CMPUT 307 PROJECT REPORT

TEAM CONVEYOR

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CONTRIBUTION:

Chuan Yang:

- Write the Storyline
- Create the FBI office scene and Terrorists' place
- Animation of all terrorists, the hero and the blue suit police

Mengyang Chen:

- bones and rigging in office scene,
- animation in office scene and stair scene
- created stair scene

Yiting Dong:

- Create the City based on some download building models
- Animate the cars chasing scene
- Debuting scene of the hero (Riding by a motorcycle)
- Video editing

Su Dong:

- create award scene
- animation in award scene

INTRODUCTION

The story is created by ourselves, and most work is done in 3DS Max. Final video was edited by Final cut pro. The purpose of doing this project is to present our proficient knowledge of 3Ds MAX. While doing the project, we had encountered lots of technical problems and difficulties, but eventually, with the help from friends, TAs and professor, we solve the most of them. We initially learned those basic knowledges from the labs and lectures. After we finish this object, we recognize that we all have a great improvement on understanding and using on 3ds Max.

STORYLINE

One day, a premeditated terrorist attack in City Pochinki is detected by FBI. At the same time, FBI are anti-reconnaissance by terrorist. When FBI arrived, the bomb preset by terrorist explodes. After the first failure of FBI, they finally find the suspect. When police chases the suspect, a hero appears. With the help of the hero, FBI catch the terrorist and award the hero for saving the city.

SOFTWARE

1. 3DS MAX (for modeling)
2. Paint （for texture）
3. Final Cut Pro (for video editing)

PROCEDURE (model, light/shadow, camera, special effect, rigging, renderer, animation)

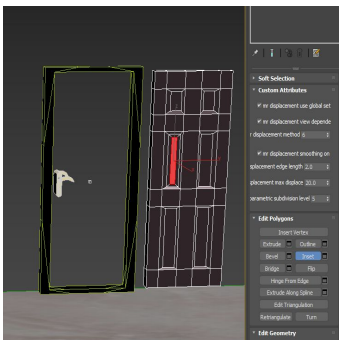
Chuan Yang:

1. I created the FBI office scene. Almost all the objects are created by myself except for the computers and keyboards. And I list the objects as below:
    - Office chair: Group of several simple models, including: 2 boxes (after using Meshsmooth modifier) as the upper part, 4 cylinders as the bottom supports and 3 more for the wheels. Apply the robber and metal material on them.
    - Table: Box after change the shape using extrude and move the polygons then apply Meshsmooth Modifier.
    - Floors and Walls: Planes and apply the bitmap from online on them.

    As for the lights, I used free light for 4 several light sources in the space. But change the color and the parameters that can change the strength of light to make a secret atmosphere.

2. The second scene is also created by me. However, because we don't have too many shots here, I grabbed most objects from internet. And I will list the models and lights I made:
    - Doors including the frame: For the main part of the door, I used box and change the shape of each polygons using scaling. And then use "Inset" to

create a new polygon as shown in the graph. Then use “extrude” and move to push this part inside to make it more realistic. As for the frame, still the box using “outline” to change the polygon in the middle and then delete them.



- Light: Free light. Recessed 250W wall wash in the small room.

- Bomb: this part includes two effects:
    - Bomb effect: using bomb model in 3ds max created by Create -> Space/Warps -> Geometric -> Bomb. And then use “Bind to Space warp” to bind bomb with the object the you want to use.
    - Fire effect: Created by Create -. Helpers -> Atmosphere -> Sphere Gizmo. And in the setup part, check the explosion and smoke option. Also change the parameters of fire effect and the start and end time.

3. Animation of the terrorists, the hero and the blue suit police. Character models are all downloaded from internet: https://www.mixamo.com/#/. And the bones are already created.
    - Terrorist, police
        - Chasing scene in the city: create a running cycle and then use “Curve Editor” to add more cycles and the position of each part.
        - The facial expression of terrorist: Use “Morpher” in the modifier. Adjust the parameter of “MouthOpen”.
    - Terrorist, hero:
        - Hero riding: firstly change the pose of him to fit the moto and then simply move the group and set keys to achieve it.
        - Fighting: Adjust the position of each part of the bones at every frame. And because of some unknown movement between two frames, I have to break one action into 2 parts to adjust and render.

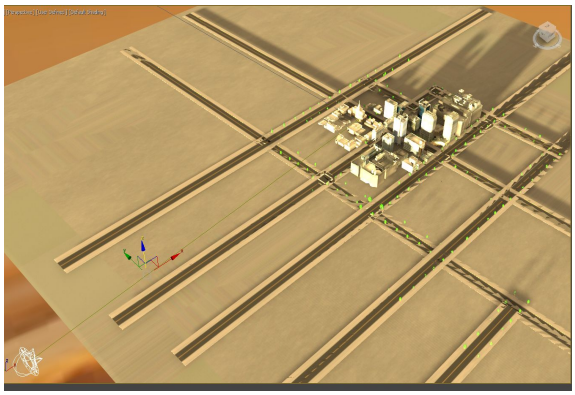
Mengyang Chen:

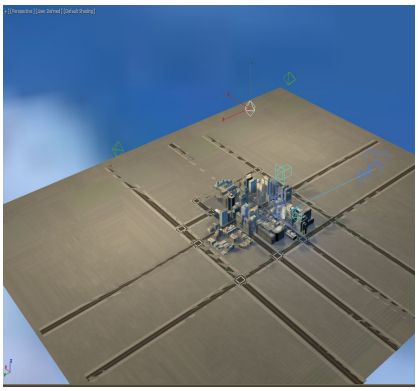
1. I created the stair scene, and this scene is basically the combination of walls, stairs, planes, and lights. For the walls, I used the wall object type from AEC Extended. For the light, I used free light, and I changed the template to the Recessed 250W wall wash(web). For the stair, I used the u-type stair from stairs type. All the objects from this scene are used the bitmap texture maps, and all the bitmaps picture are downloaded from online.
2. The models of FBI agents and FBI boss are downloaded from an online website https://www.mixamo.com/#/. I used biped for FBI boss in this scene, and when I was doing the rigging for FBI boss I found that the most complicated part to rig is the fingers. We have then discussed that we probably will not have any animations that correlate to the hands. Therefore, I decided to use only 1 finger and 1 finger link, and place it on the center part of hand. Then I used the skip modifier for FBI boss to add bones for him. When I tried to use footstep model for FBI boss, I found that the biped's left and right thighs came out easily. Additionally, the biped's left and right upper arm came out easily too when FBI boss was moving his arm. Therefore, I have changed the weight for this part with edit envelope parameter. I changed the weight almost points by points, and I found that it would be easy to use the different viewpoint because I selected the wrong points frequently by just simply use default shading view.
3. In the stair scene, the models and bones for those swats were downloaded from the same website https://www.mixamo.com/#/ I created the first cycle of the movement for the running on downstairs, running up stairs, and running on upstairs animation. It is just simply the rotation for each joint of arms and legs. Then, I copied those keyframes to next couple of frames, so the animation cycle can be doubled and redoubled, and can be a real running finally. However, if I just simply hold shift button and copy those frames, the position of those swats would be also copied, which means they will back to the original point suddenly after they reached the end. Therefore, I used curve editor to change the position from a cycle to a linear. The positions of those swats are controlled by the hip bones, so I firstly selected all the hip bones' frames at each frame time and then dragged the y-axis position to downward. After doing that the bones would be look like running in realistic. The most complicated part at here is how to make sure that the movement between end and next cycle's start looks smooth. In order to do that perfectly, I tried to adjust the keyframes and

position of arms and legs carefully, which also took me the most of time through all my parts.

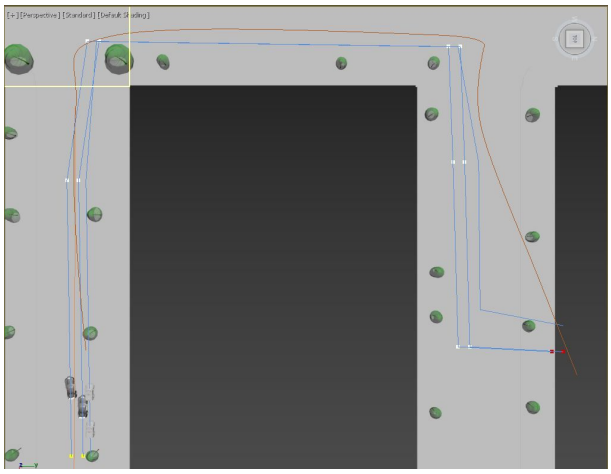
Yiting Dong:

1. The city which I created is based on some downloaded building models from the *http://www.mayawu.com* . But for roads and trees are created by Geometric Primitives in 3Ds MAX. As for the environment lights in the city, I use two different kinds of light: Omni Light and CIE sky model daylight.
    a. Roads are created based on different polygons, and shaping by using editable mash.
    b. Trees are selected from foliage library in ACE extended objects. In order to make trees more realistic, I applied different setting to pruning, seed and density parameters to create different shapes of trees.
    c. The daylight in the city was created from omni light instead of daylight. By doing this, we had similar result but a shorter time for rendering.
    d. The sunset light was created by using daylight with CIE sky model and a dusk environment setting. The environment is set by placing a bitmap picture in a dusk scene. And then place the daylight on the city.

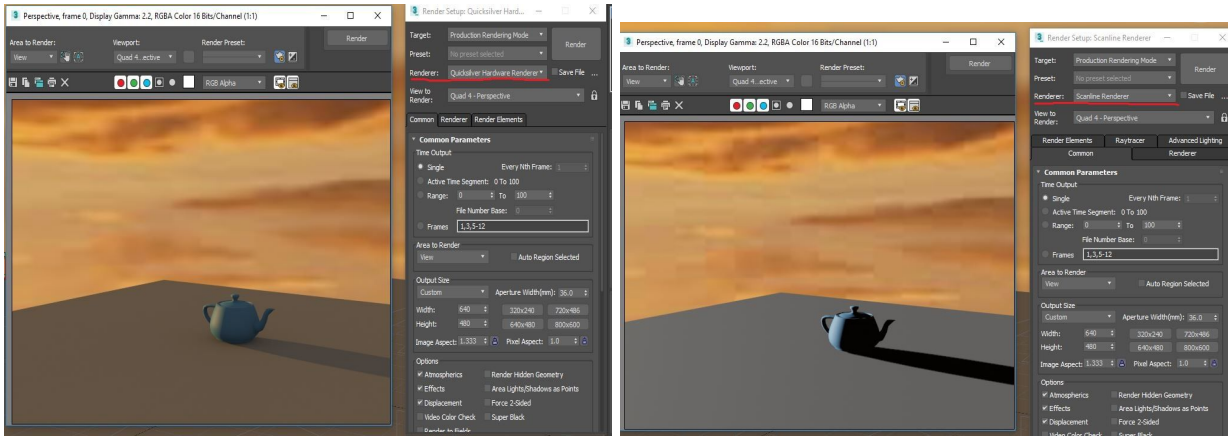




2. **Car Chasing animation** was done by combing the car models with different path. Car models are download from https://free3d.com. And car paths are basically primitive splines in 3Ds MAX. To animate the motion of cars, all I did is rotating the direction when it turns so that the motion can be more smooth. The camera that I used to follow the car chasing scene is a free camera, and keys were set at several pose which can create a more realistic following view for the scene.



3. I applied same motion path method to move camera as well. In the video, after car chasing, there is a segment of policeman and armed force standing outside the building and ready to enter, and this part is finished in a moving camera view. Although models are static, with a moving camera, the scene is more vivid.
4. The first debut scene of hero rides by his motorcycle is simply made by using a target camera and a set camera. Therefore, camera would move together with the hero; and the set camera could capture the whole route as well.
5. Quicksilver Renderer is used for rendering all scenes that I animated because the environment effect regarding lights and shadow can only show a desired result by using this type of renderer.

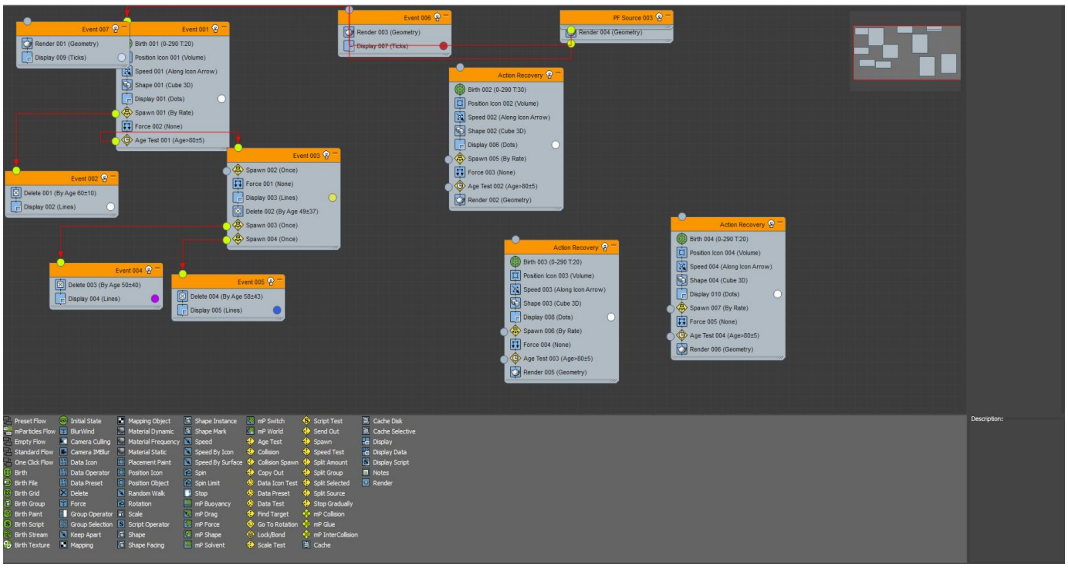


Su Dong:

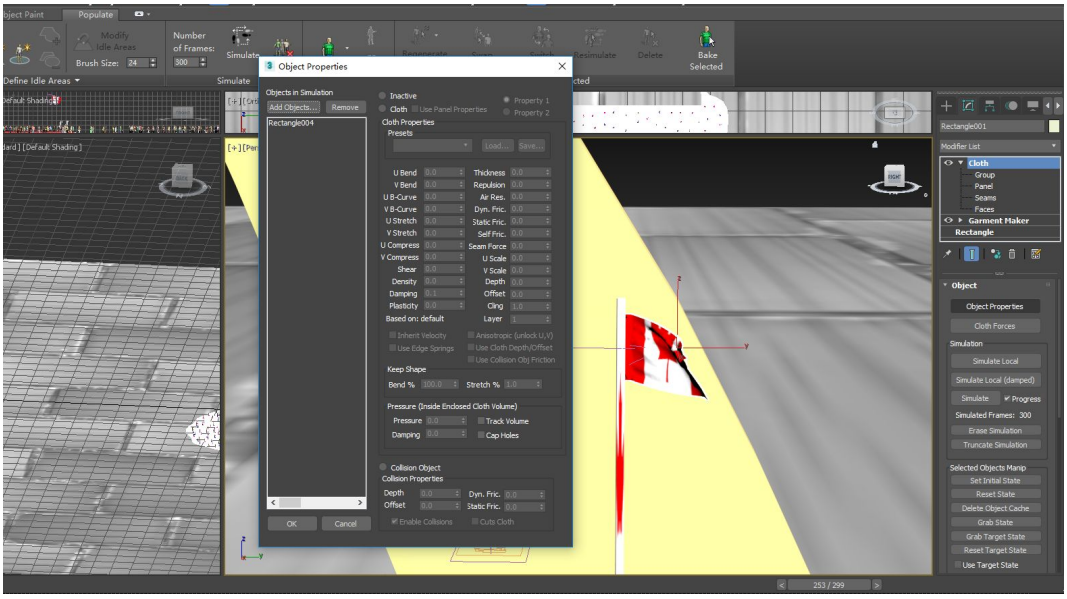
1. I created the final scene, award scene. All the models in this scene are created by

myself. All models are listed as below:

- **Firework:** is the combination of the particle effect, which is the one of the most complicated model in this scene. Firstly, I opened the particle view and drag the Standard Flow in the interface. There are 5 events in Event001 in the interface. However, the particles move from the top to bottom, not from bottom to top. To figure out this problem, I select Z axis in World Coordinates of Mirror. After figuring out the particle direction problem, I change some basic parameters in birth, speed and display events in Event 001. Birth event is about when the particles start and end. Speed event is about how fast the particle move. Display event is about which format the particles display. Also, I add the spawn event and age test in Event001. The spawn event is about creating new particles from existing ones and age test is for checking whether a specific amount of time has passed since the start animation. Delete event are created independently in Event 002 and attached with Event 001. Delete event removes particles from the particle system, which eliminate particle once they have served their purpose in the animation. Then I create another spawn event and attach with the age test in the Event 001. The first spawn event is for the firework move from the bottom to top and the second one is for the firework explosion effect. This is how the firework model works. I follow the same way and create two more spawn events. There are three colors in the firework model. Also, to make better animation effect, I use the gravity and wind forces (create -> geometry ->space warps ->gravity and wind) to make the particles divergent and vibrate like in the real life.



- **Red carpet**: modifier used on red carpet is hair and fur. The general, material, clumping, frizz and kink parameter are modified, and red-carpet texture is bitmapped on it as well.
- **Flag**: is the combination of rectangle and cylinder. Garment maker and cloth modifiers are used. The cylinder and rectangle are attached by the group in cloth. To make the flag flying in the air, two wind forces from two different directions are used.



- **Trophy**: is the combination of box, cylinder and sphere. Different textures are bitmapped to the three objects. As the foundation, editable

poly is used on the box. Editable poly->vertex->chamfer

- **Crowds**: use the crowd population in 3ds max. The population density, groups, gender and face direction all can be modified. Toggle ribbon->populate

- **Sky**: To make sky in this scene, I change the environment set in rendering. The environment is set by placing a bitmap picture. However, a problem, image quality, is encountered here. To improve the quality of sky, I searched internet http://www.cadtutor.net/tutorials/3ds-max/sky-backgrounds.php and find a solution. I click the Views->Viewport Background dialog->Background Source->Use Environment Background and change parameter like V Offset etc.

- **Camera**: Free camera is used in the scene. There is no particular camera, but I used one cinema technique called pull-back dolly. I shoot a close-up the start and film the whole at the end as the closing ceremony.

2. Animation of the mayor, guards and main protagonist are downloaded from internet https://www.mixamo.com/#/. But I create motions for themselves.

- **Guards**: the two guards stand in the award stage. Their left hand holds the right hand in front of their bodies. They look like serious and secure the stage.

- **Mayor**: the motion of mayor is complicated because he needs hold the trophy in the stage and give it to the protagonist. I need to rig every finger in both hands and make them bend

- **Protagonist**: the first thing I need protagonist do is move, from the middle of the stage to the front of mayor. Then he extends both hands toward mayor and takes the trophy back

DIFFICULTIES

1. Shadows of the character models in the city scene does not appear
2. Fluency of the video:
    a. Actions
    b. The whole video including lots of switches of the scenes
3. Renderer and Quality:
    a. Quicksilver renderer can produce a perfect result with different environment setting but a unsatisfactory quality; whereas scanline can show a high quality of image but it is difficult to imitate the environment.

CONCLUSION

Overall, the final result of our project is beyond our initial expectation. There is no doubt that this project helps us master various techniques in 3D modeling and animation. We were stimulated to acquire more knowledge while doing the project. And the team work was perfect, everyone contribute extraordinary amount of time to it, and all did the best of he/she can. This is a successful and significant project for all of us. Thank you for everyone who helped us in this project.

REFERENCES

1. https://free3d.com/
2. https://www.mixamo.com/#/
3. http://www.mayawu.com/
4. https://www.google.ca/
5. https://www.youtube.com/?gl=CA