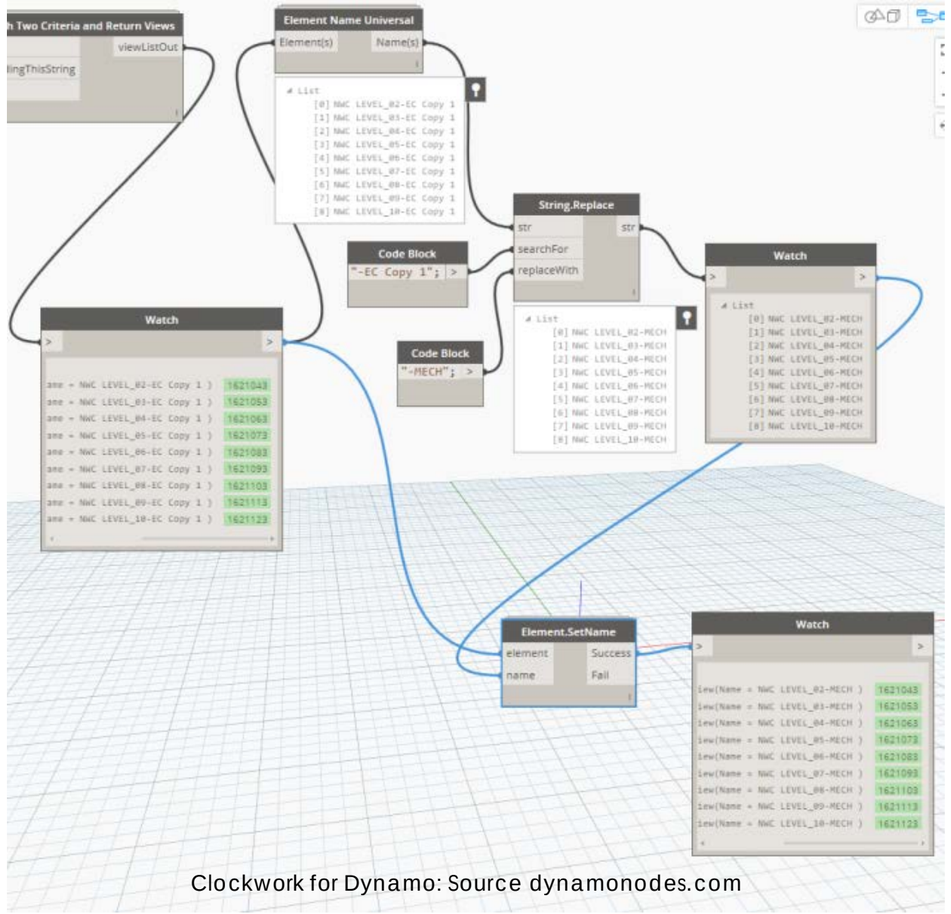


Bumblebee for Dynamo: Source archi-lab.net

Custom Packages – Clockwork

Don’t leave home without this Dynamo package!

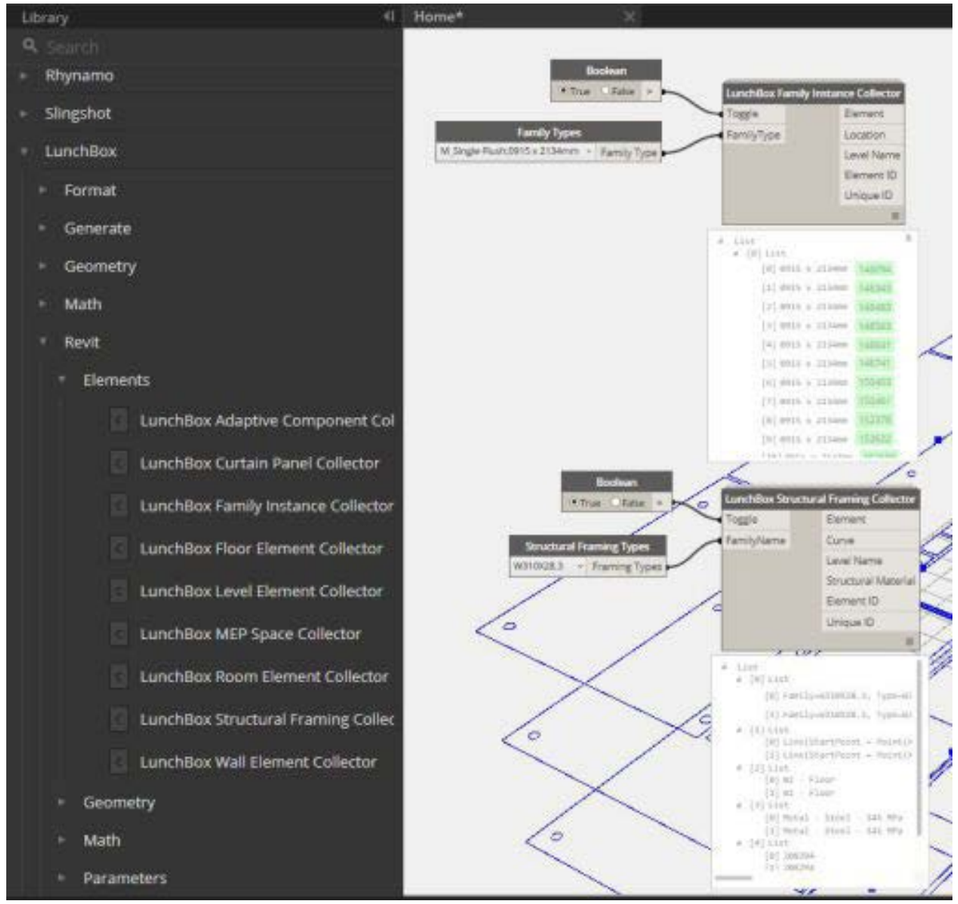
- Over 360 custom Nodes;
- Ranging from Revit related to mathematical to surfaces and much more…



Clockwork for Dynamo: Source dynamonodes.com

Custom Packages – Lunchbox

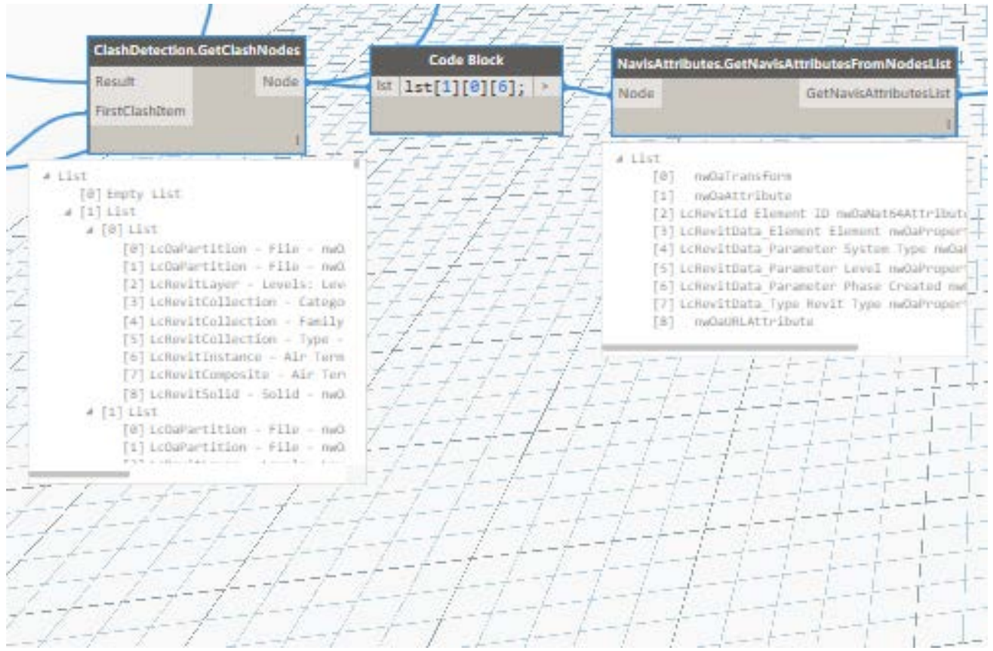
- Another must have package;
- A set of computational Nodes for Dynamo and Grasshopper;
- With over 8000 users, Lunchbox is the most downloaded tool for Dynamo.



Lunchbox for Dynamo: Source provingground.io

Custom Packages – Dynaworks

- Provides a series of packages for interfacing with Navisworks;
- If you use Revit and Navisworks, you need this package in your library.



Dynaworks for Dynamo: Source forum.dynamobim.com

Custom Packages – Mandrill

- Provides a series of packages for interfacing with Navisworks;
- If you use Revit and Navisworks, you need this package in your library.

Dynaworks for Dynamo: Source forum.dynamobim.com

Word from the Wise

- Always check for updates;
- Nodes can be replaced without warning;
- Keep good back-ups, including Dynamo installers to roll-back;
- Dynamo is a community, get to know some of the developers.



Y2Kbug: Source photobucket.com

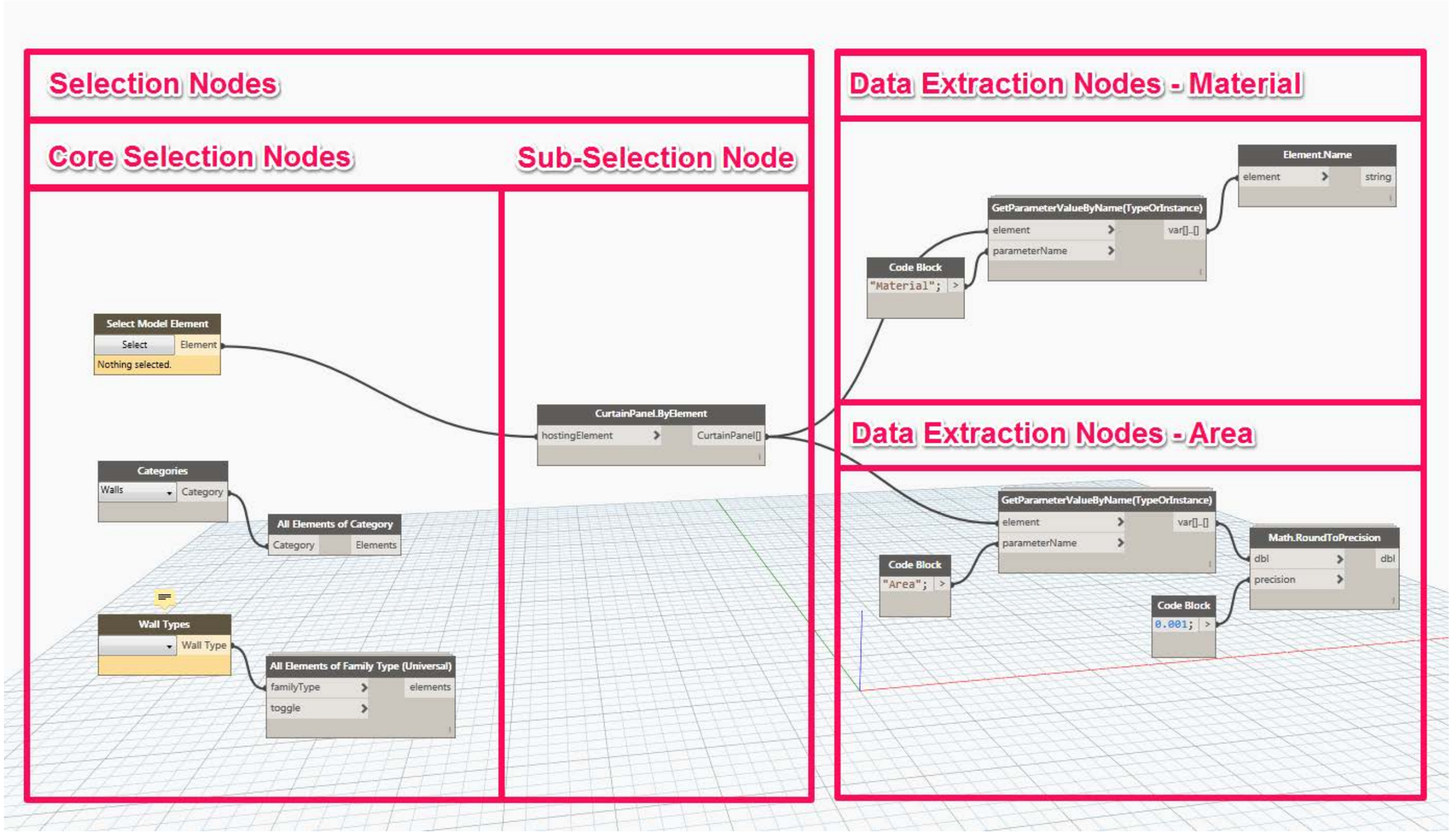
Example 1 – Simple Element Selection

The ‘First Step’

Explore different ways of selecting Model Elements in Revit with Dynamo.

- Learn to Select by pick, type and category;
- Learn to Extract Parameter Data such as Material and Areas

Example 1 – Element Selection



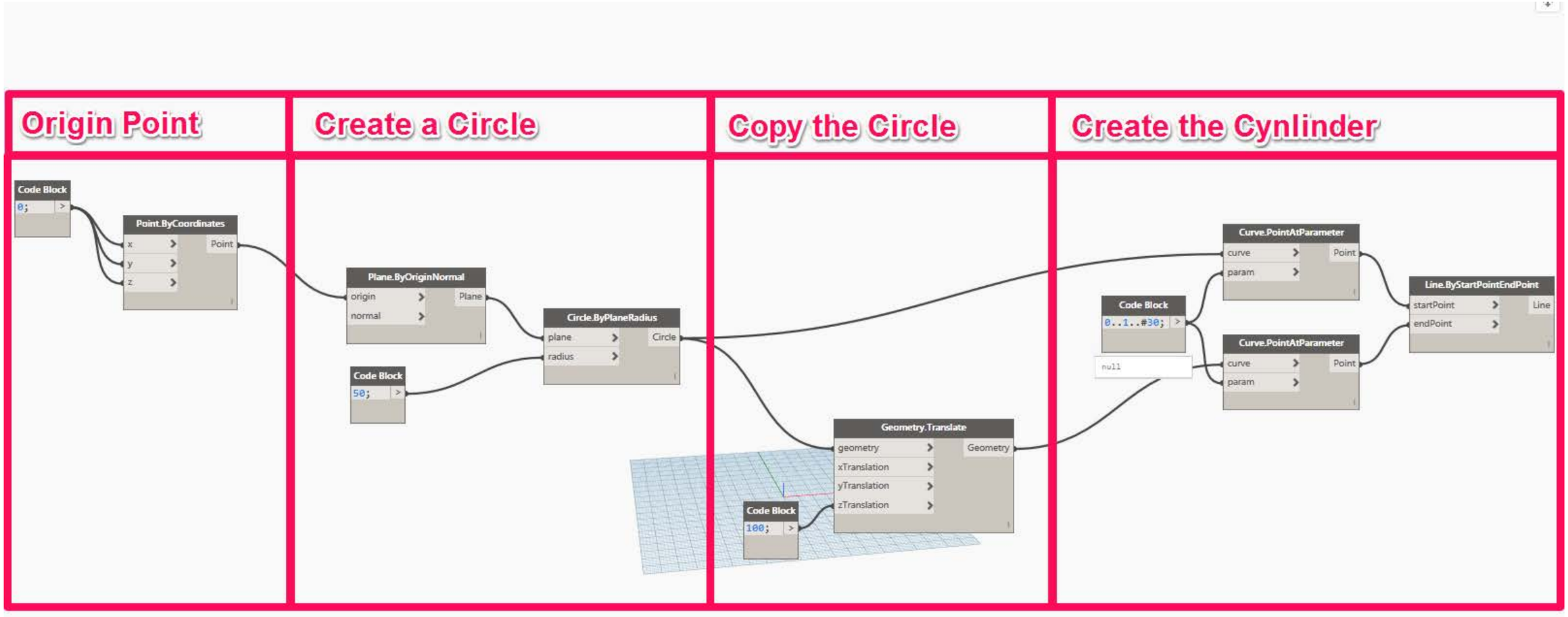
Example 2 – Working with Lists

The ‘Second Step’

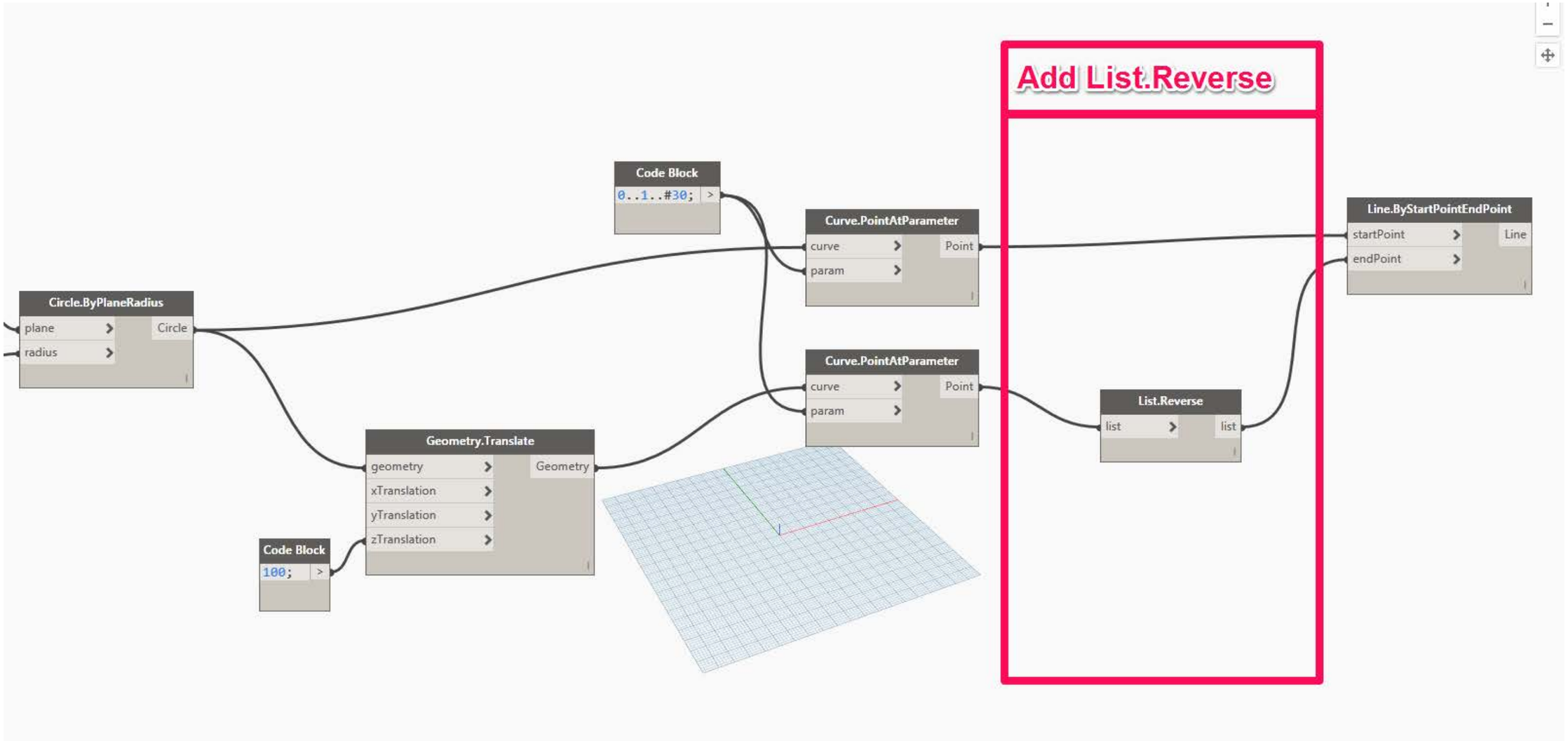
Understanding and managing Lists in Dynamo is fundamental to extending your ability to create programs that go beyond their “manufactured” starting point.

- Build a simple List; and
- Modify the List to create a Basic Cylinder.

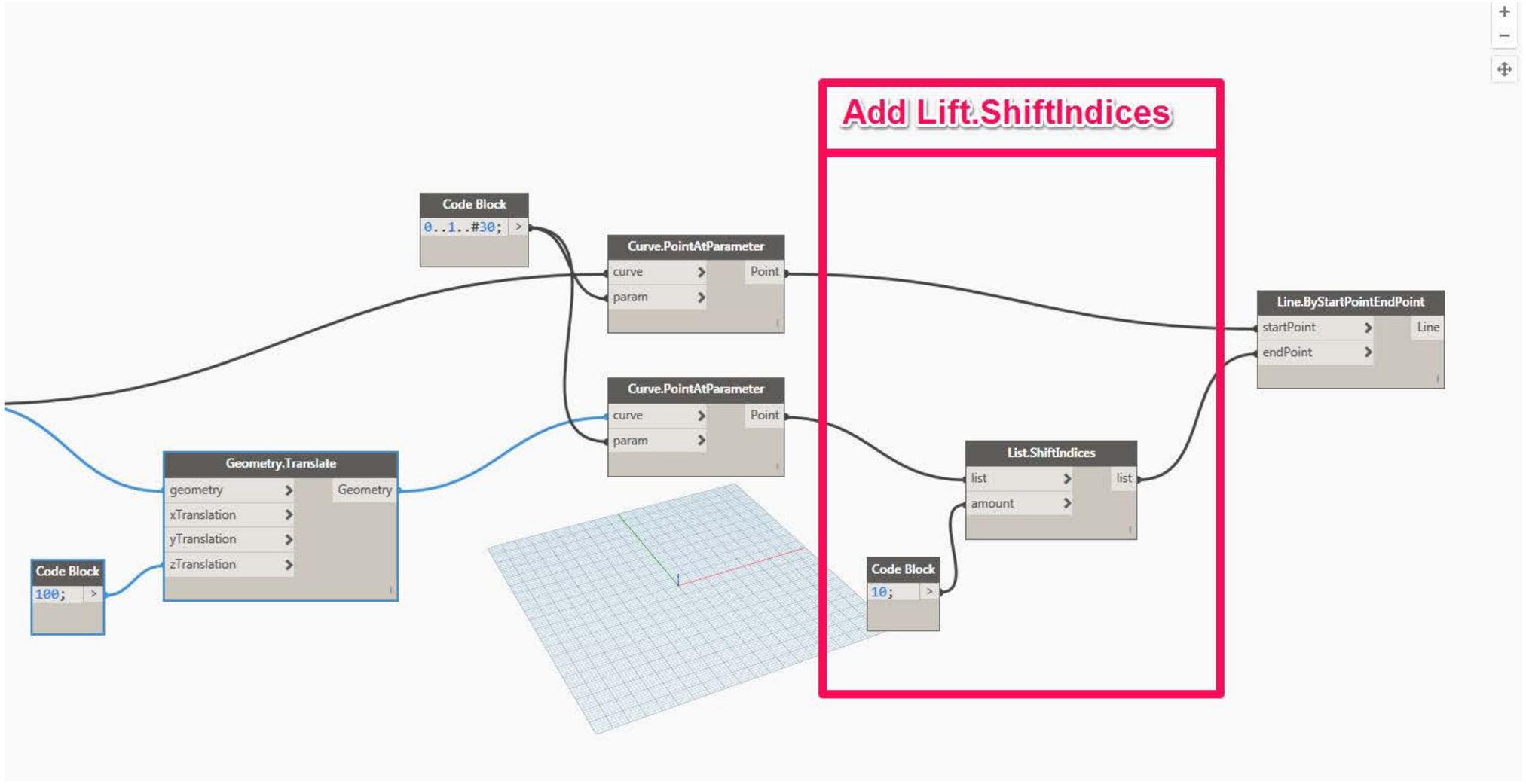
Example 2 – List Management (Part 1)



Example 2 – List Management (Part 2)



Example 2 – List Management (Part 3)



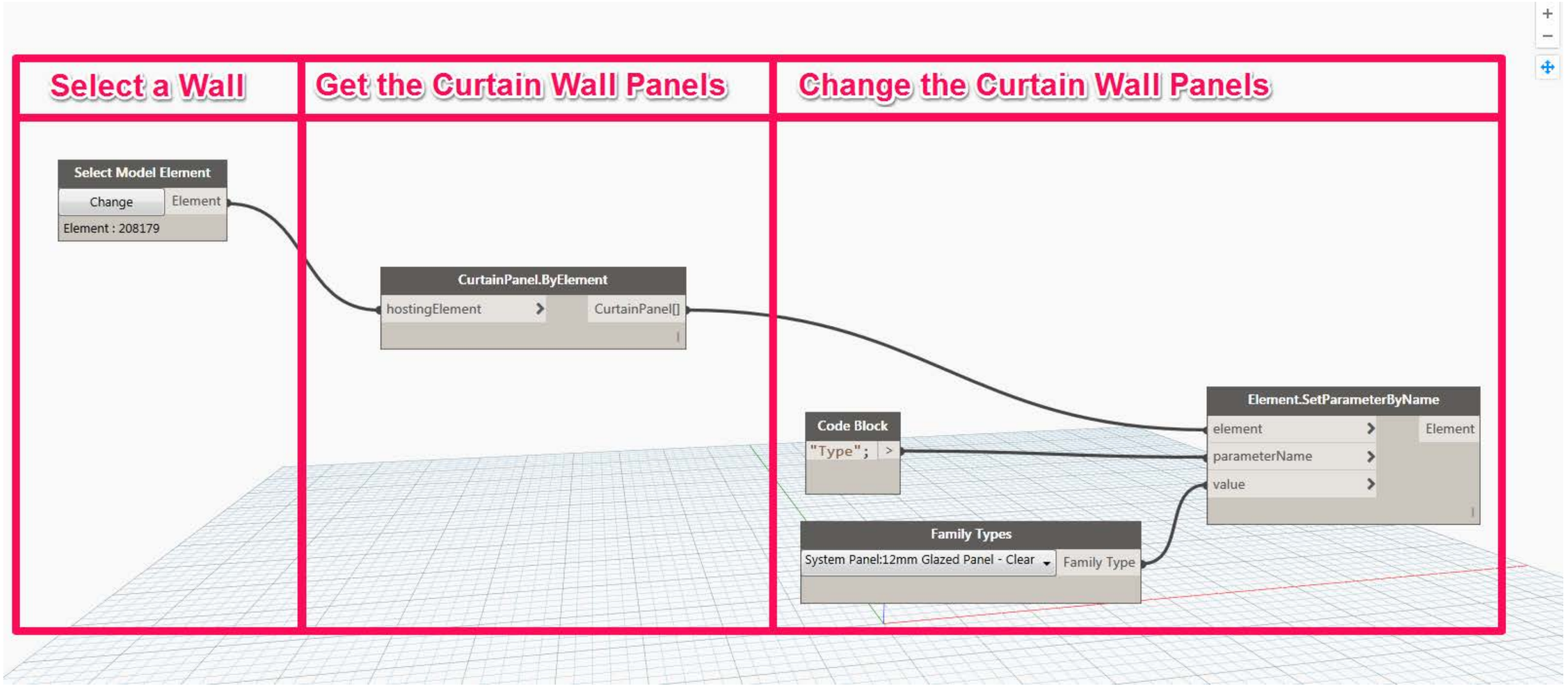
Example 3 – Curtain Wall Randomizer

Learning to “Walk”

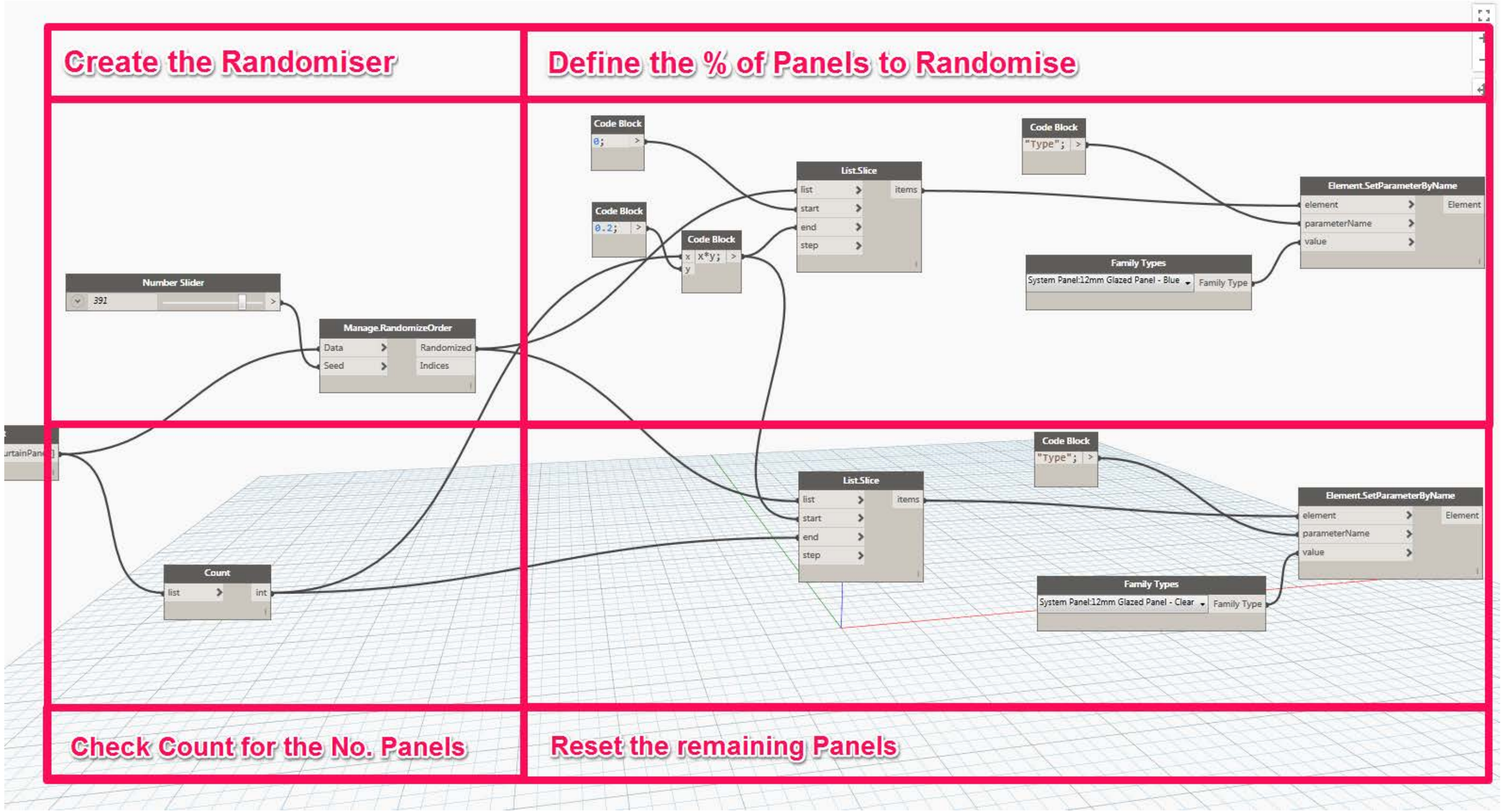
This example will use the basic learnings from the last two exercises and expand these to a real-world scenario.

- Build a Curtain Wall Randomiser;
- Including options to specify the % panel of coverage.

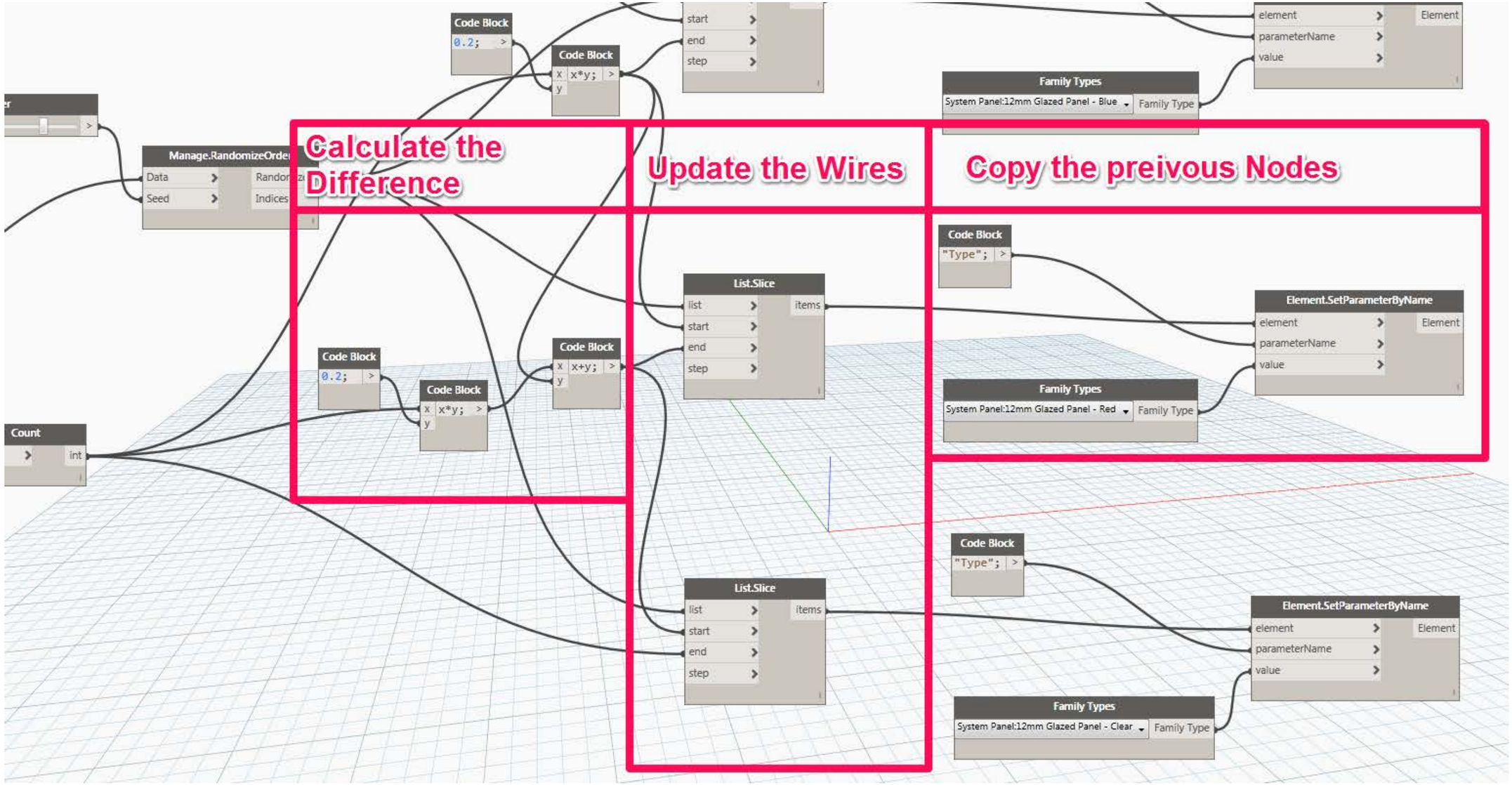
Example 3 – Curtain Wall Randomiser (Part 1)



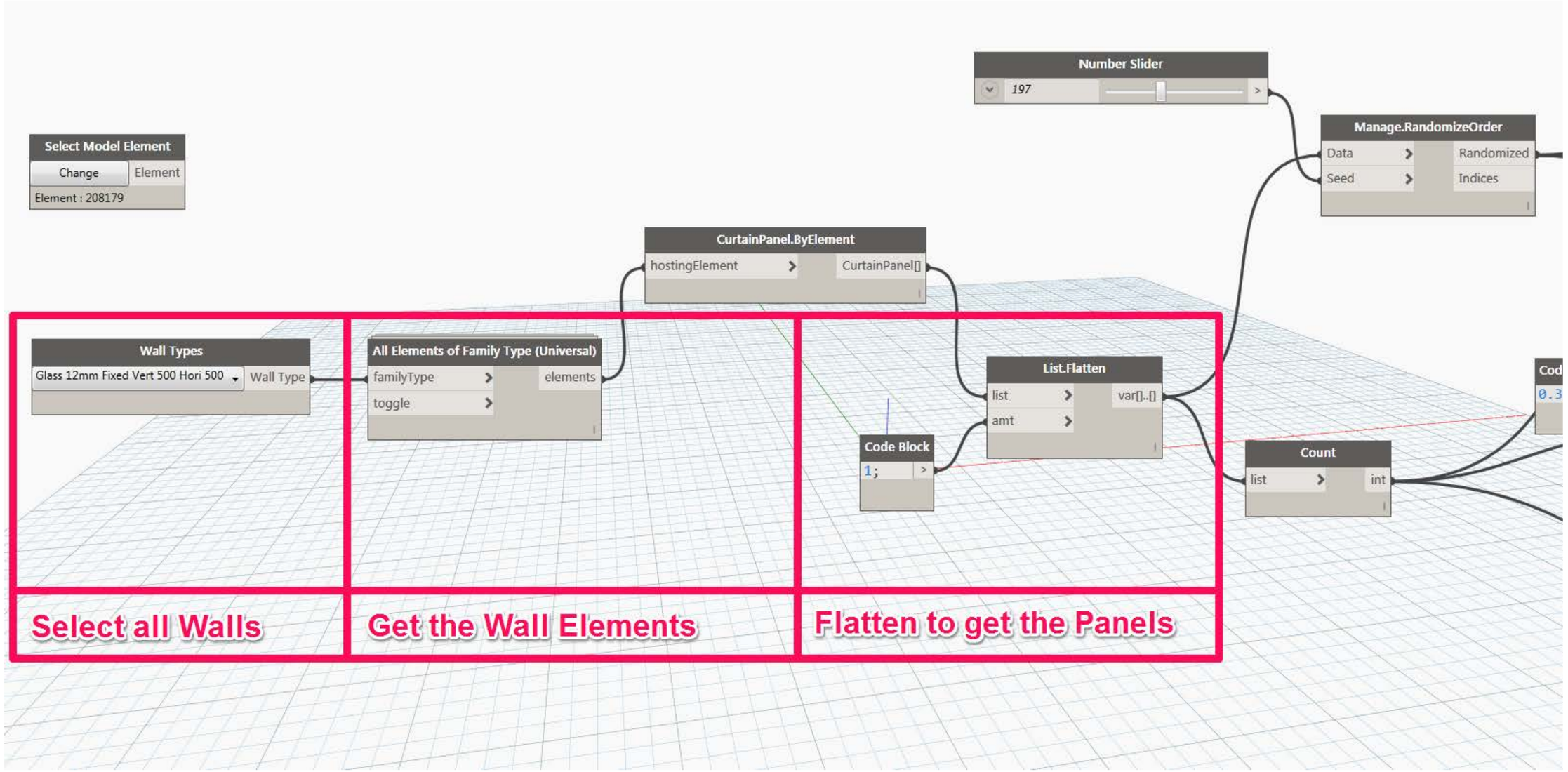
Example 3 – Curtain Wall Randomiser (Part 2)



Example 3 – Curtain Wall Randomiser (Part 3)



Example 3 – Curtain Wall Randomiser (Part 4)



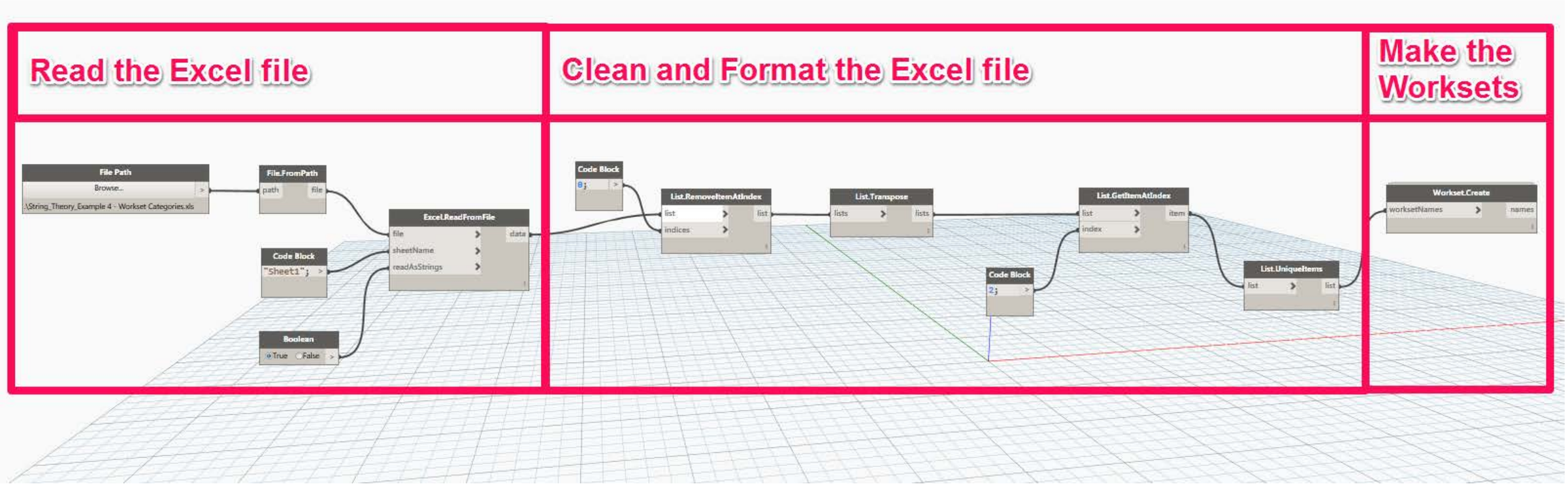
Example 4 – Workset Template Builder

Building “Speed”

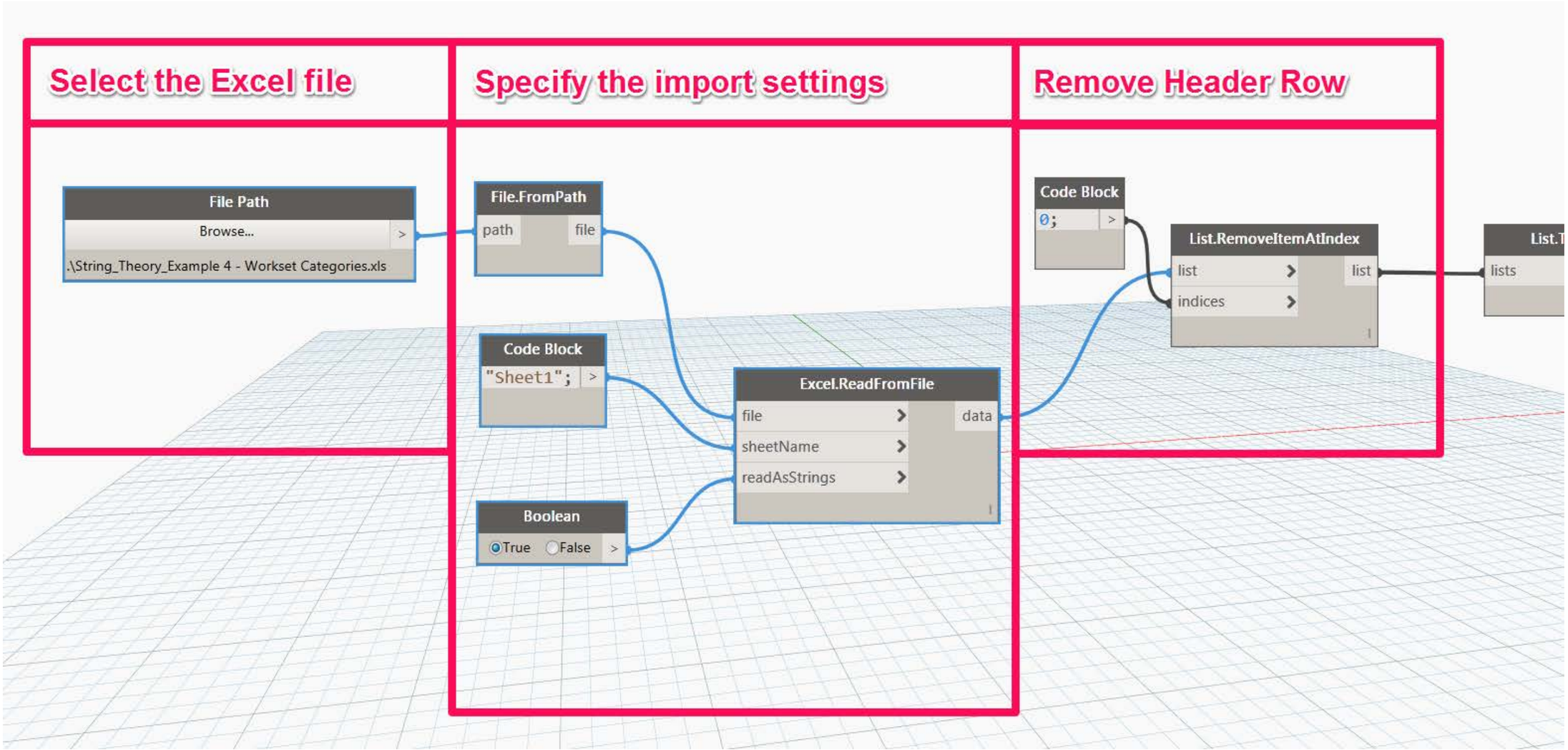
Connecting Dynamo to Excel enhances the way you can access and manage data in Revit.

- Build a script to create Revit Worksets from an Excel “Template”.

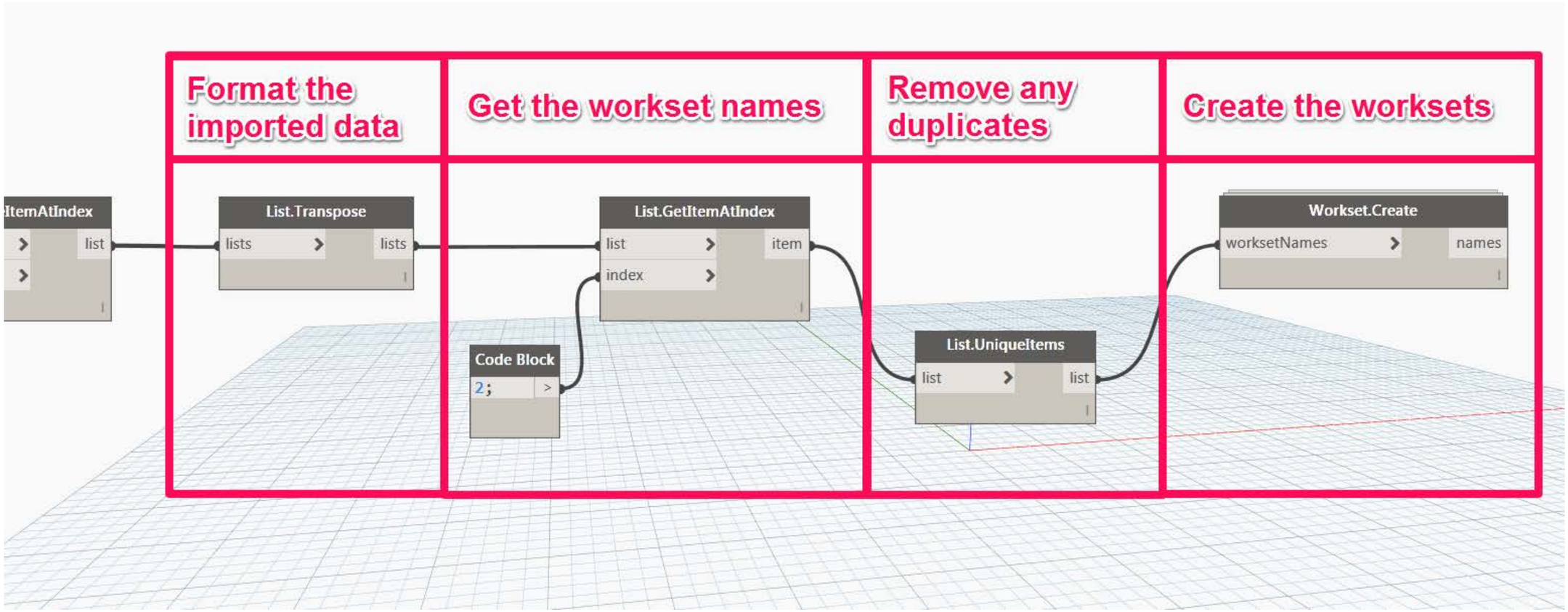
Example 4 – Workset ‘Template’ Builder (over view)



Example 4 – Workset ‘Template’ Builder (Part 1)



Example 4 – Workset ‘Template’ Builder (Part 2)



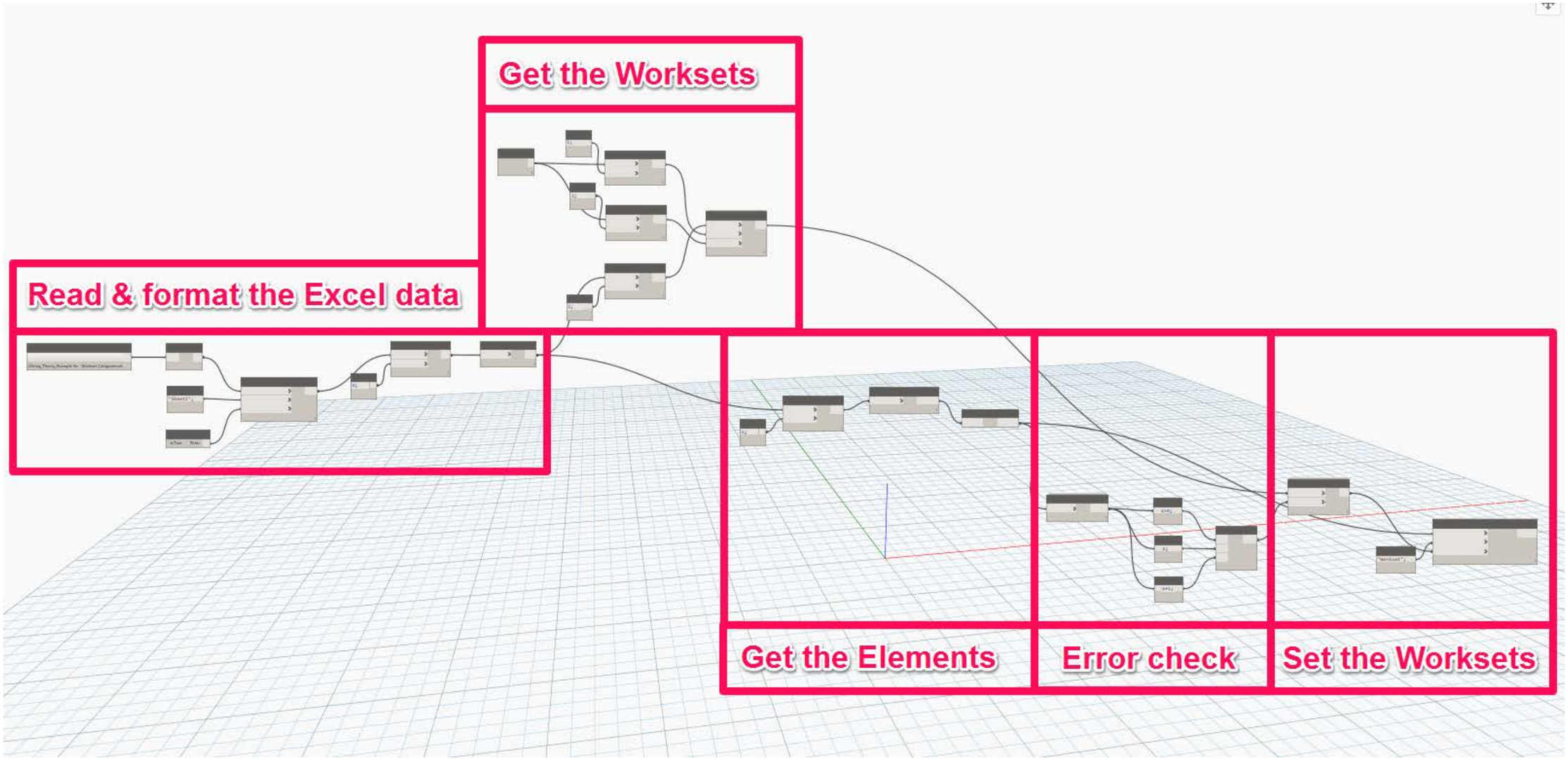
Example 5 – Workset Manager

“Full Speed”

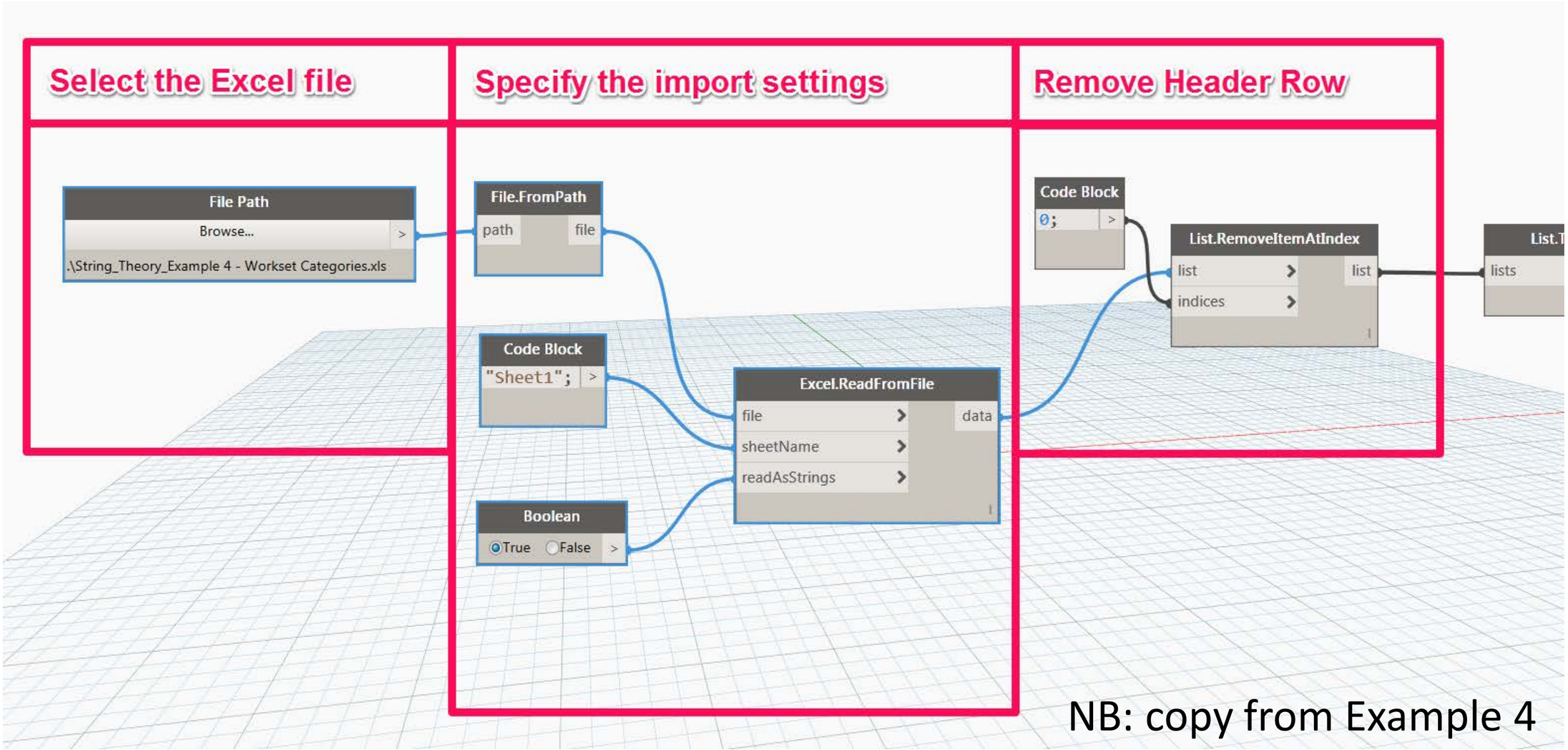
Building on the previous exercise.

- Create a script to manage Revit model elements and associate to Worksets by Category.

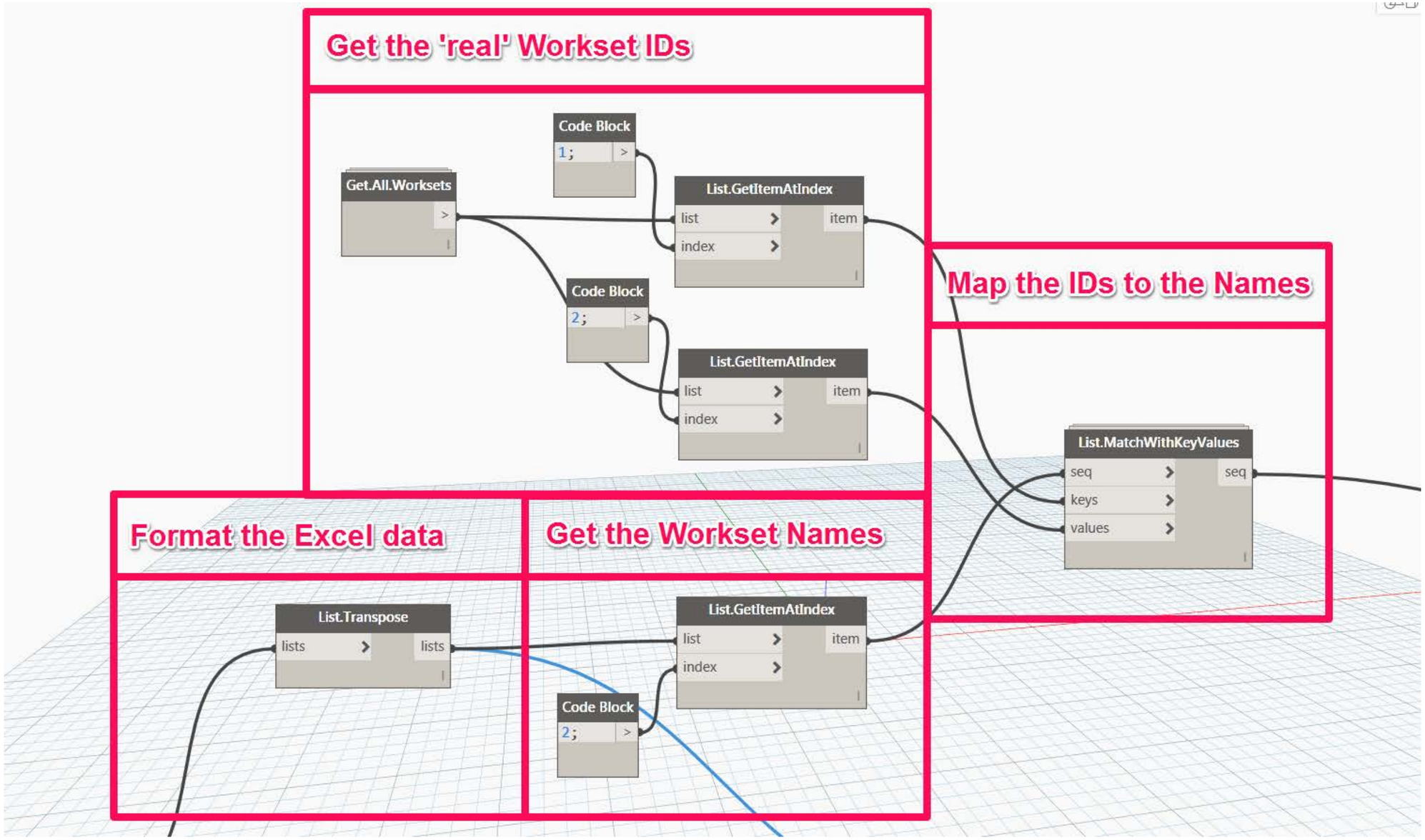
Example 5 – Workset ‘Manager’ (over view)



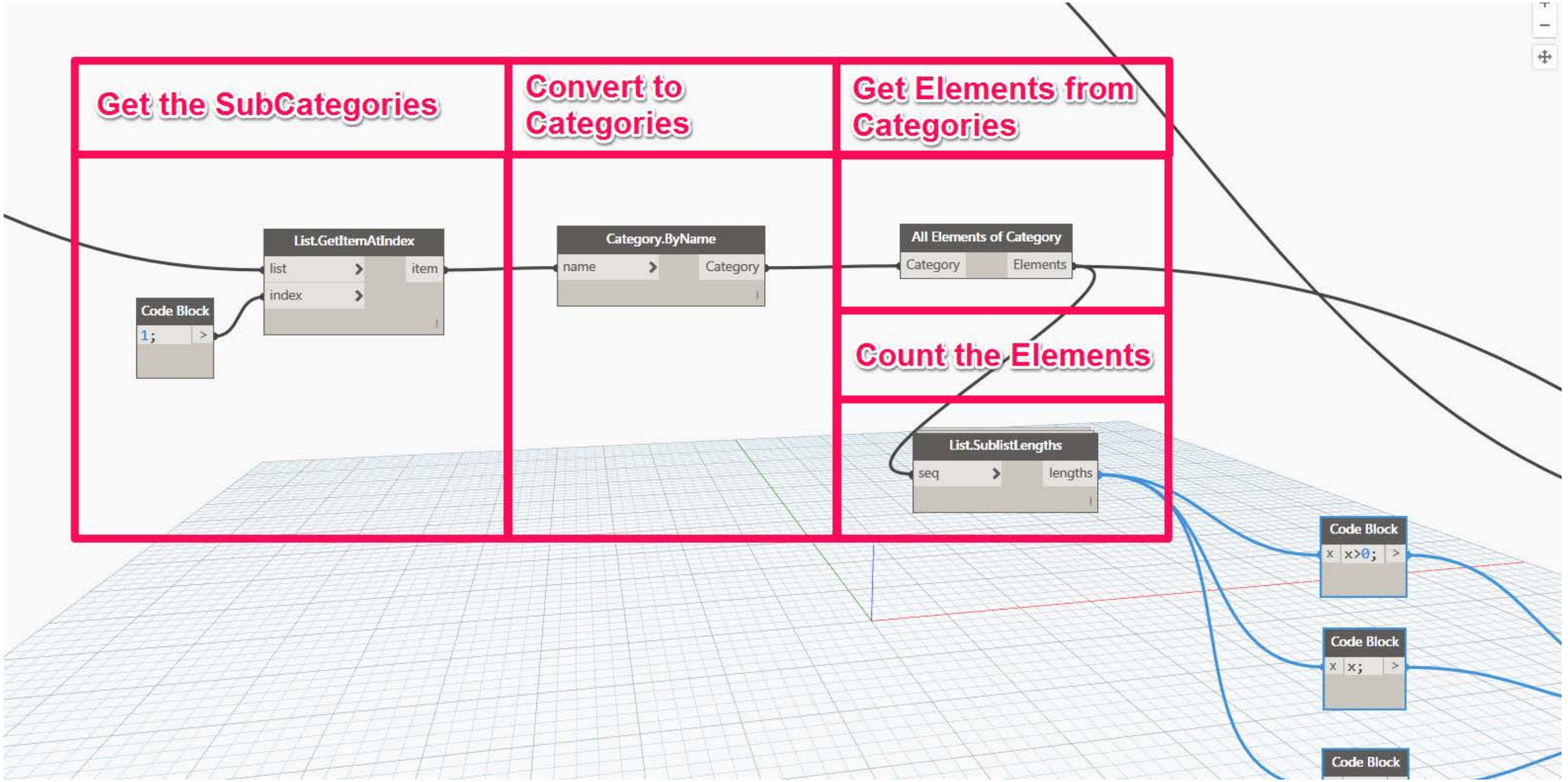
Example 5 – Workset ‘Manager’ (Part 1)



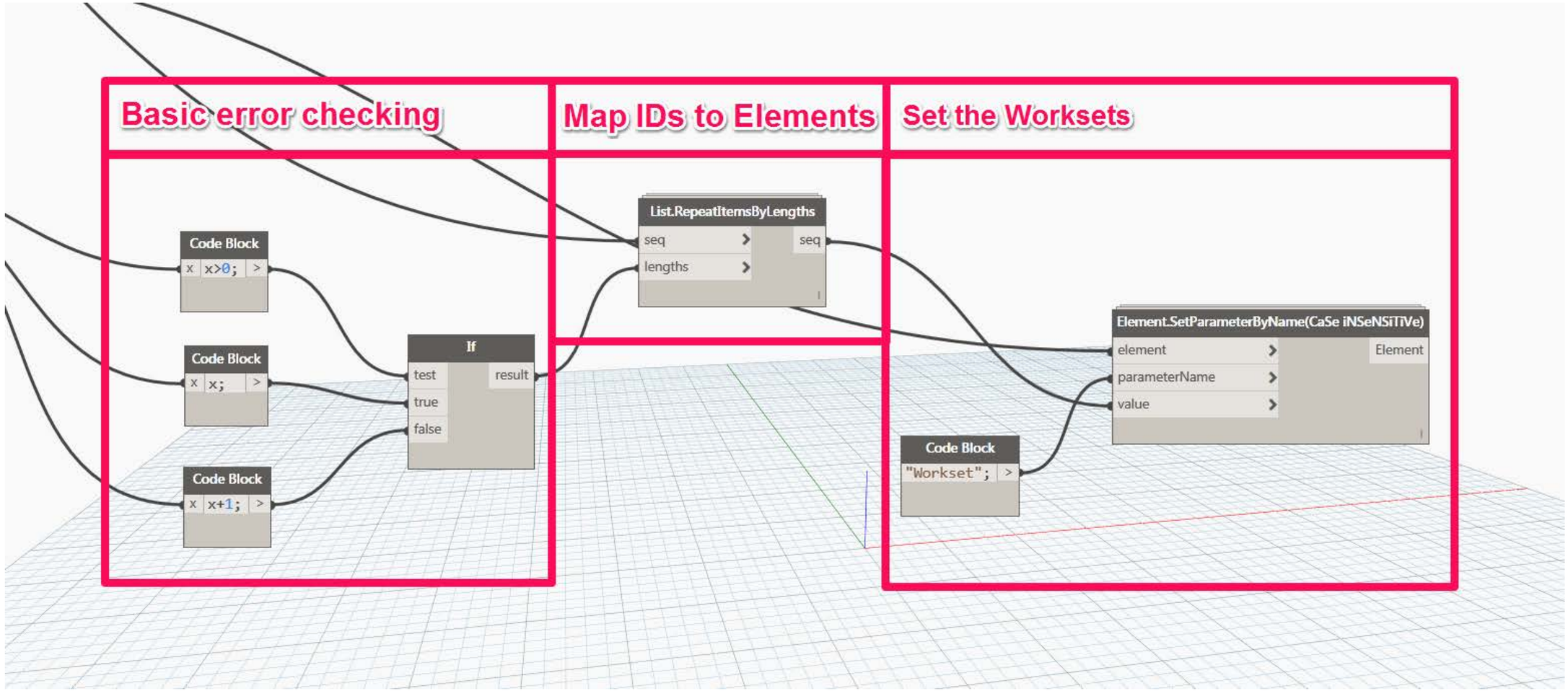
Example 5 – Workset ‘Manager’ (Part 2)



Example 5 – Workset ‘Manager’ (Part 3)



Example 5 – Workset ‘Manager’ (Part 4)



What’s New

- Dynamo Player (2017.1)

Resources

Hot links!

- Konrad K. Sobon – **http://archi-lab.net/**
- Marcello Sgambelluri – **http://therevitcomplex.blogspot.ae/**
- Adam Sheather – **http://stuffandbims.blogspot.com/**
- Philip Chan – **http://phil-osophyinbim.blogspot.ae/**
- Luke Johnson – **https://dynamonodes.com/**
- Dynamo Primer – **http://dynamoprimer.com/**
- Proving Ground – **https://provingground.io/**

Special Thanks too! *(http://badmonkeys.net/)*

BAD MONKEYS

This guy made Clockwork

This guy made Dynaworks

This guy is Awesome!



JULIEN BENOIT



ANDREAS DIECKMANN

The Package Manager Kingpin



ADAM SHEATHER

Software & Workflow Automation Lab Rat



MARCELLO SGAMBELLURI

The Technical Evangelist

This guy made Bumblebee



KONRAD K SOBON

Computational BIM Wizard



BRIAN RINGLEY



HÅVARD VASSHAUG

Design Technology Maestro



DIMITAR VENKOV

Workflow Crafter and Solution Seeker

Questions?

Jason Howden
CEO
@RTVTools





Autodesk is a registered trademark of Autodesk, Inc., and/or its subsidiaries and/or affiliates in the USA and/or other countries. All other brand names, product names, or trademarks belong to their respective holders. Autodesk reserves the right to alter product and services offerings, and specifications and pricing at any time without notice, and is not responsible for typographical or graphical errors that may appear in this document. © 2016 Autodesk, Inc. All rights reserved.

© 2016 Autodesk. All rights reserved.