COMP111/MAS111 Unity Assignment

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Introduction

GitHub Repository: https://github.com/MQGames/comp111-unity-project-mq45946396

I have created a futuristic cityscape for my project. I have used different effects to create interesting objects and effects which complement the style I was trying to achieve.

Features

Feature/Effect	Mark	Done?
Terrain/Outdoor Area	25%	✓
Indoor Area	25%	✓
Textures with normal maps	10%	✓
Single state animations	5%	✓
Multi-state trigger animations	5%	
Direct light sources	5%	✓
Baked indirect lighting	5%	✓
Light probes	5%	
Reflection probes + reflective surfaces	5%	✓
Post processing effects	5%	✓
Multiple cameras	10%	✓
Particle systems	10%	✓
Physics objects + joints	10%	
3D Audio	5%	✓
Reverb zones, filters and audio effects	5%	
Total:	110%	

Terrain/Outdoor Area

Features Used

- Terrain
- Textures + Normal maps

Description

I sculpted the terrain using the provided brushes to create a mountainous region around the main areas of the game world. I added textures with normal maps to add more variety to the ground and to make it look more like a realistic texture. I then added trees around the mountains to make them look more natural and create extra scenery around the world. Fog was also used to help convey the scale of the world, which is composed of 9 terrain tiles arranged in a 3x3 grid. There is a WindZone in the scene which makes the leaves of specific trees move gently in the wind.

Screenshot

Indoor Area

Features Used
- ProBuilder
- Appropriate textures + normal maps
- Direct light sources
- Baked indirect lighting
- Particle systems

Description
The indoor section I created is 'SkyBar', which is a building levitating above the city. It was created with ProBuilder and is accessible through a small teleporter on the ground which emits particles when the player enters it (controlled by a custom script). There are spotlights inside the room which are used to provide mood lighting, and there is a white light bar spanning one wall of the room, with the light 'bleeding' onto the surrounding walls, floor and ceiling through the use of baked indirect lighting and an emissive material. All materials in the room are complete PBR materials with normal and specular/smoothness maps.

## Screenshots
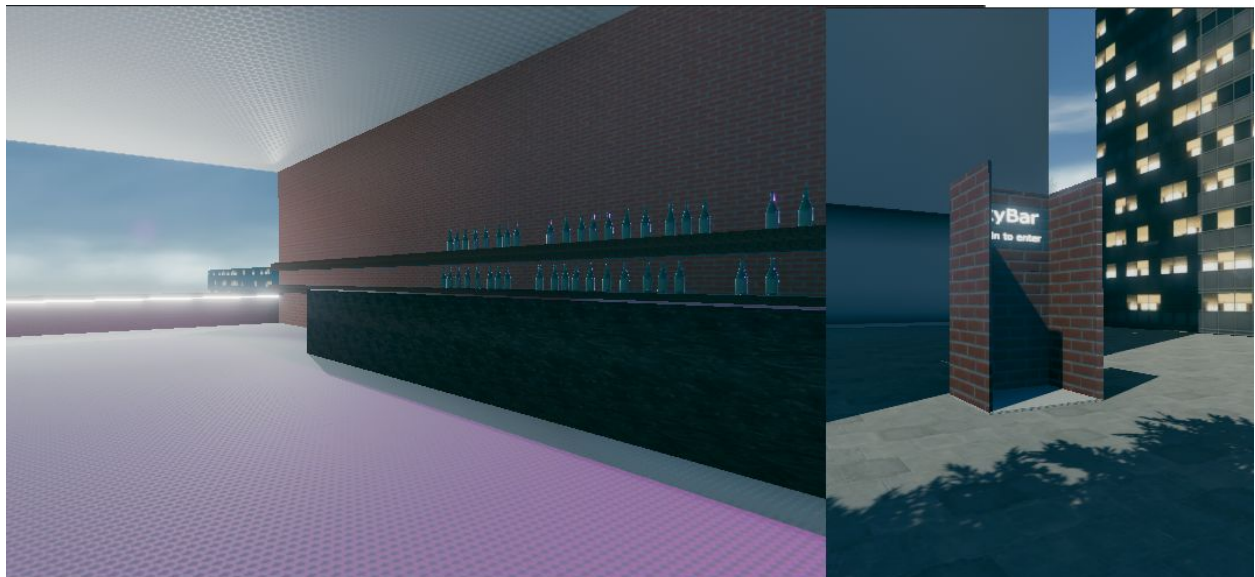
Hovertrain

Features Used
- Appropriate textures + normal maps
- Single-state animations
- Direct light sources
- Reflection probes and reflective surfaces
- Multiple cameras
- 3D Audio
- ProBuilder

Description
The hovertrain is a system which provides a functional way of traversing the large world. There are 3 stations at different points of the map, which the train travels between. This is controlled by a single-state animation, which moves the train and switches the collider for the holographic door on and off. Each station has multiple reflection probes to sample the reflections of the surrounding area and provides reflections for both the train, the metal floor of the platform, and the glass back wall of the platform. The train emits a sound with the volume controlled by the animation. A screen is inside the train which shows the view below the train, which is textured by a second camera under the train and drawn to a render texture. Lights are placed both under the train to imply anti-gravity technology, and on the screen to make it more believable in the scene.

As with the indoor section, all of the textures and materials applied to both the hovertrain and the stations are full PBR materials and react to light in a realistic way. Both the hovertrain mesh and the station meshes are created in ProBuilder, except for the benches at the station which are from a 3rd party source.

Screenshots
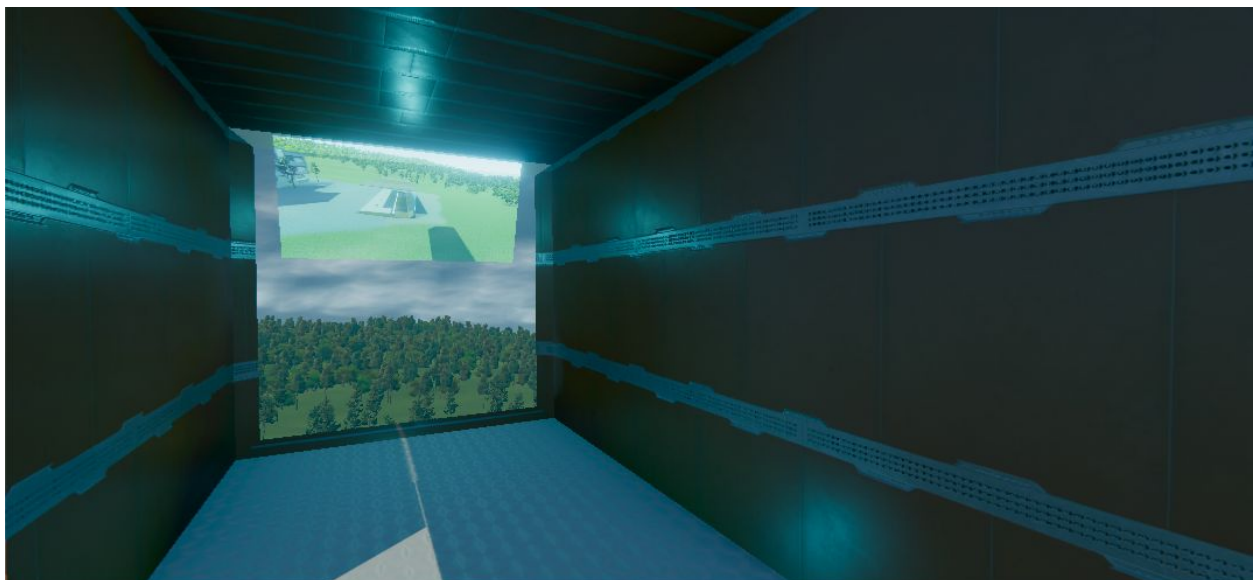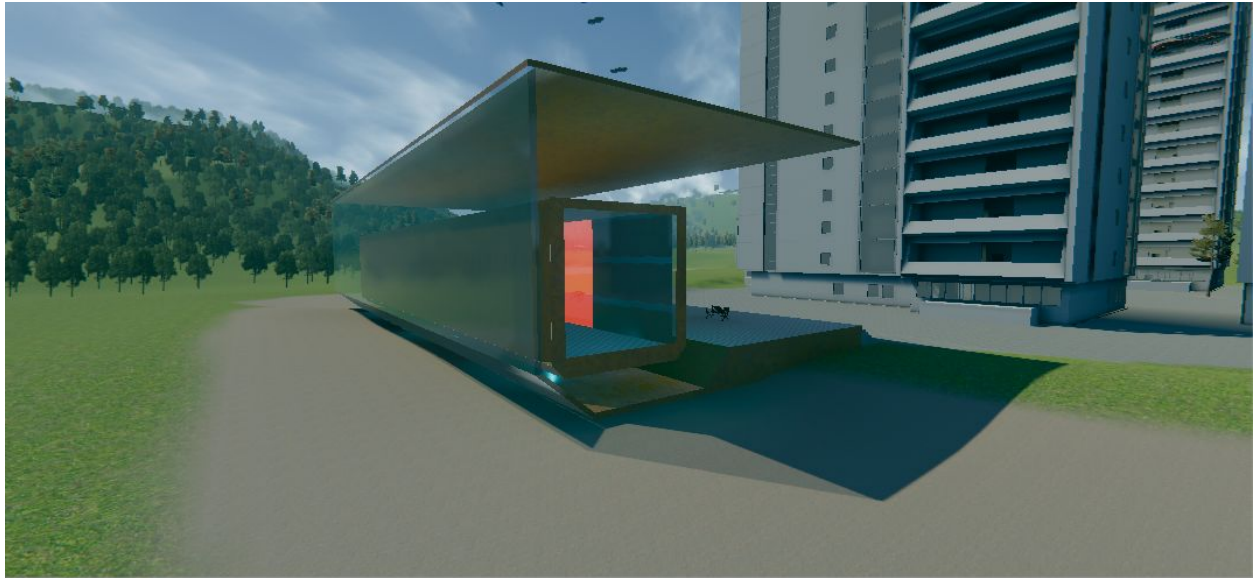
City Center

Features Used

- ProBuilder
- Terrain features
- Appropriate textures + normal maps
- Baked indirect lighting
- Single-state animations
- 3D Audio

Description

The city is comprised of three buildings which I created in ProBuilder, and others which I downloaded from the internet in order to populate the area and make it look more developed. I created the materials for the ProBuilder buildings from textures acquired online. All of the materials I created are full PBR materials. The ground is textured by the terrain, and there are trees placed throughout the 'street' area. There is a large blue display which one might expect to see in a futuristic city, which caused blue indirect light to be visible on other buildings and the terrain in the area. There are animated flying cars flying around the city in a loop, which are controlled by a single-state animation, and have a 3D audio source attached to them.

Screenshots

Clouds

Features Used
- Particle systems

Description
The clouds are created using a single particle system which is looping. The render mode is set to 'stretched billboard', which causes the particles to be stretched thinly across the scene. They are spawned within a large bounding box above the entire world, so they are visible at every point in the world. They are textured with a specific material which is created, using the additive blending mode, which makes the clouds appear bright and translucent. They are set to move in a pattern which matches the direction of the wind zone in the scene, so they move across the sky throughout gameplay. The clouds also fade in and out of existence, by changing the colour throughout the lifetime of each particle, so each cloud subtly fades in and out of visibility.

Screenshots
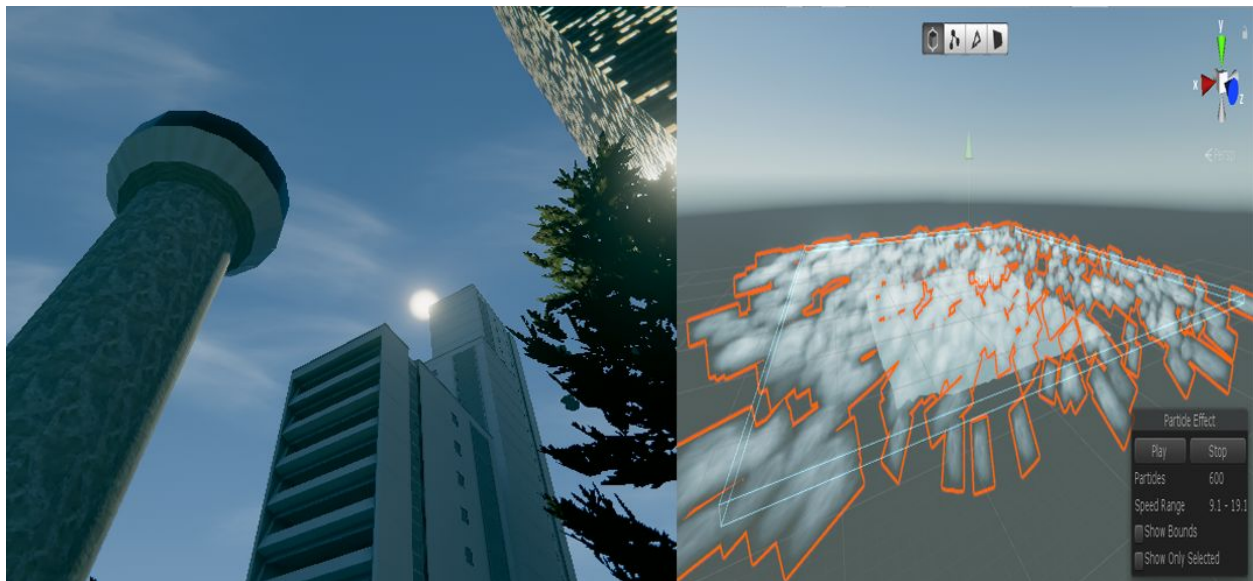
Post-processing effects

Features Used
- Post-processing effects

Description

I used post-processing effect to add some extra visual features to my game and also control the mood of the world. I used screen-space raytraced reflections (SSRR) to add more realistic reflections to certain surfaces (seen on the roof in the below screenshot), which reflects dynamic objects more accurately than reflection probes. The exposure of the image is automatically adjusted depending on the brightness of objects on-screen. Subtle chromatic aberration is added to make the lens of the camera feel more realistic, as light wavelengths are separated at the edges of vision in the real world, both on cameras and human eyes. Screen space ambient occlusion is added to make corners appear darker and add soft shadows to darker areas. Bloom is used to achieve the 'glowing' effect around very bright objects (shown in below screenshot) to help sell the futuristic 'neon' look and provide realistic colour bleeding for bright objects. A texture is used to add fake dirt to the lens, again in an effort to make it feel more realistic. Finally, colour grading is used, to tonemap the colours from high-dynamic range (HDR) to low-dynamic range (LDR). The tonemapper I chose was ACES, which is a 'filmic' tonemapper. The saturation and contrast have been adjusted, and the screen is slightly tinted blue, to help the style fit the 'futuristic' look and make the world feel somewhat colder.

Screenshot

Assets Used

Name	Author	License
Standard Assets	Unity	Commercial use
Post Processing Stack	Unity	Commercial use
HN48 Flying Car	Herminio Nieves	Commercial and noncommercial use
3D Scanned Rocky Soil	textures.com	Royalty-free license
Dust particle texture	Jason Webb	Labeled for reuse
Concrete Wall PBR material	textures.com	Royalty-free license
Office building PBR material	textures.com	Royalty-free license
Brushed Stainless Steel	textures.com	Royalty-free license
Scratched Paint	textures.com	Royalty-free license
Dirty Subway Floor Overlay B	textures.com	Royalty-free license
3D Scanned Rough New Concrete	textures.com	Royalty-free license
Sci-Fi Engine Loop	Sojan (freesound.org)	CC0 1.0 Universal (CC0 1.0) Public Domain Dedication
Residential Building Set	3dhaupt (tf3dm.com)	Personal use license
Aged Wood PBR material	textures.com	Royalty-free license
WINE BOTTLE	baptiss (tf3dm.com)	Personal use license
Modern Brick Wall	textures.com	Royalty-free license
Bench 3D model	Nicolás Quintero	Non-commercial use
Sci-Fi Industrial Panel 2	textures.com	Royalty-free license