Development and Testing

Table of Contents

[Chapter Three: Development and Testing 2](file:///C:\Users\Aissa\Desktop\Project%20Template%20New%202020\NEW%20Developmenet%20and%20testing%20Template.docx#_Toc36797623)

[3.1 Introduction 3](#_Toc36797624)

[3.2.1 Stage 1: Building the Database 3](#_Toc36797625)

[3.2.1.1 SQLITE + Python Code 3](#_Toc36797626)

[3.2.1.2 Testing Databases 3](#_Toc36797627)

[3.1.3 Feedback from Stakeholder (if appropriate) 4](#_Toc36797628)

[3.1.4 Review and Corrections 4](#_Toc36797629)

[3.2.2 Stage 2: Building Log in 4](#_Toc36797630)

[3.2.2.1 The Code for Log in section (including validation) 4](#_Toc36797631)

[3.2.2.2 Testing Log in section (including validation) 4](#_Toc36797632)

[3.2.2.3 Feedback from Stakeholder (if appropriate) 4](#_Toc36797633)

[3.2.2.4 Improvements and Corrections 4](#_Toc36797634)

[3.2.3 Stage 3: Building …….. PART THREE …. 5](#_Toc36797635)

[3.2.3.1 Code for …Part THREE … including validation 5](#_Toc36797636)

[3.2.3.2 Testing …. Part THREE ….including validation 5](#_Toc36797637)

[3.2.3.3 Feedback from Stakeholder (if appropriate) 5](#_Toc36797638)

[3.2.3.4 Improvements and Corrections 5](#_Toc36797639)

[3.2.3 Stage 4: Building …….. PART FOUR …. 6](#_Toc36797640)

[3.2.3.1 Code For … part FOUR… (including validation) 6](#_Toc36797641)

[3.2.3.2 Testing …. Part FOUR ….including validation 6](#_Toc36797642)

[3.2.3.3 Feedback from Stakeholder (if appropriate) 6](#_Toc36797643)

[3.2.3.4 Improvements and Corrections 6](#_Toc36797644)

[3.2.4 Stage 2: Building …….. PART FIVE …. 7](#_Toc36797645)

[3.2.4.1 Code for … Part FIVE… including validation 7](#_Toc36797646)

[3.2.4.2 Testing …. Part FIVE ….including validation 7](#_Toc36797647)

[3.2.4.3 Feedback from Stakeholder (if appropriate) 7](#_Toc36797648)

[3.2.4.4 Improvements and Corrections 7](#_Toc36797649)

[3.3 Final Improvements and Corrective Actions 7](#_Toc36797650)

# Chapter Three: Development and Testing

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## 3.1 Introduction

When programming my project, I will use a modular approach. This means I will use the fact that I have decomposed the project into many smaller sections and I will first test each of these sections or modules separately. In the code, each module can import other modules, when necessary, in order to be able to run a function from another module. This approach allows for reusability of code and also improves the readability and ease of editing the code.

I will use sqlite3 in order to build by database. This will mean the database is stored locally on one machine rather than on an online server. This makes it more suitable for a low number of users or even a single user. Because my project is single-player and is not an online game, it is not important that the database can only be accessed from one device.

I have decided to use Python 3.1, because it is the programming language that I feel the most comfortable with. There is also a wide range of libraries available, some of which will be used frequently in my game.

I will use Tkinter for the login part of the project as well as displaying popup messages. This allows me to create a user-friendly, visually appealing interface that the user will use to log in as well as displaying error messages.

For creating my game, I have decided to use Pygame. This will allow me to display the GUI for the space game as well as displaying the game’s menus such as the highscore menu. Pygame is suited for my project because it allows for creation of sprites that are flexible and can be displayed on screen when needed. It also allows the player to input and control their character in the game using the keyboard.

I will use the bcrypt library which will allow me to hash and salt the passwords of users that are stored in the database. This will improve the security of the system.

When testing the project, I will use unittest in order to do automatic testing rather than manual testing. This will improve the efficiency when testing and allow modules to be tested quicker.

##### Modules

|  |  |  |  |
| --- | --- | --- | --- |
| Module name | Purpose | Relevant Design section | Development section |
| Admincontrol.py | Provides the UI for an admin to create or delete users |  |  |
| colour\_changer.py | Changing the colour hue of an image |  |  |
| dates.py | Handles getting the dates needed for storing a score |  |  |
| game.py | Main game module, runs the game GUI |  |  |
| HighscoresData.py | Connects to the database in order to read or edit scores |  |  |
| login.py | Provides the UI for a user to log in |  |  |
| LoginData.py | Connects to the database in order to read or edit user details |  |  |
| main\_app.py (Top-level module) | Starts the initial login window |  |  |
| messages.py | Displays Tkinter popup messages for error handling |  |  |
| settings.py | Manages editing games settings that are saved to a text file |  |  |
| sprites.py | Contains all sprite classes that are used in game.py |  |  |
| testing.py | Runs unit tests on each module |  |  |
| validation.py | Used anytime data must be validated |  |  |

## 

## 3.2.1 Stage 1: Building the Database

### 3.2.1.1 SQLITE + Python Code

1. **def** create\_table():
2. con = sqlite3.connect("LoginScores.db")
3. con.execute('''CREATE TABLE IF NOT EXISTS Users
4. (Username VARCHAR PRIMARY KEY NOT NULL,
5. **Password TEXT NOT NULL);''')**
7. con.execute('''CREATE TABLE IF NOT EXISTS Admins
8. (Username VARCHAR PRIMARY KEY NOT NULL,
9. Password TEXT NOT NULL);''')
10. ***# add initial data***
11. hashable\_pw = bytes("K75x6Wa1WYKO", encoding='utf-8')
12. con.execute('''insert into Admins (Username, Password) values (?, ?)''',
13. ("AdminLouis\_0001", bcrypt.hashpw(hashable\_pw, bcrypt.gensalt())))
14. con.commit()
15. **con.close()**

### 3.2.1.2 Testing Databases

### 3.1.3 Feedback from Stakeholder (if appropriate)

### 3.1.4 Review

## 3.2.2 Stage 2: Building Log in

### 3.2.2.1 The Code for Log in section (including validation)

### 3.2.2.2 Testing Log in section (including validation)

### 3.2.2.3 Feedback from Stakeholder (if appropriate)

### 3.2.2.4 Review

## 3.2.3 Stage 3: Building …….. PART THREE ….

### 3.2.3.1 Code for …Part THREE … including validation

### 3.2.3.2 Testing …. Part THREE ….including validation

### 3.2.3.3 Feedback from Stakeholder (if appropriate)

### 3.2.3.4 Review

## 3.2.3 Stage 4: Building …….. PART FOUR ….

### 3.2.3.1 Code For … part FOUR… (including validation)

### 3.2.3.2 Testing …. Part FOUR ….including validation

### 3.2.3.3 Feedback from Stakeholder (if appropriate)

### 3.2.3.4 Review

## 3.2.4 Stage 2: Building …….. PART FIVE ….

### 3.2.4.1 Code for … Part FIVE… including validation

### 3.2.4.2 Testing …. Part FIVE ….including validation

### 3.2.4.3 Feedback from Stakeholder (if appropriate)

### 3.2.4.4 Review

## 3.3 Final Review, Improvements and Corrective Actions