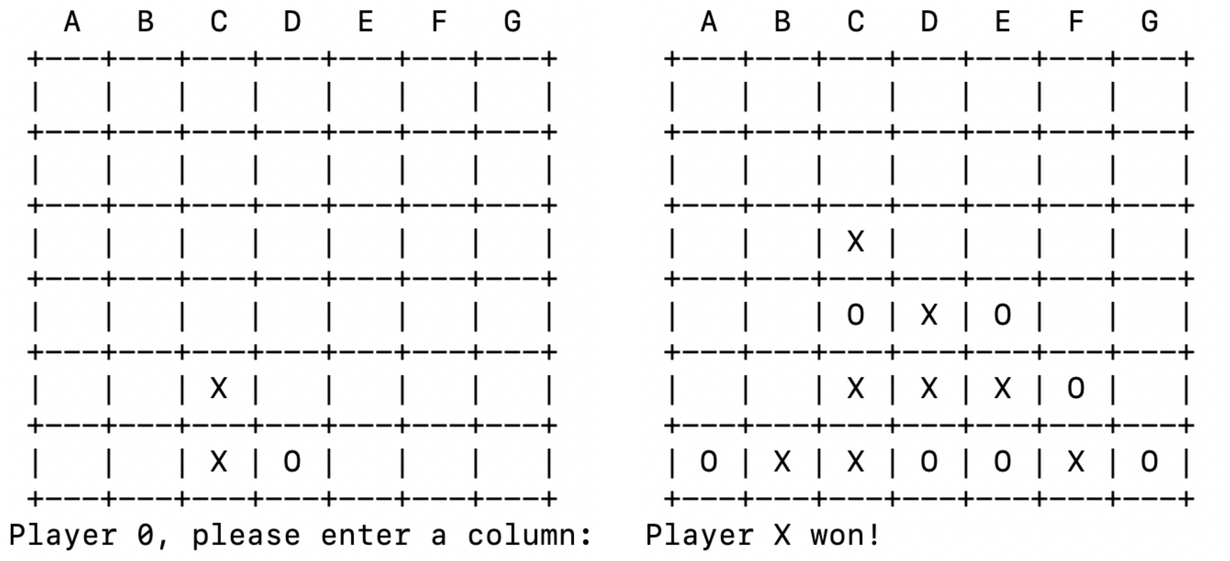
Connect 4 is typically a two player game and is played on a two-dimensional board with 7 columns and 6 rows. The two players take turns by dropping a checker into a column of the board. The checkers fall straight down, occupying the lowest available space within the column. The first player who gets 4 checkers in a row - horizontally, vertically or diagonally - wins the game.

Figure 1 shows an example implementation of the Connect 4 game in Python3.



```
  A   B   C   D   E   F   G          A   B   C   D   E   F   G
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
|   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
|   |   |   |   |   |   |   |      |   |   |   |   |   |   |   |
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
|   |   |   |   |   |   |   |      |   |   | X |   |   |   |   |
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
|   |   |   |   |   |   |   |      |   |   | O | X | O |   |   |
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
|   |   | X |   |   |   |   |      |   |   | X | X | X | O |   |
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
|   |   | X | O |   |   |   |      | O | X | X | O | O | X | O |
+---+---+---+---+---+---+---+      +---+---+---+---+---+---+---+
Player 0, please enter a column:   Player X won!
```

Figure 1: Example output of the board after 3 turns (left) and after 15 turns (right) where player X won the game with 4 checkers placed diagonally

3 Implementation

The implementation of this game consists of two stages:

Initialization:

At the start of the game, a two-dimensional board is created where all elements are initialized with whitespaces (" "). The board should have a dimension of 7 columns and 6 rows, but the dimension can be any size (max 26 columns) and the implementation should be able to support this by using constant variables. Also, the game should be able to handle between 2 and 5 players. The checkers should be "X", "O", "V", "H" and "M". Please note that independent of the number of players, a player needs 4 checkers in a row to win the game. Before the game starts, a random player should be chosen and the board should be printed to show the user how the board looks like. The columns of the board are labeled by letters, starting with letter A.

Game phase:

The players take turns by placing their checker in a column of their choice, indicated by a letter. The user input must be validated before placing the checker and if the player provides an invalid input, the player will be asked to provide another input until the input is valid (the turn is not lost). The checker falls straight down, occupying the lowest available space within the column. Please note that you do not have to implement an animation (gravity) for the checker to fall down. If some rows of the entered column are already occupied by other checkers, the checker must be placed on an empty cell above the previously placed checkers. If the column is already completely filled with checkers, the turn is invalid and the player loses its turn. After every turn, the board must be checked for a possible win. A player wins if 4 checkers in a row are placed on the board either horizontally, vertically or diagonally. If the board fills up before either player achieves 4 checkers in a row, the game is a draw. Otherwise, the game will end after one player won the game.

4 Grading

Description	**Points (/15)**
Creating the board and printing the board, as depicted in Figure 1	1
Supporting multiple players (more than 2) and dimensions (other than 6x7)	2
Randomly selecting first player and alternating turns	1
Checking for invalid input, e.g. numbers, invalid characters, out of board, etc	2
Placing the checker at the correct location	2
Checking for a win (horizontally, vertically, diagonally)	4
Checking for a draw	2
Code aesthetics (comments, readability of code, style, variable naming, etc.)	1