

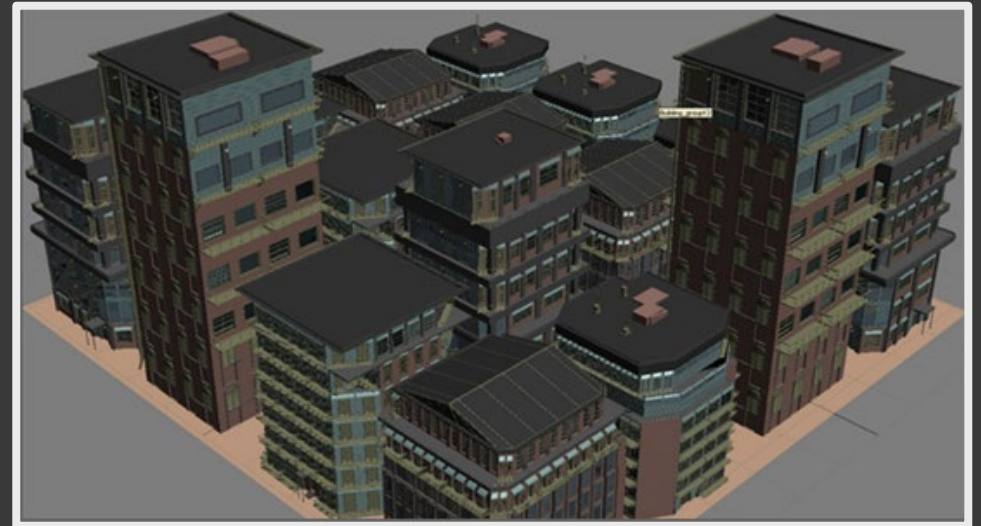
Procedural Building Generator

Final Presentation – Sandy Demian

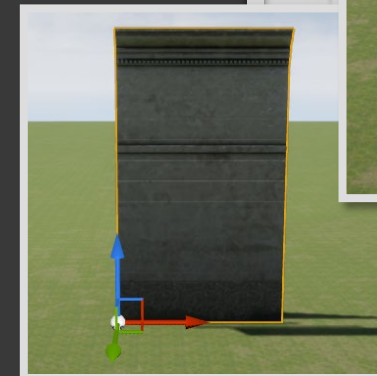
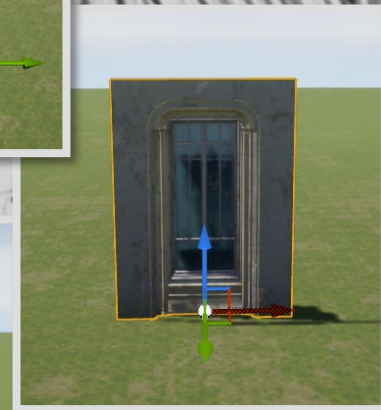
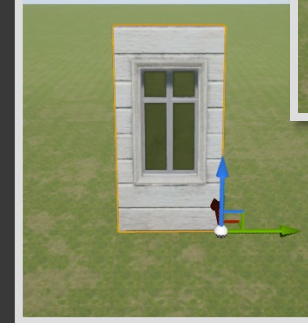
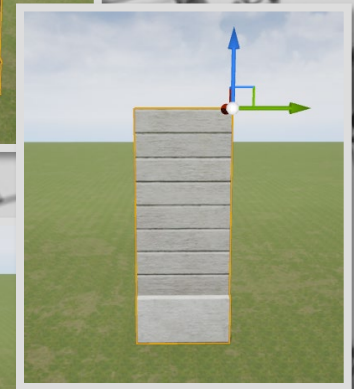
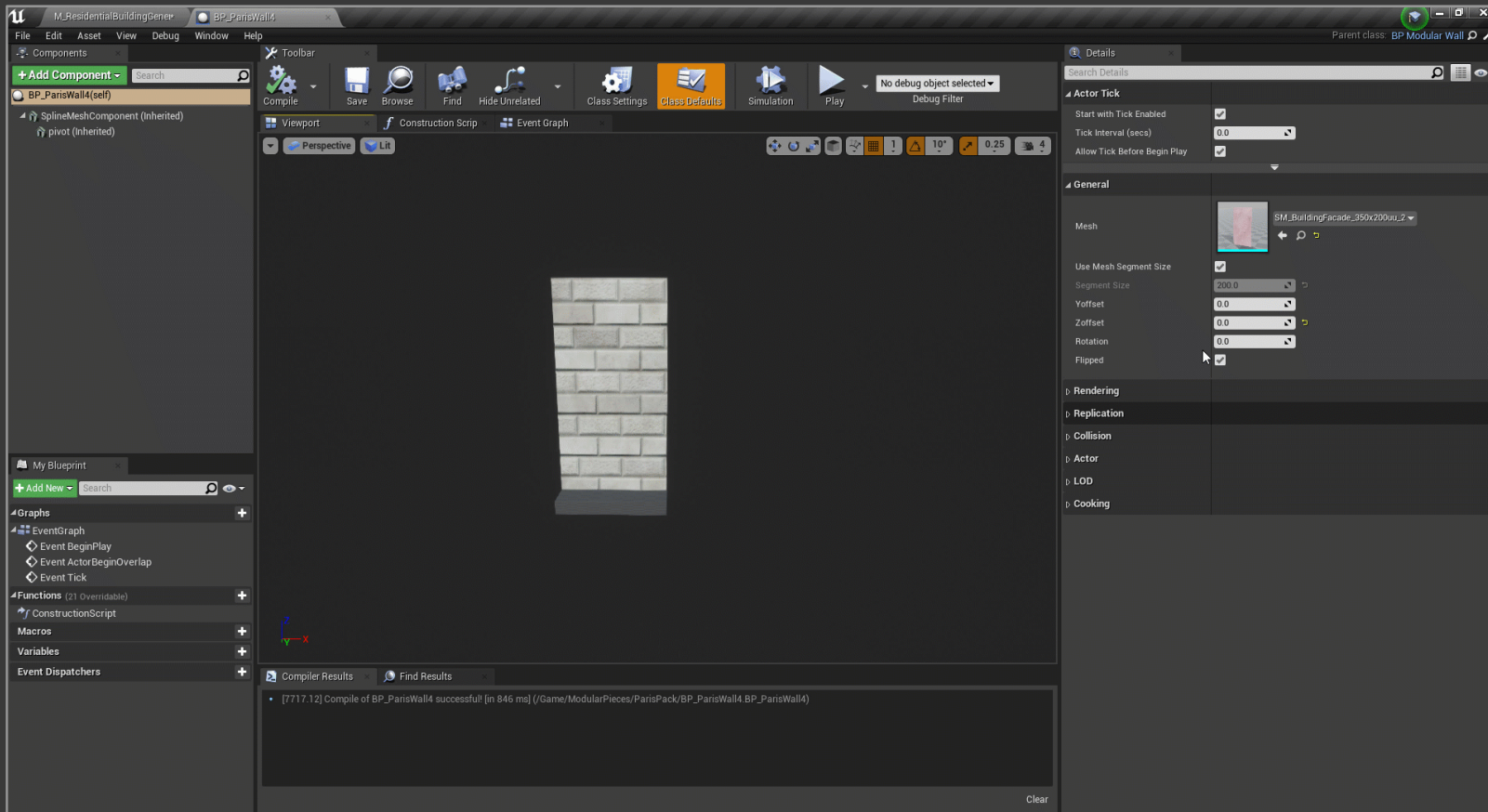


Overview

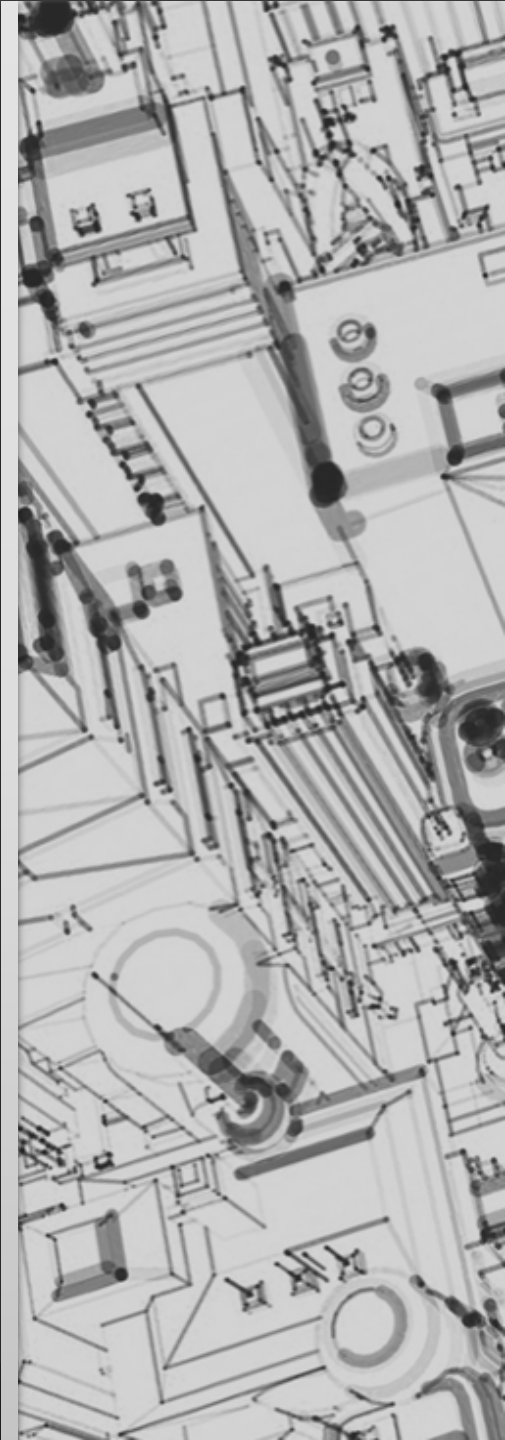
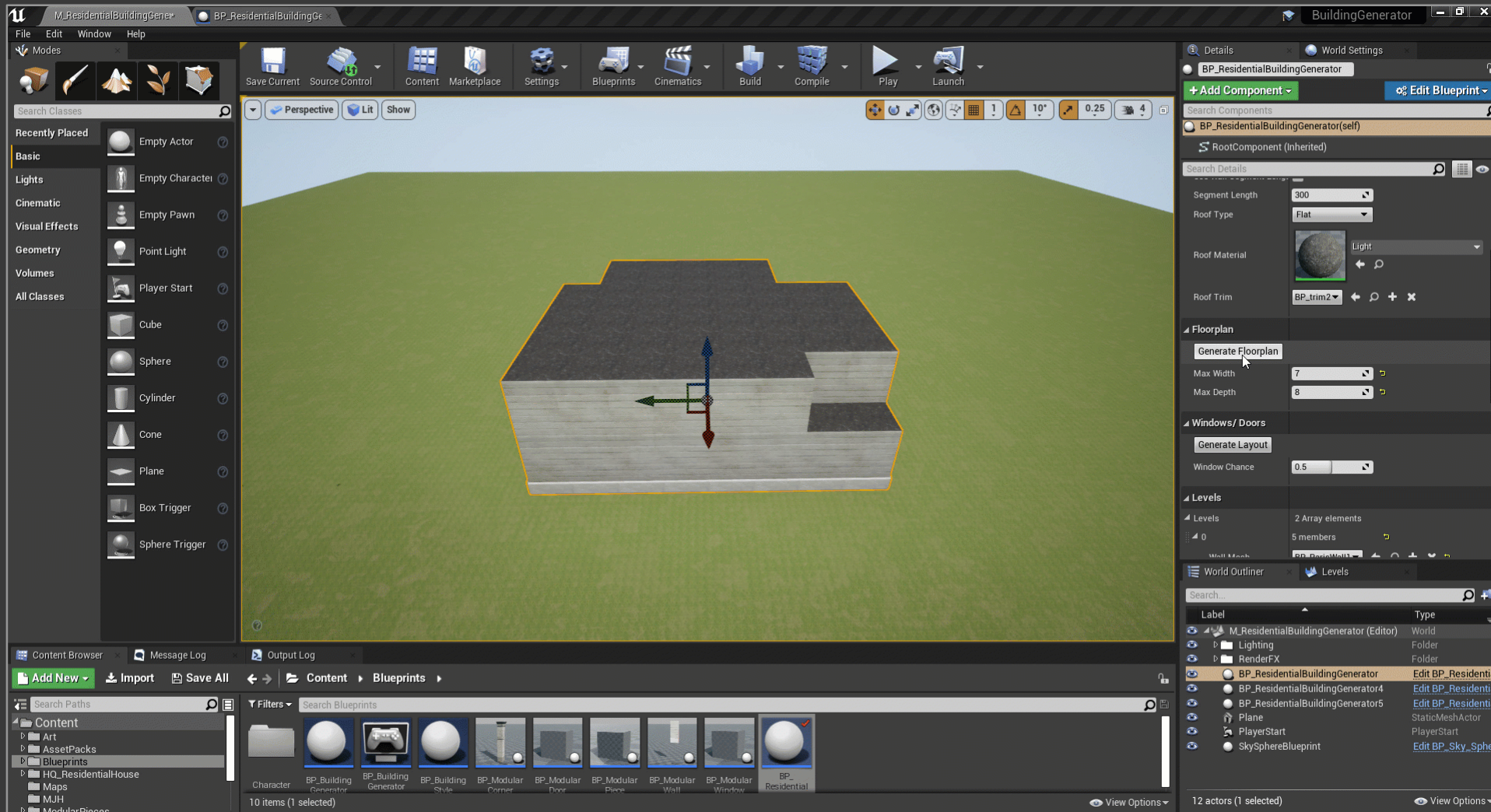
- Procedural Building Generator
 - Residential houses
 - City buildings
- Buildings can be generated automatically or by using splines
- Works with Modular meshes from asset packs
- Engine: Unreal



Using Asset Pack Meshes



Floorplan Generation



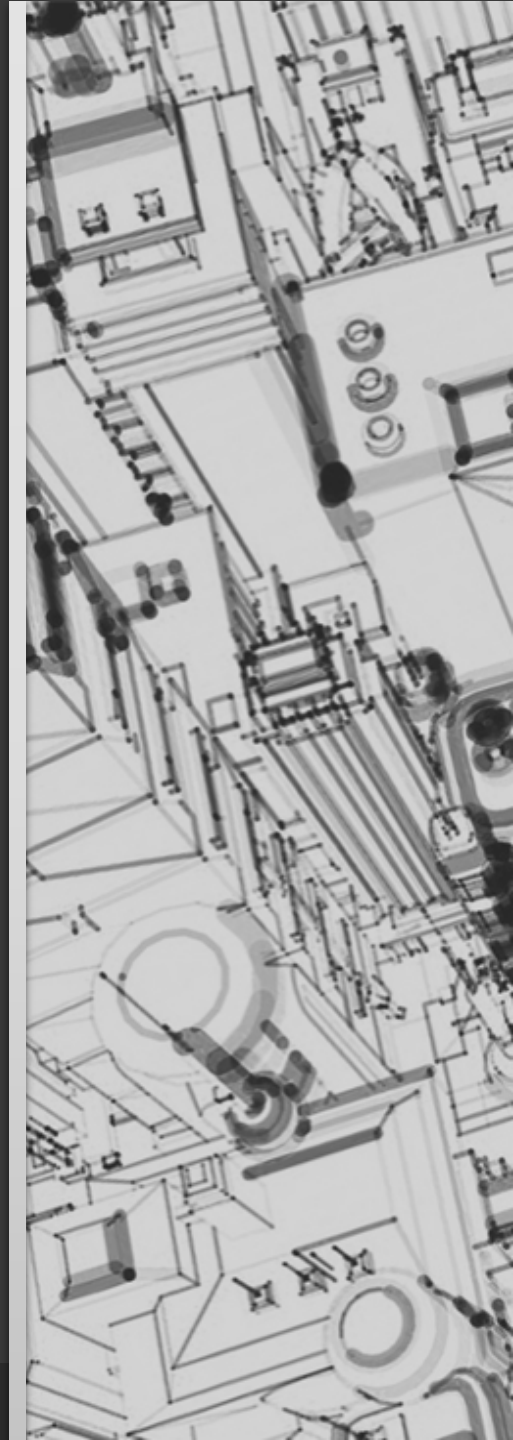
Window/Door Placement

- A ratio is used to decide the number of window segments relative to wall segments
- The last two segments placed are used to guide the random placement of the next segments
- Example: the chance of placing a window increases after two walls and decreases after two windows to create a more balanced placements



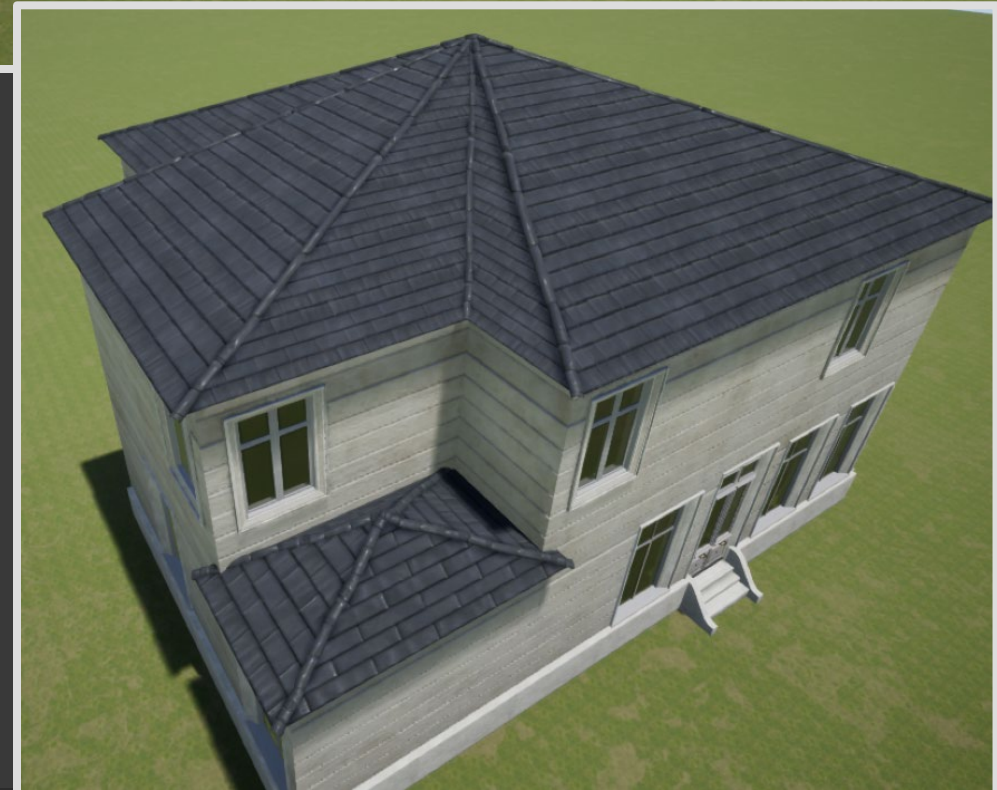
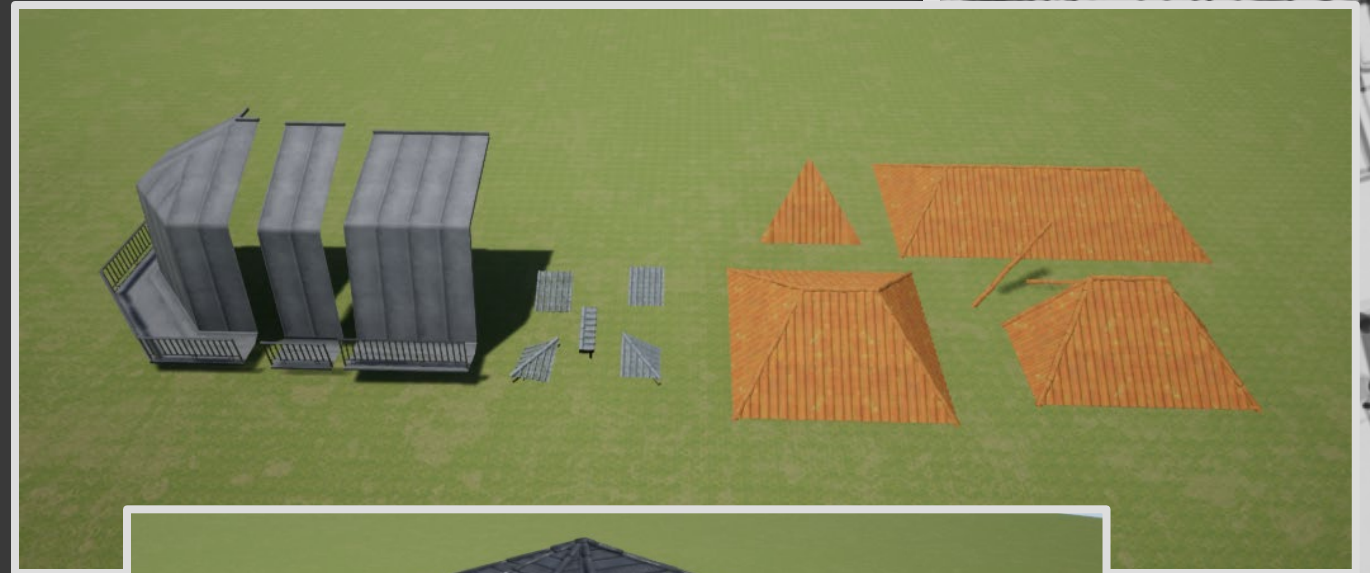
Window/Door Placement

The screenshot displays the Unreal Engine 4 interface for a project named "M_ResidentialBuildingGenerator". The central viewport shows a 3D perspective view of a two-story house with a grey stone facade, a dark grey roof, and several windows. A yellow outline highlights the house's footprint on the green ground plane. The interface includes a top menu bar (File, Edit, Window, Help), a toolbar with various tools like Save Current, Source Control, Content, Marketplace, Settings, Blueprints, Cinematics, Build, Compile, Play, and Launch. On the left, there is a "Recently Placed" list and a "Basic" class list. On the right, the "Details" panel is open for the "BP_ResidentialBuildingGenerator5" blueprint, showing settings for "Number Of Levels" (2), "Style" (Paris3), "Use Wall Segment Length" (checked), "Segment Length" (260), "Roof Type" (Flat), "Roof Material" (MI_Roofing_01), and "Roof Trim" (BP_trim2). Below these are sections for "Floorplan" (with a "Generate Floorplan" button), "Windows/ Doors" (with a "Generate Layout" button), and "Levels". At the bottom, the "World Outliner" shows a list of objects in the scene, including "M_ResidentialBuildingGenerator (Editor)", "Lighting", "RenderFX", and several "BP_ResidentialBuildingGenerator" instances. The "Content" browser at the bottom left shows a search for "Blueprints" and a list of 10 items, including "BP_BuildingGenerator", "BP_BuildingStyle", "BP_ModularCorner", "BP_ModularDoor", "BP_ModularPlace", "BP_ModularWall", "BP_ModularWindow", and "BP_Residential".

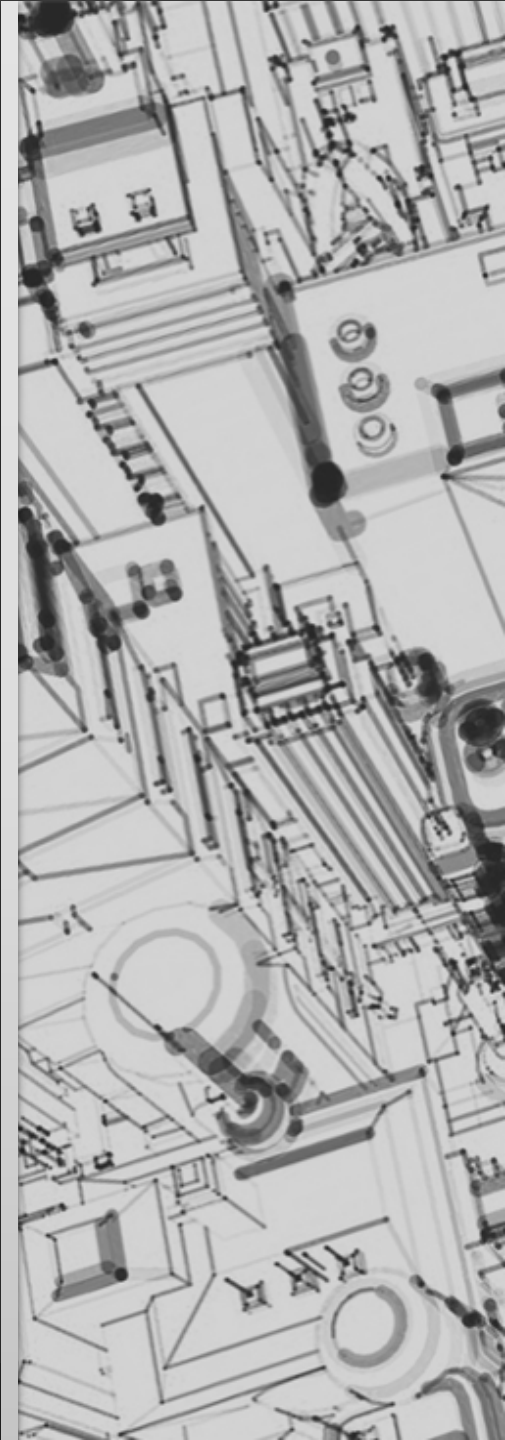
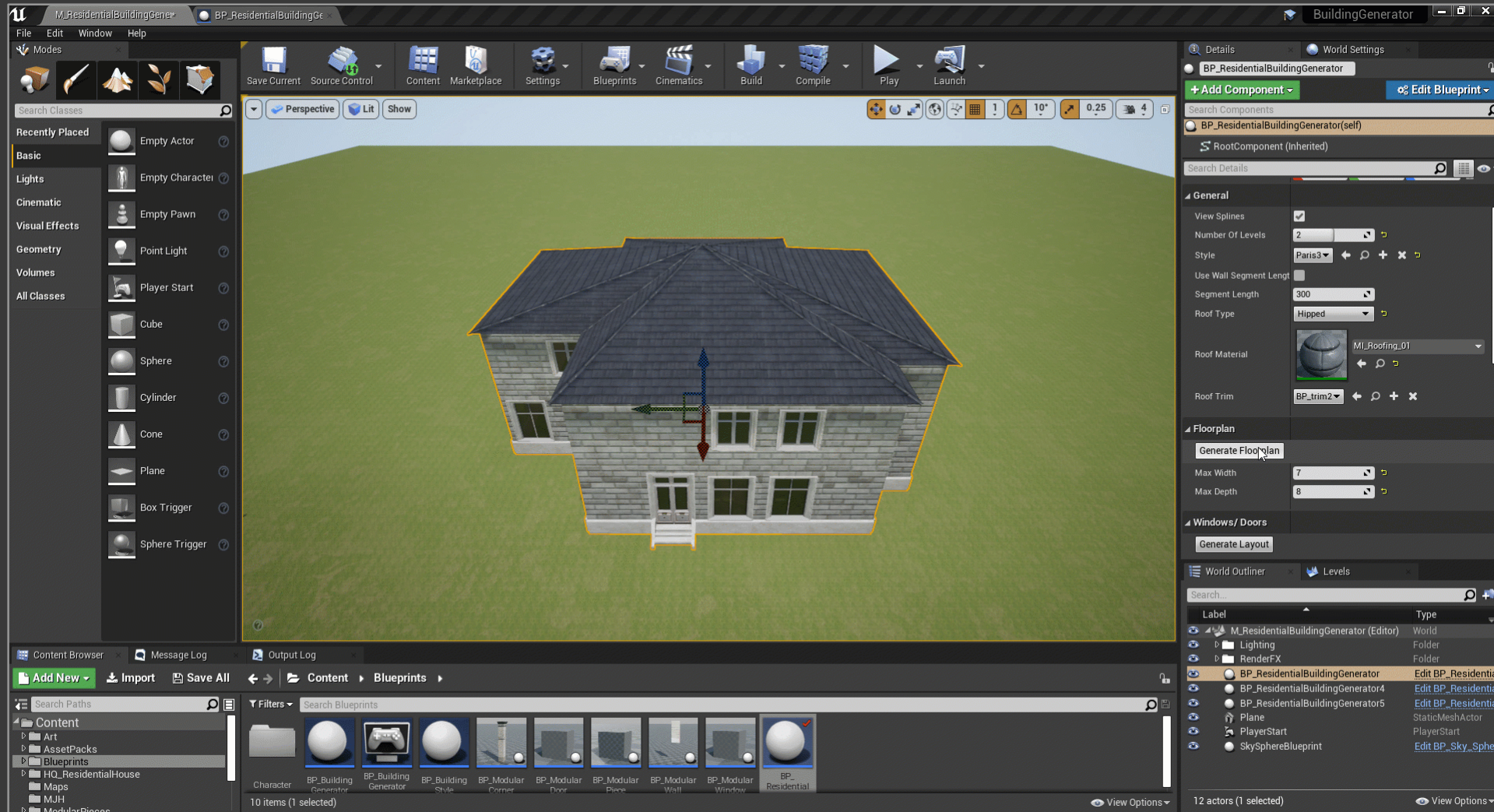


Roof Generation

- Roof generation by assembling segments was not possible for the custom floorplans
- Instead the best solution was to programmatically generate the roof mesh and UV it
- Roof material can be changed for variation

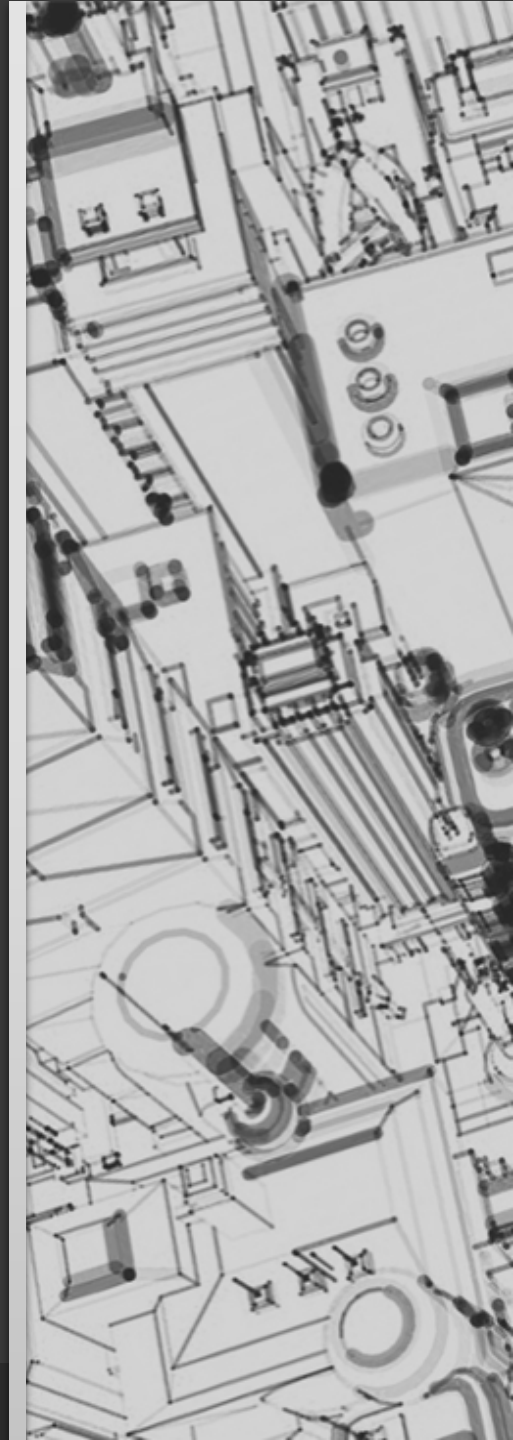
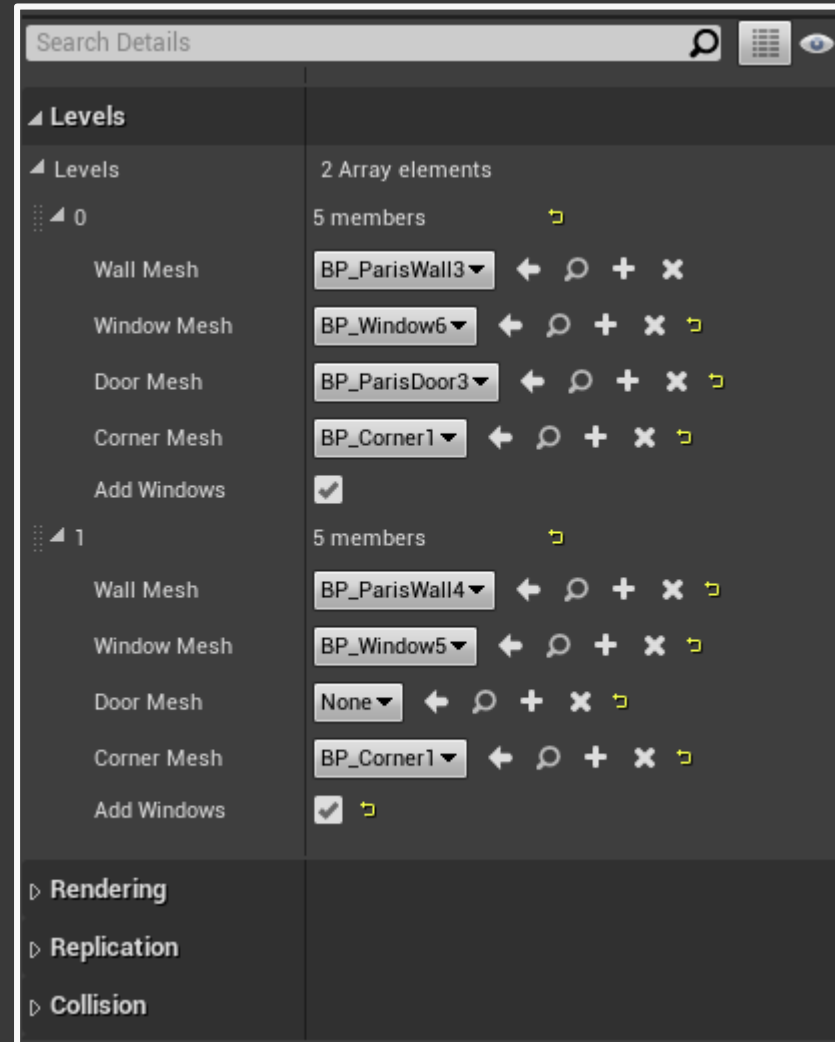


Roof Generation



Building Style

- Created a way for defining a “building style” so the user can pre group meshes



Building Style

The screenshot displays the Unreal Engine 4 interface with the 'BuildingGenerator' tool active. The central viewport shows a 3D model of a two-story house with a grey roof and white walls, set on a green field under a blue sky. The interface includes a top menu bar, a toolbar with various tools like 'Save Current', 'Source Control', and 'Play', and a left-hand 'Classes' panel. The right-hand 'Details' panel is open to the 'BP_ResidentialBuildingGenerator5' blueprint, showing settings for 'Number Of Levels' (2), 'Style' (Paris2), 'Roof Type' (Hipped), and 'Roof Material' (MI_Roofing_02). The bottom of the interface features a 'Content Browser' and a 'Blueprints' panel with a search filter.

BuildingGenerator

File Edit Window Help

Modes

Save Current Source Control Content Marketplace Settings Blueprints Cinematics Build Compile Play Launch

Perspective Lit Show

Search Classes

Recently Placed

- Empty Actor
- Basic
- Lights
- Cinematic
- Visual Effects
- Geometry
- Volumes
- All Classes

- Empty Character
- Empty Pawn
- Point Light
- Player Start
- Cube
- Sphere
- Cylinder
- Cone
- Plane
- Box Trigger
- Sphere Trigger

Details World Settings

BP_ResidentialBuildingGenerator5

+ Add Component Edit Blueprint

Search Components

BP_ResidentialBuildingGenerator5(self)

RootComponent (Inherited)

Search Details

General

- View Splines
- Number Of Levels: 2
- Style: Paris2
- Use Wall Segment Length
- Segment Length: 260
- Roof Type: Hipped
- Roof Material: MI_Roofing_02
- Roof Trim: BP_trim2

Floorplan

Generate Floorplan

- Max Width: 7
- Max Depth: 7

Windows/ Doors

Generate Layout

World Outliner Levels

Search...

Label	Type
M_ResidentialBuildingGenerator (Editor)	World
Lighting	Folder
RenderFX	Folder
BP_ResidentialBuildingGenerator4	Edit BP_Residential
BP_ResidentialBuildingGenerator5	Edit BP_Residential
Plane	StaticMeshActor
PlayerStart	PlayerStart
SkySphereBlueprint	Edit BP_Sky_Spher

11 actors (1 selected)

Content Browser Message Log Output Log

Add New Import Save All

Content Blueprints

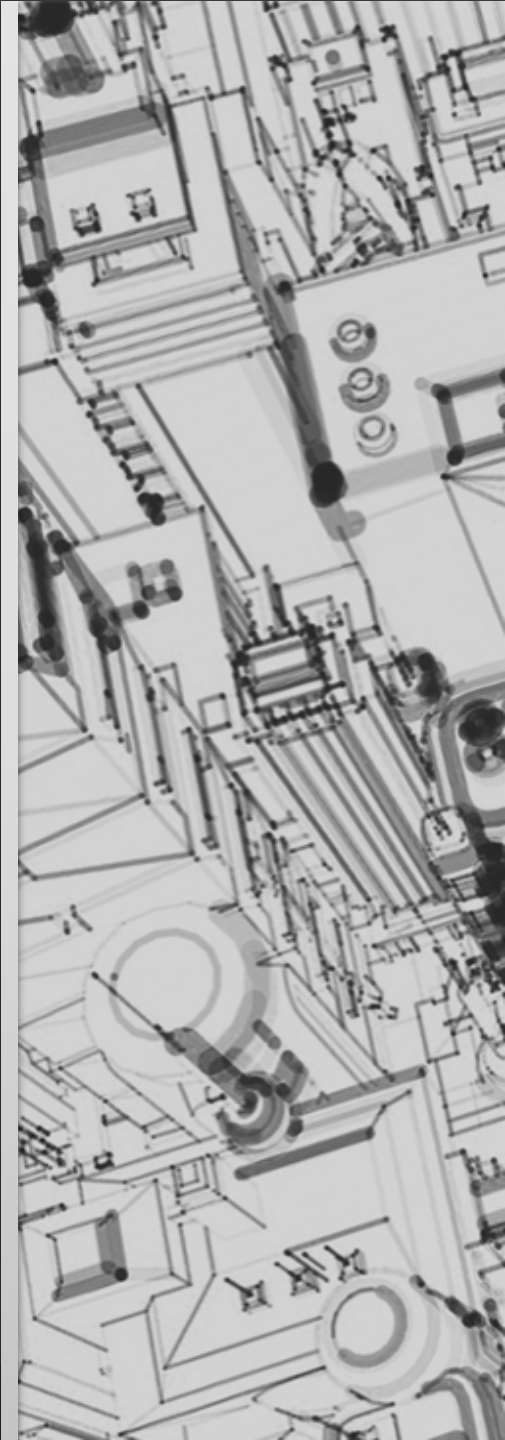
Search Paths

- Mesher
- Textures
- ModularVictorianMansion
- NCS
- ParisBuildings
- Seaside_Town
- Blueprints
- HO_ResidentialHouse

Filters Search Blueprints

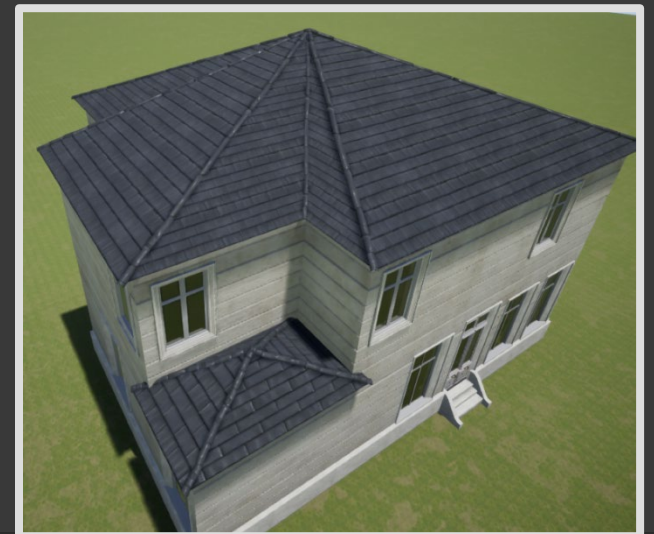
10 items (1 selected)

Character BP_Building BP_BuildingGenerator BP_Building Skys BP_Modular BP_Modular BP_Modular BP_Modular BP_Modular BP_Modular BP_Residential

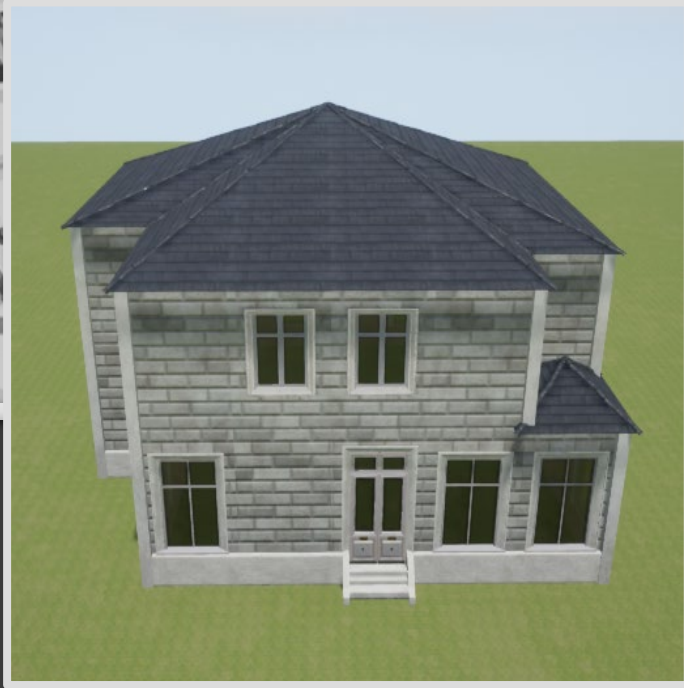


Schedule Vs. Progress

- Objectives not completed:
 - Generate decorations [shutters, light fixtures, trims]
 - Create two modes for generating high rise buildings and houses
 - Save generated buildings without the generation data
- Reasons for delays:
 - Mesh Problems
 - Spline Struggles
 - Roof generation much more complicated than expected [2.5 weeks vs estimated 1 week]







Questions/Feedback