

**FACULTY OF SCIENCE AND TECHNOLOGY  
COURSEWORK FOR THE  
BSC (HONS) INFORMATION SYSTEMS; YEAR 1 BSC  
(HONS) INFORMATION TECHNOLOGY; YEAR 1 BSC  
(HONS) COMPUTER SCIENCE; YEAR 1  
BSC (HONS) INFORMATION TECHNOLOGY (COMPUTER NETWORKING AND  
SECURITY); YEAR 1  
BSC (HONS) SOFTWARE ENGINEERING; YEAR 1  
BIS(HONS) IN MOBILE COMPUTING WITH ENTREPRENEURSHIP; YEAR 1  
ACADEMIC SESSION 2021; SEMESTER 2,3,4  
PRG1203: OBJECT ORIENTED PROGRAMMING FUNDAMENTALS  
DEADLINE: **30 NOVEMBER 2021 11:59PM****

**INSTRUCTIONS TO CANDIDATES**

- This assignment will contribute 20% to your final grade.
- This is a group (maximum 5 students) assignment

**IMPORTANT**

The University requires students to adhere to submission deadlines for any form of assessment. Penalties are applied in relation to unauthorized late submission of work.

**Any work submitted after the deadline, or after any period of extension granted shall be marked as a Fail or awarded a zero.**

**Academic Honesty Acknowledgement**

"I Jesrene Cheoy Ka Yan, Heng Shi Han, Landy Ko Zi Ying, Liaw Jia Hui, Teo Yen Ting (student name). verify that this paper contains entirely my own work. I have not consulted with any outside person or materials other than what was specified (an interviewee, for example) in the assignment or the syllabus requirements. Further, I have not copied or inadvertently copied ideas, sentences, or paragraphs from another student. I realize the penalties (*refer student handbook undergraduate programme*) for any kind of copying or collaboration on any assignment."

Jesrene Cheoy Ka Yan, Heng Shi Han, Landy Ko Zi Ying, Liaw Jia Hui, Teo Yen Ting 25/11/2021 (Student's signature /Date)

Group Number: 8

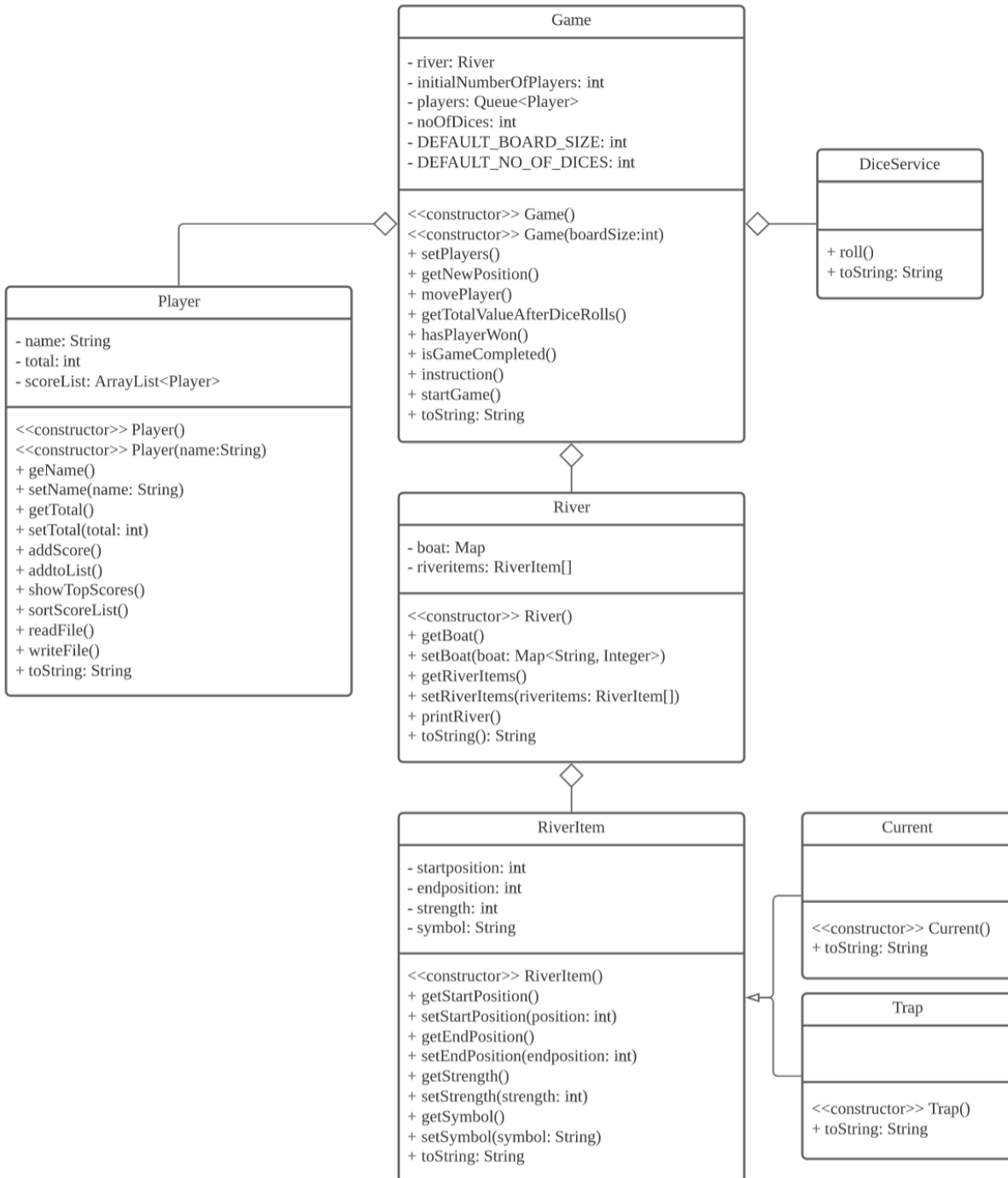
Team Members:

No	Name	Student ID	Contribution %
1	Jesrene Cheoy Ka Yan	20013546	20
2	Heng Shi Han	21022942	20
3	Landy Ko Zi Ying	20043923	20
4	Liaw Jia Hui	20031191	20
5	Teo Yen Ting	20042834	20

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## D) CLASS RELATIONSHIP DIAGRAM



## II) TEST RESULT

### **a. Screenshots taken from the first round of the game:**

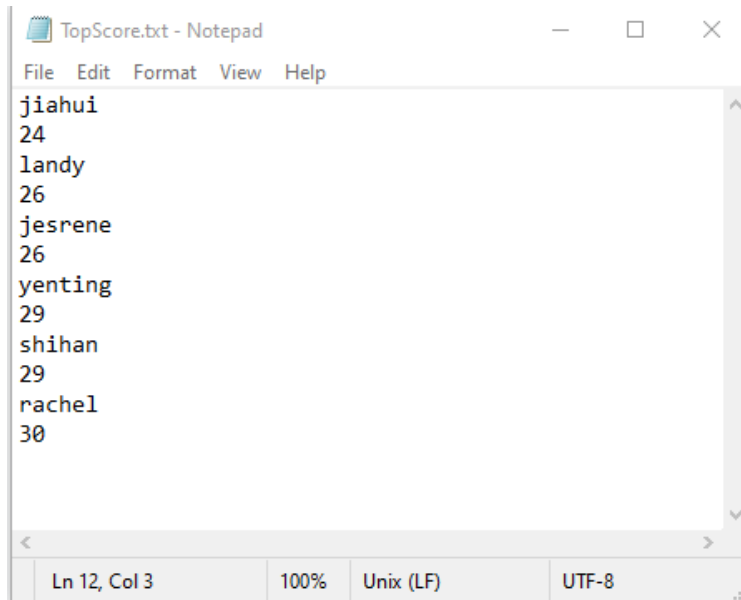


Figure 1

Figure 1 is a text file named TopScore.txt which shows the player's names and scores. The scores are arranged in ascending order and the names of each player are displayed on top of their scores. Player's scores are the same as the turns they each take to finish the game.



Figure 2

Although there are 6 names on the TopScore text file, Figure 2 shows the scoreboard in the java program that will display only the Top 5 scores in ascending order. Then, there is a banner and a brief introduction for the game for the players who are not familiar with the boat racing game.

```

River: [Start] .....C.....C...#...C....#.....#...C.....#.....C..#CC...#..C.....C.....C [End]
Location:      012345678911111111112222222222333333333333444444444455555555556666666666777777777788888888889999999999
                012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789
Enter name of player 1: Jes
Enter name of player 2: ShiHan

```

Figure 3

Figure 3 shows that the program will display the game board which shows the river. There are a total of 100-column tracks, as shown below the river display of 0 to 99 to display the length of the river. The start and end of the river are written in the program, the symbol “.” means there are no traps or currents in that location. The traps and currents are placed randomly in the river. The symbol “#” is the location of the traps, whereas “C” represents the location of each current. Then, the program prompts player 1 and player 2 to enter their names.

```

----- Game Start -----
Jes rolled a 1 and moved from 0 to 1
ShiHan rolled a 3 and moved from 0 to 3
Jes rolled a 6 and moved from 1 to 7
ShiHan rolled a 3 and moved from 3 to 6
Jes rolled a 3 and moved from 7 to 10
ShiHan rolled a 6 and moved from 6 to 12
Jes rolled a 6 and moved from 10 to 16
ShiHan rolled a 2 and moved from 12 to 14
Jes rolled a 5 and moved from 16 to 21
                ~~~~~ShiHan stepped on a current, BOAT MOVES 2 STEPS FORWARD!!!~~~~~
ShiHan rolled a 6 and moved from 14 to 22
Jes rolled a 5 and moved from 21 to 26
ShiHan rolled a 4 and moved from 22 to 26
Jes rolled a 3 and moved from 26 to 29
ShiHan rolled a 3 and moved from 26 to 29
Jes rolled a 1 and moved from 29 to 30

```

Figure 4

Figure 4 is where the game begins. After player 2 enters their name, the game starts automatically. The player takes their turn to roll the dice. Each turn, the program displays the dice value with the old and new position of the boat. If the player stepped on a trap or current, a message with the number of steps the player needed to be moved is displayed. If the player stepped on a trap, the player needed to move backwards. If the player stepped on a current, the player moved forwards.

```

ShiHan rolled a 2 and moved from 29 to 31
~~~~~Jes stepped on a trap, BOAT MOVES 1 STEP BACKWARDS!!! ~~~~~
Jes rolled a 4 and moved from 30 to 33
ShiHan rolled a 4 and moved from 31 to 35
Jes rolled a 2 and moved from 33 to 35
ShiHan rolled a 4 and moved from 35 to 39
Jes rolled a 5 and moved from 35 to 40
ShiHan rolled a 5 and moved from 39 to 44
Jes rolled a 2 and moved from 40 to 42
ShiHan rolled a 1 and moved from 44 to 45
Jes rolled a 4 and moved from 42 to 46
~~~~~ShiHan stepped on a trap, BOAT MOVES 3 STEPS BACKWARDS!!!~~~~~
ShiHan rolled a 2 and moved from 45 to 44
Jes rolled a 3 and moved from 46 to 49
ShiHan rolled a 5 and moved from 44 to 49
Jes rolled a 3 and moved from 49 to 52
ShiHan rolled a 2 and moved from 49 to 51
Jes rolled a 4 and moved from 52 to 56
ShiHan rolled a 3 and moved from 51 to 54
~~~~~Jes stepped on a trap, BOAT MOVES 3 STEPS BACKWARDS!!!~~~~~
Jes rolled a 1 and moved from 56 to 54
ShiHan rolled a 2 and moved from 54 to 56
Jes rolled a 6 and moved from 54 to 60
ShiHan rolled a 5 and moved from 56 to 61
~~~~~Jes stepped on a current, BOAT MOVES 2 STEPS FORWARD!!!~~~~~
Jes rolled a 4 and moved from 60 to 66
~~~~~ShiHan stepped on a trap, BOAT MOVES 1 STEP BACKWARDS!!! ~~~~~
ShiHan rolled a 6 and moved from 61 to 66
Jes rolled a 6 and moved from 66 to 72
~~~~~ShiHan stepped on a trap, BOAT MOVES 1 STEP BACKWARDS!!! ~~~~~
ShiHan rolled a 1 and moved from 66 to 66
Jes rolled a 2 and moved from 72 to 74
ShiHan rolled a 6 and moved from 66 to 72
Jes rolled a 3 and moved from 74 to 77
ShiHan rolled a 6 and moved from 72 to 78
Jes rolled a 2 and moved from 77 to 79
~~~~~ShiHan stepped on a current, BOAT MOVES 5 STEPS FORWARD!!!~~~~~
ShiHan rolled a 4 and moved from 78 to 87
Jes rolled a 5 and moved from 79 to 84
ShiHan rolled a 2 and moved from 87 to 89
Jes rolled a 3 and moved from 84 to 87
ShiHan rolled a 1 and moved from 89 to 90
Jes rolled a 5 and moved from 87 to 92
ShiHan rolled a 2 and moved from 90 to 92
Jes rolled a 5 and moved from 92 to 97
ShiHan rolled a 4 and moved from 92 to 96
Jes rolled a 6 and moved from 97 to 100
----- Game Over -----
Jes wins the game!
Turns: 28
ShiHan lose the game!
Turns: 27

```

*Figure 5*

Some traps and currents are much stronger than the others. The stronger currents or traps will make the boat move more steps forward or backward. We have programmed the range of traps and currents, where the weakest trap or current is 1 step consequently going up to the strongest, 5 steps for the boat to move forward or backward. Figure 5 is an example of a strong current, ShiHan was at 77, she stepped on a current and moved 5 steps forward to 87.

```

----- Game Over -----
Jes wins the game!
Turns: 28
ShiHan lose the game!
Turns: 27
Would you like to play again? Enter Y or N: y

```

Figure 6

When the player enters “Y” or “y”, the score board will be shown before the next round of the boat racing game.

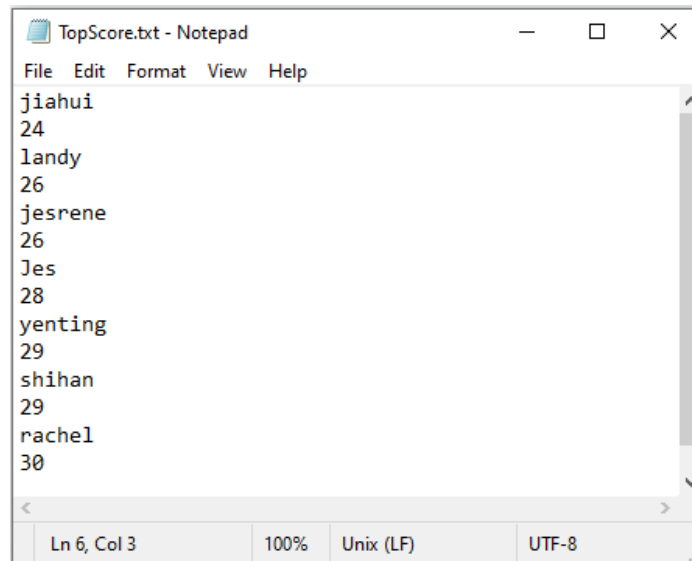


Figure 7

Since Jes won the game, the name “Jes” will be displayed in the TopScore text file.

**b. Screenshots taken from the second round of the game (continuous):**

```

----- SCORE BOARD -----
Name of players | Score
jiahui          | 24
landy           | 26
jesrene         | 26
Jes             | 28
yenting         | 29

```

Figure 8

The score board displays the first 5 scores from the TopScore.txt file, where the name “Jes” also appears.



```

-----
Welcome To Boat Racing Game
-----

Instructions:
The game is a two players game. At the beginning of the game, each player will be allocated with a boat.
During the game, the players take turn to throw the dice to decide how many steps should the boat move forward.
The river can be visualised as 100-columns track, which is filled with random number of traps(#) and currents(C).

-----Game Board-----

River: [Start] .....C#...#.#.....#.....#..C#.....C...C#.....C..C.....#..... [End]
Location: 0123456789111111112222222222333333333333444444444455555555556666666666777777777788888888889999999999
          0123456789012345678901234567890123456789012345678901234567890123456789012345678901234567890123456789

Enter name of player 1: Landy
Enter name of player 2: JiaHui

----- Game Start -----

Landy rolled a 6 and moved from 0 to 6
JiaHui rolled a 1 and moved from 0 to 1
Landy rolled a 5 and moved from 6 to 11
JiaHui rolled a 5 and moved from 1 to 6
Landy rolled a 2 and moved from 11 to 13
JiaHui rolled a 6 and moved from 6 to 12
Landy rolled a 2 and moved from 13 to 15
JiaHui rolled a 3 and moved from 12 to 15
Landy rolled a 4 and moved from 15 to 19
JiaHui rolled a 1 and moved from 15 to 16
Landy rolled a 5 and moved from 19 to 24
JiaHui rolled a 5 and moved from 16 to 21
Landy rolled a 5 and moved from 24 to 29
JiaHui rolled a 3 and moved from 21 to 24
Landy rolled a 2 and moved from 29 to 31

~~~~~JiaHui stepped on a trap, BOAT MOVES 1 STEP BACKWARDS!!! ~~~~~
JiaHui rolled a 3 and moved from 24 to 26
Landy rolled a 4 and moved from 31 to 35

~~~~~JiaHui stepped on a trap, BOAT MOVES 5 STEPS BACKWARDS!!!~~~~~

JiaHui rolled a 4 and moved from 26 to 25
Landy rolled a 2 and moved from 35 to 37
JiaHui rolled a 3 and moved from 25 to 28
Landy rolled a 4 and moved from 37 to 41
JiaHui rolled a 6 and moved from 28 to 34
Landy rolled a 1 and moved from 41 to 42
JiaHui rolled a 5 and moved from 34 to 39
Landy rolled a 4 and moved from 42 to 46
JiaHui rolled a 4 and moved from 39 to 43
Landy rolled a 1 and moved from 46 to 47
JiaHui rolled a 2 and moved from 43 to 45
Landy rolled a 4 and moved from 47 to 51

```

*Figure 9*

Figure 9 shows that JiaHui stepped on a weak trap, she rolled a 3, supposedly she will be moving to 27. However, there was a weak trap there and she had to move one step backwards. Therefore, her final position after stepping on that trap would be 26.

```

JiaHui rolled a 3 and moved from 45 to 48
Landy rolled a 5 and moved from 51 to 56
~~~~~JiaHui stepped on a trap, BOAT MOVES 2 STEPS BACKWARDS!!!~~~~~
~~~~~JiaHui stepped on a current, BOAT MOVES 5 STEPS FORWARD!!!~~~~~
JiaHui rolled a 6 and moved from 48 to 57
Landy rolled a 5 and moved from 56 to 61
JiaHui rolled a 1 and moved from 57 to 58
Landy rolled a 6 and moved from 61 to 67
JiaHui rolled a 6 and moved from 58 to 64
Landy rolled a 5 and moved from 67 to 72
JiaHui rolled a 5 and moved from 64 to 69
~~~~~Landy stepped on a current, BOAT MOVES 1 STEP FORWARD!!! ~~~~~
Landy rolled a 2 and moved from 72 to 75
JiaHui rolled a 3 and moved from 69 to 72
Landy rolled a 2 and moved from 75 to 77
~~~~~JiaHui stepped on a trap, BOAT MOVES 2 STEPS BACKWARDS!!!~~~~~
~~~~~JiaHui stepped on a current, BOAT MOVES 1 STEP FORWARD!!! ~~~~~
JiaHui rolled a 4 and moved from 72 to 75
Landy rolled a 6 and moved from 77 to 83
~~~~~JiaHui stepped on a trap, BOAT MOVES 2 STEPS BACKWARDS!!!~~~~~
~~~~~JiaHui stepped on a current, BOAT MOVES 1 STEP FORWARD!!! ~~~~~
JiaHui rolled a 1 and moved from 75 to 75
Landy rolled a 2 and moved from 83 to 85
JiaHui rolled a 2 and moved from 75 to 77
Landy rolled a 3 and moved from 85 to 88
JiaHui rolled a 3 and moved from 77 to 80
Landy rolled a 5 and moved from 88 to 93
JiaHui rolled a 1 and moved from 80 to 81
Landy rolled a 5 and moved from 93 to 98
~~~~~JiaHui stepped on a current, BOAT MOVES 1 STEP FORWARD!!! ~~~~~
JiaHui rolled a 3 and moved from 81 to 85
Landy rolled a 2 and moved from 98 to 100

```

Figure 10

In Figure 10, JiaHui rolled a 6 and moved from 54, but stepped on a trap and moved two steps backwards to 52, where 52 is a strong current, so it moves five steps forward to 57.

```
----- Game Over -----  
  
Landy wins the game!  
Turns: 27  
JiaHui lose the game!  
Turns: 26  
  
Would you like to play again? Enter Y or N: n  
Thanks for playing!
```

Figure 11

When the player enters “N” or “n”, the game stops.

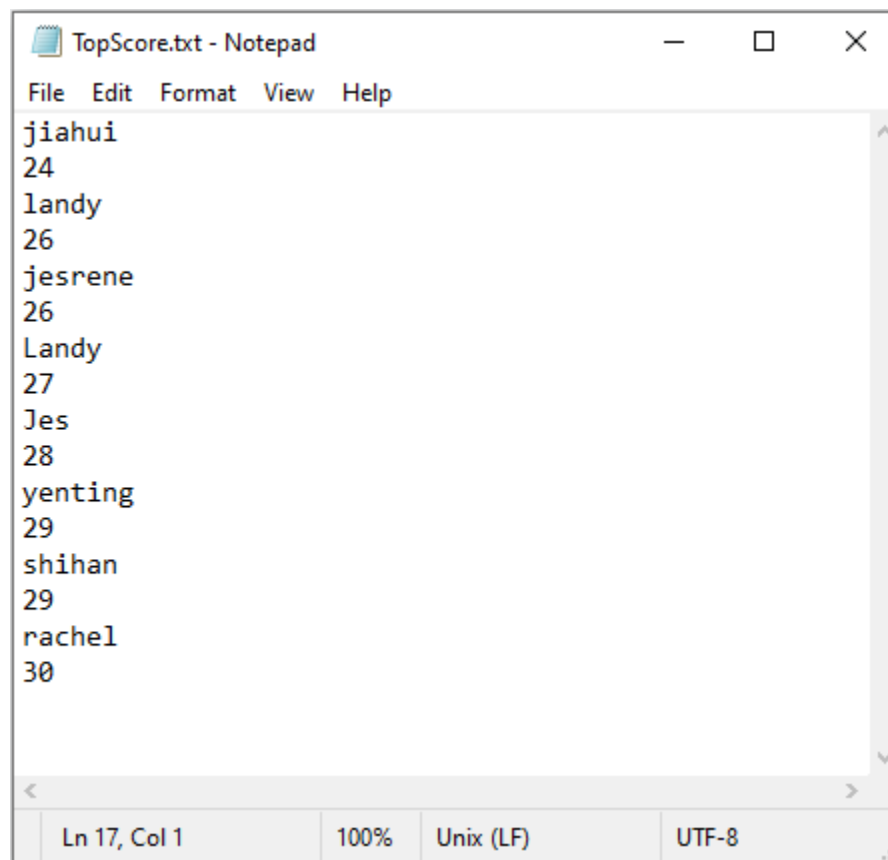


Figure 12

Since Landy won, the name “Landy” will be displayed in the TopScore text file.

### III) ADDITIONAL FUNCTIONALITY

```
package assignment;
import java.util.*;

public class Driver {
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        boolean playAgain = true;
        String response = "";

        while(playAgain) {
            Player.readFile(); //Check if Top Score file is available
            Game game = new Game();
            game.instruction();

            Player player1 = new Player();
            Player player2 = new Player();

            /**
             * ===== Prompts player 1 and player 2 to enter their names =====
             */
            List<Player> players = new ArrayList<Player>();
            System.out.print("\nEnter name of player 1: ");
            player1.setName(scanner.next());
            players.add(player1);
            System.out.print("Enter name of player 2: ");
            player2.setName(scanner.next());
            players.add(player2);

            /**
             * ===== Game starts here =====
             */
            game.setPlayers(players);
            game.startGame();

            /**
             * ===== Writes scores in the Top Scores file =====
             */
            Player.sortScoreList();
            Player.writeFile();

            /**
             * == Players are able to decide whether they would want to play again ==
             */
            System.out.print("Would you like to play again? Enter Y or N: ");
            response = scanner.next();

            if (response.equalsIgnoreCase("Y")){
                playAgain = true;
            }
            else {
                playAgain = false;
                System.out.println("Thanks for playing! ");
                scanner.close();
            }
        }
    }
}
```

The additional functionality we have is that the players are able to choose whether they want to play again after each round of the boat game. If the player wants to play again, they should type “Y” or “y” after the computer asks the question. After that, the program will keep looping from the while loop to start a new round until the player types “N” or “n”, which then stops the program and thank the player for playing.

The reason for adding this function is to make our game more convenient for users to play, as they do not have to run the game again and again after each game.