

Assignment 2

Computer Graphics

Cars have gained children's attention from the movie Lightning McQueen. Cars are really fascinating to see and many car games have come up in the game world taking this as an advantage to attract most of the digital community. This assignment requires you to create a 3d car racing game.



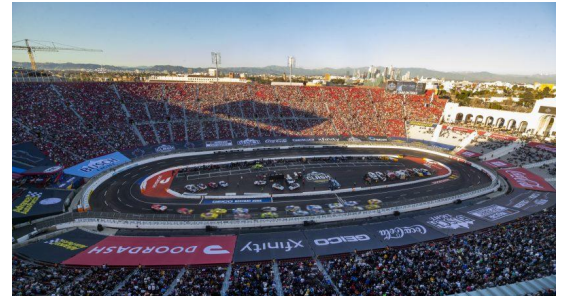
General guidelines

- You can use either OpenGL or WebGL for this assignment but you will get full 100% if you use OpenGL and only max 80% if you use WebGL and three.js.
- You can use the boilerplate of Three.js we have provided or start on your own.
- Submit your assignment by deleting your build directory, placing all other files in a single .zip file and submitting it as **<RollNumber>.zip**
- This assignment needs you to have **Speed**. Start assignment **Faster than fast, quicker than quick** because **It's lightning** ⚡.

1. 3D World (15 marks)

1. The world should have a stadium.
2. The racing track should be in a closed loop in a plane with a reasonable perimeter. You can have any amount of twists and turns.
3. You should show the audience in the stadium. They can be static without any motion too.

Hint: you can use textures.



2. Cars (30 marks)

- There are two kinds of cars in this game, one is your own car (the McQueen) and the opponent cars (at least 3)
- Features to keep track of for each car (20)
 1. Moving car left and right (*using left and right arrow keys or A and D keys*)
 2. Increasing speed of car (*up arrow key or W key*)
 3. Applying Brakes. (*down arrow key or S key*)
 4. Keeping track of car's
 - Health
 - Fuel
 - Score
 - time
 5. Keep Mileage/liter value.
 6. Friction between car wheels and ground.
- You should have a logic for Opponent cars motion in the race. It should not be the same for all try to make it random. (10)



3. Collisions (15 marks)

Collision between cars which reduces the health of both.

4. Fuel cans (10 marks)

1. Fuel cans should be randomly spawned on the road and when our car hits them, the car's fuel should be increased.
2. When fuel is over you can say “player out of fuel” and display “game over” message.



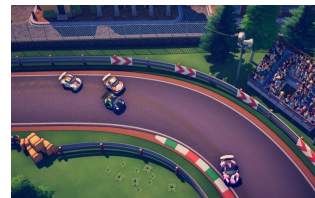
5. Different camera views (10 marks)

your game must have the capability of changing the camera view for the gamer. you should have two windows.

player window : The player should be able to see view 3 in this window

Map window: This is a small window(in one of the corners) on the main window showing the top view (view 1).

1. top bird's eye view for the game.



2. player's view or car's point of view.(optional)



3. Third person's view.



Optionally you can implement Toggling between views 2 and 3. **(optional)**

6. Display (20 marks)

1. At the start of the game: show the start button and also keys to control the car. (5)
2. At the end of the game show “game over window” and then display the ranking of the player’s in a dashboard. (5)
3. **Dashboard:** Display Health, Fuel, Score, time on the screen and they should be updated dynamically. you should also show the next fuel can distance. (10)

Resources:

Threejs Documentation: <https://threejs.org/>

Learn opengl : <https://learnopengl.com/>

You can download 3d models from <https://sketchfab.com>

Happy Car racing