



# INFORMATICS INSTITUTE OF TECHNOLOGY

## FOUNDATION CERTIFICATE IN HIGHER EDUCATION

**Module:** DOC 334 – Introduction to Programming in Python – P2

**Module Leader:** Mr. Nishan Saliya Harankahawa

**Assessment Type:** Individual

**Project Title:** 20 x 2 Board Game

**Student Details:**

Student Name	Student ID	Student Email
N.K.H. Vijan Wijewardana	20220895	vijan.20220895@iit.ac.lk

## Acknowledgment

As a foundation student of September batch, I humbly show my gratitude and appreciation towards **Mr. Nishan Saliya Harankahawa** the module leader and **Ms. Aloka Gunasekara** our tutorial lecturer for the guidance and support towards the completion of the ICW. Without their stimulating suggestions and proper coordination, it would have been impossible for me.

And finally, I would like to thank all the batchmates for providing me with various insights in certain times of need and for the support.

## Table of Contents

<b>Acknowledgment</b> .....	i
<b>List of Figures</b> .....	iii
<b>List of Tables</b> .....	iv
<b>Description of the Problem</b> .....	1
<b>Solution</b> .....	2
<b>Screenshots of the Program</b> .....	3
<b>Program Code</b> .....	9
<b>Test Case</b> .....	16
<b>Conclusion</b> .....	21
<b>References</b> .....	22

## List of Figures

Figure 1:Screenshot of Program 1.....	3
Figure 2:Screenshot of Program 2.....	3
Figure 3:Screenshot of Program 3.....	4
Figure 4:Screenshot of Program 4.....	4
Figure 5:Screenshot of Program 5.....	5
Figure 6:Screenshot of Program 6.....	5
Figure 7:Screenshot of Program 7.....	6
Figure 8:Screenshot of Program 8.....	6
Figure 9:Screenshot of Program 9.....	7
Figure 10:Screenshot of Program 10.....	7
Figure 11:Screenshot of Text file.....	8
Figure 12:Test Case 1.....	17
Figure 13:Test Case 2.....	17
Figure 14:Test Case 3.....	17
Figure 15:Test Case 4.....	18
Figure 16:Test Case 5.....	18
Figure 17:Test Case 6.....	18
Figure 18:Test Case 9.....	19
Figure 19:Test Case 8.....	19
Figure 20:Test Case 7.....	19
Figure 21:Test Case 10.....	20

List of Tables

Table 1: My Code Grid..... 1

Table 2:Test Case ..... 17

## Description of the Problem

The assigned task includes creating and putting into play a board game called "20 x 2" that pits a human player against a computer. The game begins with a dice throw, and there are 20 blocks on the playing board with numbers ranging from 1 to 20 for each player. Until a 6 appears on the dice, the player's pawn cannot enter the board.

For Human player and the computer, the letter "X" stands in for the moving pawn, while the letters "O" stand in for the two black holes that are present in blocks 7 and 14. A player must return to slot 1 if they touch down on a black hole.

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human	X							O							O						
Computer	X							O							O						

Table 1: My Code Grid

The game is won by the first player to reach or pass the 20th block. The number of moves is equal to half the dice value. The command console must display the game board, and the game must end when a player wins.

The session must be recorded at the conclusion of the game in a text file with the name format YYYY\_M\_D\_H\_M.txt.

Anyone reading the text file should be able to get a sense of how the game was played. There is example is given below,

### Human

Total moves :33

Black Hole Hits :4

Won the game.

### Computer

Total moves :31

Black Hole Hits :2

Lost the game.

## Solution

It starts by setting up all the necessary elements, including variables, players, and the game board. As a user-friendly introduction to the game, it then shows the welcome page, the regulations, and asks the user to submit their name. Then, to enable fluid gameplay, the code creates functions to move a player, manage black hole interactions, and update the game board. Turns are traded between the human and machine players when the game starts. When the dice are rolled, the players determine if they can begin the game by rolling a 6. Once play has begun, each player moves in accordance with the results of the dice roll, and the code determines whether a player has won by reaching or passing the 20th block. To keep players updated on their progress, the game board is updated after each turn. The solution records each player's total movements, black hole hits, and whether they won or lost the game in a text file after the game is over. The user is then given the option to play again, and if they do, the game restarts and provides hours of amusement.

## Screenshots of the Program

```

C:\Python311\python.exe
----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----

NOW YOU CAN START THE GAME !

Please Type Your Name :
  
```

Figure 1: Screenshot of Program 1

```

C:\Python311\python.exe
----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----

NOW YOU CAN START THE GAME !

Please Type Your Name : Vijan
You: Press Enter To Roll The Dice !
You: Dice Value = 2

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Human   | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Computer| X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 1

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Human   | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Computer| X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
You: Press Enter To Roll The Dice !
You: Dice Value = 1

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Human   | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Computer| X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 5

+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
| Human   | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Computer| X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
You: Press Enter To Roll The Dice !
  
```

Figure 2: Screenshot of Program 2



Figure 3: Screenshot of Program 3

Figure 4: Screenshot of Program 4

Computer: Press Enter To Roll The Dice !  
Computer: Dice Value = 4

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human	X							0							0						
Computer								0			X				0						

You: Press Enter To Roll The Dice !  
You: Dice Value = 4

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human	X							0							0						
Computer								0			X				0						

Computer: Press Enter To Roll The Dice !  
Computer: Dice Value = 3

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human	X							0							0						
Computer								0			X				0						

You: Press Enter To Roll The Dice !  
You: Dice Value = 6

You Can Start The Game!

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human	X							0							0						
Computer								0			X				0						

Computer: Press Enter To Roll The Dice !  
Computer: Dice Value = 6

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human	X							0							0						
Computer		X						0							0						

You: Press Enter To Roll The Dice !  
You: Dice Value = 5

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human			X					0							0						
Computer		X						0							0						

Figure 5: Screenshot of Program 5

Computer: Press Enter To Roll The Dice !  
Computer: Dice Value = 1

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human			X					0							0						
Computer		X						0							0						

You: Press Enter To Roll The Dice !  
You: Dice Value = 5

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human					X			0							0						
Computer		X						0							0						

Computer: Press Enter To Roll The Dice !  
Computer: Dice Value = 6

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human				X				0							0						
Computer				X				0							0						

You: Press Enter To Roll The Dice !  
You: Dice Value = 5

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human					X		X	0							0						
Computer				X				0							0						

Computer: Press Enter To Roll The Dice !  
Computer: Dice Value = 2

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human							X	0							0						
Computer						X		0							0						

You: Press Enter To Roll The Dice !  
You: Dice Value = 1

Players		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Human						X	X	0							0						
Computer					X			0							0						

Figure 6: Screenshot of Program 6

```

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 3



|          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Players  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human    |   |   |   |   |   | X | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |
| Computer |   |   |   |   |   | X | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |



You: Press Enter To Roll The Dice !
You: Dice Value = 3



|          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Players  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human    | X |   |   |   |   |   | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |
| Computer |   |   |   |   |   | X | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |



Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 1



|          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Players  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human    | X |   |   |   |   |   | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |
| Computer |   |   |   |   |   | X | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |



You: Press Enter To Roll The Dice !
You: Dice Value = 5



|          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Players  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human    |   |   | X |   |   |   | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |
| Computer |   |   |   |   |   | X | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |



Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 5



|          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Players  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human    |   |   | X |   |   |   | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |
| Computer |   |   |   |   |   |   | 0 | X |   |    |    |    |    | 0  |    |    |    |    |    |    |



You: Press Enter To Roll The Dice !
You: Dice Value = 6



|          |   |   |   |   |   |   |   |   |   |    |    |    |    |    |    |    |    |    |    |    |
|----------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| Players  | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human    |   |   |   |   |   | X | 0 |   |   |    |    |    |    | 0  |    |    |    |    |    |    |
| Computer |   |   |   |   |   |   | 0 | X |   |    |    |    |    | 0  |    |    |    |    |    |    |



Computer: Press Enter To Roll The Dice !

```

Figure 7: Screenshot of Program 7

```

C:\Python311>>python.exe
Computer: Press Enter To Roll The Dice !
Computer: Dice Value - 1

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
-----
You: Press Enter To Roll The Dice !
You: Dice Value - 5

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O | X |   |   |   |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O | X |   |   |   |   |   | O |   |   |   |   |   |   |
-----
Computer: Press Enter To Roll The Dice !
Computer: Dice Value - 1

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O | X |   |   |   |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O | X |   |   |   |   |   | O |   |   |   |   |   |   |
-----
You: Press Enter To Roll The Dice !
You: Dice Value - 3

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O | X |   |   |   |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O | X |   |   |   |   |   | O |   |   |   |   |   |   |
-----
Computer: Press Enter To Roll The Dice !
Computer: Dice Value - 4

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O |   | X |   |   |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O |   | X |   |   |   |   | O |   |   |   |   |   |   |
-----
You: Press Enter To Roll The Dice !
You: Dice Value - 4

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O |   |   | X |   |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O |   |   | X |   |   |   | O |   |   |   |   |   |   |
-----
Computer: Press Enter To Roll The Dice !
Computer: Dice Value - 1

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Human   |   |   |   |   |   |   | O |   |   |   |   |   |   | O |   |   |   |   |   |   |
| Computer|   |   |   |   |   |   | O |   |   |   | X |   |   | O |   |   |   |   |   |   |
|          |   |   |   |   |   |   | O |   |   |   | X |   |   | O |   |   |   |   |   |   |
-----

```

Figure 8: Screenshot of Program 8

```

You: Press Enter To Roll The Dice !
You: Dice Value = 5

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   | X | 0 |   |   |   |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 3

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   | X | 0 |   |   |   |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

You: Press Enter To Roll The Dice !
You: Dice Value = 1

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   | X | 0 |   |   |   |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 2

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   | X | 0 |   |   |   |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

You: Press Enter To Roll The Dice !
You: Dice Value = 6

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   | X |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   | 0 |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   | 0 |   |   |   |

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 2

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   | X |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   | 0 |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   | 0 |   |   |   |

You: Press Enter To Roll The Dice !

```

Figure 9:Screenshot of Program 9

```

You: Press Enter To Roll The Dice !
You: Dice Value = 3

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
Computer|   |   |   |   |   |   | 0 |   |   |   |   |   |   | X | 0 |   |   |   |   |   |
        |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 2

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
Computer|   | X |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
        |   | 0 |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

You: Press Enter To Roll The Dice !
You: Dice Value = 4

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
Computer|   | X |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
        |   | 0 |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 6

Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
Human   |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
Computer|   |   |   | X |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |
        |   |   |   | 0 |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |   |

You: Press Enter To Roll The Dice !
You: Dice Value = 3

Congratulations! You win The Game!

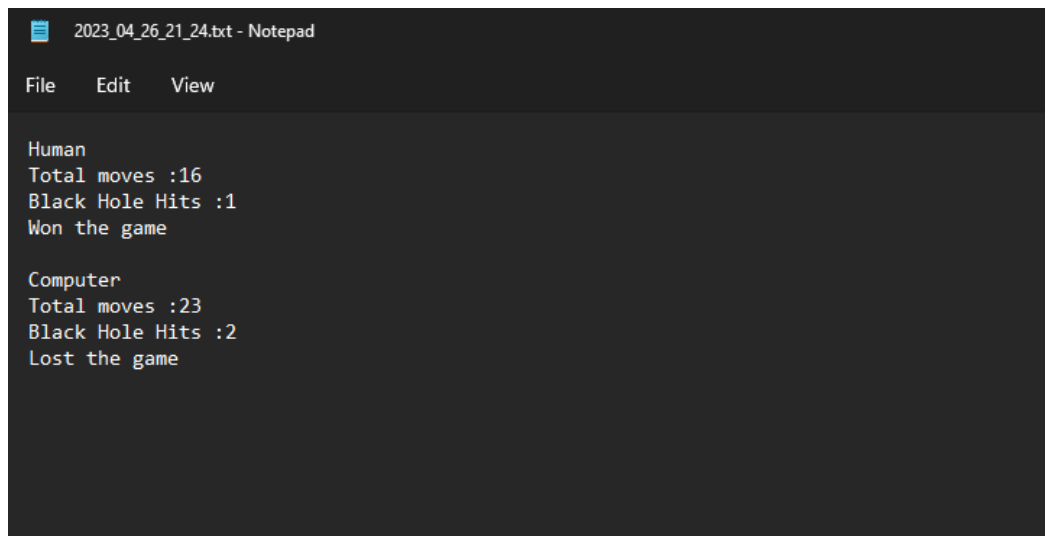
Text File Created Successfully..

Game Was Ended !

Do You Want To Play Again? (yes/no):

```

Figure 10:Screenshot of Program 10



A screenshot of a Notepad window titled "2023\_04\_26\_21\_24.txt - Notepad". The window has a menu bar with "File", "Edit", and "View". The text content is as follows:

```
Human
Total moves :16
Black Hole Hits :1
Won the game

Computer
Total moves :23
Black Hole Hits :2
Lost the game
```

*Figure 11:Screenshot of Text file*

## Program Code

```
# Import Packages

import random

from tabulate import tabulate

from datetime import datetime

import time


# Create Table

mytable = [['Players',' ','1','2','3','4','5','6','7','8','9','10','11','12','13','14','15','16','17','18','19','20'],

            ['Human',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' '],

            ['Computer',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ',' ']]


# Initialize Variables And Players

while True:

    You = {"name": "You", "position": 1}

    C_player = {"name": "Computer", "position": 1}

    players = [You, C_player]

    player = None

    Name=""

    File= None

    you_moves= 0

    computer_moves= 0

    you_hole_hit= 0

    com_hole_hit= 0

    winning_player= None

    User_Name= "
```

```

# Display the Welcome Screen and Rules
time.sleep(1.5)
print("----- WELCOME TO 20x2 BOARD
GAME ! -----")
time.sleep(1)
print("")
print("")
print("
*RULES & REGULATIONS*\n
")
time.sleep(1)
print("
This is 20x2 Board Game
")
time.sleep(0.6)
print("
The Board Consists Of 20 Blocks And 2 Black_Holes
")
time.sleep(0.6)
print("
There are Two Players Can Play in Once \n
")
time.sleep(0.6)
print("
PLAYER 1 = YOU
")
print("
PLAYER 2 = COMPUTER\n
")
time.sleep(0.6)
print("
The Game Start is Possible If 6 Appears in The Dice
")
time.sleep(0.6)
print("
If a Black_Hole Hit User Needs to Move Back to Slot 1
")
time.sleep(0.6)
print("
The First Person Who Come to 20th Block Or Passes Win
The Game \n\n
")

```

```

time.sleep(1)
print("-----")
-----")

time.sleep(0.6)
print("                                NOW YOU CAN START THE GAME !\n")
time.sleep(1)
User_Name= input("Please Type Your Name :")
print("")

# Movement Of 'X' And Setting The Black Holes
def move_player(player, move):
    black_hole_hit = False
    game_over = False

    if player["position"] + move > 20:
        game_over = True
    elif player["position"] + move == 8 or player["position"] + move == 15:
        player["position"] = 2
        black_hole_hit = True
    else:
        player["position"] += move
        game_over = False

    return game_over, move, black_hole_hit

# Update Table
def update_table():
    for i in range(1, 22):

```



```

mytable[1][i] = " "
mytable[2][i] = " "
mytable[1][You["position"]] = "X"
mytable[2][C_player["position"]] = "X"
mytable[1][8] = "O"
mytable[1][15] = "O"
mytable[2][8] = "O"
mytable[2][15] = "O"

# Start The Game
game_started = { "You": False, "Computer": False }
just_started = { "You": False, "Computer": False }
while True:

    # Switch Players
    if player == None:
        player = "You"
    elif player == "You":
        player = "Computer"
    else:
        player = "You"

    # Display The Messages And Setting The Dice
    input(f'{player}: Press Enter To Roll The Dice !')
    dice = random.randint(1, 6)
    print(f'{player}: Dice Value = {dice}\n')

    # Check The Dice Value is 6

```

```

if not game_started[player] and dice == 6:
    print(f'{player} Can Start The Game!')
    game_started[player] = True
    just_started[player] = True
    if player == "You":
        You["position"] = 1
    else:
        C_player["position"] = 1

# Setting The Moves After Starting The Game
if game_started[player]:
    if just_started[player]:
        just_started[player] = False
    else:
        move = dice // 2
        if player == "You":
            game_over, move, black_hole_hit = move_player(You, move)
            you_moves += 1
            if black_hole_hit:
                you_hole_hit += 1
        else:
            game_over, move, black_hole_hit = move_player(C_player, move)
            computer_moves += 1
            if black_hole_hit:
                com_hole_hit += 1

# Display Messages End Of The Game
if game_over:

```

```

        print("Congratulations! "f"{player} win The Game!")
        time.sleep(1)
        print("\nText File Created Successfully..\n")
        time.sleep(0.5)
        print("Game Was Ended !\n")
        winning_player= player
        break

# Print The Updated Table
update_table()
print(tabulate(mytable, headers="firstrow", tablefmt="psql"))

# Add The Game Summery To The Text File
current = datetime.now()
Name = current.strftime("%Y_%m_%d_%H_%M") + '.txt'

# Open The Text File And Write
File = open(Name, 'w')

# Write The Human Player Details
write = 'Human\nTotal moves :'+ str(you_moves)+ '\nBlack Hole Hits :'+ str(you_hole_hit)
if winning_player == "You":
    write += '\nWon the game\n'
else:
    write += '\nLost the game\n'

# Write The Computer Player Details
write += '\nComputer\nTotal moves :'+ str(computer_moves)+ '\nBlack Hole Hits :'+
str(com_hole_hit)

```

```
if winning_player == "Computer":
    write += '\nWon the game\n'
else:
    write += '\nLost the game\n'
File.write(write)

# Close The Text File
File.close()

# Setting The Play Again Loop
play_again = input("Do You Want To Play Again? (yes/no): ").lower()
if play_again == "yes" or play_again == "y":
    continue
else:
    break

input()

# End Of The Program
```

## Test Case

Test Case No	Test Description	Expected Result	Actual Result	Pass / Fail
1	Run the code in IDLE	To run the program without errors	Run the code without any errors	Pass
2	Run the code in CMD	To run the code without errors	Run the code without any error	Pass
3	Display the Welcome page and rules of the game	After running the code display the welcome page	Display the welcome page and rules without any error	Pass
4	Type your name	After the welcome screen, enter your name to continue the game	Display message for enter your name without any error	Pass
5	Roll the dice	Press enter button roll the dice and display random number	After the press enter display the random no (1,6) Without any error	Pass
6	Players can start after the appear 6 in the dice	While playing the dice value=6, can start the game	If dice value =6, start the game	Pass
7	Land on the black holes	If player lands on slots 7 or 14 direct to slot 1	Player who lands to black hole direct to slot 1	Pass
8	Win the game	Who reach or passes the 20 <sup>th</sup> slot first, win the game	After reach or passes the 20 <sup>th</sup> slot, display winning message	Pass
9	Replay the Game	After the end the game you can replay the game	After type 'y' or 'yes' replay the Game	Pass

10	Created the text file	After the Ended the game. The text file was created automatically	Create a text file with summary of the game in same location of the code	Pass
----	-----------------------	---	--	------

Table 2:Test Case

```

Python 3.11.3 (tags/v3.11.3:f3909b08, Apr  4 2023, 23:49:59) [MSC v.1934 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Users\havin\Desktop\20220895.py =====
----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----
NOW YOU CAN START THE GAME !

Please Type Your Name |

```

Figure 12:Test Case 1

```

C:\Windows\System32\cmd.exe - 20220895.py
Microsoft Windows [Version 10.0.22621.1635]
(c) Microsoft Corporation. All rights reserved.

C:\Users\havin\Desktop>20220895.py

----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----
NOW YOU CAN START THE GAME !

Please Type Your Name :

```

Figure 13:Test Case 2

```

C:\Windows\System32\cmd.exe - 20220895.py
Microsoft Windows [Version 10.0.22621.1635]
(c) Microsoft Corporation. All rights reserved.

C:\Users\havin\Desktop>20220895.py

----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----
NOW YOU CAN START THE GAME !

Please Type Your Name :

```

Figure 14:Test Case 3

```

C:\Windows\System32\cmd.exe - 20220895.py
Microsoft Windows [Version 10.0.22621.1635]
(c) Microsoft Corporation. All rights reserved.

C:\Users\havin\Desktop>20220895.py

----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----

NOW YOU CAN START THE GAME !

Please Type Your Name : Vijan
You: Press Enter To Roll The Dice !

```

Figure 15:Test Case 4

```

C:\Windows\System32\cmd.exe - 20220895.py
Microsoft Windows [Version 10.0.22621.1635]
(c) Microsoft Corporation. All rights reserved.

C:\Users\havin\Desktop>20220895.py

----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person Who Come to 20th Block Or Passes Win The Game

-----

NOW YOU CAN START THE GAME !

Please Type Your Name : Vijan
You: Press Enter To Roll The Dice !
You: Dice Value = 4

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
-----
| Human   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Computer| X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
-----
Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 4

```

Figure 16:Test Case 5

```

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
-----
| Human   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Computer| X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
-----
You: Press Enter To Roll The Dice !
You: Dice Value = 6

You Can Start The Game!

-----
| Players | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
-----
| Human   | X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| Computer| X |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
-----
Computer: Press Enter To Roll The Dice !

```

Figure 17:Test Case 6

```

You: Press Enter To Roll The Dice !
You: Dice Value = 2

+-----+
| Players | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+
| Human   | |   |   |   |   |   |   | 0 |   |   |   |   |   |   | X |   |   |   |   |   |   |
| Computer| |   |   |   |   |   |   | 0 |   |   |   |   |   |   | X |   |   |   |   |   |
+-----+

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 2

+-----+
| Players | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+
| Human   | |   |   |   |   |   |   | 0 |   |   |   |   |   |   | X |   |   |   |   |   |
| Computer| | X |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |
+-----+

You: Press Enter To Roll The Dice !

```

Figure 20:Test Case 7

```

You: Press Enter To Roll The Dice !
You: Dice Value = 6

+-----+
| Players | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+
| Human   | |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   | X |
| Computer| | X |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   | 0 |
+-----+

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 2

+-----+
| Players | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+
| Human   | |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   | X |
| Computer| |   | X |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   | 0 |
+-----+

You: Press Enter To Roll The Dice !
You: Dice Value = 3

Congratulations! You win The Game!

Text File Created Successfully..

Game Was Ended !

Do You Want To Play Again? (yes/no):

```

Figure 19:Test Case 8

```

Computer: Press Enter To Roll The Dice !
Computer: Dice Value = 2

+-----+
| Players | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
+-----+
| Human   | |   |   |   |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   |   |
| Computer| |   |   | X |   |   |   | 0 |   |   |   |   |   |   | 0 |   |   |   |   | X |
+-----+

You: Press Enter To Roll The Dice !
You: Dice Value = 3

Congratulations! You win The Game!

Text File Created Successfully..

Game Was Ended !

Do You Want To Play Again? (yes/no): yes

----- WELCOME TO 20x2 BOARD GAME ! -----

*RULES & REGULATIONS*

This is 20x2 Board Game
The Board Consists Of 20 Blocks And 2 Black_Holes
There are Two Players Can Play in Once

PLAYER 1 = YOU
PLAYER 2 = COMPUTER

The Game Start is Possible If 6 Appears in The Dice
If a Black_Hole Hit User Needs to Move Back to Slot 1
The First Person who Come to 20th Block Or Passes Win The Game

-----

NOW YOU CAN START THE GAME !

Please Type Your Name :

```

Figure 18:Test Case 9





A screenshot of a Notepad window titled "2023\_04\_27\_09\_36.txt - Notepad". The window has a menu bar with "File", "Edit", and "View". The text content is as follows:

```
Human
Total moves :16
Black Hole Hits :0
Won the game

Computer
Total moves :13
Black Hole Hits :2
Lost the game
```

*Figure 21:Test Case 10*

## Conclusion

Using the provided code, a 20x20 board game with both human and computer players may be implemented effectively. It makes use of several functions for player movement, game board updates, and game flow control, as well as the random module for dice rolls and the tabulate module for displaying the game board. The rules of the game require that players roll a 6 to begin, that they deal with black hole encounters, and that they declare victory when they reach or pass the 20th block. The user is prompted to play again after the game is finished and the game summary is stored in a text file. This assignment exhibits a thorough grasp of programming ideas as well as the capacity to use Python to develop a fun game.

## References

Astanin, S. (2022). *tabulate: Pretty-print tabular data*. [online] PyPI. Available at: <https://pypi.org/project/tabulate/>.

freeCodeCamp.org. (2022). *While Loops in Python – While True Loop Statement Example*. [online] Available at: <https://www.freecodecamp.org/news/while-loops-in-python-while-true-loop-statement-example/> [Accessed 27 Apr. 2023].

GeeksforGeeks. (2017). *File Handling in Python*. [online] Available at: <https://www.geeksforgeeks.org/file-handling-python/>.

Programiz.com. (2015). *Python List (With Examples)*. [online] Available at: <https://www.programiz.com/python-programming/list>.

W3schools.com. (2018). *Python Dictionaries*. [online] Available at: [https://www.w3schools.com/python/python\\_dictionaries.asp](https://www.w3schools.com/python/python_dictionaries.asp).