Cosc363 assignment 1

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1.0 Brief description of the scene

The scene set in the middle of Antarctica, with a garage building in the middle of nowhere. In the building, there is a garage door, bus, fan, security camera and moonwalking man. The bus operates regularly and the bus orbits around Garage and stops temporarily at the bus stop before it heads back to the garage for the daily maintenance check. This scene shows what it would look like if there is a public transport in the middle of nowhere in Antarctica.

1.1 Exterior and interior of the garage

The Figure 1.2.1 shows the exterior of the garage. The scene shows the snow background with the bus stop placed outside of the garage. The Figure 1.2.2 shows the interior of the garage, which shows fan, moonwalking man, bus and a security camera on the top right.
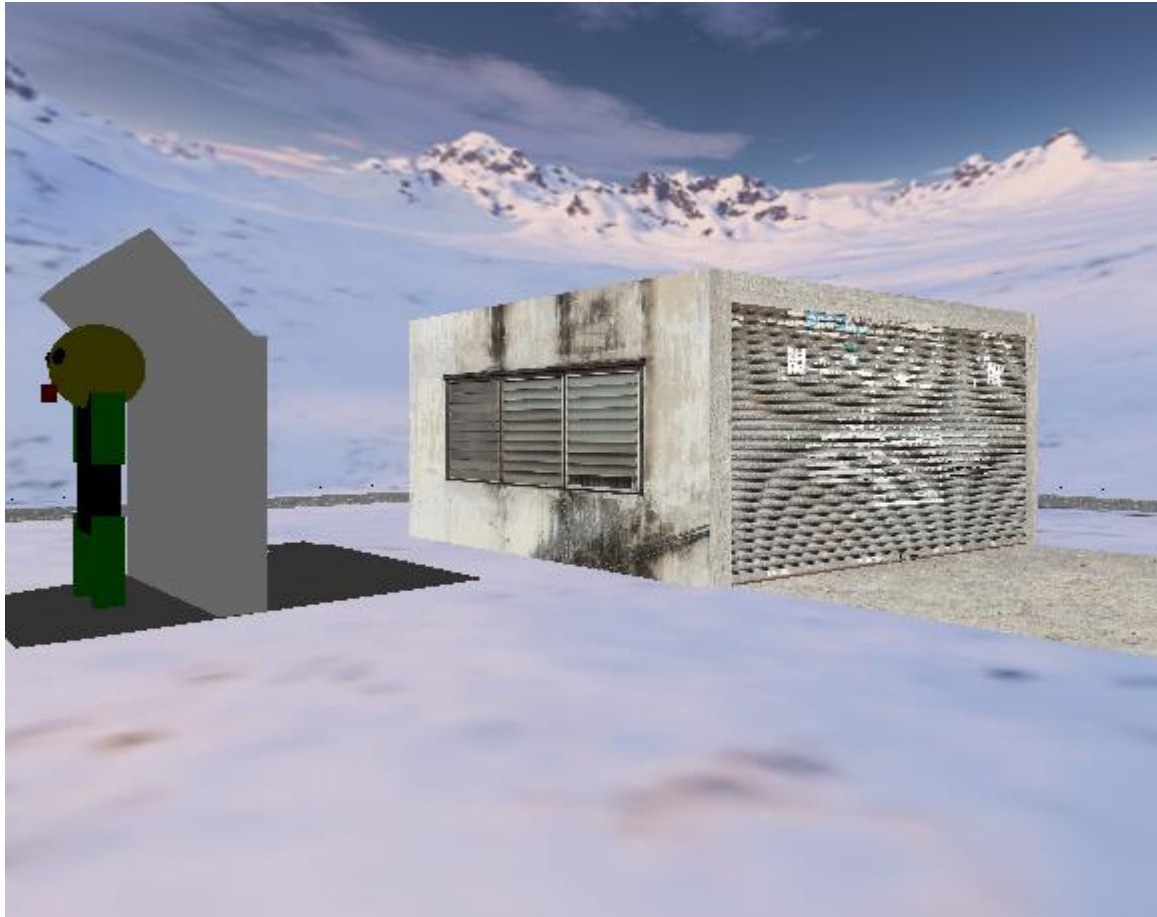

Figure 1.2.1 Exterior of the garage

Figure1.2.2 Interior of the garage

1.1 Extra Features implemented

Planar shadow

The planar shadow was implemented by first having three global variables to keep track of the light position. Then the GL_LIGHTING was disabled to draw the shadow. The shadow was drawn from the bus stop outside of the garage. Fist the bus stop was created, then the black colour was added to the bus stop and then call the glMultMatrix function to apply the shadow on the floor.

<u>First person view</u>

First person view was implemented on the man waiting at the bus stop. This was done by positioning the camera at eye level of the man. The camera can also look right, left up and down and wait for the bus to come. The camera mode can be changed by presses on 'F1'. A global variable is used to keep track of which camera mode is on currently.

<u>Surface shape (Security camera)</u>

The security camera (Inside the garage) was implemented by using complex mathematical formula. The following formula has been applied to create this model.

$$wx[i] = vx[i] * \cos(Theta) * \sin(Theta)$$

$$wy[i] = y$$

$$wz[i] = -vx[i] * \sin(Theta) + vz[i] * \cos(Theta)$$

Then the camera has been translated to the top right side of the building. Then the camera is operating by rotating left and right (by increasing and decreasing theta).

1.2 Models implemented

<u>Human</u>

The human was implemented by having multiple glut objects (The human was drawn in the Human function). Display function moves the human one place to another. The moonwalking man (in the garage), moves its arm by increasing and decreasing the angle of the arms and legs.

<u>Ceiling Fan</u>

This object again was implemented by having multiple glut objects. The fan moves by constantly increasing the theta by 8.5 degrees (from the timer function).

<u>Bus</u>

Again this object was implemented by having multiple glut objects. The bus moves by keep track of the location of the bus. Few cases have been implemented (If function) to make sure the bus does not go out of bounds when travelling on the roads. At each end of the road, the bus turns at a 90-degree angle (This is done once the bus reaches a certain point) by slowly increasing the angle towards the y-axis. The bus also reverses when the bus reaches the driveway of the garage. This is done decrementing the angle. Then the bus moves toward the positive x-direction. The bus also stops for several seconds at a bus stop and garage.

<u>Garage door</u>

The garage door (the door has been textured) opens initially at the start of the scene by incrementing the door height (Initialised as a global variable). The door then closes once the bus is out of the driveway (decrements the door height until it reaches 0).

<u>Security camera</u>

This was mentioned already in 1.2.