

A thick dark blue vertical bar runs down the left side of the page. A blue arrow-shaped banner points to the right from this bar, containing the date. In the bottom-left corner, several thin, curved lines in dark blue and light grey sweep upwards and to the right.

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Bowling Game

A Simulation Game

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1. INTRODUCTION

In today's world most of the humans uses laptops or personal machines. After working for long time on a machine the brain starts to feel some pressure which needs to be released in order to continue working for longer time. This application is a small and simple simulation of bowling game. This game allows player to play the bowling game in a simulation world. There game has 10 rounds with 2 toss each and max score that can be scored is 300 if the player scores 10 in each toss.

1.1 PURPOSE

The purpose of this application is basically to give the computer user a chance to release some pressure with a simple bowling simulation game. The motivation to play this game is to score a perfect game by scoring 10 in each round or toss. The application also serves as a programming task that is required for SAP job selection process.

1.2 SCOPE

This application is an end-to-end bowling game simulation. Once the player run this application with command on terminal / command prompt, it will open a menu containing different options. In case the user is interested in playing a simple simulation game, then pressing enter starts the game. As soon as the player presses enter key, the simulation game starts giving him results for each round and toss. Once all the rounds are finished, a tabular result for each round will be displayed and a total number of points is printed after it.

Also, if the player wants to replay the game, the player is asked if the player want to paly again or quit. One key press either closes the game or takes the player back to the menu.

1.3 OVERVIEW

This document will give you an easy walk over through the application and act as a guide with easy steps to use and maintain the application. Detailed overview of each feature and design is covered below in the System Overview. This application does not involve any database for now, but this is a future aspect of this application in case there is a need to store the high score change settings or more options., the flow of application is explained with data flow in use case diagram under System Architecture section. In the end, a visual look and feel of this application with the flow of application is shown. This application act as a perfect medium to kill sometime.

2. SYSTEM OVERVIEW

Bowling Simulation game is a nice way to implement and play bowling on laptop. Although it does not have any user interface yet but still it gives the feeling of playing live a play court. This application can help a lot of people to kill their free time with this application. The user can also choose to test the application if in case the user is unable to win the game as the test options are also integrated in the player menu.

The major options in the application menu are listed below:

1. Play Simulation Game with Random Score Generator
2. Test Game of Zeros (Gutter Game)
3. Test Game of Ones
4. Test Game of Spare
5. Test Game of Strike
6. Test a Perfect Game
7. Test Game of Spare in last Round
8. Test Game of Strike in last Toss last Round

Besides these options, when the game is finished, the application asked for user to input if the user wants to play again or want to quit the application. The user can choose any option from the above option when they choose to continue playing as the next screen is again the main menu.

Bowling simulation game is a Java based application which is developed using Eclipse IDE. The external library called Assert is used. This library is under the junit jar and the method used is assertEquals (long expected, long actual); This library helps in comparing the two values and throws error if the two values doesn't match. The error is known as Assert Error.

This application is exported as runnable java jar file. This makes this application as portable and can be run on any machine which has java installed on it. In case the java is not installed, follow below steps to install on Windows:

1. Download latest Java version from the link:
<https://docs.oracle.com/goldengate/1212/gg-winux/GDRAD/java.htm#BGBFJHAB>
2. Install Java on your machine.
3. Go to control Panel => Advanced System Settings => Environment Variables.
4. Select Path and add the path for Java on the machine. To locate Java path, go to C:/ => Program Files => Java => jdk (written with the version) => bin. It looks like this.
C:\Program Files\Java\jdk1.6.0_27\bin
5. Paste this path and click ok, if needed restart your machine
6. Go to Command Prompt and write java -version, click enter. It will show all the details about Java.

To run this jar file, first copy the jar file to the current working directory or change the directory to the place where the jar file is stored. Once, the path is correct, the user needs to go back to the terminal and write

```
java -jar Bowling Simulation Game.jar
```

This will start the application.

To explain the functionality of each menu option, the below information will be very helpful:

2.1 Play Simulation Game with Random Score Generator

This is the first option in the menu and this can be directly played by pressing enter key. As soon as the user presses enter key, it starts the program and random scores are generated for each toss. Depending on the score at the first toss, the rest of the toss and rounds are created.

This simulation of game covers all the cases where which can be achieved while playing bowling in real life. This includes a game of all zero pins tossed to a perfect game with 300 score.

Each of the cases of score are covered in below points which covers the test cases as they are also the part of the user menu.

2.2 Test Game of Zeros (The Gutter Game)

This is one of the scenarios from the real game which a player might have and this is the unluckiest case as the player did not score even one pin.

The rule for this test case is simple, in case the player is not able to hit any of the pins in 20 tosses then the user is not going to get anything in the score and zero is the score at the end of the game. This game is also known as Gutter Game as none of the toss could turn into a score.

2.3 Test Game of Ones

In this case, the player is able to hit only one pin in each round. In this case also, just like the game of zeros, the value 1 is in each toss. Once all the rounds are finished, all the values are summed together and the user scores only 20 points in total. This game also has no special or complex rules to follow.

2.4 Test Game of Spare

This is the first special case of the game scoring. In this case, the player scores ten in a round with two tosses together. As the player tosses all ten bowls in a round, he gets rewarded for that. The reward for this round is given by adding the score of first toss of next round in the current round tally. The total is finally updated in the end and the extra points are added in the total. This is also known as Spare.

2.5 Test Game of Strike

This is another special case where the player is able to score all the pins in first shot of a round and hence rewarded. The reward for this round is that the player gets bonus points added to his current round from the next two shots. This means that the next two toss the player will bowl, the score of both are added to the current round score. The final score is added in the end for this round with other rounds. This is also known as a Strike.

2.6 Test Perfect Game

This case is the case where the player tosses all ten pins in each toss. This makes him finally the winner as he scores the maximum score. This is a complex game as the player gets ten point for each of the shot. In the last round also as he scored perfect ten, the player gets two more tosses to play in order to complete the score of last round. This finally adds up to make a score of 300 for the player. This game is also known as a Perfect Game.

2.7 Test Game of Spare in Last Round

This is a case where the player scores a Spare in the last round. Hence as a reward, the player get one extra turn to play and the score of this turn is added to the last round of the game.

2.8 Test Game of Strike in Last Round

This is similar to the last case but since the player scored a strike in last round, the player get a chance to toss two more time and the score of both are added to the final round total and the grand total of the game.

3. SYSTEM ARCHITECTURE

3.1 ARCHITECTURAL DIAGRAM

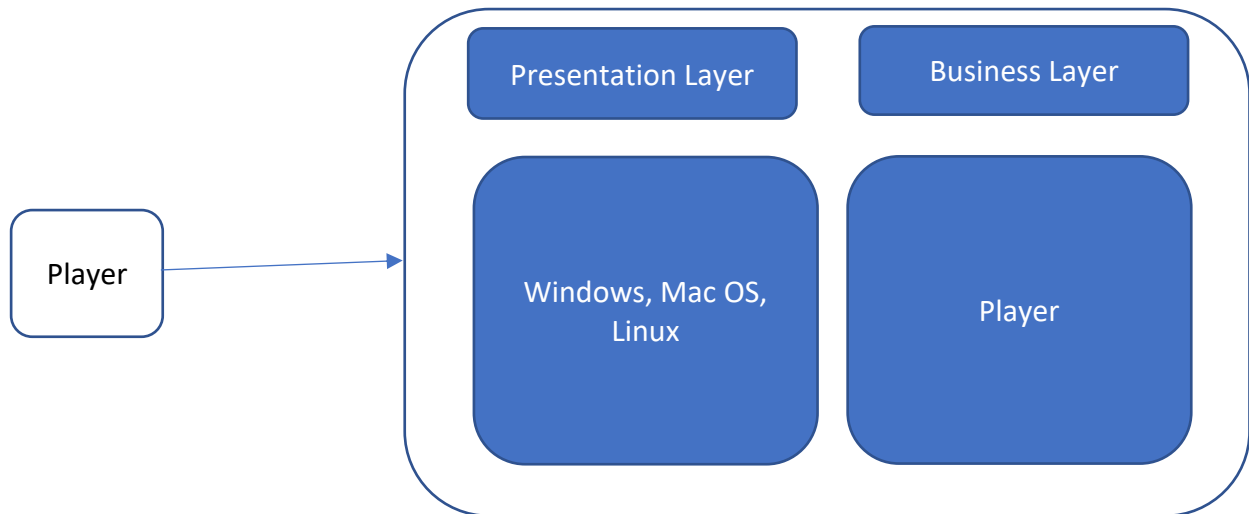


Figure 1: Bowling Simulation Game Architectural Diagram

3.2 DECOMPOSITION DESCRIPTION

3.2.1 USE CASE DIAGRAM

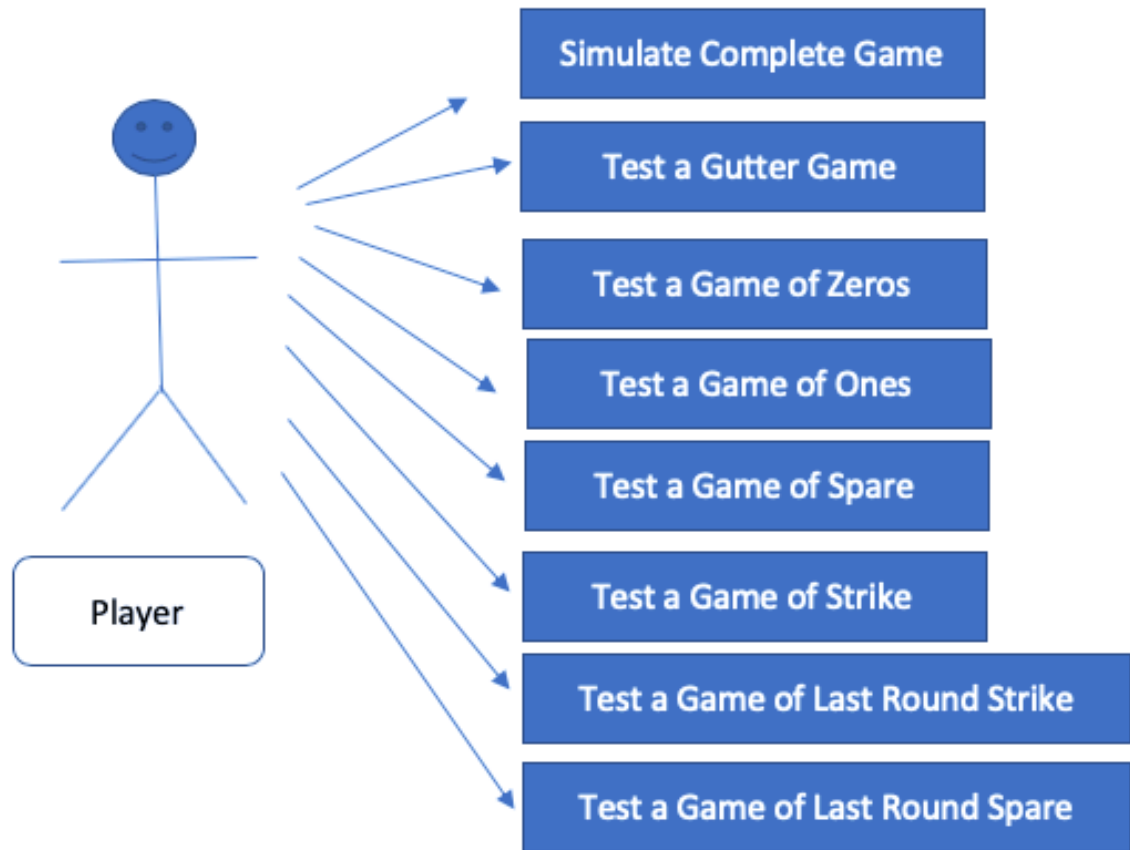


Figure 2: Use Case Diagram

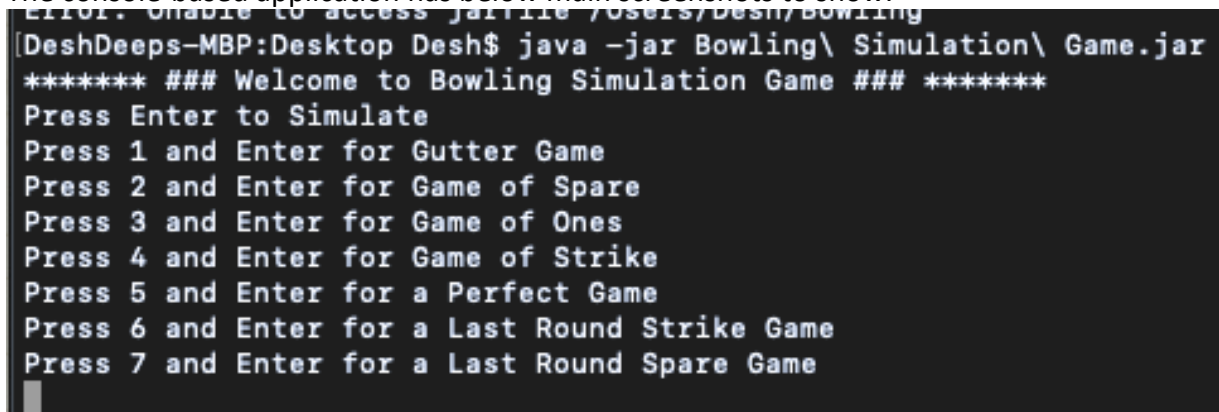
4. HUMAN INTERFACE DESIGN

It was always a priority to make the application simple to use as the program has no user interface and it runs on terminal. The plan for the future is to have a simple and elegant user interface for the simulation game. For now, the application runs on the console or command prompt and it returns a simple text-based menu to the user from which the user needs to select one option based on that the application will perform.

The next section contains some screenshot from the console-based application when it is running.

5. SCREENSHOTS

The console-based application has below main screenshots to show.



```
Error: Unable to access jarfile /Users/Desh/Bowling
[DeshDeeps-MBP:Desktop Desh$ java -jar Bowling\ Simulation\ Game.jar
***** ### Welcome to Bowling Simulation Game ### *****
Press Enter to Simulate
Press 1 and Enter for Gutter Game
Press 2 and Enter for Game of Spare
Press 3 and Enter for Game of Ones
Press 4 and Enter for Game of Strike
Press 5 and Enter for a Perfect Game
Press 6 and Enter for a Last Round Strike Game
Press 7 and Enter for a Last Round Spare Game
```

Figure 3: Main Menu

```

Press 5 and Enter for a Perfect Game
Press 6 and Enter for a Last Round Strike Game
Press 7 and Enter for a Last Round Spare Game

Bowling Simulation Begins.
previous_bowl_score: 9
Toss: 0 Score: 1
Toss: 1 Score: 1
Total Score till round: 0 Score: 1
Toss: 0 Score: 8
Toss: 1 Score: 9
Total Score till round: 1 Score: 10
Toss: 0 Score: 3
Toss: 1 Score: 9
Total Score till round: 2 Score: 19
Toss: 0 Score: 4
Toss: 1 Score: 5
Total Score till round: 3 Score: 24
Toss: 0 Score: 10
                                Nailed it!!! Its a Strike.
Toss: 1 Score: 19
                                Congratulation!!! You accomplished Spare.
Total Score till round: 4 Score: 43
Toss: 0 Score: 8
                                Points Updated to last Spare round = 8
Toss: 1 Score: 9
                                Total updated to last Strike round = 9
Total Score till round: 5 Score: 52
Toss: 0 Score: 5
Toss: 1 Score: 9
Total Score till round: 6 Score: 61
Toss: 0 Score: 6
Toss: 1 Score: 14
                                Congratulation!!! You accomplished Spare.
Total Score till round: 7 Score: 75
Toss: 0 Score: 4
                                Points Updated to last Spare round = 4
Toss: 1 Score: 19
                                Congratulation!!! You accomplished Spare.
Total Score till round: 8 Score: 94
Toss: 0 Score: 9
                                Points Updated to last Spare round = 9
Toss: 1 Score: 11
                                Congratulation!!! You accomplished Spare.
Total Score till round: 9 Score: 105

-----
| 1| 2| 3| 4| 5 | 6| 7| 8 | 9 | 10|
|-----|
| 1| 8| 3| 4| 10| 8| 5| 6 | 4 | 9 |
| 1| 9| 9| 5| 19| 9| 9| 14| 19| 11|

Total Score at the end of game: 105
Do you want to play again?
Press 'y' or 'Y' to play again or any key to quit.
Thank you!!!

```

Figure 4: Simulated Game Output

```

Do you want to play again?
Press 'y' or 'Y' to play again or any key to quit.
Thank you!!!
y
***** ### Welcome to Bowling Simulation Game ### *****
Press Enter to Simulate
Press 1 and Enter for Gutter Game
Press 2 and Enter for Game of Spare
Press 3 and Enter for Game of Ones
Press 4 and Enter for Game of Strike
Press 5 and Enter for a Perfect Game
Press 6 and Enter for a Last Round Strike Game
Press 7 and Enter for a Last Round Spare Game
1
Gutter Game Begins
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 0 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 1 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 2 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 3 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 4 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 5 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 6 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 7 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 8 Score: 0
Toss: 0 Score: 0
Toss: 1 Score: 0
Total Score till round: 9 Score: 0

-----
| 1| 2| 3| 4| 5| 6| 7| 8| 9| 10|
|=====|
| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0|
| 0| 0| 0| 0| 0| 0| 0| 0| 0| 0|

Total Score at the end of game: 0
Do you want to play again?
Press 'y' or 'Y' to play again or any key to quit.
Thank you!!!
█

```

Figure 5: Game of Zeros Output

```

Total Score till round: 9 Score: 16
-----
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|=====|
| 5 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 13| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Total Score at the end of game: 16

```

Figure 6: Game of Spare Output

```

Total Score till round: 9 Score: 20
-----
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|=====|
| 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
Total Score at the end of game: 20

```

Figure 7: Game of One's Output

```

-----
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|=====|
| 10| 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 16| 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
Total Score at the end of game: 22

```

Figure 8: Game of Strike Output

```

Total Score till round: 9 Score: 300
-----
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|=====|
| 10| 10| 10| 10| 10| 10| 10| 10| 10| 10|
| 30| 30| 30| 30| 30| 30| 30| 30| 30| 30|
Total Score at the end of game: 300

```

Figure 9: Perfect Game Output

```

Congratulation
Total Score till round: 9 Score: 30
-----
| 1| 2| 3| 4| 5| 6| 7| 8| 9| 10|
|=====|
| 0| 0| 0| 0| 0| 0| 0| 0| 0| 10|
| 0| 0| 0| 0| 0| 0| 0| 0| 0| 30|
Total Score at the end of game: 30

```

Figure 10: Last Round Strike Game Output

```

Congratulation
Total Score till round: 9 Score: 15
-----
| 1| 2| 3| 4| 5| 6| 7| 8| 9| 10|
|=====|
| 0| 0| 0| 0| 0| 0| 0| 0| 0| 6 |
| 0| 0| 0| 0| 0| 0| 0| 0| 0| 15|
Total Score at the end of game: 15
Do you want to play again?

```

Figure 11: Game of Last Round Spare Output