**Description and limitation of each game**

**TIC TAC TOE:**

Description of game:

* A 3x3 matrix is generated, in which both players are required to make their moves turn-by-turn. The function checks whether a player has succeeded in placing 3 of their symbols diagonally / vertically or horizontally.

Limitations

* The players cannot choose their symbols (i.e ‘X’ or ‘O’)
* The players cannot choose who starts first.

**Hangman:**

Description of game:

* The objective of this game is for the player to correctly guess the word randomly generated by the program within 6 tries.
* The player has to key-in the letter to guess the word from any one of five different categories.

Limitations:

* Every time, you can either enter 1 alphabet OR the full word only. You cannot enter part of the word. I.e. if the word is ‘football’, I cannot enter ‘ball’ or ‘ootbal’ etc. I can only enter ‘f’ or ‘o’ or ‘l’ OR ‘football’ etc. (Limitation)
* Player cannot quit in the middle of the game.

**Mastermind**

Description:

* Mastermind is a number game. The program will randomly generate a number based on the level of difficulty. The object of the game is to guess that secret number within 11 tries. Each guess is answered by the number of digits in the guess number that match or occur in the secret number.
* You will be told how many of the digits are in the correct position in the secret number. Through a process of elimination, you should be able to deduce the correct digits using logic.

Limitation:

* In a given number, if any digit repeats multiple times, my program is unable to help the player to **easily** identify the number

**Sudoku:**

Description:

* The objective is to fill a 9×9 grid with digits so that each column, each row, and each of the nine 3×3 subgrids that compose the grid (also called "boxes", "blocks", or "regions") contain all of the digits from 1 to 9. a partially completed grid, is provided for the user to help solve the puzzle

Limitation:

* There are too many moves a player needs to make to finish game, making the game very long and it may even get boring since the program isn’t time-bound and does not have any challenge attached to it.
* After completing the matrix, and if there is a mistake, my program does not hint the player where he has gone wrong. Thus, the player mightn’t be able to identify where he has gone wrong, and he may be discouraged to play again.

**Tiles:**

Description:

* This is a game of logic and patience, where the player is supposed to successfully sort the matrix in ascending order

Limitations:

* It’s a very lengthy game, and with endless trials. The player might get bored / irritated / uninterested If he is unable to solve the puzzle
* There are too many moves a player needs to make to finish game, making the game very long and it may even get boring since the program isn’t time-bound and does not have any challenge attached to it.

**Overall:**

Takeaway:

* I have learnt that when creating a game / any huge program, developers have to design, write, and test the code for new programs to ensure efficiency. Moreover, running diagnostic programs and quality testing on existing projects before releasing them to certify effectiveness is vital, as they help us to identify our short-comings and mistakes.

**CITATIONS**

**Link for reference of games:**

* https://knightlab.northwestern.edu/2014/06/05/five-mini-programming-projects-for-the-python-beginner/

**Gathering and DATE and TIME on diaplay (start\_up) function:**

* 1 - TIME:https://www.programiz.com/python-programming/datetime/current-time
* 1 - DATE:https://www.w3schools.com/python/python\_datetime.a

**GAMES**:

1. Mastermind :

* isnumeric() : ht<tps://www.geeksforgeeks.org/python-string-isnumeric-ap>plication/
* https://stackoverflow.com/questions/419163/what-does-if-name-main-do

1. Tiles :

* random.sample() : ht<tps://stackoverflow.com/questions/9755538/how-do-i-cr>eate-a-list-of-random-numbers-without-duplicates
* random.shuffle(): ht<tps://stackoverflow.com/questions/1524160/does-anyone-kn>ow-a-way-to-scramble-the-elements-in-a-list
* https://stackoverflow.com/questions/419163/what-does-if-name-main-do

1. Sudoku:

* copy.deepcopy(dictionary) : ht<tps://thispointer.com/python-how-to-copy-a-di>ctionary-shallow-copy-vs-deep-copy/
* <https://stackoverflow.com/questions/419163/what-does-if-name-main-do>

1. Tic Tac Toe:
   * <https://stackoverflow.com/questions/419163/what-does-if-name-main-do>
2. Hangman:
   * https://stackoverflow.com/questions/419163/what-does-if-name-main-do