ECM2434 Software Engineering
Continuous Assessment
Guitar Zero Live

February 2019

This document outlines the assessment structure and submission requirements for the ECM2434 Group Software Engineering Project module, before setting out the requirement.

1 Assessment

1.1 Groups

This assessment is to be carried out by groups of students completing and combining tasks to produce a single shared product. Individual students will be assigned to groups before work commences, and will remain in these groups throughout.

1.2 Sprints

There are three assessment points for each group:

1. *Sprint 1* (30%): **Friday February 22nd 2019** (Week 6);
2. *Sprint 2* (30%): **Friday March 8th 2019** (Week 8);

3. *Sprint 3* (30%): **Friday March 22nd 2019** (Week 10);

A sprint submission consists of:

- a snapshot of the group Kanban board (process);
- a snapshot of the group source code (product);
- a showcase of the group source code (product).

The Kanban board should be a chart divided into four columns: *Backlog*, *Specification*, *Implementation* and *Validation*. It clearly identifies group members and the tasks they are undertaking. The source code snapshot is all of the Java source code needed to build the product that clearly identifies which group members wrote which code. Coding conventions should be as outlined in the *Google Java Style Guide*. The showcase is a short film in MP4 format that gives a good idea of how the product operates — no more than one minute per group member.

Each sprint submission should be made both electronically using the Harrison E-submit system, and on paper by BART. The electronic submission consists of a single ".zip" file for the group, whose name is of the form "`Group`X`Sprint`Y`.zip`' [1]. The paper submission consists of BART sheets for all group members attached to a confirmation that the electronic submission has been successful.

A group member's sprint mark is based on their contribution to the snapshot of the group Kanban Board (for 20%), their contribution to the snapshot of the group source code (for 60%), and their contribution to the showcase of the group source code (for 20%).

1.3 Peer Assessment

At the the same time as the final sprint is submitted, each group member will be asked to anonymously rate the contribution of every other group member to the project (but not themselves). These ratings will be submitted separately by BART, and will be used to calculate a peer assessment mark. The peer assessment mark is worth 10% of the module mark.

2 Requirement

The requirement is to implement a simplified version of the game Guitar Hero Live called Guitar Zero Live. This game allows players to simulate playing lead, rhythm and bass guitars on a variety of rock music tracks.

[1] Please use the traditional ZIP format, rather than other formats such as 7Zip, GZIP, BZIP2, etc.

2.1 Overview

The Guitar Zero Live controller is a plastic guitar, which has an *escape button*, a *bender button*, a *whammy bar*, a *zero power button*, a *strum bar*, and six *fret buttons* arranged in two rows of three, the black ones above the white ones. See Figure 1.

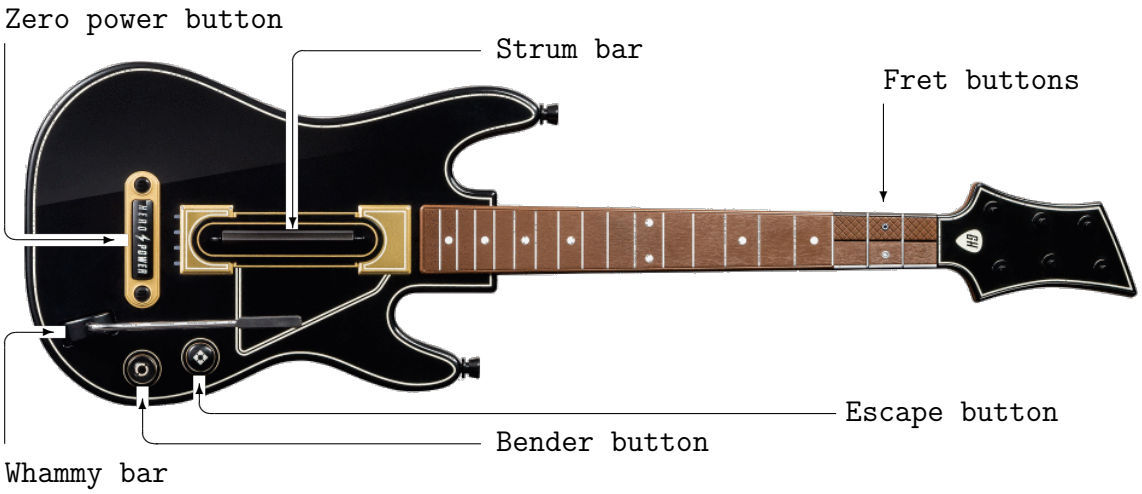

Figure 1: The controller.

The Guitar Zero Live screen is dominated by a guitar neck, called the *note highway*, displayed in the centre of the screen. See Figure 2. The note highway is divided into three *lanes*, in which black and white guitar picks, called *notes*, may be displayed. A *fret board* is displayed at the bottom of the note highway. A *streak count* is displayed at the top of the note highway, and *in-game currency units* and a *score count* at the bottom left of the note highway. Some *cover art* is displayed at the top left of the screen. At times, a *multiplier roundel* may be displayed on the left of the note highway, and a *zero power shield* may be displayed on the right of the note highway.

2.2 Store Manager Mode

In **Store Manager Mode**, the store manager can create a *bundle* and make it available in the Guitar Zero Live store. See Figure 3. A bundle is an archive in ZIP format. The archive is named after the title of a music track, and contains three files. The first file is the music for the track, stored in Musical Instrument Digital Interface (MIDI) format. The second file is the cover art for the track, stored in Portable Network Graphics (PNG) format. The final file is the notes file for the track, stored in a proprietary format. The notes file is automatically derived (here) from the most significant guitar part, or the closest thing to a guitar part, in the MIDI file, and describes the notes to be displayed on the note highway during game play. Once complete, the bundle is saved on the Guitar Zero Live server running the store.

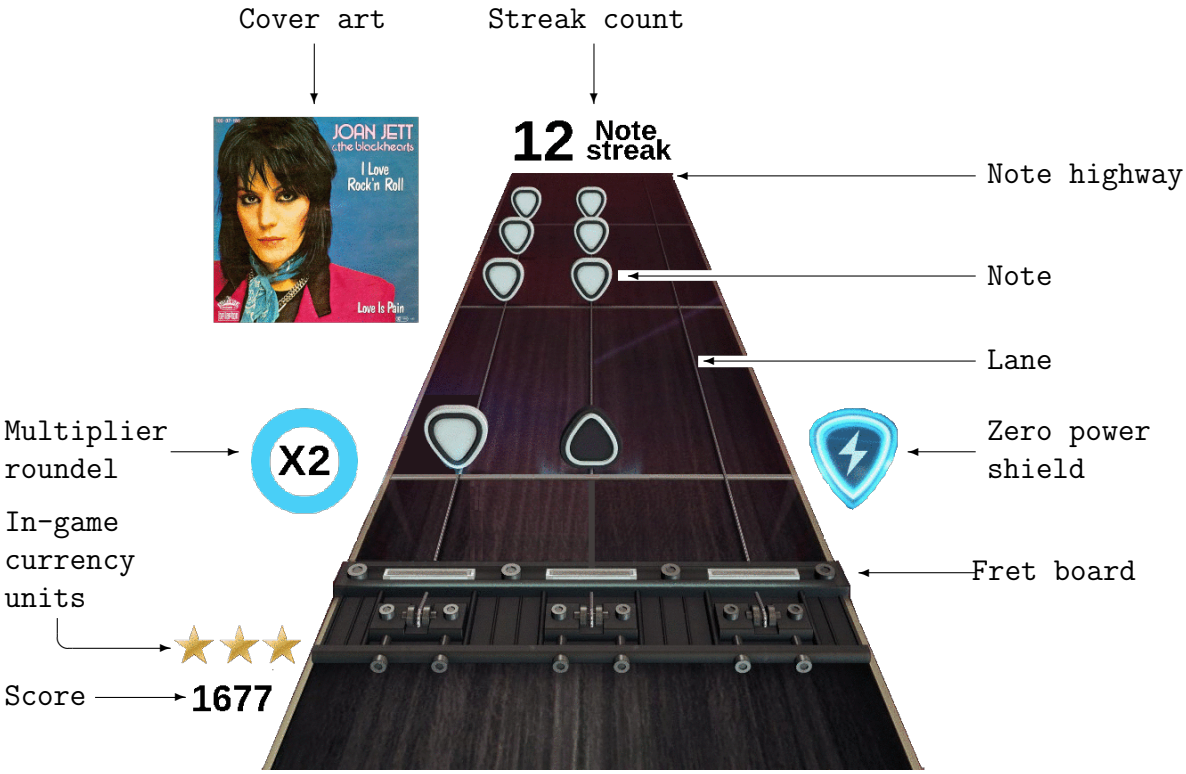

Figure 2: Game play.

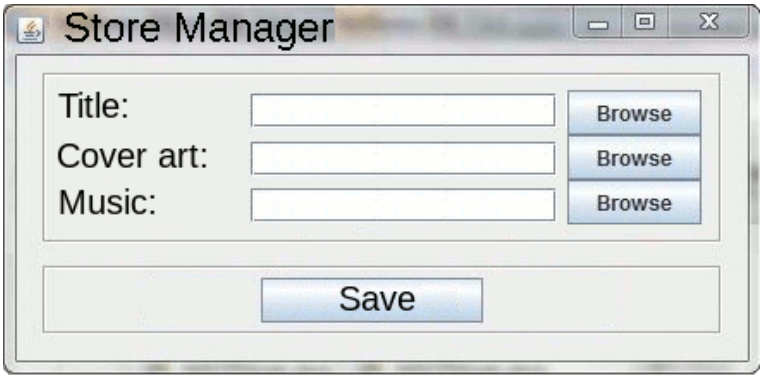

Figure 3: Store Manager Mode.

Note that **Store Manager Mode** is a *pseudo mode* that provides a tool to maintain the Guitar Zero Live store. This tool is used only on the Guitar Zero Live server running the store.

2.3 Slash Mode

Initially, the Guitar Zero Live game is in the top, root mode of the game, called **Slash Mode**. In **Slash Mode**, the note highway is displayed and a carousel of game modes is superimposed on it. See Figure 4. The carousel displays game mode icons and names,

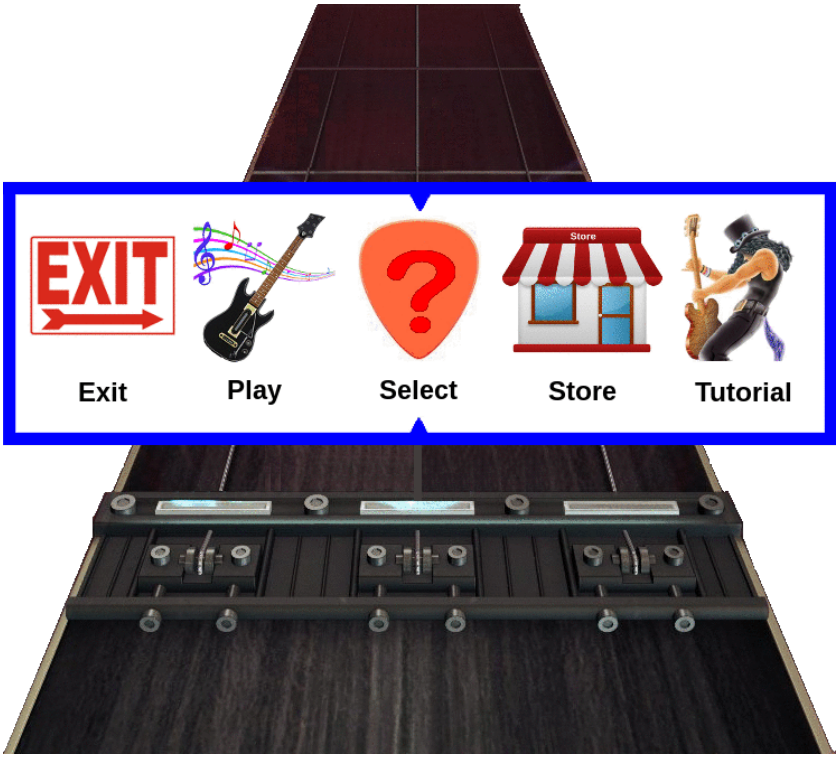

Figure 4: Slash Mode.

and is ordered alphabetically by name. All game modes are displayed, with the *intended game mode* in the middle.

The zero power button, strum bar and escape button are enabled. All other bars and buttons are disabled.

In this mode, when the strum bar is tweaked up or down, the carousel cycles forwards or backwards. In this mode, when the zero power button is pressed and the intended game mode is "`Exit`", the game ends; when the intended game mode is "`Select`", the game continues to **Select Mode** (see Section 2.4); when the intended game mode is "`Play`", the game continues to **Play Mode** (see Section 2.5); when the intended game mode is

"`Store`", the game continues to **Store Mode** (see Section 2.6); and when the intended game mode is "`Tutorial`", the game continues to **Tutorial Mode** (see Section 2.7). In this mode, when the escape button is pressed, the game continues in **Slash Mode** (see Section 2.3).

2.4 Select Mode

In **Select Mode**, the note highway is displayed and a carousel of purchased bundles is superimposed on it. See Figure 5. The carousel displays bundle cover art and titles, and

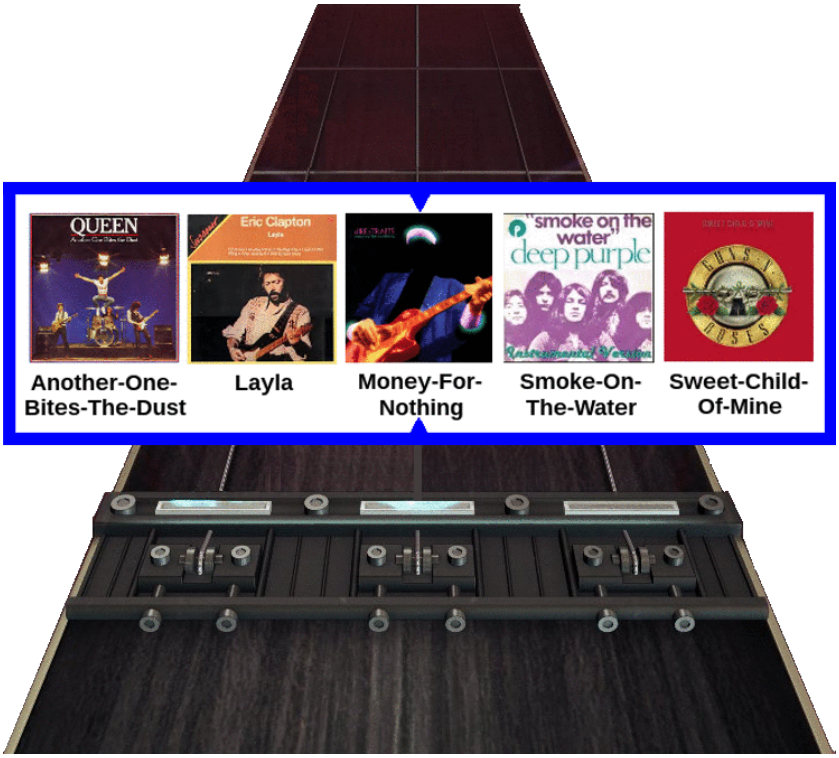

Figure 5: Select Mode.

is ordered alphabetically by title. Only five bundles are displayed at a time, with the *intended bundle* in the middle. Purchased bundles are stored on the Guitar Zero Live client running the game, along with the three free bundles that initially came with the game.

The zero power button, strum bar and escape button are enabled. All other bars and buttons are disabled.

In this mode, when the strum bar is tweaked up or down, the carousel cycles forwards or backwards. In this mode, when the zero power button is pressed, the intended bundle becomes the current one, and the game continues in **Slash Mode** (see Section 2.3). In

this mode, when the escape button is pressed, the game continues in **Slash Mode** (see Section 2.3).

2.5 Play Mode

In **Play Mode**, the note highway is displayed along with the cover art from the current bundle. The streak count, in-game currency units and score are displayed, and a multiplier roundel or a zero shield may also be displayed. See Figure 6.

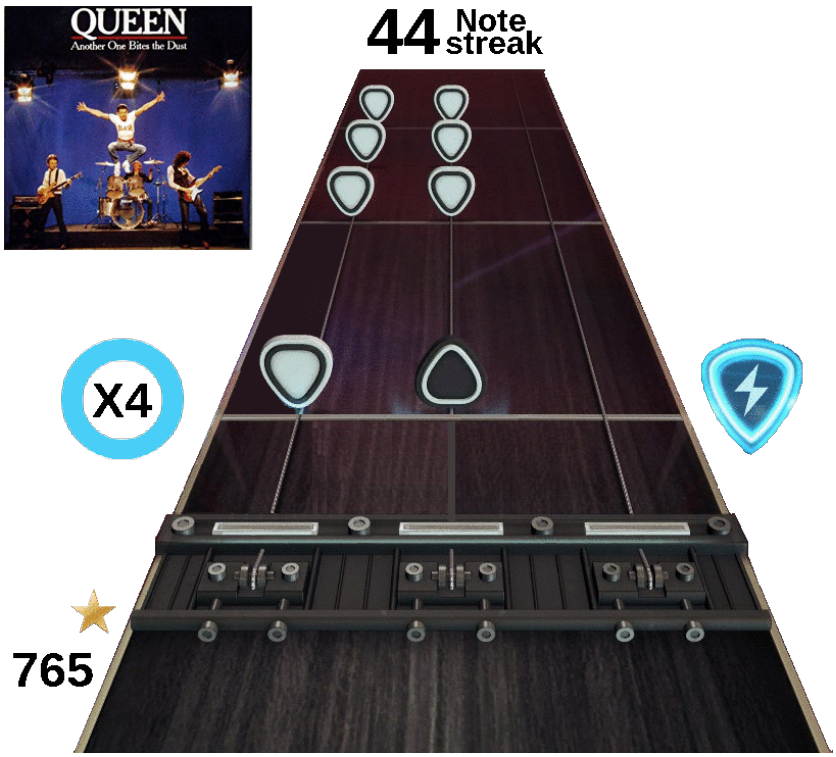

Figure 6: Play Mode.

All bars and buttons are enabled.

In this mode, the music from the current bundle is played, while the notes described in its notes file flow down the note highway lanes, so that the notes arrive at the fret board in time with the music. As the notes arrive the fret board, the player either *collects* them or *drops* them. A note is collected by pressing the fret button corresponding to the lane and the colour of the note, while tweaking the strum bar down or up at the same time. As the player collects notes, their *score* (initially zero) increases according to the value of the notes, and their *streak count* (also initially zero) increases according to the number of notes that they have collected in a row. The value of a note is weighted by the *multiplier* (initially one). Every time the streak count reaches another multiple of ten (10, 20, 30,

. . .), the multiplier doubles (2, 4, 8, . . .). Every time the score reaches another multiple of 500, another unit of *in-game currency* (initially zero) is awarded, up to a maximum of five units. The multiplier roundel is only displayed when the multiplier is greater than one. At certain musical high points described in the notes file, *zero power* is enabled, meaning that notes are now collected by either slapping the zero power button, fiddling with the bender button, or waving the whammy bar up and down instead of tweaking the strum bar up and down. The zero power shield is only displayed when zero power is enabled. In this mode, when the escape button is pressed, the game continues in **Slash Mode** (see Section 2.3).

2.6 Store Mode

In **Store Mode**, the note highway is displayed and a carousel of available bundles is superimposed on it. Any in-game currency units awarded are also displayed. See Figure 7. The carousel displays bundle cover art and titles, and is ordered alphabetically by

Figure 7: Store Mode.

title. Only five bundles are displayed at a time, with the *intended bundle* in the middle. Available bundles are stored on the Guitar Zero Live server running the store.

The zero power button, strum bar and escape button are enabled. All other bars and buttons are disabled.

In this mode, when the strum bar is tweaked up or down, the carousel cycles forwards or backwards. In this mode, when the zero power button is pressed and there is at least

one unit of in-game currency available, the intended bundle is purchased by decreasing the units of in-game currency available by one, before downloading the bundle from the Guitar Zero Live server over the network and storing it on the Guitar Zero Live client. The game then continues in **Slash Mode** (see Section 2.3). In this mode, when the escape button is pressed, the game continues in **Slash Mode** (see Section 2.3).

2.7 Tutorial Mode

This work package should not be attempted by a team of four students.

In **Tutorial Mode**, the note highway is displayed. See Figure 8. The cover, streak count,

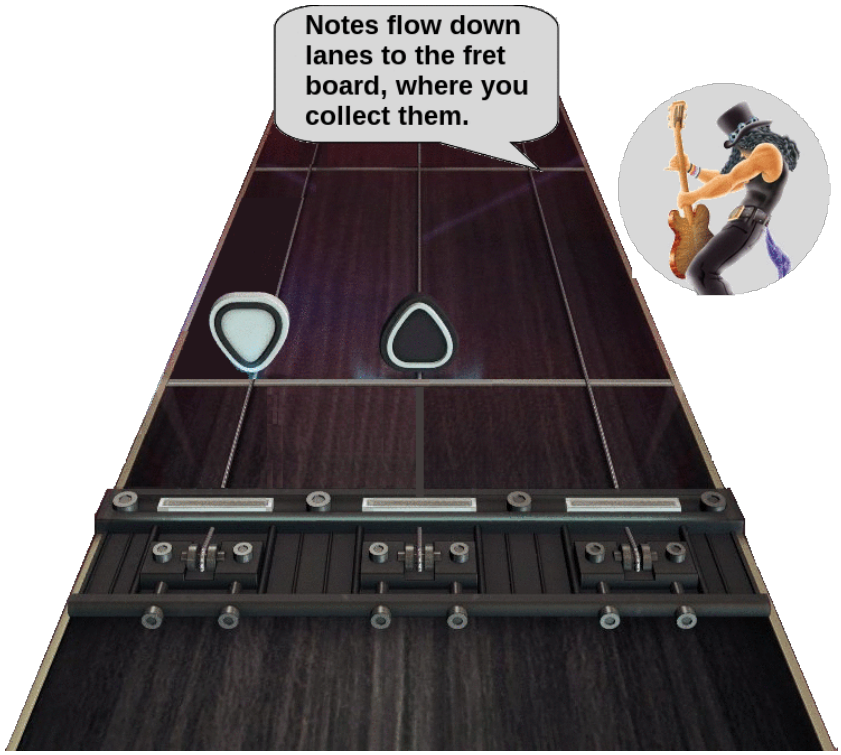

Figure 8: Tutorial Mode.

in-game currency units and score may be displayed, and a multiplier roundel or a zero shield may also be displayed.

All bars and buttons are enabled.

In this mode, as the zero power is pressed, successive tutorial steps are displayed to show how the game is played. In this mode, when the escape button is pressed, the game continues in **Slash Mode** (see Section 2.3).

Appendix A: Using the Guitar Controller in Java

In order to complete this assessment, each group will need a plastic guitar controller. These controllers will be available from Laver 816. Each team should customise their controller using tape, stickers or paint to reflect their identity. This appendix describes how to use the plastic guitar controller in Java.

Download the "`PlasticGuitar.zip`" file from from the ELE server, and unzip it.

After inserting two AA batteries and pairing the plastic guitar controller with its dongle, as detailed in the leaflet that comes with the controller, it may be tested with the following commands that depend on operating system being used.

Linux

On Linux, four commands are needed.

```
CLASSPATH=jinput-2.0.9.jar:.
export CLASSPATH
javac PlasticGuitar.java
java -Djava.library.path=. PlasticGuitar
```

Tested Sunday 20th January 2019, Harrison Blue, Linux (version 3.10.0-862.3.2.el7.x86_64).

OSX

On OSX, four commands are needed.

```
CLASSPATH=jinput-2.0.9.jar:.
export CLASSPATH
javac PlasticGuitar.java
java -Djava.library.path=. PlasticGuitar
```

Tested Sunday 20th January 2019, Harrison 204, macOS (version 10.12.2).

Windows

On Windows, three commands are needed.

```
set CLASSPATH=jinput-2.0.9.jar;.
javac PlasticGuitar.java
java -Djava.library.path=. PlasticGuitar
```

Tested Sunday 20th January 2019, Harrison 208, Windows 10 (version 1803).

Tested Sunday 20th January 2019, Harrison Red, Windows 7 (version 6.1).