



# Girls' Programming Network

*Tic Tac Toe!*

***Tutors Only***

**This project was created by GPN Australia for GPN sites all around Australia!**

**This workbook and related materials were created by tutors at:**

Sydney, Canberra and Perth



Girls' Programming Network

***If you see any of the following tutors don't forget to thank them!!***

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# Part 1: Welcome to Tic Tac Toe!

## 1.4: Printing the Board

```
# Copy your previous code here...
print("Welcome to Tic-Tac-Toe!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " ", " ", " ", " "]
print("-----")
print("|", board[0], "|", board[1], "|", board[2], "|")
print("-----")
print("|", board[3], "|", board[4], "|", board[5], "|")
print("-----")
print("|", board[6], "|", board[7], "|", board[8], "|")
print("-----")
```

# Part 2: Enter the First Move

## 2.3: Check what happened!

```
# Copy your previous code here...
print("Welcome to Tic-Tac-Toe!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " ", " ", " "]
print("-----")
print("|", board[0], "|", board[1], "|", board[2], "|")
print("-----")
print("|", board[3], "|", board[4], "|", board[5], "|")
print("-----")
print("|", board[6], "|", board[7], "|", board[8], "|")
print("-----")

symbol = "0"
square = input("Which square do you want your symbol to go in? ")
square_index = int(square)
board[square_index] = symbol
```

## Bonus 2.5: Welcome the players

```
# Copy your previous code here...
print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is 0!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " ", " ", " "]
```

```
print("-----")
print("|", board[0], "|", board[1], "|", board[2], "|")
print("-----")
print("|", board[3], "|", board[4], "|", board[5], "|")
print("-----")
print("|", board[6], "|", board[7], "|", board[8], "|")
print("-----")

symbol = "0"
square = input("Which square do you want your symbol to go in? ")
square_index = int(square)
board[square_index] = symbol
```

## Part 3: Creating a print function

### 3.4: Let's print the board again

```
# Copy your previous code here...
def print_board(board):
    print("-----")
    print("|", board[0], "|", board[1], "|", board[2], "|")
    print("-----")
    print("|", board[3], "|", board[4], "|", board[5], "|")
    print("-----")
    print("|", board[6], "|", board[7], "|", board[8], "|")
    print("-----")
print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is O!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " "]
print_board(board)

symbol = "O"
square = input("Which square do you want your symbol to go in? ")
square_index = int(square)
board[square_index] = symbol

print_board(board)
```

# Part 4 : Taking Turns

## 4.3 Run your code!

*# Copy your previous code here...*

```
def print_board(board):
    print("-----")
    print("|", board[0], "|", board[1], "|", board[2], "|")
    print("-----")
    print("|", board[3], "|", board[4], "|", board[5], "|")
    print("-----")
    print("|", board[6], "|", board[7], "|", board[8], "|")
    print("-----")

print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is O!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " "]
print_board(board)

symbol = "O"
print("The current player is", symbol, "!")
square = input("Which square do you want your symbol to go in? ")
square_index = int(square)
board[square_index] = symbol

print_board(board)
if symbol == "O":
    symbol = "X"
else:
    symbol = "O"
```

# Part 5 : Wait a while to win?

## 5.2 Did I win yet?

*# Copy your previous code here...*

```
def print_board(board):
    print("-----")
    print("|", board[0], "|", board[1], "|", board[2], "|")
    print("-----")
    print("|", board[3], "|", board[4], "|", board[5], "|")
    print("-----")
    print("|", board[6], "|", board[7], "|", board[8], "|")
    print("-----")

print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is O!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " "]
game_over = False
print_board(board)

symbol = "O"
while not game_over:
    print("The current player is", symbol, "!")
    square = input("Which square do you want your symbol to go in? ")
    square_index = int(square)
    board[square_index] = symbol

    print_board(board)
    if symbol == "O":
        symbol = "X"
    else:
        symbol = "O"
```

# Part 6 : Winner winner tic tac dinner

## 6.2 Functions again

*# Copy your previous code here...*

```
def print_board(board):
    print("-----")
    print("|", board[0], "|", board[1], "|", board[2], "|")
    print("-----")
    print("|", board[3], "|", board[4], "|", board[5], "|")
    print("-----")
    print("|", board[6], "|", board[7], "|", board[8], "|")
    print("-----")

def check_winner:

print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is O!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " "]
game_over = False
print_board(board)

symbol = "O"
while not game_over:
    print("The current player is", symbol, "!")
    square = input("Which square do you want your symbol to go in? ")
    square_index = int(square)
    board[square_index] = symbol

    print_board(board)
    if symbol == "O":
        symbol = "X"
    else:
        symbol = "O"
```



# Part 7.1 : Option 1

## 7.1.4 No winners here!

### Option 1: If statements

```
def check_winner(board) :  
    if board[0] == board[1] == board[2] != " "  
        return True  
    elif board[3] == board[4] == board[5] != " "  
        return True  
    elif board[6] == board[7] == board[8] != " "  
        return True  
    if board[0] == board[3] == board[6] != " "  
        return True  
    elif board[1] == board[4] == board[7] != " "  
        return True  
    elif board[2] == board[5] == board[8] != " "  
        return True  
    if board[0] == board[4] == board[8] != " "  
        return True  
    elif board[2] == board[4] == board[6] != " "  
        return True  
    else:  
        return False
```

# Part 7.2 : Option 2

## 7.1.4 No winners here!

### Option 2: For loop and lists

```
def check_winner(board) :  
    winning_combos = [  
        # Rows  
        (0,1,2),  
        (3,4,5),  
        (6,7,8),  
        # Columns  
        (0,3,6),  
        (1,4,7),  
        (2,5,8),  
        # Diagonals  
        (0,4,8),  
        (2,4,6)  
    ]  
  
    for combo in winning_combos:  
        combo_part_0 = combo[0]  
        combo_part_1 = combo[1]  
        combo_part_2 = combo[2]  
        symbol_0 = board[combo_part_0]  
        symbol_1 = board[combo_part_1]  
        symbol_2 = board[combo_part_2]  
        if symbol_0 == symbol_1 == symbol_2 == " "  
            return True  
    return False
```

# Part 8 : Declare the winner

## 8.2 Declare who won

*# Copy your previous code here...*

```
def print_board(board):
    print("-----")
    print("|", board[0], "|", board[1], "|", board[2], "|")
    print("-----")
    print("|", board[3], "|", board[4], "|", board[5], "|")
    print("-----")
    print("|", board[6], "|", board[7], "|", board[8], "|")
    print("-----")
```

*# Be aware that students may have used the Option 2 code here*

```
def check_winner(board) :
    if board[0] == board[1] == board[2] != " ":
        return True
    elif board[3] == board[4] == board[5] != " ":
        return True
    elif board[6] == board[7] == board[8] != " ":
        return True
    if board[0] == board[3] == board[6] != " ":
        return True
    elif board[1] == board[4] == board[7] != " ":
        return True
    elif board[2] == board[5] == board[8] != " ":
        return True
    if board[0] == board[4] == board[8] != " ":
        return True
    elif board[2] == board[4] == board[6] != " ":
        return True
    else:
        return False
```

```
print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is O!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " "]
game_over = False
print_board(board)
```

```
symbol = "O"
while not game_over:
    print("The current player is", symbol, "!")
    square = input("Which square do you want your symbol to go in? ")
```

```
square_index = int(square)
board[square_index] = symbol

print_board(board)
game_over = check_winner(board)
if game_over:
    print(symbol, "won! Congratulations!")
if symbol == "0":
    symbol = "X"
else:
    symbol = "0"
```

# Extensions

## All extensions commented with which

```
import random

# Copy your previous code here...
def print_board(board):
    print("-----")
    print("|", board[0], "|", board[1], "|", board[2], "|")
    print("-----")
    print("|", board[3], "|", board[4], "|", board[5], "|")
    print("-----")
    print("|", board[6], "|", board[7], "|", board[8], "|")
    print("-----")
# Be aware that students may have used the Option 2 code here
def check_winner(board) :
    if board[0] == board[1] == board[2] != " ":
        return True
    elif board[3] == board[4] == board[5] != " ":
        return True
    elif board[6] == board[7] == board[8] != " ":
        return True
    if board[0] == board[3] == board[6] != " ":
        return True
    elif board[1] == board[4] == board[7] != " ":
        return True
    elif board[2] == board[5] == board[8] != " ":
        return True
    if board[0] == board[4] == board[8] != " ":
        return True
    elif board[2] == board[4] == board[6] != " ":
        return True
    else:
        return False

print("Welcome to Tic-Tac-Toe!")
player_0 = input("Who is playing naughts? ")
player_X = input("Who is playing crosses? ")

print("Welcome", player_0, ", your symbol is O!")
print("Welcome", player_X, ", your symbol is X!")
board = [" ", " ", " ", " ", " ", " ", " ", " ", " "]
game_over = False
print_board(board)

# Extension 9
symbol = random.choice("X","O")
```

```

# Extension 12
if symbol == "0":
    current_player = player_0
else:
    current_player = player_X
print(symbol, "player will go first!")
free_squares = [0,1,2,3,4,5,6,7,8]
counter = 0
while not game_over:
    print("The current player is", current_player, "Who is playing as", symbol, "!")
#Extension 12

# Extension 13
if current_player == "computer":
    square = random.choice(free_squares)
else:
    square = input("Which square do you want your symbol to go in? ")
    square_index = int(square)

# Extension 9
if square_index not in free_squares:
    print("That wasn't a valid move!")
    continue
board[square_index] = symbol
counter+=1

print_board(board)
free_squares.remove(square_index)
game_over = check_winner(board)
if game_over:
    print(current_player, "won! Congratulations!")
elif counter == 9: # Extension 10
    print("It's a tie!")
    break

if symbol == "0":
    current_player = player_X
    symbol = "X"
else:
    current_player = player_0
    symbol = "0"

```