C++ programming project plan

Hill-side Racing

Paavo Hietala
Veera Itälinna
Oskari Lehtonen
Markus Toivonen

Introduction

For the project of C++ Programming course, we will create our own version of a classical Hills Racing 2D game. We will be using the Box2D physics engine and SFML media library. These are open source libraries that are published zlib license. We haven't done anything of substance yet, but luckily there are a lot of tutorials in the internet to help us in the usage of Box2D and SFML.

Gameplay

The player drives a motorized vehicle through a 2D obstacle course while trying to reach the goal in time. The player receives points for reaching the goal fast and collecting tokens along the way. The top 5 scores are maintained in a separate section of the menu. Should you make it to the top 5, the program will congratulate you.
In addition to the vehicle and the track, the window shows the amount of time left, current score and the number of tokens collected.

Schedule:

The plan is to get the environment set up within a week, and then start creating the obstacles & maps, vehicles, camera movement. Our plan is to get it working at a very simple level at first, and then start building on top of it. Our group consists from very busy individuals who are active in many fields, so having enough time to do the project might be a challenge. However, we believe in ourselves and our capabilities, and will deliver a working product.

Classes:

WORLD aka the map

Vehicle

Private: [max speed, tire friction, torque]

Vehicle types:

Mersu inherited from Vehicle
Ferrari inherited from Vehicle
VW inherited from Vehicle

Obstacles -> change the attributes of the vehicles upon collision

---

Obstacle types:

Sand inherited from Obstacle
Stone inherited from Obstacle
Water inherited from Obstacle
Other stuff inherited from Obstacle
Token inherited from Obstacle

High_scores -> calculates the score

+1 from token collision
+ the remaining time (seconds) from the given time

If a player gets a top five high score the player will get notified and the score will be saved in a text file of top 5 scores.

We will have to implement a collision detection to make the Obstacle class work. Also the SFML and BOX2D libraries provide efficient physics and object-drawing capabilities which will be used to implement different features for the game.

Work delegation:

Oskari - Game physics

Veera - Visuals

Markus - Level designs and testing

Paavo - Movement of the vehicle & screen

Introduction

Goal of the project: implement a 2D side-scroll driving/racing game, similar to the games like Elasto Mania.

The player drives a motorized vehicle through an obstacle course while trying to reach the finish line in time and/or in one piece. Player can collect tokens along the way and/or do cool stunts to collect more points. There are obstacles such as steep hills, jumps, water, quicksand, sinkholes, that the player should avoid and survive. Failing, i.e dying, typically means the track is reset and all points are lost.

The game has very simple rules, but as in any well-crafted game, the player's points should correlate with their skills.

This project subject does not require you to make a clone of an existing game, but to implement a one with the same general idea.

Minimum Requirements

All of these are obligatory!

- Basic graphics. The "camera" follows the vehicle as it moves sideways.
- At least 1 vehicle with realistic behaviour, for example:
- Tires have limited friction.
- Engine has limited power/torque.
- Not enough velocity & too steep a hill -> you'll fall backwards.
- The vehicle may get stuck on an obstacle.
- Controlling the vehicle with keyboard (at least accelerate/decelerate, tilt forwards/backwards).
- At least 3 game levels with increasing difficulty.

- Simple user interface that shows information such as points/time left, velocity.
- A list of high scores (decide yourself how to calculate points). High scores must be saved between game sessions!
- Fun and overall pleasant gaming experience.

Extra Requirements

- Sounds
- Better graphics: nice animations, detailed textures
- Temporary advancements for vehicle (in game, appear randomly), such as "turbo boosts"
- The vehicle can be tuned (better tyres, suspension, upgradeable engine)
- Different game modes: reach goal in time, collect all items, other kind of challenges
- Special freeride game mode with no goal; the level is generated on-the-fly by the computer.
- More, different vehicles with different dynamics
- User can import their own game levels
- Multiplayer mode (local or networked)
- Your own ideas for increasing the maximum fun!

Box2D: https://github.com/erincatto/Box2D
SFML: https://www.sfml-dev.org/