Dynamo Master Class While Playing Monopoly

# Synopsis

Join a group of Dynamo experts to build and play Monopoly in Revit. The class contains various examples that mirror common Dynamo and Revit workflow. With tips and tricks peppered throughout, everyone is bound to learn something new and have some fun.

# Abstract

Learning Dynamo can be confusing for nonprogrammers, and mastering Dynamo can seem nearly impossible. Still, this class has the whole spectrum covered by teaching Dynamo using a topic almost everyone can understand, the game of Monopoly. This master class covers various topics the three expert presenters discussed as they share the code and their collaborative process. These topics include Revit data structure, rendering beautiful Revit visuals, creating rotating Revit families, building geometric systems, and authoring code best practices. Whether you are a beginner or an expert, this class has practical tips and tricks. Be sure to stop by and check out this fantastic demonstration of just how far Revit and Dynamo can go and get your hands on the latest version of America's favorite board game, Monopoly.

## Key Learning Objectives

* Deconstruct and program the game of Monopoly.
* Discover the key Dynamo functionalities.
* Learn best practices for authoring Dynamo Scripts.
* Build relationships between Revit’s elements to create parametric Systems.

# Intro (5min)

Mastering the art of coding can be daunting, and I can personally attest to my disdain for programming during my engineering school days. At the time, I failed to see the significance of it all since the problems we were solving seemed like something that could be quickly done by hand. However, upon entering the real world, I quickly realized that programming was essential for eliminating the mundane. If you're someone who didn't take programming seriously in school, learning to program can be a confusing and frustrating experience. But fear not, for I have discovered the keys to mastering the art of programming: Setting clear and ambitious goals.

My journey to becoming a proficient programmer started with learning a few Dynamo workflows for transferring data between Excel and Revit and automating Revit project setup. These simple accomplishments served as the spark that ignited my passion for programming. From there, I set myself a lofty challenge - to build the game of Monopoly using Revit and Dynamo. Without clearly defined goals, it's hard to see the point of programming and even harder to derive the satisfaction of accomplishing something. Goals give you something to aim for and achieving them releases a flood of dopamine that keeps you motivated to continue your journey. In other words, if you want to enjoy learning to code, set clear and ambitious goals.

Building a game of Monopoly using Revit and Dynamo can be a fantastic learning experience for those interested in integrating Building Information Modeling (BIM) and programming. By combining Revit's visual representation with Dynamo's programming interactivity, you will have the opportunity to explore the use of Dynamo in AEC workflows, automate repetitive tasks, create interactive designs, and streamline workflows. This hands-on project will allow you to apply your BIM and programming skills practically, providing a fun and engaging learning experience. Additionally, by creating a game of Monopoly, you can explore the integration of BIM and programming, while developing valuable skills highly relevant to AEC professionals. So, whether you're a beginner or an experienced professional, building a game of Monopoly using Revit and Dynamo is an excellent opportunity to improve your skills, have fun, and learn something new.

# What is Dynamo?

Dynamo for Revit is a visual programming platform that enables users to enhance the functionality of Autodesk Revit, a Building Information Modeling (BIM) software. Dynamo provides a visual interface that allows users to create custom scripts, known as "Dynamo graphs," to automate repetitive tasks, create interactive designs, and streamline workflows within Revit. These Dynamo graphs can perform various tasks, such as modifying element properties, generating reports, and creating custom families and components. With Dynamo, users can easily automate tasks and work with Revit data more flexibly and dynamically, enabling them to be more productive and efficient in their BIM workflows.

# Collaboration (5min)

Discuss how the project is on GitHub and the benefits. John?

# Script Development Process(5min)

Discuss an Analogy between building code and game directions.

Structured data – adding sharded parameters.

Creating Revit Families

# Random Numbers(5min) MK

Discuss how the random dice numbers are generated.

A game such as Monopoly inherently relies on the randomness of throwing a pair of dice. A program simulates this with a random number generator such as Math.random(). However, debugging a program that uses a random number generator is difficult. Efficient debugging relies on reproducing errors at will — something that a random number generator will not do!

# Efficient Code(5min)

Tune-up example that looks at different ways of getting points inside a room and finds the fastest method.

New Game Script – Placing Player Tokens on the go.

# Geometry Computation(5min)

Placing the Houses and Hotels in a grid at the start of the game.

Shuffling and stacking the Community Chest and Chance Cards

Random points – Atomic Bomb Script that places every game piece in a random location.

Random points – Dice locations on open are off the board.

Placing Houses

# Collecting Revit Elements(5min)

Show different ways of collecting Revit elements.

# Mesh To Revit(5min) MK

Explain how the player tokens are created

# Revit Family from Dynamo Geometry(5min)

Explain how the houses and hotels where created.

# Dice Revit Family(5min)PA

Explain how the rotating Revit Dice family was created.

# Dynamo Player(5min)

Show how tooltips and icons can be added to scripts.

# Connecting Revit Element Data(5min) SF

Revit parameters/tables

Relational database – Properties have owners’ primary key

# Revit Rendering (5min) JP

Discuss how to render the project to look really good.

Twinmotion?

# Dynamo Dictionaries(5min) SF

Discuss Dynamo dictionaries - why and when to use them.

Dynamo Definition

# Data Shapes UI (5mins)

Discuss how UI can be triggered in the middle of a script.

Use data to drive UI.

Tigger different UIs based on Data inputs.

Iterative UI – Monopoly Trading sequence

Looping UI(5mins)

# Control data flow with If Statements (5mins)

Design script example

Output blank list to remove errors

# Dynamo Definitions

Discuss when and why to use them.

* Faster
* Reuse
* Ignore errors.
* Easier lacing

# Edge Case

Discuss edge cases – how they suck and how to deal with them.

Example – Player Token location points in the Jail property

# Exporting Data from Excel

Game log using Excel.

# Importing Data from Excel

Shared Parameters from Excel

Add Property Parameters to Rooms.

Fill out property Parameters from Excel.

Add and populate Parameters in the family environment.

**20 topics**

Add a bunch of comparisons to common AEC workflows.

**Estimated time Per topic.**

60 mins / 5mins per topic = 12 topics

12 topics/ 3 speakers = 4 topics/speaker