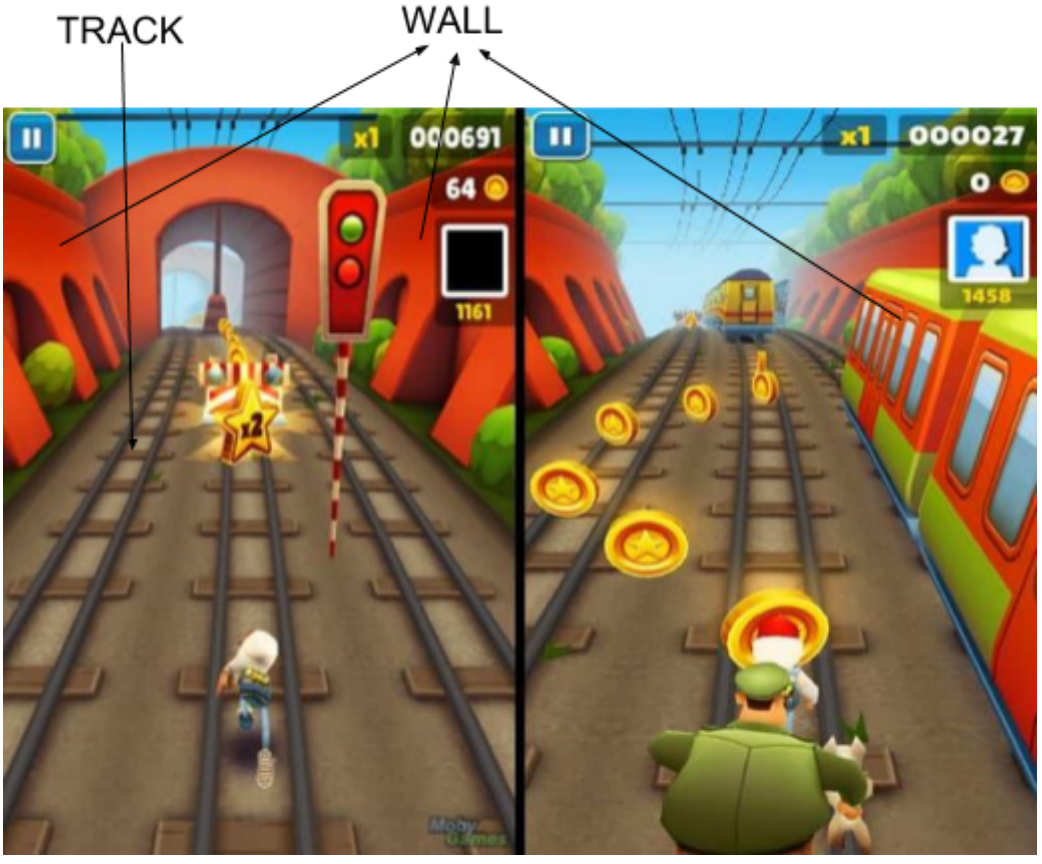
Graphics
Assignment 3

Deadline : 10 / 03 / 2019 - 20:00 PM

Problem :

Web graphics library, more popularly known as WebGL is a JavaScript library for rendering 2D and 3D graphics within any web browser. The previous two assignments dealt with OpenGL. And now, following on the same concepts of OpenGL, you will be using WebGL to design an interactive 3D game. The game will be inspired from Subway Surfer where the person playing will be trying to escape a chasing police officer running in a narrow obstacle filled lane. It's your game, it's your world, make it dance to your own tune. The requirements mentioned are minimal so please be creative and add interesting features.

3D World :



1. The main character in this whole game, the runner, will be in a chase sequence, trying his/her best to escape an onrushing police officer who will appear on the screen at the start of the chase but will later disappear once the player gains speed

only to reappear whenever runner slows down. The moment police officer gets hold of his prisoner, the game ends.

2. The obstacle course will be a wide track(road) made up of at least two lanes. On being approached by an obstacle during the run, the person will change his/her lane avoiding being hit or getting slowed down by it. The runner can turn left or right(but cannot go out of the road), can jump over the obstacles or duck under them. Also, a certain boost lying on the road will help the player to fly over the obstacles but that will only be temporary.

3. Upon reaching a fixed target will mark the player safe from the chasing officer. The game will end displaying the number of coins collected as final score.

4. The obstacles will be of two types.
   Type 1: These obstacles will stop the runner right dead on his/her tracks. Meaning the game will end as soon as the runner hits one of them. There needs to be at least two obstacles of this type.
   Type2:These won't end the game instantaneously but will slow down the runner and hitting any one of them twice in quick succession(say 10 seconds) will make the police officer to catch the runner ending the pursuit
   The obstacles aren't being mentioned explicitly from our side and so a lot of freedom is being given to you in coming up with interesting obstacles which will suit the environment. So make full use of it.

5. Coins!!!! Yes the coins. And a lot of them. Make sure to keep lots of coins in multiple lanes which will tempt the players of the game to make their runner go and fetch them giving rise to more chances of indecisions and risks.

6. The game will have a "Flying Boost" which can be found lying in one of the lanes and must appear at least twice during the course of the run. Upon achieving the boost, it will enable the player to fly over the obstacles but will only be available temporarily. After a certain period of time, the player must come back into one of the lanes and keep running as previously.

7. The game will have a "Jumping Boots", a kind of a power-up which increases the jump height. The power-up lasts for some specific time duration after being collected during the run.

8.Shader Tasks.These tasks must be done using shaders and not JavaScript.
   a. Make the world grayscale temporarily (using a button or timed)
   b. Textured tracks.
   c. Make the walls flash periodically.

Controls :

1. There won't be any controller for forward movement. The player should automatically move forward according to the current speed, i.e. it should change on speed ups and when hit by obstacles.
2. No backward movement.
3. Left and right arrow key to move left and right respectively.
4. Spacebar to jump. Note: In case of Jumping Boots the jump height should be handled accordingly.

Bonus:

1. WebGL allows you to use different **textures and lighting** very efficiently. So make sure to use that to create a world which is more realistic and beautiful. There are lesser number of objects in the world this time compared with previous assignments so that you could focus upon the aesthetics of the game more effectively. Marks will be awarded not only upon the correct functioning of the component but also on the looks of it.
2. Depending upon your liking of it, create more types of boosts. These, just like the "Flying Boost", will make the player to do exceptional things in the game. But make sure that these aren't frequent and don't make the game too simple for the player.
3. Create at least one more obstacle each of Type1 and Type2. But again, just don't keep two cuboids of different colours as obstacles lying on the road. That won't fetch you any marks. Be creative.
4. A running police dog behind the runner which will be mimicking the actions of the runner at all times. The dog will not be affected by any of the boosts(for e.g when runner will be flying using the "Flying Boost", dog will keep running in the lanes only down below).

Grading :

You will be graded based on the correctness and efficiency (speed) of the implementation of the elements described above. Tentative grading would take place in several stages.
Version 1.0: World,Player,Coins : 30 marks
Version 2.0:Obstacles,Jumping boots,flying boost : 35 marks
Version 3.0: Shader Tasks : 35 marks
Version 4.0: Bonus and your **powerful imagination** ! :) : 20 marks

Submission :

You submissions should include your source code and a makefile. Do not use any non-standard libraries. In addition to these, include a file named README.md in the submission that gives a one page description of the game and how to play it.
Details of how to submit and any modification to the above submission details will be posted by the TAs towards the submission deadline. This assignment will take time to complete. Start early. All error scenarios must be gracefully handled (Games crashing during testing will be
penalised).

Plagiarism in any form shall not be tolerated (MOSS will be used) and a straight F grade for the course will be given. Not protecting your code and collaborative efforts will also be counted as Plagiarism.