

Initial Plan

Project Title

Title: Racing Game for Android devices
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Module Number: CM3203
Module Title: One Semester Individual Project
Credits: 40

Project Description

The project that I have decided to develop is a 2D, top-down racing game for Android devices. A player will race against other computer players from one side of a city to the other, in a car.

The aim of the game is to beat the computer players to the finish line. The cars will simulate realistic car physics viewed in 2D, meaning they will be able to accelerate, steer, brake, when they collide with objects they will interact accordingly and when they travel on the grass they will slow down due to the reduced traction.

The city will essentially be a maze, which has roads that go in different directions as well as buildings as obstacles. Providing there is enough time the city will either be automatically generated using some procedural algorithm, or using map data (for example from Google Maps or OpenStreetMap) to create a city based on real locations.

The computer player will require some form of artificial intelligence so they are able to move around and eventually finish the level, the intelligence of the computer players will vary to make the game more enjoyable.

Project Aims and Objectives

Primary aims and objectives – These are the absolute minimum features that need to be implemented.

- Game should be compatible on at least Android 2.1, be able to resize and fit various screens sizes and use the touch screen to control the car.
- Cars should simulate real life physics in a 2D, i.e. friction, acceleration etc. in a top-down perspective.
- Map could be pre-generated with roads that go in all directions as well as buildings, pavements and grass. Cars will not be allowed to travel through buildings, but allowed to travel on pavements and grass.

Secondary aims and objectives – These will be the features that will be implemented provided there is enough time.

- Computer opponents should have some form of artificial intelligence for pathfinding and for interacting with other cars. They should not always race optimally, to give the human player a chance to win.
- Auto generate city using some form of procedural generation, or use external map data to create a course based on real locations and also allow users to create their own.
- Create an intuitive User Interface so that users can select a particular car and race.
- Sounds of the car accelerating, colliding and braking.
- Create traffic to give player and computer opponents more to think about.
- Implement some form of networked multiplayer, which allows two players to play against each other simultaneously (this will be implemented if automatic city generation or using external map data to create maps is unfeasible).

Work Plan

Week 1

- Draft Initial Plan.

Week 2

- Submit Initial Plan
- Do background work on programming racing games in Android, including physics, rendering, collision detection, map creation and pathfinding.
- Research games similar to mine and decide how to implement it, perhaps using a framework to simplify the process or by other means. Use this research to begin writing the Introduction and Background of Final Report.
- Research User interface and design how screens should look once complete.

Week 3

- Draw/get assets required to make game appealing.
- Download and install relevant programs on computer e.g. Eclipse and Android Development Tools, start to write the Approach and Implementation for the final report.
- Finalise whether a framework is necessary, if it is then compare and contrast the ones available. Pick the most suitable one and identify the features that it possesses, then begin learning basics of how to use it (all this will be documented).
- Research and document car physics and map creation in depth and begin coding basic components of game (essentially all the primary objectives), the car and its movement, a basic city and on screen controls to move the car.

Week 4

- Research whether to automatically generate or use data from external sources to generate a city, if unfeasible research networked multiplayer. Document findings and justify the chosen method to implement.
- Continue coding basic components of the game

Week 5

- Finish coding basic components of game and schedule meeting with supervisor to discuss progress.
- Research artificial intelligence and pathfinding techniques (in depth) for computer controlled cars.

Week 6

- Begin implementation of artificial intelligence, continually test and document progress.

Week 7

- Finish implementation of artificial intelligence.

Week 8

- Implement procedural map generation or external map data course (or networked multiplayer)
- Organise another meeting with supervisor to discuss progress.

Week 9

- Implement new map (or networked multiplayer).

Week 10

- Implement user interface; that is the main menu, car selection and game screen. Also implement sounds and traffic and do some project clean-up.

Week 11

- Begin Results and Evaluation for Final Report. Evaluation will consist of user testing and playing the artificial intelligence against each other, to see how they progress.

Easter Holidays

- Reflect on the project and how the methods used could be improved and consider future work. Include this in the Final Report, which should be finished at the end of the holidays.

Week 12

- Submit Final Report.