LAB-1 24/9/24

~~Algorithms to check if move is valid~~

1. Variables -

- Algorithms -

Step-1 Initialise 3x3 matrix (board)

Step-2 Check if any winning player exists or check if the board is filled completely.
And print draw or that the player has won depending on the conditions

Convert matrix into a string.

Step-3 Let the player play and input the ~~code~~ choice in a row or column of their choice.

~~Step-4 Convert the matrix to a string of 24 characters~~

Step-4 Check of the ~~player~~ computer can win or if the player can win using the win state -

Win state can be 8 different conditions based on the rules where the algorithm can check if the win state is achieved

Step-5. If win state has not been achieved then find if there is a draw state where board is filled and none of the states match.

Step - 6 If none of the states match then repeat the working using moves after analysing the string to get closer to winning.

Step - 7 Go back to step 2 and repeat the entire process.

<u>Code for the following algorithm -</u>

```
import random

tic = [["-"] * 3 for _ in range(3)]
players = ["0", "X"].
current_player = "0"

def place(i, j, player):
  tic[i][j] = player

def listify():
  res = []
  for i in range(3):
    res.append("".join(tic[i]))
  for i in range(3):
    temp = ""
    for j in range(3):
      temp += tic[j][i]
    res.append(temp)
  res.append(tic[0][2] + tic[1][1] + tic[2][0])
  return res.

def check(lis):
```

```
for i in li:
  count = max(count, i.count("-"))
    if i.count("O") == 3:
      return 0
    if i.count("X") == 3
      return 1
  if count == -1:
    return 1.
  return 4.

def display():
  for i in range(3):
    for j in range(3):
      print(tic[i][j], end=" ")
    print("\n").
  print()

def computer_move():
  for i in range(3):
    for j in range(3):
      if tic[i][j] == "-";
        place(i,j,"X")
        if check(listify()) == 1:
          return
        place(i,j,"-")

def main():
  global current_player
  while true:
```

```
display ()
lis = listify()
flag = check (lis)

if flag==0:
   print ("Player 0 wins!")
   break
 elif flag == 1:
   print(" Player X (Computer) wins ! ")
   break
 elif flag == -1:
   print ("It's a draw! ")
   break :

if current_player == "0" :

   print (" Player 0's turn")
    i,j = map(int , input (" Enter row and column (0-2): ") . split ())
     if tic [i][j]== "_":
       place (i,j , current_player)
        current_player = "X"
     else :
       print (" Invalid move , try again ")
   else :
     print (" Computer's turn ")
     computer_move ()
     current_player = "0"
```

OUTPUT -

```
Player 0's turn
Enter row and column (0-2): 0 2

- - 0
- - -
- - -
```

```
Computer's turn
X _ 0
- - -
- - -
```

```
Player 0's turn
Enter row and column (0-2): 2 0

X _ 0
_ _ 0
_ _ _
```

```
Computers turn
X _ 0
- - 0
- - X
```

```
Player 0's turn
Enter row and column : 1 0

X _ 0
0 _ X
- - X
```

```
Computers turn
X _ 0
0 X 0
_ _ X
```

```
Computer wins !
```

[illegible]

[illegible]