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The controls for the program are as follows.
Up arrow moves the camera forward.
Down arrow moves the camera backwards.
Left arrow changes the angle towards the left.
Right arrow changes the viewing angle towards the right.
F1 lowers you on the Y axis.
F2 raises you on the Y axis.

This program was written in C++ using geany. The build command when using geany to compile, build, and run is g++ -Wall -o "%e" "%f" -lm -lGL -lGLU -lglut . In order to run this I recommend using geany.
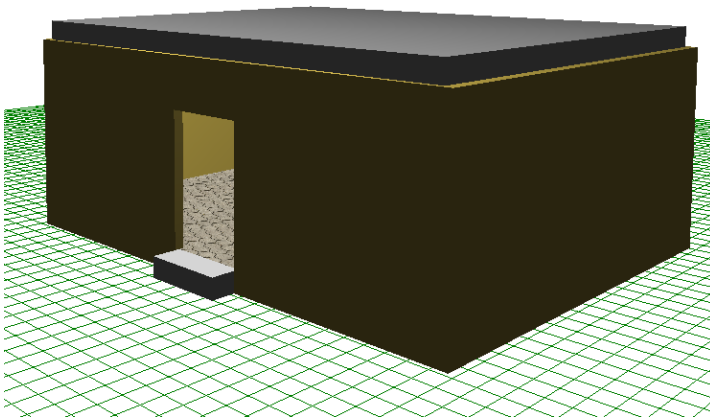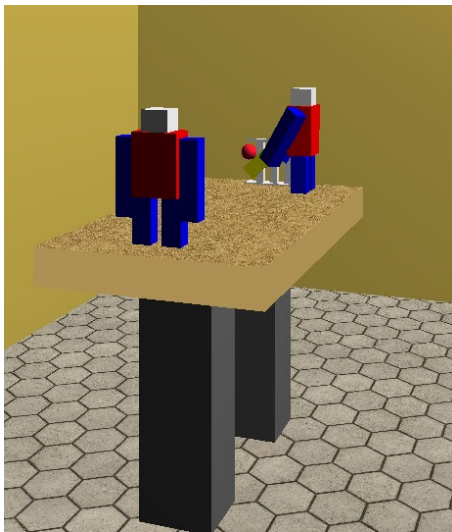
Models:
The first model to look at is the museum. It has 3 walls, a roof, and a doorway which is 3 separate glutSolidCubes put together to give an entrance to the museum. This doorway always has a small step used to make the floor be raised.. The floor inside is a textured cube. It is textured with hexagonal tiles to give a proper museum look to it.

The next models are the exhibits. Each exhibit has performing a sport on a table. Some tables are are made of two tables put together to increase the exhibit. The first exhibit is the volleyball serve. This ball up with his right hand, which he then hits with ball hits the wall, the ball clips into the wall slightly the illusion of impact. A ball hitting the wall and the force before bouncing back. The ball then


a human singular and some length of the has a man throw a his left hand. The but this is to give condensing from returns to his left loops. The surface on is wooden emulate high

hand and it he is standing texture to school gym.

The second exhibit is a cricket bowl. The man rotates with a straight arm as that is how cricket is bowled in real life. The ball bounces, once again compressing to show the impact of the bounce. It then hits the bat and comes back

to his hand, looping. These men are on two tables placed together to give the length of the cricket pitch. It is grass textured to best represent a cricket pitch. The wickets behind the batsman are constructed out of glutSolidCubes. The bat is made of a cube and cylinder.
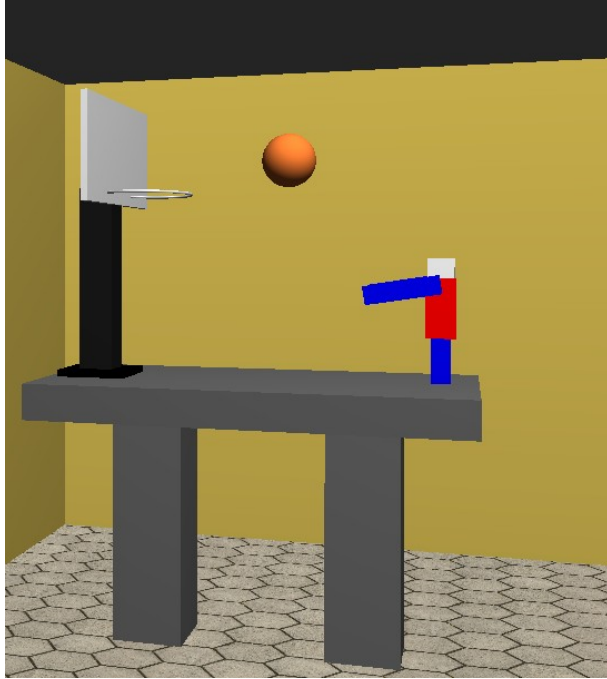
The final exhibit is a man throwing a basketball towards a hoop. The hoop was constructed using cubes for the stand and backboard with a torus used for the proper hoop part. The man throws the ball towards the hoop in a gravity based arc, but it bounces off of the rim, back towards him. This is also done in an arc. This was done instead of the ball going in to make a natural way for the animation to loop with the ball returning to him.

Extra features added
Collision:
Collision detection with the floor and ceiling have been added when inside the museum. When inside the museum you no longer have the ability to change the camera height and the camera height is set to 6. This detects that you are walking on the floor and prevents you from going through it and going through the roof. Colliding with the walls is still allowed because sometimes phasing through them is required in order to view all parts of the exhibit. However if you are at a high enough camera height before entering the realm of the museum your camera height will not be set to 6 and you can continue to move it freely, move too low however and you will be put inside the museum. This is to allow you to view the roof, but not clip through it arbitrarily. Instead if you attempt to clip too low you are put in the museum to admire the exhibits. Collision with walls and exhibits themselves has not been implemented in case the person using it wants to see it from every different angle possible and only wants to see specific parts.

Physics Based Animations:
In the third exhibit the ball is thrown in an arc. This equation is for $t > 0$, $t < 1$
basket_x = ((1-t) * (1-t))*start_point_x + 2*(1-t)*t*control_point_x + (t*t)*end_point_x;
basket_y = ((1-t) * (1-t))*start_point_y + 2*(1-t)*t*control_point_y + (t*t)*end_point_y;
In these equations start_point_x and start_point_y are the points (x, y) where the ball initially leaves the hands of the man. The end_point_x and end_point_y are the point (x, y) where the ball ends up. Lastly, control_point_x and control_point_y are the intersections of the tangents to the parabola at the end points. Combining this gives us a arc path for the ball to follow. This made the ball follow the shape of a parabola and obey gravity. The ball uses the same equations with different points to return to the man.

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