LabWars

LCOM 2019/20 final project - Specification

T5G03

up201806429@fe.up.pt Diogo Miguel Ferreira Rodrigues

up201806554@fe.up.pt Telmo Alexandre Espirito Santo Baptista

25/11/2019

Table of contents

1 Description

This project consists of a shooting game in a walled map, where players watch the map from above and have their visibility restricted to their field of view.

The game will have several modes (single player, cooperative, deathmatch, zombie 1player and 2players), where each mode might have different rules and goals.

Bullets have a travel time and deal a certain amount of damage to the entities they hit. All entities have a certain health, corresponding to the total damage they can withstand before perishing.

Entities have a roughly circular *body*, meaning

1. A bullet is considered to hit an entity if it touches its body.
2. Entities take up space in the map, thus making it impossible to have two entities too close to each other.

1.1 Autonomous opponents

On some of the modes, players will have to face autonomous opponents, which will abide to one of the following behaviours:

- Walk around the map in a pre-programmed fashion, shooting at players on sight.
- More sofisticated ways to oppose players, by using some heuristics, the simplest of which is to follow the player after he is detected, and if not on sight trying to guess where the player is.

1.2 Single player

In single-player mode, the goal is to eliminate all autonomous opponents. Additional prizes are awarded for time limits and health at the end of the match.

1.3 Two players

In two players mode, there are three possible sub-modes.

Cooperative

In cooperative mode, two players have to eliminate all autonomous opponents. There is friendly fire, which results in a penalty for the infringing player.

If one of the players loses all his health, he is *downed*, meaning he may not move or shoot but may be revived by the other player, given the other player performs the proper key presses when close enough to the downed player.

Deathmatch

In deathmatch mode, two players face each other, the last to die wins.

1.4 Zombie

In zombie mode, one or two players have to survive multiple zombie waves of increasing difficulty. In this mode visibility is not limited. Zombies spawn from specific locations on the boundary of the map, and they know exactly where the one or two players are.

Depending on the success of the implementations, zombies will either move randomly or take the shortest path to the closest player. Zombies attack players with short range attacks.

2 Modules

2.1 Timer (`timer`)

Module to be developed by Telmo Baptista (this module is almost fully-implemented in lab works).

Roles	Manage screen refresh rate.
Functionalities	Timer periodic interrupts.

2.2 KBC

2.2.1 Keyboard (`kbd`)

Module to be developed by Telmo Baptista (this module is partially implemented in lab works).

Roles	Filling text fields. In-game pause, other options, character movement.
Functionalities	Keyboard in interrupt mode.

2.2.2 Mouse (`mouse`)

Module to be developed by Telmo Baptista (this module is partially implemented in lab works).

Roles	Menu items selection. In-game weapon aiming.
Functionalities	Mouse buttons and movement in interrupt mode.

2.3 Graphics (`graph`)

Module to be developed by Diogo Rodrigues (this module is partially implemented in lab works).
This module will include a generic interface to handle graphics and drawing.

Roles	Graphics display on menus and in-game.
Functionalities	Video Card in graphic mode with direct color encoding, dynamic updating of VRAM/screen.

2.4 Real time clock (`rtc`)

Module to be developed by Telmo Baptista.

Roles	Score dates. In-game time since the beginning of the match.
Functionalities	Use of the RTC functionalities needed to implement the requirements stated in the role of the device.

2.5 UART (`uart`)

Module to be developed by Diogo Rodrigues.

Roles	Two-player matches in distinct physical computers.
Functionalities	Point-to-point communication between two computers.

2.6 Menus (`menu`)

Module to be developed by Telmo Baptista.
This module will include all menus of the game.

2.7 Entities (`ent`)

Module to be developed by Diogo Rodrigues.
This module will include all implementations related to the entities, namely health, weapons, damage, movement algorithms, etc.

3 Development plan

Bottom-up primarily.

3.1 1st week

Diogo will be working mainly on the graphics, such as:

1. Design the main map, differentiating walls and ground to then implement collision.
2. Design sprites for the characters.
3. Work on animation of sprites, simple movement on the xOy plane.
4. Work on the rotation of characters.

Telmo will be focused on the player input that will command the movement.

1. Work on the keyboard controls that will be the main movement of character.
2. Work on mouse controls which will be used to shoot.
3. Work on mouse movement that will be used for rotation of the characters.

So each member will be focused on a different set of drivers, thus reducing dependence between each others' parts (modularity) and allowing parallel development.

3.2 2nd week

Diogo will be working mainly on the creation of entities for the game:

1. Implement collision boxes.
2. Add basic entities to use collision boxes.
3. Basic game dynamic (game events), such as being shot and hitting walls preventing movement.

Telmo will be focused on the integration of past week work.

1. Integration of the character movements with the user controls.

3.3 3rd week

Diogo will be mainly finishing and improving entity dynamics.
Telmo will be focused on the menus.

3.4 After demo

Revision of the development plan to fulfill the project needs.
Add in-game time.
Improve entities interaction.
Work on the communication between computers, to implement two-player modes.