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Analysis

1.1 Description of Problem

Description of problem

I plan to develop a quiz about popular films and TV shows. The player will enter their name before starting the game so that they can appear on a leaderboard. The player will select their difficulty level from the buttons, deciding how much of a challenge they want and will be asked 10 random questions based on their answer. These questions will be different every time you play and multiple-choice buttons, getting 5 points if they are correct and minus one point if they're incorrect. I will also give the players a choice to skip a question if they don't know the answer, but they can only use this once. After the 10 questions have been answered, a leaderboard will be displayed at the end. In the case of a tie, the players will get asked random questions until somebody is right and the other is wrong.

The end-users of this quiz will be S1-6 students who have an interest in film and tv and want to test their knowledge and have fun.

My project meets the advanced higher computing requirements as my project will:

1. Completed in java and integrated with SQL.
2. I will work with stored data within a database for my leaderboard, using a 2D array and bubble sort.
3. My interface will be easy to understand and fit end-users from s1 to s6.
4. I will validate all my inputs.

1.2 Constraints

Constraints

There are many economic, technical and time constraints that will affect my project.

1. I will have to have my project completed for SQA by April 7th, 2023, so it can be sent to mark.
2. My project will have no cost implications as the software I intend to use is free.
3. I will use java and SQL to complete my project as I have many years' experiences using it.
4. I will follow copyright laws if copying quiz questions online.
5. I will input fake data, so I don't have to follow GDPR regulations.

1.3 Requirement Specification

Functional Requirements

Inputs

1. User will select what page they would like to go to.
2. The user will say if they understand the rules.
3. The user will enter their username.
4. The user will select their difficulty level.
5. User will select their answer.
6. User can select to skip a question.
7. User will select if they would like to check the leaderboard.
8. User will select their next page.

Process

9. Validate all inputs.
10. Generate 15 random questions from selected difficulty level.
11. Add and subtract points to/from total score.
12. Check if user has already skipped question.
13. Add users score and name to leaderboard.
14. Sort leaderboard from highest to lowest score.

Output

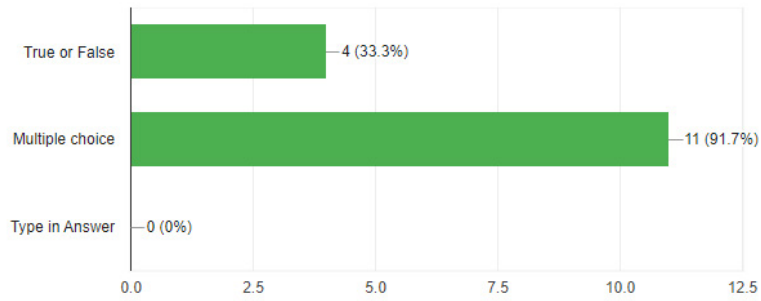
15. Display welcome message.
16. Display selected pages.
17. Display error messages.
18. 15 questions will be displayed with 3 answers to choose from.
19. Display if the answer is right or wrong.
20. Display users total score.
21. Display leaderboard with matching scores and usernames.

End-User Requirements

What style of questions would you like?

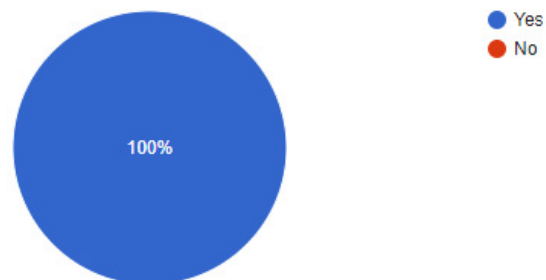
 Copy

12 responses



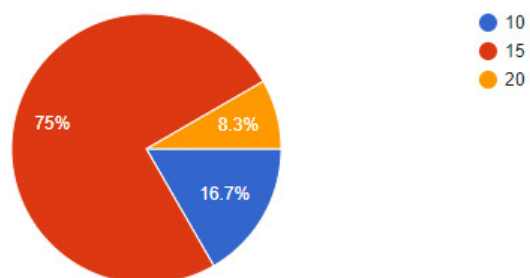
Would you like different difficulty levels?

12 responses



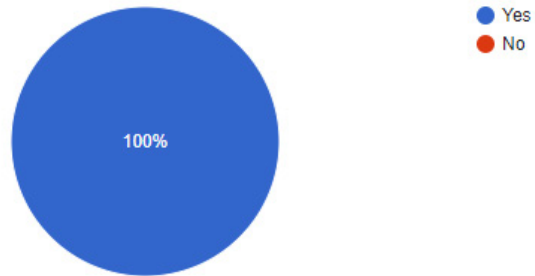
How many Questions should there be?

12 responses



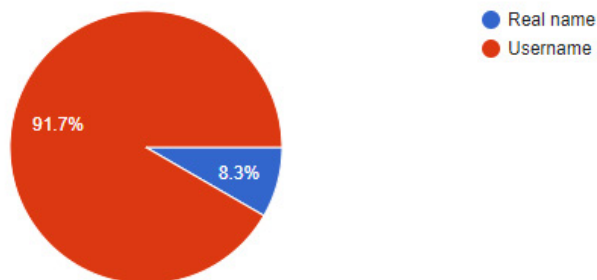
Do you want different questions every time you play?

12 responses



What name do you want to enter?

12 responses



Do you want the option to skip a question?

12 responses



Summary

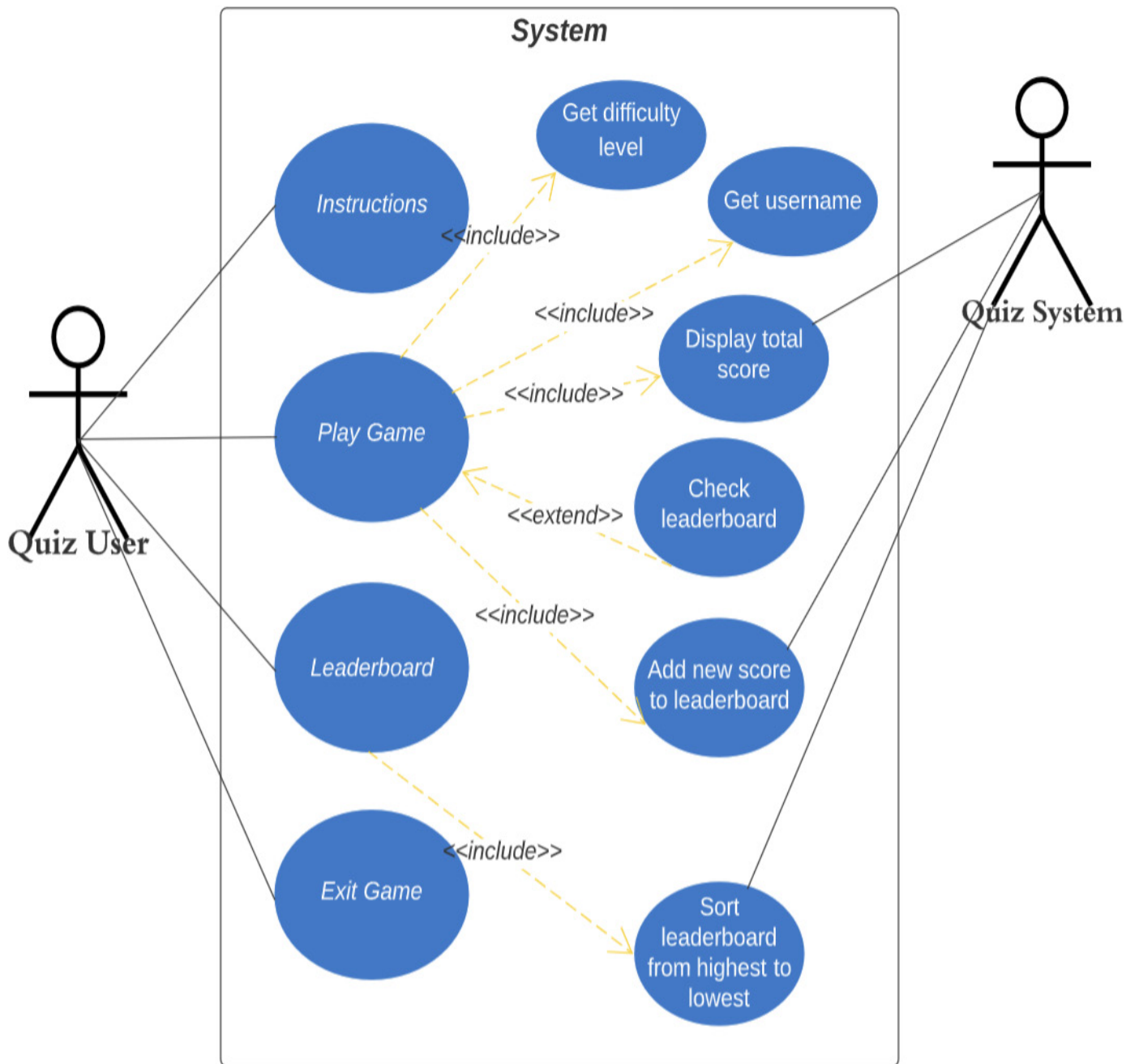
Based on the results of my survey I have decided on the following user requirements.

1. The user should be welcomed to the game with a start screen.
2. The user should be able to view a leaderboard.
3. The user should be able to read the rules of the quiz.
4. The user should be able to exit the program.
5. The user must be able to enter a username before they begin the quiz.
6. The user must be able to select their difficulty level from easy, medium, and hard.
7. The user shall be asked 15 random questions.
8. The user should be asked a different set of questions each time they play.
9. The user must be able to select one answer from a choice of 3.
10. The user should be able to skip one question, but they can only use this once.

1.4 Project Plan

Week			Aug		Sept					Oct					Nov					Dec					Jan					Feb		
			3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	
Analysis	Investigate Requirements																															
	Description of Problem																															
	Constraints																															
	UML																															
	End User and Functional Requirements																															
	Project Planning																															
Design	Inputs, Processes and Outputs																															
	User Survey																															
	Java Pseudocode																															
	Data Dictionary																															
Implementation	Query Design																															
	Test Plan																															
	Database Design																															
Testing	Display welcome menu and validate option																															
	Instructions Page and validation																															
	Get difficulty level and validate																															
	Get username from player and validate																															
	Generate 15 random questions																															
	Get answer from user and validate																															
	Calculate Total Score																															
	Display and sort leaderboard																															
	Learn a new skill and add to program																															
	On-going testing																															
Evaluation																																
	Functional Requirements																															
	End user Requirements																															
	Full System																															
	Unexpected Inputs																															
	Test Case and Persons																															
Maintenance	Gathering evidence																															
Robustness																																
Fitness for Purpose																																

1.5 UML Case Diagram



Design

2.1 TLA & Refinements

Main Steps

1. Declare global variables
 2. Set up array of records
 3. Read in datafile
 4. Display Opening Message
 5. Get selected page and validate input OUT: vOption
 6. Display instructions
 7. Ask if they understand and validate input
 8. Get selected difficulty level from user and validate option OUT: userLevel
 9. Get username and validate
 10. Play game and validate user answers
 11. Display total score
 12. Ask if user wants to view leaderboard
 13. Update and sort database IN: username, totalPoints
 14. Display leaderboard
-
- 3.1 Display welcome message and page options
 - 3.2 Get vOption from user
 - 3.3 While vldMenu = false
 - 3.4 If vOption is between 1 and 4 then
 - 3.5 Set vldMenu to true
 - 3.6 Else display error message
 - 3.7 End else
 - 3.8 End while
 - 3.9 Return vOption
-
- 4.1 If vOption == 1 then
 - 4.2 Go to instructions()
 - 4.3 If vOption == 2 the
 - 4.4 Go to startGame()
 - 4.5 If vOption == 3 then
 - 4.6 Go to leaderboard()
 - 4.7 Else exit game
-
- 5 Display Instructions
 - 6.1 while goHome = false
 - 6.2 Display “Do you understand? YES or NO”
 - 6.3 Get understand from user and change to uppercase
 - 6.4 If understand is equals YES then
 - 6.5 Set goHome to true

```

6.6     Call displayOpeningMsg() method
6.7     Else if understand equals NO then
6.8         Display "Have another look at the rules, and then you can start to play!"
6.9     Else display "understand is not an option"
6.10    End else
6.11    End while

7.1    While vldLevel = false
7.2        Display difficulty options
7.3        Get userLevel from user
7.4        If userLevel is between 1 and 3 then
7.5            Set vldLevel to true
7.6            Display "You have selected option userLevel"
7.7        Else display error message
7.8        End else
7.9    End while
7.10    Return userLevel

8.1    While nameValid = false
8.2        Display enter username
8.3        Get username from user
8.4        If username contains an uppercase, lowercase & a number then
8.5            Set nameValid to true
8.6        Else display error message
8.7        End else
8.8    End while
8.9    Set aLeaderboard[5][1] to username

9.1    Repeat 15 times
9.2        Generate random number between 1-30 (easy), 31-60 (medium), or 61-90 (hard)
9.3        Set vldAnswer to false
9.4        Display questionsTable[randomInteger].Question
9.5        Display A. + questionsTable[randomInteger].Option1
9.6        Display B. + questionsTable[randomInteger].Option2
9.7        Display C. + questionsTable[randomInteger].Option3
9.8        If skip = 1 then
9.9            display D. Skip Question
9.10       End if
9.11       While vldAnswer = false then
9.12           Ask user for userAnswer
9.13           Get userAnswer from user and change to uppercase
9.14           If userAnswer equals A or B or C or D && skip = 1 then
9.15               Set vldAnswer to true
9.16           Else display error message
9.17           End else
9.18       Display userAnswer

```

```

9.19    Display correct answer
9.20    Convert to ascii
9.21    If useranswer is correct then
9.22        Add 5 points to totalPoints
9.23    If userAnswer = D then
9.24        Set skip to 0
9.25    Else subtract 1 point
9.26    End else
9.27    Set aLeaderboard[5][2] to Integer.toString(totalPoints)
10      Display totalPoints

```

```

11.1 While go2Leaderboard= false
11.2 Ask if user want to check leaderboard, YES or NO
11.3 Get go2Leaderboard from user and change to uppercase
11.4 If go2Leaderboard = yes
11.5     Set leave to true
11.6     Go to leaderboard()
11.7     If go2Leaderboard = no
11.8         1 Set leave to true
11.9 Go to procesGame()
11.10 Else display error message
12.1 Set n to 6
12.2 Set swapped to true
12.3 While swapped and n > 0 then
12.4     1 Set swapped to false
12.5     1 For i = 0 to n-1 do
12.6         Set vNum1 to Integer.parseInt(aLeaderboard[i][2])
12.7         1 Set vNum2 to Integer.parseInt(aLeaderboard[i+1][2])
12.8         1 If vNum1 is less than vNum2 then
12.9             1 Set temp to aLeaderboard[i][2]
12.10            1 Set aLeaderboard[i][2] to aLeaderboard[i+1][2]
12.11            1 Set aLeaderboard[i+1][2] to temp
12.12            1 Set temp to aLeaderboard[i][1]
12.13            1 Set aLeaderboard[i][2] to aLeaderboard[i+1][1]
12.14            1 Set aLeaderboard[i+1][1] to temp
12.15            1 Set swapped to true
12.16            1 End if
12.17        1 End for
12.18        1 Set n to n-1
12.19    1 End while

```

2.2 Integration Pseudocode

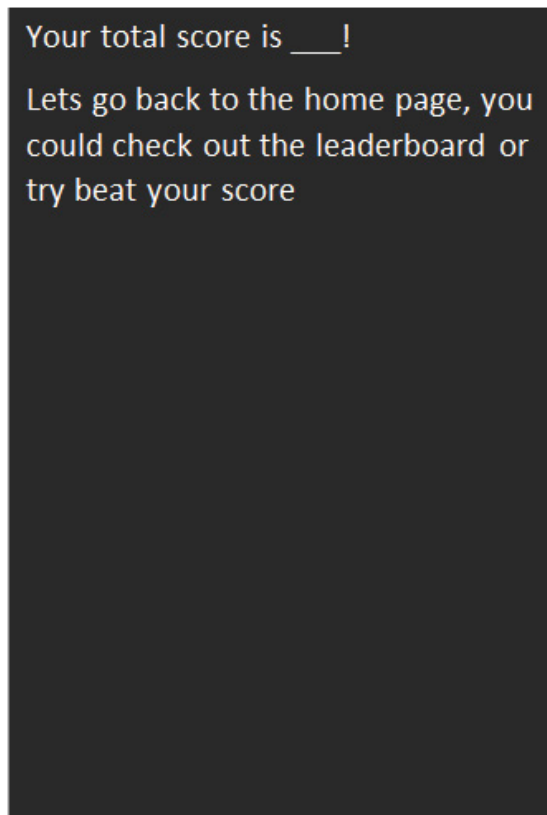
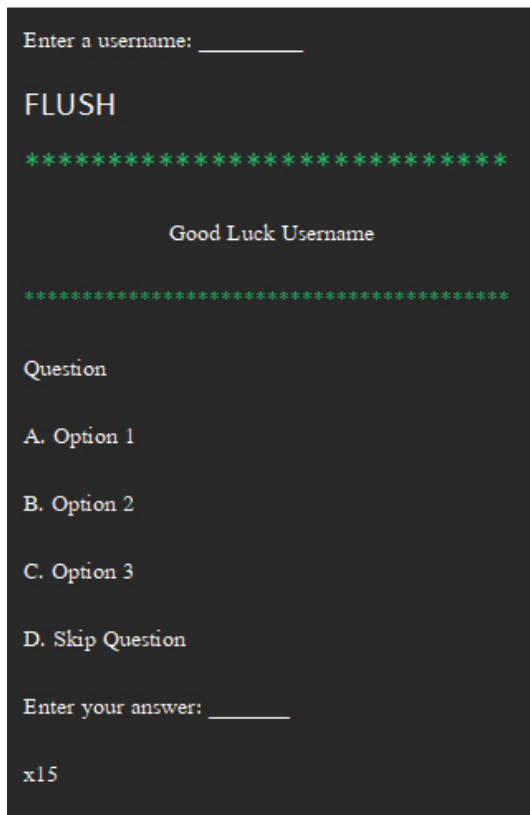
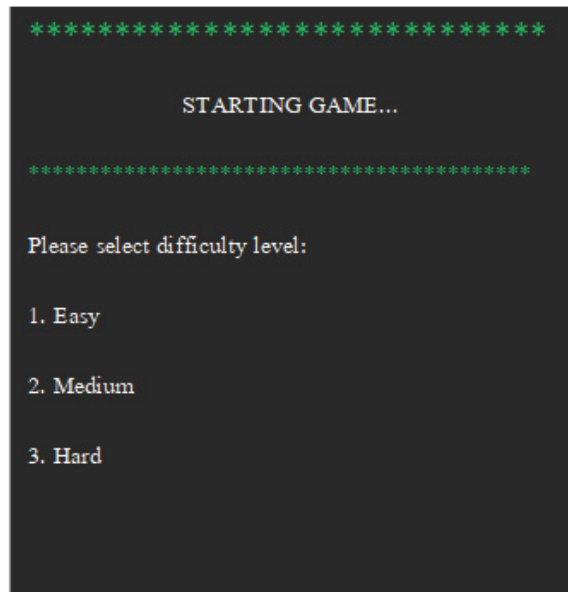
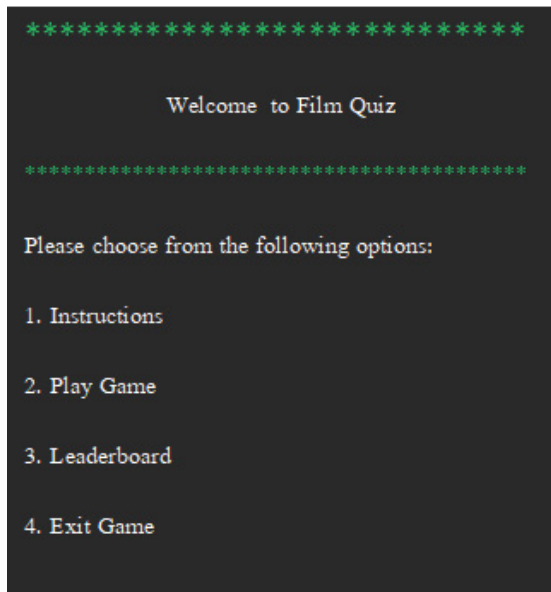
```
CREATE TABLE `filmquiz`.`leaderboard` (`id` INT NOT NULL AUTO_INCREMENT, `name` VARCHAR(20) NOT NULL, `score` INT NOT NULL, PRIMARY KEY (`id`))
```

```
INSERT INTO `leaderboard` (`id`, `name`, `score`) VALUES (NULL, 'Bob10', '8'), (NULL, 'Mike22', '12'), (NULL, 'Sophia15', '20'), (NULL, 'Duncan77', '32'), (NULL, 'Mia5', '40');
```

2.3 SQL Query Design

Fields	Id, name, score
Tables	leaderboard
Condition	
Sort	

2.4 User Interface



INSTRUCTIONS

1. Explaining

2. The

3. Game

Do you understand? YES or NO:

LEADERBOARD

NAME	SCORE
NAME	SCORE
NAME	SCORE
NAME	SCORE
NAME	SCORE

Do you want to leave leaderboard? YES or NO

Implementation

3.1 Java Code

MPQuizV1.java

```
import java.util.*;
import java.io.*;
import java.sql.Connection;
import java.sql.DriverManager;
import java.sql.PreparedStatement;
import java.sql.ResultSet;
import java.sql.SQLException;
import java.sql.Statement;
import java.util.regex.Pattern;

class questions {
    String Question = "";
    String Level = "";
    String Option1 = "";
    String Option2 = "";
    String Option3 = "";
    String Answers = "";
}

public class MPQuizV1 {
    String username = "";
    int totalPoints = 0;

    public static void main(String[] args) throws IOException, SQLException {
        MPQuizV1 myProg = new MPQuizV1();
        myProg.processGame();
    } //end main

    questions[] questionsTable = new questions[90];
    // String[][] aLeaderboard = new String[6][3];
    Scanner keyboard = new Scanner(System.in);
```

```

public void processGame() throws IOException, SQLException {
    String[][] aLeaderboard = new String[6][3];
    int vOption = 0;
    readData(aLeaderboard);
    readFile();
    vOption = displayOpeningMsg();
    switch (vOption) {
        case 1:
            instructions();
            break;
        case 2:
            processLevels(aLeaderboard);
            break;
        case 3:
            leaderboard(aLeaderboard);
            break;
        default:
            System.exit(0); //end else
    } //end switch statement
} // end processGame

void readFile() throws IOException {
    try (Scanner fileReader = new Scanner(new File("D:\\QuizQuestions.csv"))) {
        fileReader.useDelimiter(",|\\n"); for (int i = 0; i < questionsTable.length;
        i++) { // READ in datafile questionsTable[i] = new questions();
        questionsTable[i].Question = fileReader.next(); questionsTable[i].Level =
        fileReader.next(); questionsTable[i].Option1 = fileReader.next();
        questionsTable[i].Option2 = fileReader.next(); questionsTable[i].Option3 =
        fileReader.next(); questionsTable[i].Answers = fileReader.next();

        } // end loop
    }
}

```

```

    } // end readFile

    public int displayOpeningMsg() throws IOException {

        System.out.print("\033[H\033[2J");

        System.out.flush();

        System.out.println("\u001B[32m" +
        "*****"
        "*****");

        System.out.println();

        System.out.println("                                WELCOME TO THE FILM
QUIZ");

        System.out.println();

        System.out.println("\u001B[32m" +
        "*****"
        "*****");

        boolean vldMenu = false;

        int vOption = 0;

        do {

            System.out.println("Please choose from the following options: ");

            System.out.println("1. Instructions");

            System.out.println("2. Play Game");

            System.out.println("3. Leaderboard");

            System.out.println("4. Exit Game");

            vOption = keyboard.nextInt(); //Get users answer

            keyboard.nextLine();

            if (vOption >= 1 && vOption <= 4) { //IF user enters number between 1 & 4

then

                vldMenu = true; //set to true

            } else {

                System.out.println("Please enter a number between 1-4"); //display
error message

            } //end else

        } //end do

        while (!vldMenu);

        return vOption;

    } // end displayOpeningMsg

```

```

public void instructions() throws IOException, SQLException {

    String understand = "";

    boolean goHome = false;

    System.out.print("\033[H\033[2J");

    System.out.flush();

    System.out.println("\u001B[32m" +
    "*****"
    "*****");

    System.out.println();

    System.out.println("\u001B[37m" + "
INSTRUCTIONS");

    System.out.println();

    System.out.println("\u001B[32m" +
    "*****"
    "*****");

    System.out.println("1. Select your difficulty: easy, medium or hard");

    System.out.println("2. You will be asked 15 random multiple choice
questions");

    System.out.println("3. Receive +5pts for every correct answer, -1pts for every wrong
answer ");

    System.out.println("4. If you get a streak of 5 correct answers, you'll get an
additional 3pts ");

    System.out.println("5. You will have 1 chance to skip a question if you don't know the
answer");

    System.out.println("6. After you have finished, look for your name on the
leaderboard");

    do {

        System.out.println("Do you understand the rules? YES or NO");

        understand = keyboard.nextLine();

        understand = understand.toUpperCase();

        if (understand.equals("YES")) { //if user answer is yes

            goHome = true; //set to true

            processGame(); // get back to home page

        } else if (understand.equals("NO")) {

            System.out.println("Have another look at the rules, and then you can begin to
play!");

            } else {

                System.out.println(understand + " is not an option"); //display error
message

```

```

        } //end else

    } //do

    while (!goHome); // if goHome is false
} // end instructions

public int startGame() throws IOException {

    System.out.print("\033[H\033[2J");

    System.out.flush();

    System.out.println("\u001B[32m" +
    "*****");

    System.out.println();

    System.out.println("                                STARTING
GAME...");

    System.out.println();

    System.out.println("\u001B[32m" +
    "*****");

    int userLevel = 0;

    boolean vldLevel = false;

    Scanner keyboard = new Scanner(System.in);

    do {

        System.out.println("Please select difficulty level:"); // select
difficulty
        System.out.println("1. Easy"); System.out.println("2. Medium");

        System.out.println("3. Hard"); userLevel = keyboard.nextInt();

        keyboard.nextLine(); if (userLevel >= 1 && userLevel <= 3) {

            vldLevel = true; System.out.println("You have selected level " +
            userLevel);

        } else {

            System.out.println("Please enter a number between 1-3"); //display
error message

        } //end else

```

```

        } //end do

        while (!vldLevel);

        return userLevel;
    } //end startGame

    public void processLevels(String[][] aLeaderboard) throws IOException,
    SQLException {

        int userLevel = 0;

        userLevel = startGame();

        if (userLevel == 1) {
            easy(aLeaderboard);
        } else if (userLevel == 2) {
            medium(aLeaderboard);
        } else if (userLevel == 3) {
            hard(aLeaderboard);
        } //end if
    } // end processPlay

    public void easy(String[][] aLeaderboard) throws IOException, SQLException {

        String userAnswer = "";

        int skip = 1;

        boolean vldAnswer = false;

        boolean nameValid = false;

        boolean leave = false;

        String go2Leaderboard = "";

        System.out.print("\033[H\033[2J");

        System.out.flush(); // clean

        do {

            System.out.println("Enter a username: "); // get a username

            username = keyboard.nextLine(); //username validation below

            if (Pattern.compile("[0-9]").matcher(username).find() &&
            Pattern.compile("[a-z]").matcher(username).find() &&
            Pattern.compile("[A-Z]").matcher(username).find()) {

                //username must contains uppercase lowercase and numbers

                nameValid = true; //username is valid
            }
        }
    }

```

```

        } else {

System.out.println("Username is not valid, include lowercase, uppercase and a
number"); //error message, create new username

        } //end else

    } //end do

    while (!nameValid);

    aLeaderboard[5][1] = username;

    System.out.print("\033[H\033[2J");

    System.out.flush(); // clean

    System.out.println("\u001B[32m" +
    "*****");

    System.out.println();

    System.out.println("                                Good Luck " +
    username + "!");

    System.out.println();

System.out.println("\u001B[32m" +
    "*****");

    int totalPoints = 0; //restart points

    // start questions

    for (int i = 0; i < 15; i++) { // for 15 times

        // GENERATE 15 RANDOM NUMBERS BETWEEN 0-30, READ THOSE QUESTIONS

        int randomInteger = (((int)(Math.random() * (30 - 0))) + 0);

        vldAnswer = false; //reset

System.out.println(questionsTable[randomInteger].Question); //DISPLAY question and
answers

        System.out.println("A. " + questionsTable[randomInteger].Option1);

        System.out.println("B. " + questionsTable[randomInteger].Option2);

        System.out.println("C. " + questionsTable[randomInteger].Option3);

        if (skip == 1) { // IF skip hasn't been used DISPLAY

            System.out.println("D. " + "Skip question");

        } //end if

        do { //start validation

            System.out.print("Enter your answer: ");

            userAnswer = keyboard.nextLine();

            userAnswer = userAnswer.toUpperCase(); //NEW SKILL

```

```

        // if user enters numbers 123, ASCII Value

if (userAnswer.equals("A") || userAnswer.equals("B") ||
userAnswer.equals("C") || userAnswer.equals("D") && skip == 1) {

    vldAnswer = true; //set to true

    } else {

        System.out.println(userAnswer + " is not an option");

    } //end else
} //do

while (!vldAnswer);

System.out.println(userAnswer);

System.out.println(questionsTable[randomInteger].Answers);

char character = userAnswer.charAt(0); // This gives the character 'a'

int ascii = (int) character;

char character2 = questionsTable[randomInteger].Answers.charAt(0); // This gives the
character 'a'

int ascii2 = (int) character2;

if (ascii == ascii2) { // if its equal to correct answer

    totalPoints = totalPoints + 5; // add 5 points to score

}

if (userAnswer.equals("D")) {

    skip = 0;

    continue;

} else { // if answer is incorrect

    totalPoints = totalPoints - 1;

    // minus 1 point from score

} //end else

} //end for

aLeaderboard[5][2] = Integer.toString(totalPoints);

System.out.println("Your total score is " + totalPoints + "!");

System.out.println(aLeaderboard[5][2]);

do {

    System.out.println("Do you want to check the Leaderboard? YES or NO");

    go2Leaderboard = keyboard.nextLine();

    go2Leaderboard = go2Leaderboard.toUpperCase();

```



```

        switch (go2Leaderboard) {
            case "YES":
                //if user answer is yes
                leave = true; //set to true
                leaderboard(aLeaderboard); //Go to leaderboard
                break;
            case "NO":
                //if user says no
                System.out.println("Heading to main menu...");
                processGame(); //go to main menu
                break;
            default:
                System.out.println(go2Leaderboard + " is not an option");
//display error message
                break; //end else
        } //end switch
    } //do
    while (!leave);
    keyboard.close();
} //end easy

public void medium(String[][] aLeaderboard) throws IOException, SQLException {
    String userAnswer = "";
    int skip = 1;
    boolean vldAnswer = false;
    boolean nameValid = false;
    boolean leave = false;
    String goLeaderboard = "";
    System.out.print("\033[H\033[2J");
    System.out.flush(); // clean
    do {
        System.out.println("Enter a username: "); // get a username
        username = keyboard.nextLine(); //username validation below
    }

```

```

        if (Pattern.compile("[0-9]").matcher(username).find() &&
Pattern.compile("[a-z]").matcher(username).find() && Pattern.compile("[A-
Z]").matcher(username).find()) {

            //if username contains uppercase lowercase an numbers then...

            nameValid = true;

        } else {

System.out.println("Username is not valid, include lowercase, uppercase and a
number");

            } //end else

        } //end do

        while (!nameValid);

        aLeaderboard[5][1] = username;

        System.out.print("\033[H\033[2J");

        System.out.flush(); // clean

        System.out.println("\u001B[32m" +
"*****");

        System.out.println();

        System.out.println("                                Good Luck " +
username + "!");

        System.out.println();

System.out.println("\u001B[32m" +
"*****");

        int totalPoints = 0; //restart points

        // start questions

        // GENERATE 15 RANDOM NUMBERS BETWEEN 31-60, READ THOSE QUESTIONS

        for (int i = 0; i < 15; i++) { // for 15 times

            vldAnswer = false; //reset

int randomInteger = (((int)(Math.random() * (60 a random - 31))) + 31); // generate
number between 31 and 60 ||

            System.out.println(questionsTable[randomInteger].Question);

            System.out.println("A. " + questionsTable[randomInteger].Option1);

            System.out.println("B. " + questionsTable[randomInteger].Option2);

            System.out.println("C. " + questionsTable[randomInteger].Option3);

            if (skip == 1) {

                System.out.println("D. " + "Skip question");

            } //end if

```

```

do { //start validation

    System.out.print("Enter your answer: ");

    userAnswer = keyboard.nextLine();

    userAnswer = userAnswer.toUpperCase(); //NEW SKILL

    if (userAnswer.equals("A") || userAnswer.equals("B") ||
userAnswer.equals("C") || userAnswer.equals("D") && skip == 1) {

        vldAnswer = true; //set to true

    } else {

        System.out.println(userAnswer + " is not an option");

    } //end else

} //do

while (!vldAnswer);

System.out.println(userAnswer);

System.out.println(questionsTable[randomInteger].Answers);

char character = userAnswer.charAt(0); // This gives the character 'a'

int ascii = (int) character;

char character2 = questionsTable[randomInteger].Answers.charAt(0); // This gives the
character 'a'

int ascii2 = (int) character2;

if (ascii == ascii2) { // if its equal to correct answer

    totalPoints = totalPoints + 5; // add 5 points to score

}

if (userAnswer.equals("D")) { // if they selected skip

    skip = 0; //set skips left to 0

    continue;

} else { // if answer is incorrect

    totalPoints = totalPoints - 1; // minus 1 point from score

} //end else

} // end for

aLeaderboard[5][2] = Integer.toString(totalPoints);

System.out.println("Your total score is " + totalPoints + "!");

System.out.println(aLeaderboard[5][2]);

do {

    System.out.println("Do you want to check the Leaderboard? YES or NO");

    goLeaderboard = keyboard.nextLine();

```

```

goLeaderboard = goLeaderboard.toUpperCase();
switch (goLeaderboard) {
    case "YES":
        //if user answer is yes
        leave = true; //set to true
        leaderboard(aLeaderboard); //Go to leaderboard
        break;
    case "NO":
        //if user says no
        System.out.println("Heading to main menu...");
        processGame(); //go to main menu
        break;
    default:
        System.out.println(goLeaderboard + " is not an option"); //display
error message
        break; //end else
    } //end switch
} //do
while (!leave);
keyboard.close();
} //end medium

```

```

public void hard(String[][] aLeaderboard) throws IOException, SQLException {
    int skip = 1;
    boolean vldAnswer = false;
    boolean nameValid = false;
    boolean leave = false;
    String goLeaderboard = "";
    String userAnswer = "";
    System.out.print("\033[H\033[2J");
    System.out.flush(); // clean
    do {
        System.out.println("Enter a username: "); // get a username
        username = keyboard.nextLine(); //username validation below

```

```

        //if username contains uppercase lowercase an numbers then...

        if (Pattern.compile("[0-9]").matcher(username).find() &&
            Pattern.compile("[a-z]").matcher(username).find() &&
            Pattern.compile("[A-Z]").matcher(username).find()) {

            nameValid = true;

        } else {

System.out.println("Username is not valid, include lowercase, uppercase and a
number");

        } //end else

    } //end do

    while (!nameValid);

    aLeaderboard[5][1] = username;

    System.out.print("\033[H\033[2J");

    System.out.flush(); // clean

System.out.println("\u001B[32m" +
"*****
*****");

    System.out.println();

    System.out.println("                                Good Luck " +
username + "!");

    System.out.println();

System.out.println("\u001B[32m" +
"*****
*****");

    int totalPoints = 0; //restart points

    // start questions

    for (int i = 0; i < 15; i++) {

        vldAnswer = false; //reset

        int randomInteger = (((int)(Math.random() * (90 - 61))) + 61);

        System.out.println(questionsTable[randomInteger].Question);

        System.out.println("A. " + questionsTable[randomInteger].Option1);

        System.out.println("B. " + questionsTable[randomInteger].Option2);

        System.out.println("C. " + questionsTable[randomInteger].Option3);

        if (skip == 1) { // if skip hasn't already been used

            System.out.println("D. " + "Skip question");

        } //end if do { //start

        validation

```

```

        System.out.print("Enter your answer: ");

        userAnswer = keyboard.nextLine();

        userAnswer = userAnswer.toUpperCase(); //NEW SKILL

        if (userAnswer.equals("A") || userAnswer.equals("B") ||
userAnswer.equals("C") || userAnswer.equals("D") && skip == 1) {

            vldAnswer = true; //set to true

        } else {

            System.out.println(userAnswer + " is not an option");

        } //end else

    } //do

    while (!vldAnswer);

    System.out.println(userAnswer);

    System.out.println(questionsTable[randomInteger].Answers);

    char character = userAnswer.charAt(0); // This gives the character 'a'

    int ascii = (int) character;

char character2 = questionsTable[randomInteger].Answers.charAt(0); // This gives the
character 'a'

    int ascii2 = (int) character2;

    if (ascii == ascii2) { // if its equal to correct answer

        totalPoints = totalPoints + 5; // add 5 points to score

    }

    if (userAnswer.equals("D")) {

        skip = 0; //set skip to 0 so user cant use again

        continue;

    } else { // if answer is incorrect

        totalPoints = totalPoints - 1; // minus 1 point from score

    } //end else

} // end for

aLeaderboard[5][2] = Integer.toString(totalPoints);

System.out.println("Your total score is " + totalPoints + "!");

do {

    System.out.println("Do you want to check the Leaderboard? YES or NO");

    goLeaderboard = keyboard.nextLine();

    goLeaderboard = goLeaderboard.toUpperCase();

    switch (goLeaderboard) {

```

```

        case "YES":
            //if user answer is yes

            leave = true; //set to true

            leaderboard(aLeaderboard); //Go to leaderboard

            break;

        case "NO":
            //if user says no

            System.out.println("Heading to main menu...");

            processGame(); //go to main menu

            break;

        default:

            System.out.println(goLeaderboard + " is not an option"); //display
error message

            break; //end else

    }

} //do

while (!leave);

keyboard.close();

} //end hard

} //end game

```

3.2 Implementation Code

Leaderboard

```
public void leaderboard(String[][] aLeaderboard) throws IOException, SQLException {  
    boolean goMenu = false; String  
    menu = "";  
    displayLeaderboard(aLeaderboard);  
    sortData(aLeaderboard);  
    displayLeaderboard(aLeaderboard);  
    do { System.out.println("Do you want to leave leaderbaord? YES or NO");  
        menu = keyboard.nextLine(); menu = menu.toUpperCase(); if  
        (menu.equals("YES")) { //if user answer is yes goMenu = true; //set to  
        true processGame(); // get back to home page } else if  
        (menu.equals("NO")) { System.out.println("Okay,take your time!"); }  
        else {  
  
            System.out.println(menu + " is not an option"); //display error  
message  
        } //end else  
    } //do  
    while (!goMenu);  
    updateDatabase(aLeaderboard);  
} //end leaderboard
```

Update Leaderboard

```
public void updateDatabase(String[][] aLeaderboard) {  
    try {  
        Connection con = null;  
        con = DriverManager.getConnection("jdbc:mysql//localhost:3306/filmquiz",  
"root", "");  
        for (int i = 0; i < 5; i++) {  
            String query = " insert into leaderboard (name, score)" + "values(?,  
?)";
```



```

        //create the mysql insert prepared statement

        PreparedStatement preparedStmt = con.prepareStatement(query);

        preparedStmt.setString(1, aLeaderboard[i][1]);
        preparedStmt.setString(2, aLeaderboard[i][2]);

        //execute the prepared statement

        preparedStmt.execute();

    } //end for

    con.close();

} catch (SQLException e) {

    System.err.println(e);

} //end catch

} //end updateDatabase

```

Delete rows in database

```

public void deleteRowsInDatabase(String[][] aLeaderboard) {

    try {

        Connection con = null;

        con = DriverManager.getConnection("jdbc:mysql://localhost:3306/filmquiz",
"root", "");

        PreparedStatement preparedStmt = con.prepareStatement("delete from
leaderboard");

        preparedStmt.execute();

        con.close();

    } catch (SQLException e) {

        System.err.println(e);

    } //end catch

} // end deleteRowsInDatabase

```

Add New Score

```

public void addNewScore(String[][] aLeaderboard) {

    updateDatabase(aLeaderboard);

} //end addNewScore

```

Sort from highest to lowest

```
public void sortData(String[][] aLeaderboard) {  
    //this method uses the bubble sort to sort the name and score based on the  
score  
    int n = 6; //declare swapped length(list) boolean  
    swapped = true; //declare swapped = true while  
    ((swapped) && (n > 0)) {  
        swapped = false; for  
        (int i = 0; i < n - 1; i++) {  
            int vNum1 = Integer.parseInt(aLeaderboard[i][2]); int  
            vNum2 = Integer.parseInt(aLeaderboard[i + 1][2]); if  
            (vNum1 < vNum2) {  
                String temp = aLeaderboard[i][2];  
                aLeaderboard[i][2] = aLeaderboard[i + 1][2];  
                aLeaderboard[i + 1][2] = temp; temp =  
                aLeaderboard[i][1]; aLeaderboard[i][1] =  
                aLeaderboard[i + 1][1]; aLeaderboard[i +  
                1][1] = temp; swapped = true;  
            } //end if  
        } //end for  
        n--; } //end  
    while  
} //end sortData
```

Display leaderboard

```
public void displayLeaderboard(String[][] aLeaderboard) {  
    System.out.print("\033[H\033[2J");  
    System.out.flush();  
    System.out.println("\u001B[32m" +  
"*****");  
    System.out.println();  
    System.out.println("LEADERBOARD");  
    System.out.println();
```

```

System.out.println("\u001B[32m" +
"*****"
"*****");

    for (int i = 0; i < 6; i++) {

        System.out.printf("%-20s", aLeaderboard[i][1]);

        System.out.printf("%-20s", aLeaderboard[i][2]);

        System.out.println();

    } //end for

} //end displayLeaderboard

```

Read data

```

public void readData(String[][] aLeaderboard) throws SQLException {

    Connection con = null;

    System.out.println("Bob");

    try {

        con = DriverManager.getConnection("jdbc:mysql://localhost:3306/filmquiz",
"root", "");

        Statement stmt = con.createStatement(ResultSet.TYPE_SCROLL_INSENSITIVE,
ResultSet.CONCUR_READ_ONLY);

        ResultSet rs = stmt.executeQuery("select * from leaderboard");

        int numCols;

        numCols = rs.getMetaData().getColumnCount();

        int row = 0;

        rs.beforeFirst();

        while (rs.next()) {

            for (int col = 0; col < numCols; col++) {

                aLeaderboard[row][col] = rs.getString(col + 1);

            } //end for

            row++;

        } //end while

        con.close();

    } catch (SQLException e) {

        System.err.println(e);

    } //end catch

} //end readData

```

3.3 User Interface

Welcome Page

WELCOME TO THE FILM QUIZ

Please choose from the following options:

- ```
1. Instructions
2. Play Game
3. Leaderboard
4. Exit Game
```

### Instructions

## INSTRUCTIONS

1. Select your difficulty: easy, medium or hard
  2. You will be asked 15 random multiple choice questions
  3. Recieve +5pts for every correct answer, -1pts for every wrong answer
  4. If you get a streak of 5 correct answers, you'll get an additional 3pts
  5. You will have 1 chance to skip a question if you dont know the answer
  6. After you have finished, look for your name on the leaderboard
- Do you understand the rules? YES or NO

1

Difficulty Level & Username

Please select difficulty level:

1. Easy
2. Medium
3. Hard

1

You have selected level 1

Enter a username:

Molly15

Good Luck Molly15!

## Play Game

\*\*\*\*\*

Good Luck Molly15!

\*\*\*\*\*

What are Willy Wonka's helpers called?

- A. Ewoks
- B. Minions
- C. Oopma Loompas
- D. Skip question

Enter your answer: c

C

C

In "SpongeBob SquarePants" what type of creature is Patrick?

Which DC Comics character does Henry Cavill play?

- A. Batman
- B. Superman
- C. Aquaman

Enter your answer: b

B

B

Your total score is 46!

46

Do you want to check the Leaderboard? YES or NO

|

## Leaderboard unsorted

\*\*\*\*\*

### LEADERBOARD

\*\*\*\*\*

|          |    |
|----------|----|
| Bob10    | 23 |
| Mike88   | 12 |
| Sophia15 | 20 |
| Duncan77 | 6  |
| Mia5     | 40 |
| Molly15  | 46 |

\*\*\*\*\*

## Leaderboard sorted

\*\*\*\*\*

### LEADERBOARD

\*\*\*\*\*

|          |    |
|----------|----|
| Molly15  | 46 |
| Mia5     | 40 |
| Bob10    | 23 |
| Sophia15 | 20 |
| Mike88   | 12 |
| Duncan77 | 6  |

Do you want to leave leaderbaord? YES or NO

## 3.4 Datafile

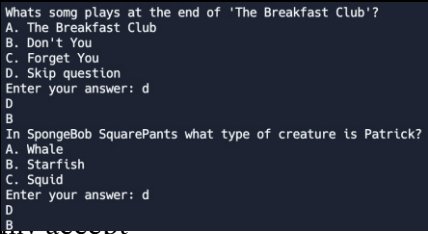
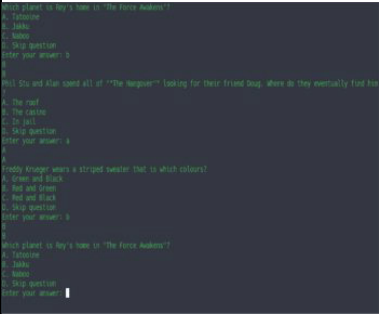
|                                                                                                           |        |                       |                      |                            |   |
|-----------------------------------------------------------------------------------------------------------|--------|-----------------------|----------------------|----------------------------|---|
| Which 2005 film tells the story of a lion a hippo a zebra and a giraffe who escape from Central Park Zoo? | Easy   | The Wild              | Madagascar           | Zootopia                   | B |
| Which festive movie from 1990 revolves around a character called Kevin McAllister?                        | Easy   | Home Alone            | Christmas Chronicles | Arthur Christmas           | A |
| Sebastian Scuttle and Flounder are all supporting characters in which 1989 film?                          | Easy   | Bambi                 | Snow White           | The Little Mermaid         | C |
| What type of creature is Shrek?                                                                           | Easy   | Troll                 | Goblin               | Ogre                       | C |
| Which animal is responsible for the attacks in "Jaws"?                                                    | Easy   | Lion                  | Whale                | Shark                      | C |
| What is the name of the real space ranger in "Toy Story"?                                                 | Easy   | Buzz                  | Woody                | Neil                       | A |
| Which colour is in the following title "The _____ Mile"                                                   | Easy   | Green                 | Blue                 | Red                        | A |
| Which DC Comics character does Henry Cavill play?                                                         | Easy   | Batman                | Superman             | Aquaman                    | B |
| In "SpongeBob SquarePants" what type of creature is Patrick?                                              | Easy   | Whale                 | Starfish             | Squid                      | B |
| "Run Forest Run" is a famous quote from which movie?                                                      | Easy   | Coach Carter          | Forest Gump          | Remember the Titans        | B |
| Which 2016 movie starred Ryan Gosling and Emma Stone?                                                     | Easy   | Crazy Stupid Love     | La La Land           | The Amazing Spiderman      | B |
| "Do or do not. There is no try" is a quote from which Star Wars character?                                | Easy   | Obi-wan Kenobi        | Yoda                 | Luke Skywalker             | B |
| Marty McFly and Doc are famous characters from which movie?                                               | Easy   | Back to the Future    | Doctor Who           | Maze Runner                | A |
| What is the name of the character played by Johnny Depp in "Pirates of the Caribbean"?                    | Easy   | Blackbeard            | Captain Hook         | Jack Sparrow               | C |
| What is the name of the rat in "Ratatouille"?                                                             | Easy   | Emile                 | Ratatouille          | Remy                       | C |
| Which Marvel character has wrist-mounted web-shooters?                                                    | Easy   | Captain America       | Spiderman            | Antman                     | B |
| What is the name of the school in Harry Potter?                                                           | Easy   | Aretuza               | Hogwarts             | The Academy of Unseen Arts | B |
| In which series of films can you see a character named Frodo Baggins?                                     | Easy   | The Lord of the Rings | Harry Potter         | Game of Thrones            | A |
| Who is Thor's brother?                                                                                    | Easy   | Loki                  | Odin                 | Frigga                     | A |
| What is the name of Simba's father in "The Lion King"?                                                    | Easy   | Scar                  | Mufasa               | Kovu                       | B |
| Which child was not selected to tour the Wonka factory in Willy Wonka and the Chocolate Factory?          | Easy   | Charlie Bucket        | James Trotter        | Veruca Salt                | B |
| What is the name of the fictional land where Frozen takes place?                                          | Easy   | Neuschwanstein        | Portorosso           | Arendelle                  | C |
| Judy Garland starred as Dorothy Gale in which classic movie?                                              | Easy   | The Pirate            | A Star is Born       | The Wizard of Oz           | C |
| Who played Jack Dawson in the 1997 epic Titanic?                                                          | Easy   | Leonardo DiCaprio     | Toby Maguire         | Brad Pitt                  | A |
| In Monsters Inc who is the short green one-eyed monster?                                                  | Easy   | Mike Wazowski         | James Sullivan       | Randall Boggs              | A |
| What color is the Loxm?                                                                                   | Easy   | Yellow                | Orange               | Green                      | B |
| What are Willy Wonka's helpers called?                                                                    | Easy   | Ewoks                 | Minions              | Oopma Loompas              | C |
| In the Ice Age movies what kind of animal is Manny?                                                       | Easy   | Mammoth               | Elephant             | Sloth                      | A |
| In the Princess Diaries' what country is Mia the princess of?                                             | Easy   | Genovia               | Grenadia             | Pavaria                    | A |
| Whats song plays at the end of The Breakfast Club?                                                        | Easy   | The Breakfast Club    | Don't You            | Forget You                 | B |
| What bars does Cady give Regina in 'Mean Girls'?                                                          | Medium | Canteen Bars          | Kalteen Bars         | Caffeine Bars              | B |
| What magazine does Jenna work for in '13 Going on 30'?                                                    | Medium | Sparkle               | Poise                | Vogue                      | B |
| Freddy Krueger wears a striped sweater that is which colour?                                              | Medium | Green and Black       | Red and Green        | Red and Black              | B |
| If you watch the Marvel movies in chronological order which movie would you watch first?                  | Medium | Captain Marvel        | Iron Man             | Captain America: TFA       | C |
| Which movie star is killed off in the opening scene of Scream?                                            | Medium | Courtney Cox          | Drew Barrymore       | Neve Campbell              | B |
| What's the name of the skyscraper in Die Hard?                                                            | Medium | Nakatomi Plaza        | Empire State         | Chrysler Building          | A |
| Complete the name of this Wes Anderson movie "The Grand _____ Hotel"                                      | Medium | Central               | Plaza                | Budapest                   | C |
| Which singer starred in "The Bodyguard"?                                                                  | Medium | Whitney Houston       | Madonna              | Mariah Carey               | A |
| In which 1940 film did Mickey Mouse conduct the orchestra?                                                | Medium | The Symphony Hour     | Melody Time          | Fantasia                   | C |
| Who plays the Prime Minister in Love Actually?                                                            | Medium | Hugh Grant            | Martin Freeman       | Colin Firth                | A |
| In Shaun Of The Dead what's the name of the pub which is later overrun by zombies?                        | Medium | The Winchester        | The Worlds End       | The Crown                  | A |
| What is the name of Thor's hammer in The Avengers?                                                        | Medium | Bolt                  | Stormbreaker         | Mjölñir                    | C |
| How many movies are in the Jurassic Park series overall?                                                  | Medium | Five                  | Three                | Six                        | C |
| Which actor stars as Deadpool in Marvel's Deadpool?                                                       | Medium | Ryan Gosling          | Hugh Jackman         | Ryan Reynolds              | C |
| Who directed the film Get Out?                                                                            | Medium | Jordan Peele          | Daniel Kaluuya       | Raimi                      | A |

|                                                                                                                 |        |                             |                                              |                                          |       |
|-----------------------------------------------------------------------------------------------------------------|--------|-----------------------------|----------------------------------------------|------------------------------------------|-------|
| May Poppins is the nanny to which family?                                                                       | Medium | The Banks                   | The Smiths                                   | The Jones                                | A     |
| What does Tom Hanks compare life to in Forrest Gump?                                                            | Medium | Camera                      | Box of Chocolates                            | Butterfly                                | B     |
| Who directed Titanic Avatar and The Terminator?                                                                 | Medium | Steven Spielberg            | James Cameron                                | Martin Scorsese                          | B     |
| Which song does Joanna sing at the holiday concert "Love Actually"?                                             | Medium | Last Christmas              | Jingle Bell Rock                             | All I Want for Christmas Is You          | C     |
| What does Aladdin get chased through the town for stealing?                                                     | Medium | Bread                       | Fruit                                        | Jewellery                                | A     |
| Which planet is Rey's home in "The Force Awakens"?                                                              | Medium | Tatooine                    | Jakku                                        | Naboo                                    | B     |
| In "Avengers: Endgame" who does Steve Rogers pass the role of Captain America to?                               | Medium | Wanda Maximoff              | Bucky Barnes                                 | Sam Wilson                               | C     |
| In "The Truman Show" why is Truman Burbank afraid of water?                                                     | Medium | Accident involving his Dad  | Scared of Sea Creatures                      | Scraed of Drowning                       | A     |
| In "Crazy Rich Asians" Rachel and Nick travel to attend a wedding in which country?                             | Medium | Thailand                    | Indonesia                                    | Singapore                                | C     |
| Which house wins the Quidditch game in "Harry Potter and the Sorcerer's Stone"?                                 | Medium | Ravenclaw                   | Slytherin                                    | Gryffindor                               | C     |
| In "Dead Poet's Society" what does John Keating teach?                                                          | Medium | Literature                  | Philosophy                                   | English                                  | C     |
| Which museum does "Night at the Museum" take place at?                                                          | Medium | The British Museum          | The Museum of Natural History                | Louvre                                   | B     |
| How many exes does Scott Pilgrim fight in "Scott Pilgrim vs the World"?                                         | Medium | Five                        | Seven                                        | Nine                                     | B     |
| Phil Stu and Alan spend all of "The Hangover" looking for their friend Doug. Where do they eventually find him? | Medium | The roof                    | The casino                                   | In jail                                  | A     |
| "I see dead people" is a quote from what film?                                                                  | Medium | The Sixth Sense             | The Conjuring                                | Just Like Heaven                         | A     |
| What was the last movie that Walt Disney was able to work on before he died?                                    | Hard   | Mary Poppins                | Jungle Book                                  | The Sword in the Stone                   | B     |
| In what other Pixar movie does the Wall-E company "Buy n' Large" make an appearance?                            | Hard   | Cars 2                      | Toy Story 3                                  | The Incredibles                          | B     |
| The final battle between SpiderMan and Mysterio takes place on which bridge?                                    | Hard   | London Bridge               | Waterloo Bridge                              | Tower Bridge                             | C     |
| Which country does Forrest Gump travel to as part of the All-American Ping Pong Team?                           | Hard   | Hungary                     | England                                      | China                                    | C     |
| What score did Ellie Woods get on her LSAT in Legally Blonde?                                                   | Hard   |                             | 199                                          | 179                                      | 189 B |
| What was the top grossing movie of 2014?                                                                        | Hard   | Interstellar                | Guardians of the Galaxy                      | The Grand Budapest Hotel                 | B     |
| How much power does it take to fuel the flux capacitor in Back to the Future?                                   | Hard   | 1.21 gigawatts              | 2.45 gigawatts                               | 2.45 gigawatts                           | A     |
| What was the name of the young girl in Jurassic Park?                                                           | Hard   | Lex Murphy                  | Ellie Sattler                                | Maisie Lockwood                          | A     |
| What does WALL-E stand for?                                                                                     | Hard   | Waste Alien Love Life Earth | World Administration Life Locator Electrical | Waste Allocation Load Lifter Earth-Class | C     |
| What type of monkey is Abu?                                                                                     | Hard   | Vervet                      | Mandrill                                     | Capuchin                                 | C     |
| What object is Drop Dead Fred imprisoned in?                                                                    | Hard   | Jack-in-a-Box               | Vase                                         | Jewelry Box                              | A     |
| How many Oscars did West Side Story win?                                                                        | Hard   |                             | 11                                           | 9                                        | 5 A   |
| What book is Forrest Gump's son reading at the end of the film?                                                 | Hard   | The Cat in the Hat          | Curious George                               | Berenstain Bears                         | B     |
| What is the janitor's name in "The Breakfast Club"?                                                             | Hard   | Jim                         | Carl                                         | Pete                                     | B     |
| Who is the voice of Stuart Little?                                                                              | Hard   | Steve Zahn                  | Nathan Lane                                  | Michael J. Fox                           | C     |
| Who played Lemony Snicket in "A Series of Unfortunate Events"?                                                  | Hard   | Matthew Morrison            | Jude Law                                     | Jim Carrey                               | C     |
| Which of the following movies was Elijah Wood NOT in?                                                           | Hard   | Wreck it Ralph              | Back to the Future Part II                   | Flipper                                  | A     |
| "The things you own end up owning you" is a quote from which movie?                                             | Hard   | Fight Club                  | Lord of the Rings                            | Joker                                    | A     |
| "I don't know how to put this, but I'm kind of a big deal" is a quote from which film?                          | Hard   | Bruce Almighty              | Anchorman                                    | 10 Things I Hate About You               | B     |
| "Wait I thought all you did was kill innocent people?" is a quote from which film?                              | Hard   | Zodiac                      | Se7en                                        | Saw                                      | B     |
| What language does Colin Firth's housekeeper speak in Love Actually?                                            | Hard   | French                      | Spanish                                      | Portuguese                               | C     |
| What country does Bridget travel to for the TV show in Bridget Jones 2?                                         | Hard   | Paris                       | Taiwan                                       | Thailand                                 | C     |
| In "Titanic" where did Jack mention he and his dad went ice fishing?                                            | Hard   | Wisconsin                   | Colorado                                     | Minnesota                                | A     |
| In "Just like Heaven" what was the name of David's first wife?                                                  | Hard   | Lara                        | Lucy                                         | Lily                                     | A     |
| How many letters did Noah write Allie when they were apart in "The Notebook"?                                   | Hard   |                             | 100                                          | 365                                      | 250 B |
| What was Jessie's owner's name in Toy Story 2?                                                                  | Hard   | Mollie                      | Sally                                        | Emily                                    | C     |
| How many of the little pigs had hats in Shrek?                                                                  | Hard   |                             | 1                                            | 2                                        | 3 C   |
| How many school productions have Sharpay and Ryan been in?                                                      | Hard   |                             | 21                                           | 11                                       | 17 C  |
| What club does Patrick go to to see Kat in 10 Things I Hate About You?                                          | Hard   | Club Skunk                  | Indie House                                  | The Attic                                | A     |
| What is the name of the little boy Tony Stark befriends while stranded?                                         | Hard   | Harley                      | Harry                                        | Henry                                    | A     |



### 3.5 On Going Testing

| Date     | What I tested                                                                                                                     | Result and Fix                                                                                                                                                                                                                                                                                                                                          | Screenshot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------|-----------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 24/10/22 | I started working on the main welcome message and wanted to test my user page options: Instructions, Play Game, Leaderboard, Exit | Nothing would print. I realised I had set up my methods twice each and hadn't included an option in the dataflow.                                                                                                                                                                                                                                       | <pre> ./game.java:25: error: method displayOpeningMsg in class game cannot be applied to given types;     app.displayOpeningMsg();            ^ required: int found:    no arguments reason: actual and formal argument lists differ in length ./game.java:56: error: incompatible types: void cannot be converted to int     vOption = displayOpeningMsg(vOption);                 ^ </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 02/11/22 | I tested my validation on the instructions page, when the user answers if they understood or not                                  | If the user typed YES, the call displayWelcomeMsg() was not working, it wouldn't take you to the next page. To fix this I realised that I needed to call processGame() instead.                                                                                                                                                                         | Please choose from the following options:<br>1. Instructions<br>2. Play Game<br>3. Leaderboard<br>4. Exit Game<br>1<br><input type="checkbox"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 07/11/22 | I tested my processLevels() & startGame() methods                                                                                 | The methods easy(), medium(), & hard() did not run when called upon. I had forgotten to add throws IOException.                                                                                                                                                                                                                                         | <pre> ./game.java:182: error: cannot find symbol     easy(questionsTable);       ^ symbol:   variable questionsTable location: class game ./game.java:184: error: cannot find symbol     medium(questionsTable);       ^ symbol:   variable questionsTable location: class game ./game.java:186: error: cannot find symbol     hard(questionsTable);       ^ symbol:   variable questionsTable location: class game </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 14/11/22 | I need to test my username validation. My password had to include lower and uppercase letters, as well as a number.               | When I tried running my validation I recognized that it did not meet requirements however the error message kept printing repeatedly. To fix this I realized I hadn't added a question asking to enter the username into the do loop. This stopped repeating.                                                                                           | Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br>Username is not valid, include lowercase, uppercase and a number<br> |
| 23/11/22 | I had to make sure my questions and answers all matched up and were correct.                                                      | When I ran my code the questions and answers did not match, some of my answers were questions. After re-reading my data file I realized that I had forgotten to get rid of some commas in the middle of questions. I also left the headings for each column in the file. I fixed my data file and the questions and answer options printed as expected. | Odin<br>B. What is the name of Simbas father in The Lion King?<br>C. Easy<br>D. Skip question<br>Enter your answer: <input type="text"/>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

|          |                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 28/11/22 | I tested the validation for my users answer to the question. This process was made simpler with my new skill changing the answer to uppercase. This made it easy to compare. | My validation process worked, even after the user had skipped question, the program still accepted answer D from the user. I updated the code and added a second requirement. <code>userAnswer.equals(skip) == 1</code> The program would only accept D as an answer if the skip variable was equal to 1.                                                                           |  <pre> Whats song plays at the end of 'The Breakfast Club'? A. The Breakfast Club B. Don't You C. Forget You D. Skip question Enter your answer: d D B In SpongeBob SquarePants what type of creature is Patrick? A. Whale B. Starfish C. Squid Enter your answer: d D </pre>                                                                                                                                                                                                                                                                                                                                         |
| 01/12/22 | I had to check that my point system was working correctly.                                                                                                                   | After running my program I realized my points were not adding up properly. It did not matter what answer you entered your total score was always a negative number. To test that the answers were matching I added extra lines of codes to display the users answer and the correct answer next to each other. To fix this I converted both answers to ASCII to compare the values. |  <pre> What planet is Rey's home in 'The Force Awakens'? A. Tatooine B. Jakku C. Hoth D. Skip question Enter your answer: i i You and your pals saved all of 'The Avengers'! Looking for their friend Shag, where do they eventually find him? A. The coast B. The castle C. The jail D. Skip question Enter your answer: i i Which character wears a striped sweater that is which colour? A. Green and black B. Red and green C. Red and black D. Skip question Enter your answer: i i Which planet is Rey's home in 'The Force Awakens'? A. Tatooine B. Jakku C. Hoth D. Skip question Enter your answer: i </pre> |

# Testing

## 4.1 Test Plan

### *Functional & End-User Requirements Testing:*

I will test each requirement individually and record the results. I will show what type of testing I will use, either component or integrative, a description of what I done with any errors that occurred, and finally the solution to these errors. I will also include evidence of each test.

### *Full System Testing:*

akjdg

### *Unexpected Inputs:*

I will test normal, extreme, and exceptional data to test the robustness of my program. I will show what I am testing, my input, what my expected response is and my actual response.

### *Test Cases and Personas:*

I have gave all my actors multiple tasks to complete, to test out my program. Each test focuses on my functional and end user requirements, making sure they are all there and are running as expected. These tasks also test the overall functionality of my quiz.

### *Personas:*

Name: Mia Williams

Age: 21

Tech Experience: Social Media, Online Shopping, Gaming, Online Streaming

Name: Duncan Hamilton

Age: 45

Tech Experience: Emails, Facebook, Online Streaming, Texting

## 4.2 New Skills

| <i>What I needed</i>                            | <i>What I Learned</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <i>Example</i>                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I needed to make my validation process simpler. | To make my validation process simpler, I decided to change my users' inputs to uppercase. This was not part of my course and I had to investigate to use this method online. The website W3Schools had a tutorial. This technique meant that when a user had typed their answer to a question it would be changed to a capital letter to match my database. This made the validation process simpler as I did not have to ask the user to retype their answer if they had used lowercase. This made the experience of my quiz more enjoyable for users also as they did not need to worry about small details and the game ran more smoothly. | <b>114.</b> System.out.println("Do you understand the rules? YES or NO"); <b>115.</b> understand = Keyboard.nextLine(); <b>116.</b> understand = understand.toUpperCase(); <b>243.</b> System.out.println("Enter your answer: "); <b>244.</b> userAnswer = keyboard.nextLine(); <b>245.</b> userAnswer = userAnswer.toUpperCase(); |
| I wanted to make my quiz more fun and engaging. | I decided to add coloured text to my program. I had never used or been taught how to use coloured text in java, so I completed some research online. I discovered ANSI color codes and found a tutorial on CodeHS on how to use these codes correctly. I added green codes to my page titles to make them stand out, as well as white to my general text.                                                                                                                                                                                                                                                                                     | <b>102.</b> System.out.println("\u001B[37m" + "INSTRUCTIONS"); <b>106.</b> System.out.println("\u001B[37m" + "1. Select your difficulty: easy, medium, or hard");                                                                                                                                                                  |

### 4.3 Functional & End-User Requirements Testing

| <i>Functional Requirements</i>                                          | <i>Description of test and any errors</i>                                                                                                                                                                                                                          | <i>Solution</i>                                           |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|
| 1. User will select what page they would like to go to.                 | The user can successfully select their page on the options menu/displayOpeningMsg                                                                                                                                                                                  | Not required                                              |
| 2. The user will enter required their username.                         | A username was entered but it did not include a number, however the input validation was already added, and an error message was displayed. The user was able to re-enter their name.                                                                              | Not required                                              |
| 3. The user will select their difficulty level.                         | I had already added my input validation so when a number higher or lower than expected was entered the program displayed an error and asked them to                                                                                                                | Not required                                              |
| 4. User will answer if they understand the rules or not.                | I had added my input validation to make sure the required user had entered either YES or NO. In addition, I had added my new skill .toUpperCase to make the validation simpler. The program continues to display an error message and asks to them re-enter answer | Not required                                              |
| 5. User will select their answer.                                       | I had added my input validation and new skill, they enter a random letter or a number.                                                                                                                                                                             | Not required                                              |
| 6. User can select to skip a question.                                  | After the user had skipped a question, the program still accepted the answer D from the user.                                                                                                                                                                      | Not required                                              |
| 7. User will select if they would like to check the leaderboard or not. | My input validation worked however if the user selected NO then it would bring them to the options page. They would select their next page and nothing would happen.                                                                                               | I fix this I changed displayWelcomeMsg()to processGame(); |
| 8. User selects next page.                                              | After the user has reached the end of the code for the page, they have selected they are given a suggested page to go to or they can just go to processGame(). All of input validation works here.                                                                 | Not required                                              |
| 9. Validate all inputs                                                  | All the user's inputs are validated. I already fixed the problem by validating letter D                                                                                                                                                                            | Not required                                              |
| 10. Generate 15 random questions from selected difficulty level         | The program was successful and generated 15 required random questions with the correct level.                                                                                                                                                                      | Not required                                              |

|                                                                   |                                                                                                                                                                                    |                                                                                                                                                                                                |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11. Add and subtract points to/from total score                   | The program was successful at calculating the required users total score.                                                                                                          | Not required                                                                                                                                                                                   |
| 12. Check if the user has already skipped a question.             | After updating my input validation, the program successfully checked if the user had used the skip pass.                                                                           | Not required                                                                                                                                                                                   |
| 13. Add users score and name to leaderboard.                      | The username wouldn't be added onto the leaderboard if you selected the medium level.                                                                                              | When my user creates their name I had wrote String username = keyboard.nextLine();which made it a local variable. I got rid of the string at the start and the name                            |
| 14. Sort leaderboard from highest to lowest score.                | My leaderboard successfully sorted all my users scores with their names, using a bubble sort.                                                                                      | Not required                                                                                                                                                                                   |
| 15. Display welcome message.                                      | The program successfully displayed the welcome message.                                                                                                                            | Not required                                                                                                                                                                                   |
| 16. Display selected pages.                                       | The program successfully displays the users selected page on all pages.                                                                                                            | Not required                                                                                                                                                                                   |
| 17. Display error messages.                                       | The program successfully displays all error messages for all inputs.                                                                                                               | Not required                                                                                                                                                                                   |
| 18. 15 questions will be displayed with 3 answers to choose from. | After transferring my program from Repl.it to NetBeans my datafile got messed up. I printed the question as an answer and some answers were difficulty levels. Nothing matched up. | I looked through my datafile and rewrote some of it out. From question 71 onwards all the data had been put into one section. After this was sorted the program read all the data as expected. |
| 19. Display if the answer is right or wrong.                      | The program reprints the users answer and the correct answer on the next line to show the comparison and whether it is right or wrong.                                             | Not required                                                                                                                                                                                   |
| 20. Display users' total score.                                   | program successfully prints the users total score at the end of the game.                                                                                                          | Not required                                                                                                                                                                                   |

|                                                             |                                                                                                                        |              |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------|
| 21. Display leaderboard with matching scores and usernames. | After fixing the problem with the username in the medium level, my program successfully displays all names and scores. | Not required |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|--------------|

| <i>Test</i> | <i>Evidence</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1           | <pre> *****                                 WELCOME TO THE FILM QUIZ *****  Please choose from the following options: 1. Instructions 2. Play Game 3. Leaderboard 4. Exit Game 2 *****                                  STARTING GAME... </pre>                                                                                                                                                                                                                                                                                    |
| 2           | <pre> Enter a username: Molly15 *****                                  Good Luck Molly15! ***** </pre>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3           | <pre> ***** Please select difficulty level: 1. Easy 2. Medium 3. Hard 1 You have selected level 1 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 4           | <pre> 1. Select your difficulty: easy, medium or hard 2. You will be asked 15 random multiple choice questions 3. Recieve +5pts for every correct answer, -1pts for every wrong answer 4. If you get a streak of 5 correct answers, you'll get an additional 3pts 5. You will have 1 chance to skip a question if you dont know the answer 6. After you have finished, look for your name on the leaderboard Do you understand the rules? YES or NO yes Bob *****                                  WELCOME TO THE FILM QUIZ </pre> |
| 5           | <pre> What are Willy Wonka's helpers called? A. Evoks B. Minions C. Oopma Loompas D. Skip question Enter your answer: c C C </pre>                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6           | <pre> C In "SpongeBob SquarePants" what type of creature is Patrick? A. Whale B. Starfish C. Squid D. Skip question Enter your answer: d D B In the Ice Age movies what kind of animal is Manny? - </pre>                                                                                                                                                                                                                                                                                                                          |

|          |                                                                                                                                                                                                                                                                                                                                                                       |       |    |        |    |          |    |          |   |      |    |         |    |
|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----|--------|----|----------|----|----------|---|------|----|---------|----|
| 7        | <p>Do you want to check the Leaderboard? YES or NO</p> <p>yes</p> <p>*****</p> <p>LEADERBOARD</p> <p>*****</p> <table> <tr><td>Bob10</td><td>23</td></tr> <tr><td>Mike88</td><td>12</td></tr> <tr><td>Sophia15</td><td>20</td></tr> <tr><td>Duncan77</td><td>6</td></tr> <tr><td>Mia5</td><td>40</td></tr> <tr><td>Molly15</td><td>46</td></tr> </table> <p>*****</p> | Bob10 | 23 | Mike88 | 12 | Sophia15 | 20 | Duncan77 | 6 | Mia5 | 40 | Molly15 | 46 |
| Bob10    | 23                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Mike88   | 12                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Sophia15 | 20                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Duncan77 | 6                                                                                                                                                                                                                                                                                                                                                                     |       |    |        |    |          |    |          |   |      |    |         |    |
| Mia5     | 40                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Molly15  | 46                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| 8        | <p>WELCOME TO THE FILM QUIZ</p> <p>*****</p> <p>Please choose from the following options:</p> <ol style="list-style-type: none"> <li>1. Instructions</li> <li>2. Play Game</li> <li>3. Leaderboard</li> <li>4. Exit Game</li> </ol> <p>2</p> <p>*****</p> <p>STARTING GAME...</p>                                                                                     |       |    |        |    |          |    |          |   |      |    |         |    |
| 10       | <p>Enter your answer: c</p> <p>C</p> <p>C</p> <p>Which DC Comics character does Henry Cavill play?</p> <ol style="list-style-type: none"> <li>A. Batman</li> <li>B. Superman</li> <li>C. Aquaman</li> </ol> <p>Enter your answer: b</p> <p>B</p> <p>B</p> <p>Your total score is 46!</p> <p>46</p>                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| 11       | <p>Your total score is 46!</p> <p>46</p>                                                                                                                                                                                                                                                                                                                              |       |    |        |    |          |    |          |   |      |    |         |    |
| 12       | <p>Enter your answer: d</p> <p>D is not an option</p> <p>Enter your answer: <input type="text"/></p>                                                                                                                                                                                                                                                                  |       |    |        |    |          |    |          |   |      |    |         |    |
| 13       | <p>*****</p> <p>LEADERBOARD</p> <p>*****</p> <table> <tr><td>Bob10</td><td>23</td></tr> <tr><td>Mike88</td><td>12</td></tr> <tr><td>Sophia15</td><td>20</td></tr> <tr><td>Duncan77</td><td>6</td></tr> <tr><td>Mia5</td><td>40</td></tr> <tr><td>Molly15</td><td>46</td></tr> </table> <p>*****</p>                                                                   | Bob10 | 23 | Mike88 | 12 | Sophia15 | 20 | Duncan77 | 6 | Mia5 | 40 | Molly15 | 46 |
| Bob10    | 23                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Mike88   | 12                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Sophia15 | 20                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Duncan77 | 6                                                                                                                                                                                                                                                                                                                                                                     |       |    |        |    |          |    |          |   |      |    |         |    |
| Mia5     | 40                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |
| Molly15  | 46                                                                                                                                                                                                                                                                                                                                                                    |       |    |        |    |          |    |          |   |      |    |         |    |



|    |                                                                                                                                                                                                                                          |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 14 | <pre> *****                                 LEADERBOARD *****  Molly15          46 Mia5             40 Bob10            23 Sophia15         20 Mike88           12 Duncan77         6 Do you want to leave leaderbaord? YES or NO </pre> |
| 15 | <pre> *****                                 WELCOME TO THE FILM QUIZ *****  Please choose from the following options: 1. Instructions 2. Play Game 3. Leaderboard 4. Exit Game - </pre>                                                  |
| 16 | <pre> Please choose from the following options: 1. Instructions 2. Play Game 3. Leaderboard 4. Exit Game 2 *****                                  STARTING GAME... </pre>                                                                |
| 17 |                                                                                                                                                                                                                                          |
| 18 | <pre> What are Willy Wonka's helpers called? A. Ewoks B. Minions C. Oopma Loompas D. Skip question </pre>                                                                                                                                |
| 19 | <pre> Enter your answer: c C C </pre>                                                                                                                                                                                                    |
| 20 | <pre> Your total score is 46! 46 </pre>                                                                                                                                                                                                  |
| 21 | <pre> *****                                 LEADERBOARD *****  Molly15          46 Mia5             40 Bob10            23 Sophia15         20 Mike88           12 Duncan77         6 </pre>                                             |

| <i>End-User Requirements</i>                                                                                                     | <i>Description of test and any errors</i>                                                                                     | <i>Solution</i>                                                                                                        |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| 1. The user should be welcomed to the game with a start screen.                                                                  | The program successfully displays a welcome message and start screen.                                                         | Not required                                                                                                           |
| 2. The user should be able to view a leaderboard.                                                                                | The user can select to see the leaderboard before they play and after. However, it would not update to include their name and | Not required                                                                                                           |
| 3. The user should be able to read the rules of the quiz.                                                                        | <del>The</del> user can view the rules of the game by selecting them on the options menu on processGame()                     | Not required                                                                                                           |
| 4. The user should be able to exit the program.                                                                                  | The user can select to exit the game on the options menu processGame().                                                       | Not required                                                                                                           |
| 5. The user must be able to enter a username before they begin the                                                               | The user can successfully enter username meeting all requirements before the game.                                            | Not required                                                                                                           |
| 6. The user must be able to select their difficulty level from easy, medium, and hard.                                           | The user can select their own difficulty level.                                                                               | Not required                                                                                                           |
| 7. The user shall be asked 15 random questions.                                                                                  | The user is successfully asked 15 random questions from their selected difficulty level.                                      | Not required                                                                                                           |
| 8. The user should be asked a different set of questions each time they play.                                                    | The program has 30 questions to choose from and so it successfully asks different questions every time.                       | Not required                                                                                                           |
| 9. The user must be able to select one answer from a choice of 3.                                                                | When you selected the easy level, you only had options B, C, & D to choose from.                                              | I had accidentally deleted the line of code that printed this. I added it back and the user was given 3 options again. |
| 10. The user should be able to skip one question, but without exiting the program or losing points. they can only use this once. | The user is able to skip a question once to                                                                                   | Not required                                                                                                           |

| Test | Evidence                                                                                                                                                                                              |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <pre> *****                                 WELCOME TO THE FILM QUIZ *****  Please choose from the following options: 1. Instructions 2. Play Game 3. Leaderboard 4. Exit Game </pre>                 |
| 2    | <pre> *****                                 LEADERBOARD *****  Molly15          46 Mia5             40 Bob10            23 Sophia15         20 Mike88           12 Duncan77         6 </pre>          |
| 3    |                                                                                                                                                                                                       |
| 4    |                                                                                                                                                                                                       |
| 5    | <pre> Enter a username: Molly15 *****                                  Good Luck Molly15!  ***** </pre>                                                                                               |
| 6    | <pre> Please select difficulty level: 1. Easy 2. Medium 3. Hard 1 You have selected level 1 </pre>                                                                                                    |
| 7    |                                                                                                                                                                                                       |
| 8    |                                                                                                                                                                                                       |
| 9    | <pre> What are Willy Wonka's helpers called? A. Ewoks B. Minions C. Oopma Loompas D. Skip question Enter your answer: c C C </pre>                                                                    |
| 10   | <pre> In "SpongeBob SquarePants" what type of creature is Patrick? A. Whale B. Starfish C. Squid D. Skip question Enter your answer: d D B In the Ice Age movies what kind of animal is Manny? </pre> |

## 4.4 Full System Testing

| <i>Step</i>                  | <i>Input</i> | <i>Process</i>                                  | <i>Output</i>                                                                                              | <i>Expected Results</i>                                                                                                                                                                                                   | <i>Actual Result</i>                                                                      |
|------------------------------|--------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|
| 1. Welcome message           | 2            |                                                 | Please choose from the following options:<br>1.Instructions<br>2.Play Game<br>3.Leaderboard<br>4.Exit Game | Program continues and start the game.                                                                                                                                                                                     | Program continues and start the game.                                                     |
| 2. Instructions              | yes          |                                                 | Do you understand the rules? YES or NO                                                                     | User reads the instructions of the game. They indicate that they understand by either entering yes or no. If the answer is YES the program continues to the home page. If NO then it tells the user to have another look. | Program continues to home page.                                                           |
| 3. Choose level              | 1            |                                                 | Please select difficulty level:<br>1.Easy 2.Medium<br>3.Hard You have selected level 1                     | The user selects their difficulty level by entering either 1, 2, or 3. The program should then ask for username and continue the game with correct questions.                                                             | User enters 1 (easy) and the program continues to ask for username and correct questions. |
| 4. Enter username            | Molly15      |                                                 | Enter a username:                                                                                          | The program store's username as Molly15.                                                                                                                                                                                  | The program stores username as Molly15.                                                   |
| 5. Play game / Enter Answers | C            | Compare score and add/subtract points to score. | What are Willy Wonka's helpers called? A.Ewoks<br>B.Minions<br>C.Oompa Loompas                             | The program compares users' answers to the correct answer and displays each one next to each other.                                                                                                                       | The user enters the correct answer C and adds the 5 points to score.                      |

|                                         |     |                                       |                                                                                                                       |                                                                                                                                |                                                                                                                          |
|-----------------------------------------|-----|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|
|                                         |     |                                       | D.Skip Question<br>C<br>C                                                                                             | If it's correct add 5 points to total points, if it's wrong -1 point.                                                          |                                                                                                                          |
| 6. Skip Question                        | D   |                                       | In SpongeBob SquarePants what type of creature is Patrick?<br>A.Whale<br>B.Starfish<br>C.Squid D.Skip Question D<br>B | The program accepts the answer and displays the correct answer anyways. The program should then continue to the next question. | The program accepts the answer and displays the correct answer anyways. The program then continues to the next question. |
| 7. Display total score                  |     |                                       | Your total score is 46!                                                                                               | The program displays the total score.                                                                                          | The program displays the total score.                                                                                    |
| 8. Go to leaderboard                    | yes |                                       | Do you want to check the leaderboard? YES or NO                                                                       | The program displays the leaderboard.                                                                                          | The program displays the leaderboard.                                                                                    |
| 9. Store name and score on leaderboard. |     | Add score and username to leaderboard |                                                                                                                       | Leaderboard is updates with new score and username                                                                             | Leaderboard was updated with new score and username                                                                      |
| 10. Display leaderboard and sort.       |     |                                       | Molly15 46<br>Mia5 40<br>Bob10 23<br>Sophia15 20<br>Mike88 12<br>Duncan77 6                                           | Leaderboard is displayed with user's username and score and sorted.                                                            | Leaderboard is displayed with user's username and score and sorted.                                                      |

| Step | Evidence                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1    | <pre> *****                                 WELCOME TO THE FILM QUIZ *****  Please choose from the following options: 1. Instructions 2. Play Game 3. Leaderboard 4. Exit Game 2 *****                                  STARTING GAME... </pre>                                                                                                                                                                                                                                    |
| 2    | <pre> 2. You will be asked 15 random multiple choice questions 3. Recieve +5pts for every correct answer, -lpts for every wrong answer 4. If you get a streak of 5 correct answers, you'll get an additional 3pts 5. You will have 1 chance to skip a question if you dont know the answer 6. After you have finished, look for your name on the leaderboard Do you understand the rules? YES or NO yes Bob *****                                  WELCOME TO THE FILM QUIZ </pre> |
| 3    | <pre> Please select difficulty level: 1. Easy 2. Medium 3. Hard 1 You have selected level 1 Enter a username: Molly15 *****                                  Good Luck Molly15! </pre>                                                                                                                                                                                                                                                                                             |
| 4    | <pre> Enter a username: Molly15 *****                                  Good Luck Molly15! </pre>                                                                                                                                                                                                                                                                                                                                                                                   |
| 5    | <pre> What are Willy Wonka's helpers called? A. Ewoks B. Minions C. Oopma Loompas D. Skip question Enter your answer: c C C </pre>                                                                                                                                                                                                                                                                                                                                                 |
| 6    | <pre> In "SpongeBob SquarePants" what type of creature is Patrick? A. Whale B. Starfish C. Squid D. Skip question Enter your answer: d D B </pre>                                                                                                                                                                                                                                                                                                                                  |
| 7    | <pre> Your total score is 46! 46 </pre>                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 8    | <pre> Do you want to check the Leaderboard? YES or NO yes *****                                  LEADERBOARD  ***** </pre>                                                                                                                                                                                                                                                                                                                                                         |
| 9    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

|    |                                                                                                                                                                                                                              |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|    | <pre> *****                                 LEADERBOARD ***** Bob10           23 Mike88          12 Sophia15        20 Duncan77         6 Mia5            40 Molly15         46 ***** </pre>                                 |
| 10 | <pre>                                 LEADERBOARD ***** Molly15         46 Mia5            40 Bob10           23 Sophia15        20 Mike88          12 Duncan77         6 Do you want to leave leaderbaord? YES or NO </pre> |

## 4.5 Unexpected Inputs Testing

| <i>Test</i>             | <i>Input</i> | <i>Expected Response</i>                                          | <i>Actual response</i>                                            |
|-------------------------|--------------|-------------------------------------------------------------------|-------------------------------------------------------------------|
| Welcome message         | 1            | Program displays instructions                                     | Program displays instructions                                     |
| Welcome message         | 2            | Program proceeds to start game                                    | Program proceeds to start game                                    |
| Welcome message         | 3            | Program displays leaderboard                                      | Program displays leaderboard                                      |
| Welcome message         | 4            | Program stops running                                             | Program stops running                                             |
| Welcome message         | -7           | Program displays error message and asks user to try again         | Program displays error message and asks user to try again         |
| Welcome message         | 6            | Program displays error message and asks user to try again         | Program displays error message and asks user to try again         |
| Instructions understand | no           | Tells user to have another look and asks if they understand again | Tells user to have another look and asks if they understand again |
| Instructions understand | yes          | Program brings you to welcome message/options menu                | Program brings you to welcome message/options menu                |
| Instructions understand | nope         | Program displays error message and asks user to try again         | Program displays error message and asks user to try again         |
| Difficulty level        | 1            | Program proceeds to ask username and easy questions               | Program proceeds to ask username and easy questions               |
| Difficulty level        | 2            | Program proceeds to ask username and medium questions             | Program proceeds to ask username and medium questions             |
| Difficulty level        | 3            | Program proceeds to ask username and hard questions               | Program proceeds to ask username and hard questions               |
| Difficulty level        | 6            | Program displays error message and asks user to try again         | Program displays error message and asks user to try again         |
| Difficulty level        | -9           | Program displays error message and asks user to try again         | Program displays error message and asks user to try again         |
| Username                | Molly15      | Program proceeds to questions                                     | Program proceeds to questions                                     |



|                                   |         |                                                           |                                                           |
|-----------------------------------|---------|-----------------------------------------------------------|-----------------------------------------------------------|
| Username                          | molly15 | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Username                          | Molly   | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Username                          | molly   | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Username                          | 15      | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Answer                            | a       | Program proceeds to ask next question                     | Program proceeds to ask next question                     |
| Answer                            | b       | Program proceeds to ask next question                     | Program proceeds to ask next question                     |
| Answer                            | c       | Program proceeds to ask next question                     | Program proceeds to ask next question                     |
| Answer                            | d       | Program proceeds to ask next question                     | Program proceeds to ask next question                     |
| Answer                            | f       | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Answer                            | 2       | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Use skip a second time            | d       | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Do you want to check leaderboard? | yes     | Program displays leaderboard with new username and score  | Program displays leaderboard with new username and score  |
| Do you want to check leaderboard? | no      | Program brings you to welcome message/options menu        | Program brings you to welcome message/options menu        |
| Do you want to check leaderboard? | a       | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Do you want to check leaderboard? | 5       | Program displays error message and asks user to try again | Program displays error message and asks user to try again |
| Do you want to leave leaderboard? | yes     | Program brings you to welcome message/options menu        | Program brings you to welcome message/options menu        |

|                                   |      |                                                                     |                                                                     |
|-----------------------------------|------|---------------------------------------------------------------------|---------------------------------------------------------------------|
| Do you want to leave leaderboard? | no   | Tells user to have another look and asks if you want to leave again | Tells user to have another look and asks if you want to leave again |
| Do you want to leave leaderboard? | Yeah | Program displays error message and asks user to try again           | Program displays error message and asks user to try again           |
| Do you want to leave leaderboard? | 12   | Program displays error message and asks user to try again           | Program displays error message and asks user to try again           |

## 4.6 Results of Test Cases

| Test Case | Description of task to be performed by participants                                                                                          |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Main Menu – When the program first starts the user is asked to select which page they would like to go to.                                   |
| 2         | View Instructions – The program will display a set of rules and the user is asked if they understand and would like to proceed.              |
| 3         | Select Difficulty – The user is asked to select their difficulty                                                                             |
| 4         | Username – User is asked to create a username including numbers and letters. If these are not included an error message should be displayed. |
| 5         | Entering Answer – User has 3 multiple choice answers to select from, plus if it hasn't already been used, the option to skip a question.     |
| 6         | Display Leaderboard – The user should try and find their score from the game and see how well they had done compared to other players.       |

*Mia Williams:*

| Test Case | Results of performed task                                                                                                                                                                                                                     |
|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Mia found it easy to navigate the main menu and select which page they wanted to go to.                                                                                                                                                       |
| 2         | Mia was able to select the instructions of the main menu and found the rules simple to understand. She typed in lowercase when answering if she understood, but it was changed to uppercase automatically, and she was sent to the main menu. |
| 3         | Just like the main menu, Mia found it straight forward to select the difficulty she wanted to play at. She selected Medium as she felt she had a good amount of movie knowledge.                                                              |
| 4         | Mia entered her username and found it easy to understand. However, at first, she didn't include an uppercase letter. The error message popped up and she created another one that met the requirements.                                       |
| 5         | Mia found the layout of questions easy to understand. She entered all her answers in lowercase, but this was automatically corrected. She also tried to use her skip pass twice, but this didn't work due to the input validation.            |
| 6         | Mia effortlessly found her name and score on the leaderboard and was in the top 10 scorers.                                                                                                                                                   |

*Duncan Hamilton:*

| Test Case | Results of performed task                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1         | Duncan found the main menu simple to understand, however he selected to play the game before looking at the instructions and couldn't exit.                                                                                                                                                                                                                                                                                                                        |
| 2         | After Duncan had finished playing a round of the quiz, he went back to look at the instructions. It took him a while to look through and typed NO when asked if he understood. He read through them once more and then typed YES. He found the page itself easy to understand.                                                                                                                                                                                     |
| 3         | Duncan easily selected his difficulty level. He selected easy as he had little knowledge of films.                                                                                                                                                                                                                                                                                                                                                                 |
| 4         | Duncan just typed in his real name when asked for a username. An error message was displayed, and he read the instructions. After this he created a real username following all the requirements.                                                                                                                                                                                                                                                                  |
| 5         | Duncan found the layout of questions simple to understand. When entering his answer to the first question he typed in the number 2, as all the previous options he had been given were numbers, not characters. The message "2 is not an option" was displayed and he retyped the letter B. Duncan at one point accidentally entered the letter S, but the error message was displayed, and he was able to retry. Duncan never used the option to skip a question. |
| 6         | Duncan was able to find his name and score near the bottom of the leaderboard, scoring a total of 6 points.                                                                                                                                                                                                                                                                                                                                                        |

# Evaluation

## 5.1 Fitness for Purpose

My program is fit for purpose. I have completed all my testing and the results show that I have met all the functional and end-user requirements. My program gives users 4 options when they first start; instructions, play game, leaderboard, exit game. They can read and say if they understand the rules. Users can select a difficulty level and create a username that meets the requirements. They are then asked 15 random questions and these questions should be different every time they play. In addition, they can skip 1 question of they don't know the answer. The user is told their final score and they can find themselves on the leaderboard. This leaderboard adds new scores and names as well as sorting the scores from highest to lowest.

| <i>Functional Requirements</i>                                                | <i>Complete</i> |
|-------------------------------------------------------------------------------|-----------------|
| User will select what page they would like to go to.                          | ✓               |
| The user will say if they understand the rules.                               | ✓               |
| The user will enter their username and it should be stored on the leaderboard | ✓               |
| The user will select their difficulty level.                                  | ✓               |
| User will select their answer.                                                | ✓               |
| User will select if they would like to check the leaderboard.                 | ✓               |
| Validate username to check for numbers, and letters.                          | ✓               |
| Validate users selected page.                                                 | ✓               |
| Validate YES and NO inputs.                                                   | ✓               |
| Generate 15 random questions from selected difficulty level.                  | ✓               |
| Validate users answer.                                                        | ✓               |
| Add and subtract points to/from total score.                                  | ✓               |
| Check if user has already skipped question.                                   | ✓               |
| Calculate user's total score.                                                 | ✓               |
| Add users score and name to leaderboard.                                      | ✓               |
| Sort leaderboard from highest to lowest score.                                | ✓               |
| Display welcome message.                                                      | ✓               |
| Display selected pages.                                                       | ✓               |
| Display error messages.                                                       | ✓               |
| 15 questions will be displayed with 3 answers to choose from.                 | ✓               |
| Display if the answer is right or wrong.                                      | ✓               |
| Display users total score.                                                    | ✓               |

|                                                         |   |
|---------------------------------------------------------|---|
| Display leaderboard with matching scores and usernames. | ✓ |
|---------------------------------------------------------|---|

| <i>End-User Requirements</i>                                                        | <i>Completed</i> |
|-------------------------------------------------------------------------------------|------------------|
| The user should be welcomed to the game with a start screen                         | ✓                |
| The user should be able to view a leaderboard.                                      | ✓                |
| The user should be able to read the rules of the quiz.                              | ✓                |
| The user should be able to exit the program.                                        | ✓                |
| The user must be able to enter a username before they begin the quiz.               | ✓                |
| The user must be able to select their difficulty level from easy, medium, and hard. | ✓                |
| The user shall be asked 15 random questions.                                        | ✓                |
| The user should be asked different questions every time they play.                  | ✓                |
| The user must be able to select one answer from a choice of 3.                      | ✓                |
| The user should be able to skip one question, but they can only use this once       | ✓                |

## 5.2 Maintainability

I believe my program is maintainable. Throughout the process of writing my code I have used multiple techniques to make my code easy to read and understand.

### Meaningful Variable Names

One technique I used was making sure all my variable names were meaningful. Their names were decided based on the role they had in certain tasks or exactly what the user was inputting.

*Example:*

```
String username = "";
String userAnswer = "";
int totalPoints = 0;
int skip = 1;
boolean vldAnswer = false;
boolean nameValid = false;
```

### Commentary

I also added commentary throughout my program, describing what each line of code done, as well as adding notes for things that I had to add and test. This made it easier as when I came back to look at my code after a break, I could read these notes and understand where I had left it and what I had to do next. It made the process run quicker and smoothly.

*Example:*

```
// GENERATE 15 RANDOM NUMBERS BETWEEN 0-30, READ THOSE QUESTIONS int
randomInteger = (((int) (Math.random() * (30 - 0))) + 0); vldAnswer = false; //RESET
System.out.println("\u001B[37m" + questionsTable[randomInteger].Question); //DISPLAY
QUESTIONS AND ANSWERS
System.out.println("B. " + questionsTable[randomInteger].Option2);
System.out.println("C. " + questionsTable[randomInteger].Option3);
if (skip == 1){ // IF SKIP HASNT BEEN USED THEN DISPLAY
 System.out.println("D. " + "Skip question");
} //END IF
```

### White Lines

Furthermore, I added indentation and white lines throughout my code. This made it much easier to read and understand my code as it added more structure. After I had finished with a block of code relating to a certain task, I would leave a blank space to show that I had completed this and was starting a new one, just like you would when writing a story normally.

*Example:*

```
do{//START VALIDATION
 System.out.print("Enter your answer: ");
 userAnswer = keyboard.nextLine();
 userAnswer = userAnswer.toUpperCase(); //NEW SKILL

 if (userAnswer.equals("A") || userAnswer.equals("B") || userAnswer.equals("C") ||
 userAnswer.equals("D") && skip == 1){ vldAnswer = true; //SET TO TRUE
 }else{ System.out.println(userAnswer + " is not an option");

 } //END ELSE
} //END DO
while(!vldAnswer); //WHILE vldAnswer IS FALSE
```



## 5.3 Robustness

The robustness of my code is deemed by how well I manage unexpected inputs. Throughout my program I have dealt with unexpected inputs and therefore I would conclude that my program is robust.

To test that my program could deal with an unexpected input when the user selects their page, I entered the number 6. The program then displayed a message asking the user to reenter a number between 1 and 4.

Secondly, I tested that the program could deal with an unexpected input when it asks the user if they understand the rules. I entered the letter Y to test this, and an error message was displayed. I also tested that my program could deal with an unexpected input when it asks the user to select a difficulty level. I entered the number minus 3. The program then responded asking the user to re-enter a number between 1 and 3.

Furthermore, I tested that when the user creates their username, the program could deal with unexpected input. I entered my name 'molly' on the first try, then entered 'Molly' the second time. Both times an error message was displayed asking the user to make sure there were lowercase, uppercase and numbers included in their username and to retry.

My final test was to check that the program could deal with an unexpected input when the user enters their answer to a quiz question. This answer had to be in capital letters, so I tested that my `.toUpperCase()` method worked and it did. I entered a letter that was not an option 'h', It was changed to a capital, but an error message was display and I was asked to retry. I also tried typing the number 5 and an error message was displayed. Additionally, I had to check it didn't accept the letter D twice. I skipped the question on my 3<sup>rd</sup> try and it worked but when I entered it a second time, it did not accept this answer.