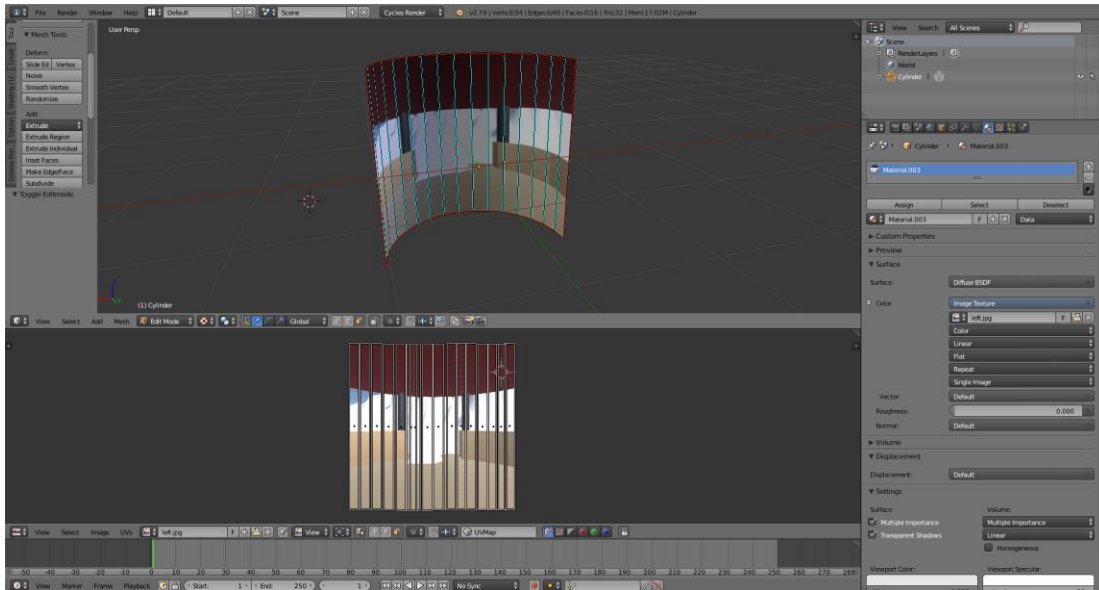
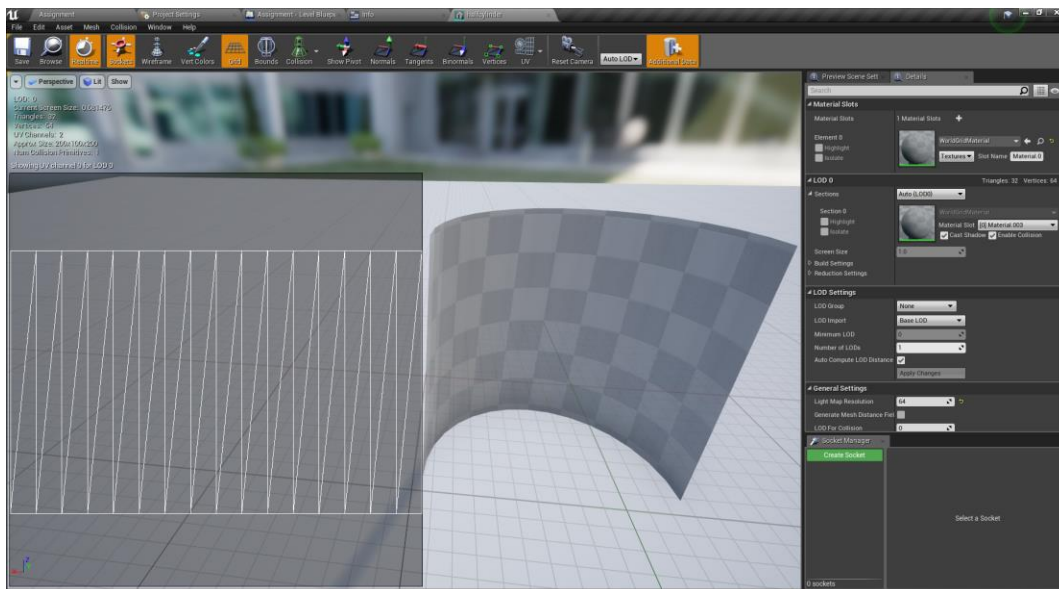


## VR Assignment Documentation

- Game engines require 3d data to be imported from external 3d application.
- Hence I used blender to model the cylinder.
- The UVs of the created 3d model were mapped to fit the texture
- The model along with its uvs was imported in Unreal engine 4.18.3

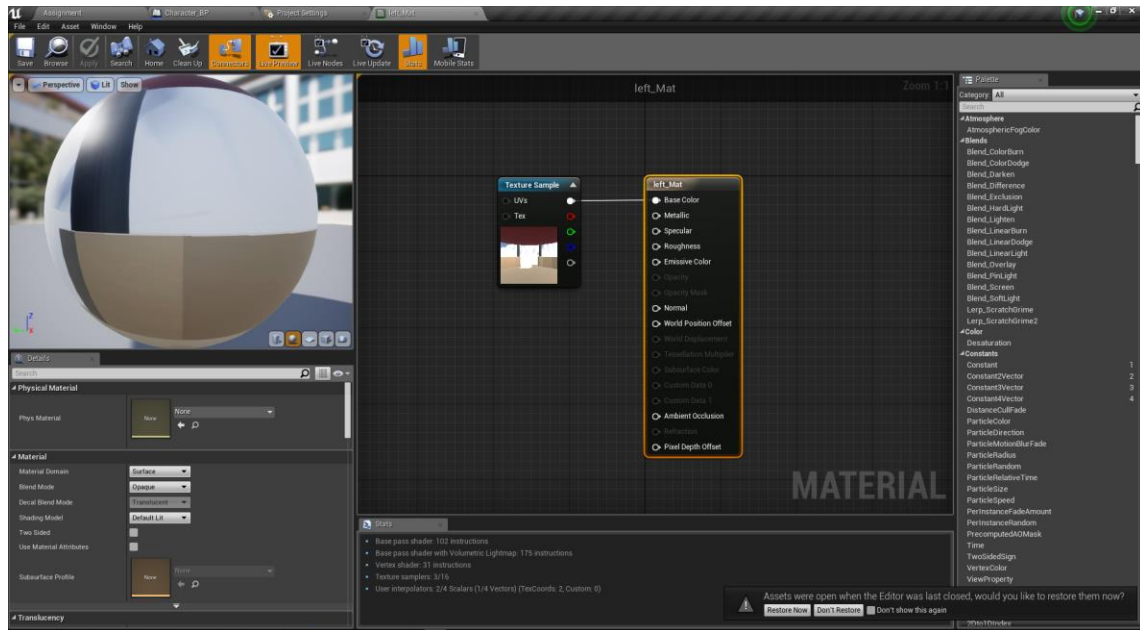


*Model with UVs in blender*



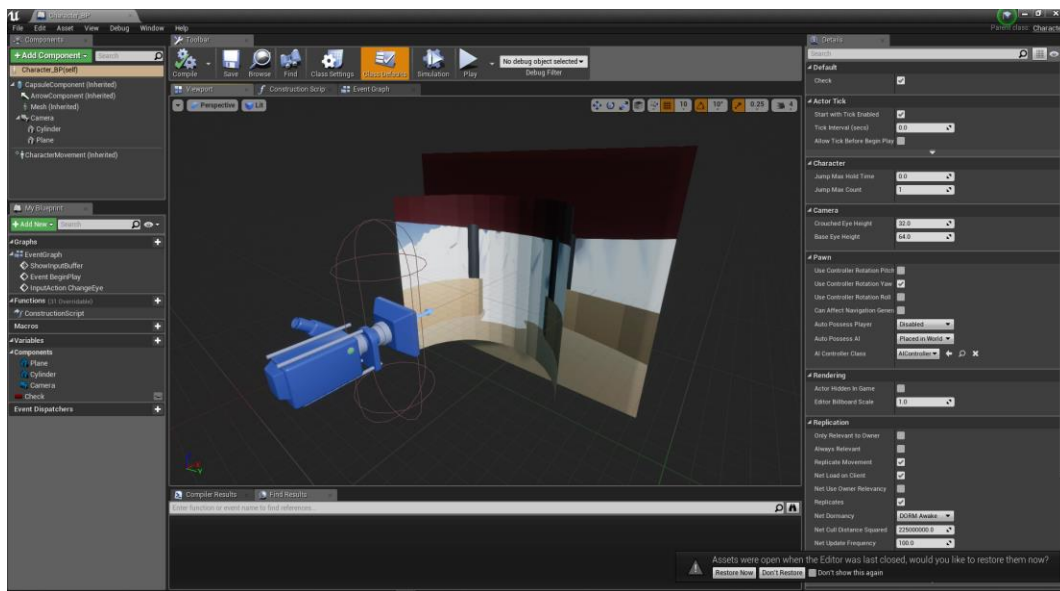
*Imported model with UVs in unreal engine 4.18.3*

- The images provided were imported to Unreal Engine. Unreal Engine converts the images to .uasset
- Materials were created for these images



*Materials created from input images*

- Character scene graph contains a camera with provided FOV, frustum bounds.
- A scene graph with the imported and textured cylinder and a plane with the same texture showing input images

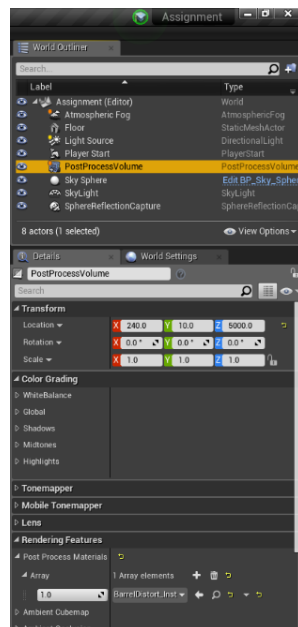


*Character scene graph contains a camera with provided FOV, frustum bounds and. A scene graph with the imported and textured cylinder and a plane with the same texture showing input images*

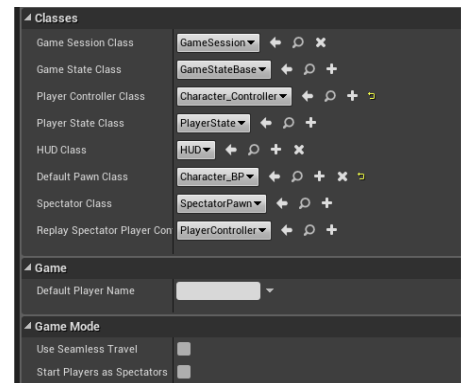
```
[Script/Engine.InputSettings]
-AxisConfig(AxisKeyName="Gamepad_LeftX",AxisProperties=(DeadZone=0.25,Exponent=1.f,Sensitivity=1.f))
-AxisConfig(AxisKeyName="Gamepad_LeftY",AxisProperties=(DeadZone=0.25,Exponent=1.f,Sensitivity=1.f))
-AxisConfig(AxisKeyName="Gamepad_RightX",AxisProperties=(DeadZone=0.25,Exponent=1.f,Sensitivity=1.f))
-AxisConfig(AxisKeyName="Gamepad_RightY",AxisProperties=(DeadZone=0.25,Exponent=1.f,Sensitivity=1.f))
-AxisConfig(AxisKeyName="Mouse",AxisProperties=(DeadZone=0.f,Exponent=1.f,Sensitivity=0.875))
-AxisConfig(AxisKeyName="Gamepad_LeftX",AxisProperties=(DeadZone=0.250000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Gamepad_LeftY",AxisProperties=(DeadZone=0.250000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Gamepad_RightX",AxisProperties=(DeadZone=0.250000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Gamepad_RightY",AxisProperties=(DeadZone=0.250000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Mouse",AxisProperties=(DeadZone=0.000000,Sensitivity=0.870000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Mouse",AxisProperties=(DeadZone=0.000000,Sensitivity=0.870000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MouseWheelAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Gamepad_LeftTriggerAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="Gamepad_RightTriggerAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MotionController_Left_Thumbstick_X",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MotionController_Left_Thumbstick_Y",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MotionController_Left_TriggerAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MotionController_Left_GripAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
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-AxisConfig(AxisKeyName="MotionController_Right_Thumbstick_Y",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MotionController_Right_TriggerAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
-AxisConfig(AxisKeyName="MotionController_Right_GripAxis",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))
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-AxisConfig(AxisKeyName="Gamepad_Special_Left_Y",AxisProperties=(DeadZone=0.000000,Sensitivity=1.000000,Exponent=1.000000,bInvert=false))

bAltEnterTogglesFullscreen=True
bFullLogScreen=False
bUseMouseForTouch=False
bEnableMouseSmoothing=True
bEnableFOVScaling=True
FOVScale=0.011110
DoubleClickTime=0.200000
bCaptureMouseOnLaunch=True
DefaultViewportMouseCaptureMode=CapturePermanently_IncludingInitialMouseDown
DefaultViewportMouseLock=False
DefaultViewportMouseLockMode=LockOnCapture
+ActionMappings=(ActionName="ChangeKey",Key=Spacebar,bShift=False,bCtrl=False,bAlt=False,bCmd=False)
+ActionMappings=(ActionName="ShowInputBuffer",Key=Backspace,bShift=False,bCtrl=False,bAlt=False,bCmd=False)
bAlwaysShowTouchInterface=False
bShowConsoleOnFourFingerTap=True
DefaultTouchInterface=/Engine/MinimalResources/MinimalDefaultVirtualJoysticks.DefaultVirtualJoysticks
ConsoleKey=None
ConsoleKeys=111de
+ConsoleKeys=111de
```

Snapshot of DefaultInput.ini file. This file is necessary for input bindings. It contains some default bindings and other user



Scene Graph of the Map containing post process volume having barrel distortion shader



Game Mode Class

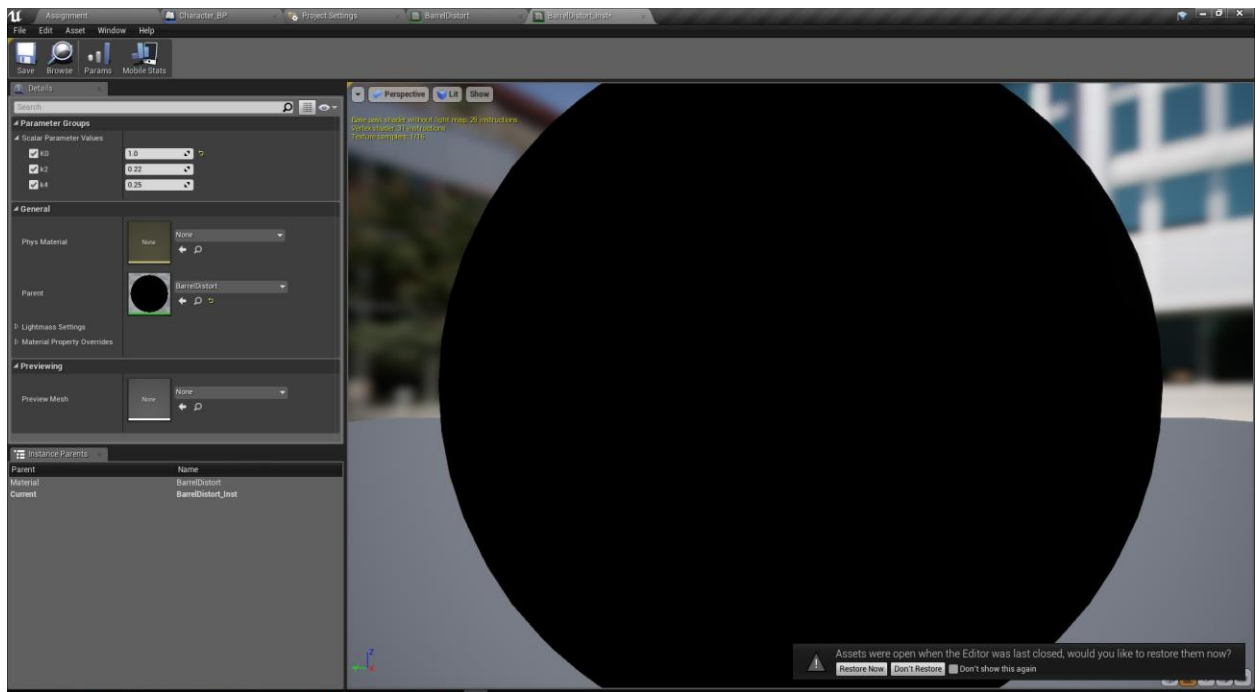
- We are using Post processing volume to create the barrel distortion. The post processing volume has a shader which defines barrel distortion
-

- [illegible]

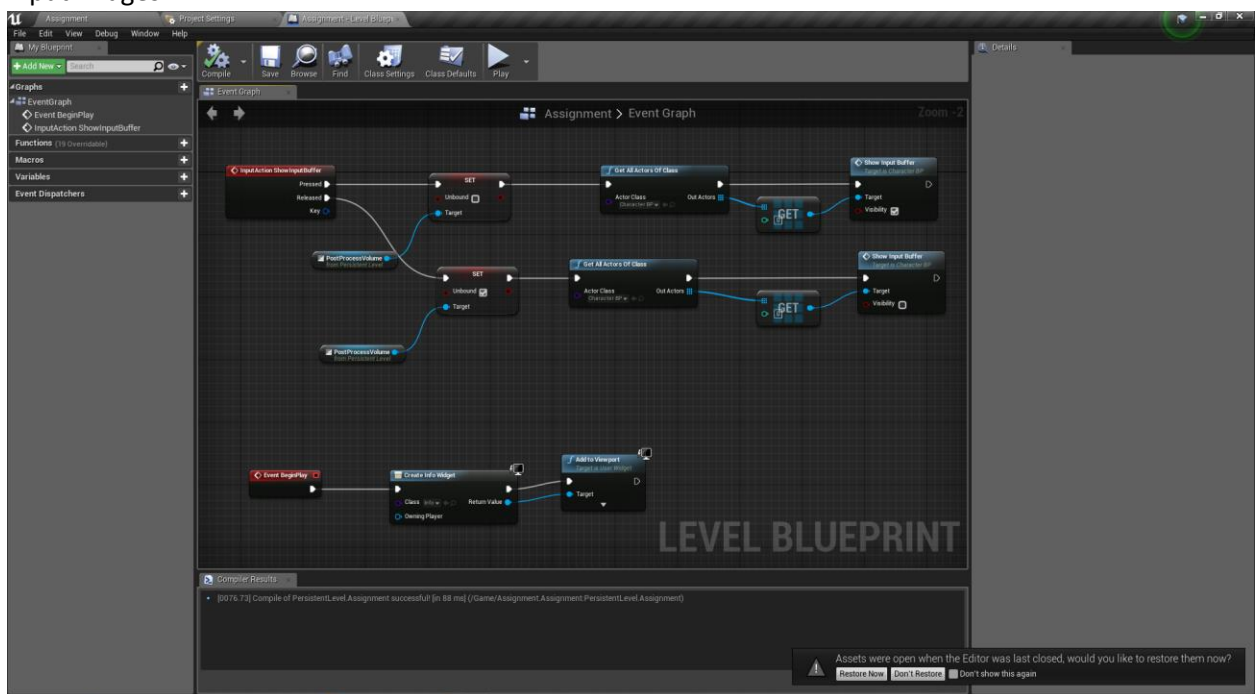
- 
- The screenshot displays the Unreal Engine 4 interface for editing a material named 'BarrelDiorator'. The interface is divided into several panels:
- Top Bar:** Contains standard application menus (File, Edit, Asset, Window, Help) and engine-specific buttons (Save, Browse, Apply, Search, Home, Clean Up, Connect, Live Preview, Live Nodes, Live Update, Stats, Mobile Stats).
  - Left Sidebar:**
    - Perspective Viewport:** Shows a 3D preview of a barrel with a black circular texture.
    - Details Panel:**
      - Physical Material:** Shows 'None' for Phys Material.
      - Material:** Shows 'Post Process' for Material Domain, 'Opaque' for Blend Mode, 'Translucent' for Decal Blend Mode, 'Default Lit' for Shading Model, and 'None' for Subsurface Profile.
      - Transparency:** Currently collapsed.
  - Main Viewport:** Displays the material graph for 'BarrelDiorator'. The graph includes nodes for 'Unconvert UVs', 'Texture Sample', 'Blend Linear', and 'Blend Color'. A large 'MATERIAL' watermark is visible in the background.
  - Right Sidebar:**
    - Palette:** A list of material functions categorized by type (Atmosphere, Blends, Color, etc.).
    - Stats:** Shows performance metrics: 'Base pass shader without light map: 29 instructions', 'Vertex shader: 31 instructions', 'Texture samplers: 1/16', and 'User interpolators: 2/4 (Scalars 1/4 Vectors) (TexCoords: 2, Custom: 0)'.
  - Bottom Bar:** A message box states 'Assets were open when the Editor was restored' with buttons for 'Restore None', 'Don't Restore', and 'Don't show this'.

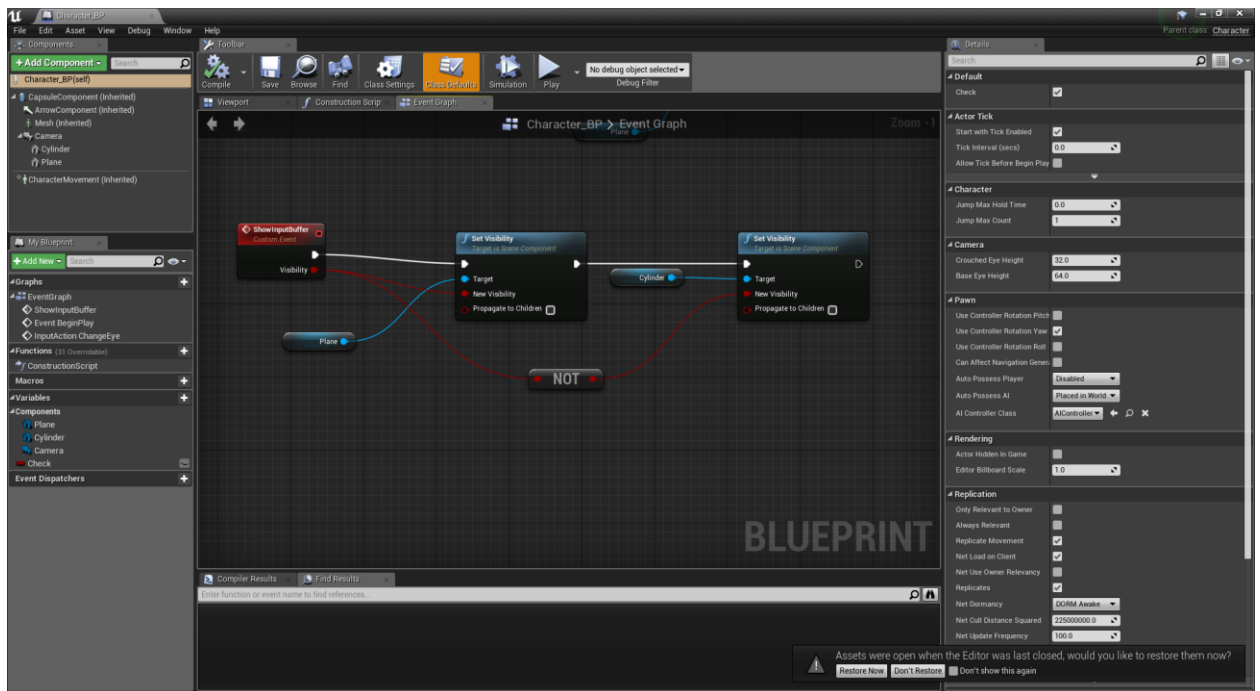


- A material instance with exposed parameters is created from the Barrel Distort material
- The values of k0, k1, k4 can be changed



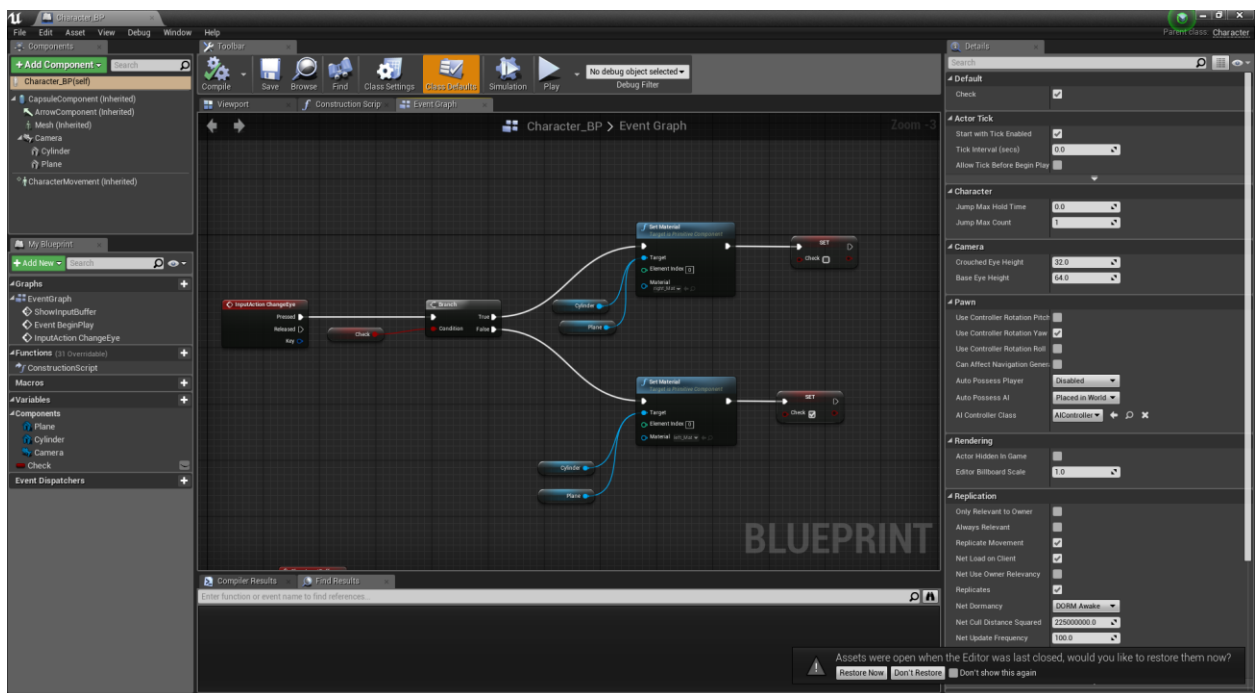
- The level blueprint (node based editor of unreal engine) implements the input mapping to show/hide input buffer. And calls the method in the character to hide the cylindrical projection and show the planar version. Also, it disables/enables the distortion shader in order to show the input images.





*Show input buffer event in the character class*

- Change eye input mapping changes the texture projected upon the cylinder. Pressing space bar lets the user toggle the eye



*Change eye input mapping implemented*