

Dynamo Course Content

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Chapter 01: Programming Basics

1. What is programming:
 - General Introduction
2. Data Types & Revit Api objects
3. Parameters and lists
4. Programming concepts:
 - Indices
 - If statement
 - And-Or checks
 - While loop

Chapter 02: Step One

1. Installation and Versions differences
2. Dynamo Interface:
 - Exploring the interface
 - Navigations
 - Read nodes
 - Design script introduction
 - Dynamo library (Creating-Analyzing-Query)
3. Nodes Types
4. Run the script
 - How to run manual or automatic
 - When is preventing running?
 - Default values of nodes
 - How do I know that the node is ready to run?
 - Reading the error
 - How to know it's finished
 - Opening multi files
 - Backup locations when it fails
5. Geometry:
 - General overview
 - When we use and how we use
 - Dynamo units

Chapter 03: Nodes in Dynamo

1. Nodes:
 - Place Node
 - Copy Paste Node
 - Creating lists

- Ensure inputs and outputs
 - Connecting wires
 - Watch and view results
 - Object type
2. Nodes Arrangement:
 - Add Group
 - Add Note
 - Arrangement of Groups
 - Un preview geometry Node
 - Freeze Nodes
 3. Nodes operations:
 - Sums subtract
 - Equality - not equal to
 - If statements
 - And – Or
 - Larger than greater than
 - While statements
 4. Design script language:
 - Language reference
 - Adding Parameters
 - Operations
 - Calling nodes
 - Switch Node to Code
 5. Lists:
 - Create list
 - Creating sequence of numbers with nodes and design script language
 - List of Random numbers
 - Remap range
 - Sub lists
 - Flatten – chop – insert – remove - slice
 - Test list empty-count true-contains
 - Deconstruct
 - Index of
 - Union – Intersections - unique items – Max -Min
 6. Revit Nodes:
 - What can be manipulated in Revit
 - Creation: Dimension, Wall, and Floor
 - Manipulation: Know sheets on Views
 - Get Set Parameter for any Element or for any Family

Chapter 04: Dynamo Data Manipulations

1. Selections:
 - Select from Revit by type, family
 - All category
 - All type
 - All Family

- From Path
 - Select specific files from path
2. Filtering:
 - Filter by bool mask
 - Filter by condition
 - Filter by parameter
 3. Strings:
 - Find Replace
 - Add Suffix - prefix
 - Split by...
 - Contain or not
 4. Numbers:
 - To string, from string
 - Cut
 - Ceiling
 - Floor
 - Round
 5. Sort and Organize:
 - Organizing the workplace
 - Sort data ascending order
 - Reverse sorting
 6. Lacing:
 - What is lacing
 - Different between lacing types shortest cross product longest
 - Different between lacing list and lacing values
 7. Leveling:
 - What is leveling
 - What is used for
 8. Dictionaries:
 - Create a dictionary
 - What is used for
 9. Image Manipulations:
 - Import image
 - View image
 - Extract brightness data
 - EX: topology
 10. Reading and Writing Excel:
 - Points
 - Export to excel
 - Write to excel
 - Transposing data
 - EX: Reading all data from Excel (Level name, Level Elevation) , (Sheet name, Number)

Chapter 05: Dynamo Geometry

1. Points:

- Creating Point
 - Matrix of points
 - Point Analysis x, y, z
 - Point manipulation
 - EX: Attractor Point for a box by point distance to all points
2. Lines:
- Create line from 2 points
 - Different between curve and line
 - Circles
 - Place point on curve parameter
 - Create splines from points
 - Ex: Place Element along line
3. Planes:
- What's plane
 - Usage
 - Create plane
 - Plane normal
 - Point on param via planes
 - EX: cut all columns to get boundaries
4. Vectors and Coordinate Systems:
- What's vectors
 - Create vector
 - Move point by vector
 - Vector analysis
 - Normalize vectors
 - Operation on vectors: angle between, parallel to, perpendicular on
 - Move elements by vectors
5. Bounding box:
- What's bounding box
 - Usage
 - Create bounding box methods
 - Extract data from bounding box
 - create section by bounding box
6. Solids and Surfaces:
- Create surface
 - Extract data from surface
 - Join surface to poly surfaces
 - Methods of create solid: cube, sphere
 - Explode solid to extract surfaces edges vertices

Chapter 06: Algorithmic Thinking

1. Divide and conquer:
- Defining the Problem and extracting critical parameters
 - Divide, break down the problem simulating the manual way
 - check validity from Dynamo, Revit api
 - Conquer, solving each part separately

- Gathering all parts in one Algorithm
- Making in efficient
- EX: Creating Floors in all rooms Boundary

Chapter 07: Analyzing and Validating

1. Manipulating Elements Parameters:
 - EX: Rename all views suffix prefix, find replace
2. Report Revit Data:
 - Report all Views Data to check
3. General Issues:
 - Rotation all elements in specific direction
 - Elements in room excel

Chapter 08: Workflow Automation

1. Create Elements from excel file
2. Calculate Backfilling
3. Create Drop Panels
4. Collect Specs
5. Create Walls Finishes from Columns
6. Create floors for all rooms
7. Create Elements from CAD

Chapter 09: Packages, Custom Nodes & Dynamo Player

1. My first Custom Node:
 - What is custom node
 - Create a custom node
 - Manipulate inputs
 - Ensure inputs data types
 - Publish my custom node locally
2. Install Packages:
 - Searching for package in Dynamo
 - Searching and download from online
3. Running Dynamo Player:
 - What's Dynamo Player
 - Ensure inputs
 - Strings inputs and code blocks inputs
 - Pros and cons
 - EX: any previous code

Chapter 10: Refinery

1. Start with Refinery:
 - What is Dynamo Refinery