Code Documentation

Tic-tac-toe Game designed in C language

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Contents

Data Types Used

INT
Int is a data type in C.
It is 2 or 4 bytes.
It can range from -32,768 to 32,767 or -2,147,483,648 to 2,147,483,647 (unsigned int)
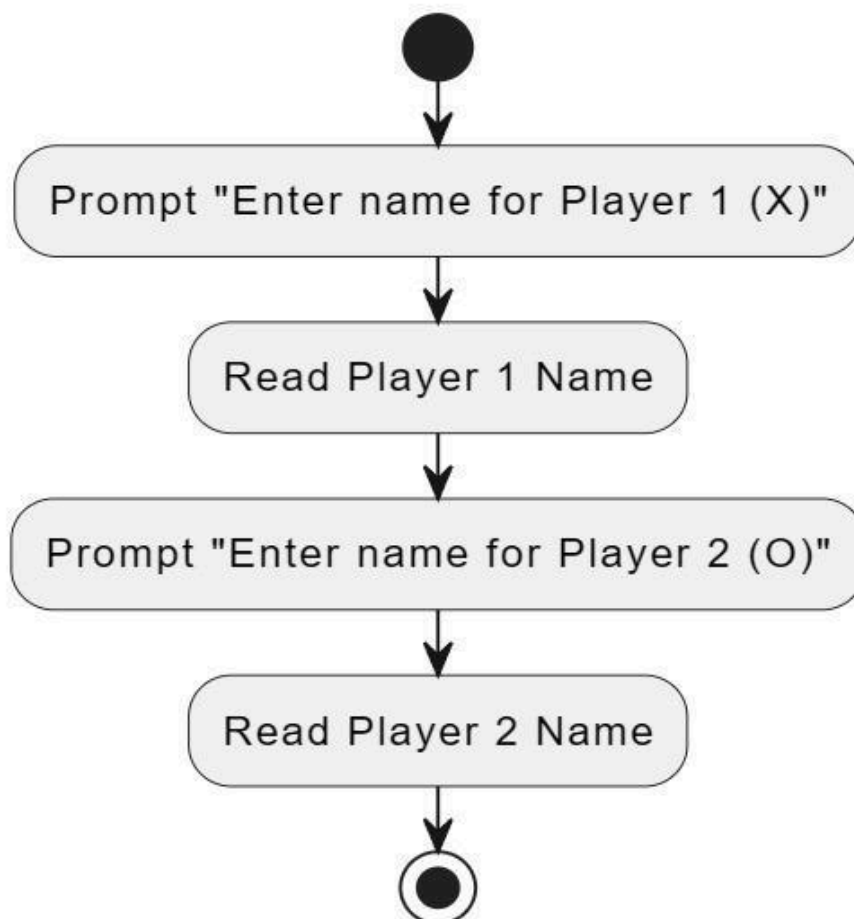
CHAR
Char is a data type in C.
It is of 1 byte.
It can range from -128 to 127 or 0 to 255

Functions

Void getPlayerNames()

This function is used to get two players name from the user and save them. When playing the game, it is necessary to save the names of players for when a Player need to make a move, the program asks by name to give user an input.
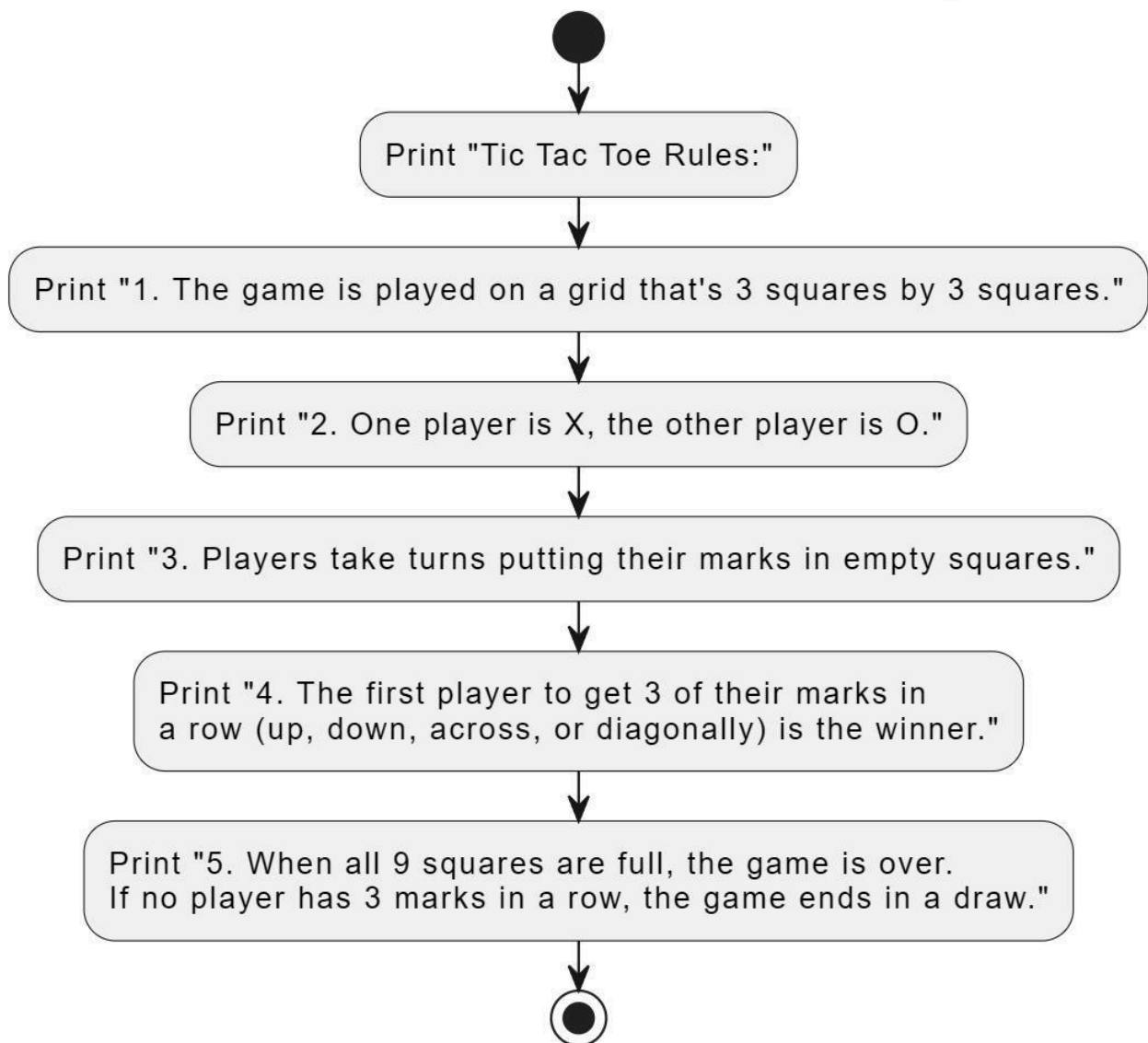

getPlayerNames Activity Diagram

Void showRules()

This program is used to print the rules of the game on the screen.
When user chooses the option to show rules, this function is called and it shows the simple rules of playing the game.

showRules Activity Diagram

Print "Tic Tac Toe Rules:"

Print "1. The game is played on a grid that's 3 squares by 3 squares."

Print "2. One player is X, the other player is O."

Print "3. Players take turns putting their marks in empty squares."

Print "4. The first player to get 3 of their marks in a row (up, down, across, or diagonally) is the winner."

Print "5. When all 9 squares are full, the game is over. If no player has 3 marks in a row, the game ends in a draw."

Void startGame()
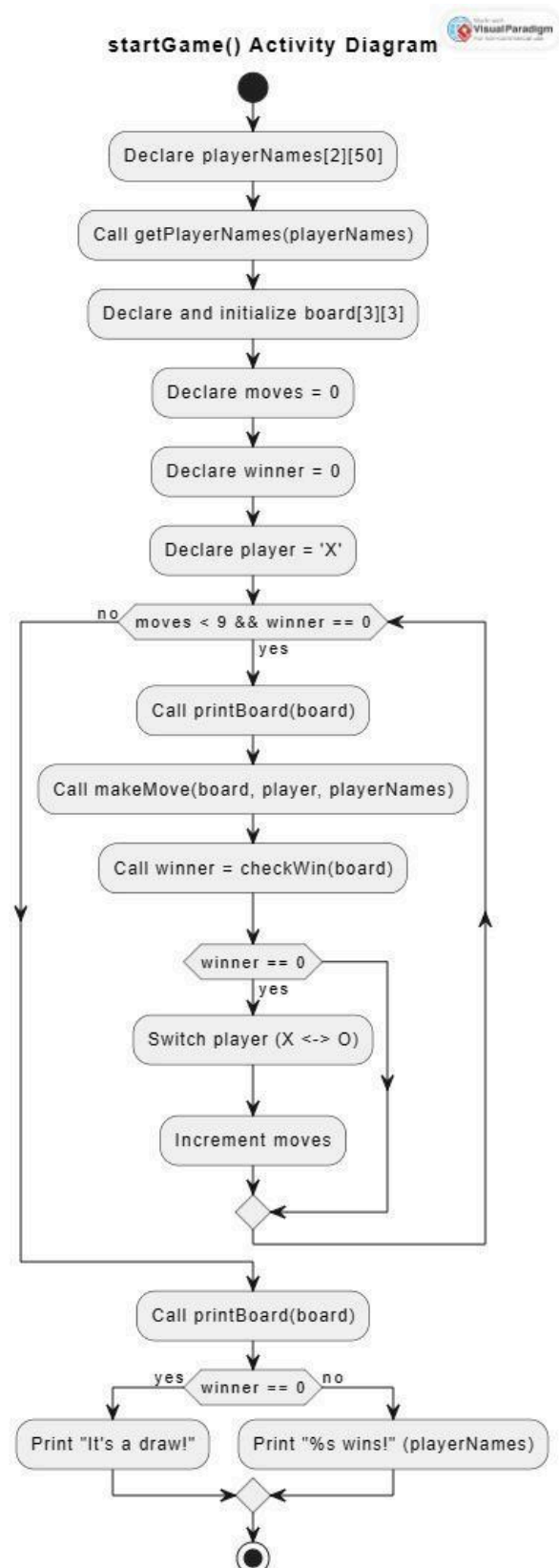This function is used to play the game. At first it calls getPlayerNames() function

It then initialized a 3x3 board where the game is played. Sets integers 'moves' and 'winner' to 0, which counts total moves and if there is a winner or not, or the game is draw consequently.
Highest number of moves can be 9, as there are only 9 squares in a Tic-tac-toe board. 'winner' is set to 0 until there are no winner.
printBoard() function is called to print the board on screen, makeMove() function then called, which prompts player to make a move.
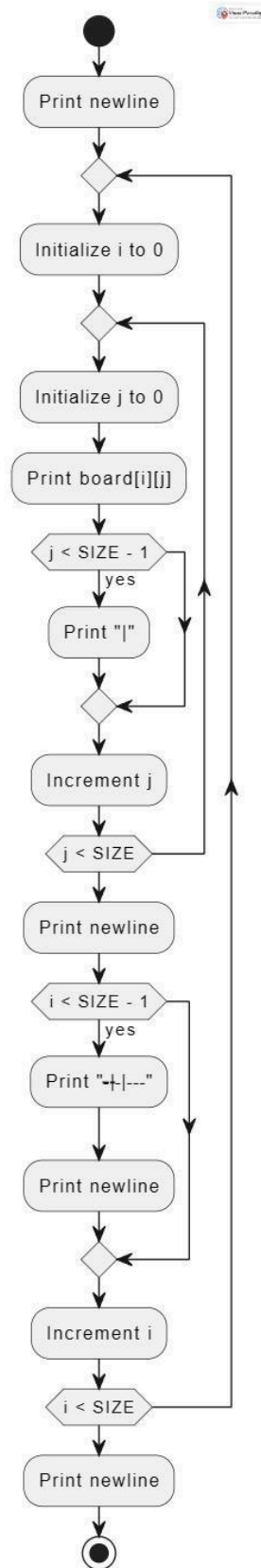It also prints a new board with new move showing in it with all the previous moves. Then it switch player (from X to O or from O to X)

Increament 'move' by 1 to register 1 move. If there are no winner, the loop continues. If there is a winner or all the 9 moves are made, the program shows the result (win or draw) and print the name of the winner.

startGame() Activity Diagram

- Declare playerNames[2][50]
- Call getPlayerNames(playerNames)
- Declare and initialize board[3][3]
- Declare moves = 0
- Declare winner = 0
- Declare player = 'X'
- moves < 9 && winner == 0 — no / yes
  - Call printBoard(board)
  - Call makeMove(board, player, playerNames)
  - Call winner = checkWin(board)
  - winner == 0 — yes
    - Switch player (X <-> O)
    - Increment moves
- Call printBoard(board)
- winner == 0 — yes / no
  - Print "It's a draw!"
  - Print "%s wins!" (playerNames)

Void printBoard(char board[SIZE][SIZE])

This function print the tic-tac-toe board
on screen which is a 3x3 grid

```
●
↓
Print newline
↓
◇ ←─────────────────┐
↓                   │
Initialize i to 0   │
↓                   │
◇ ←──────────────┐  │
↓                │  │
Initialize j to 0│  │
↓                │  │
Print board[i][j]│  │
↓                │  │
⟨j < SIZE - 1⟩───┼──┐
yes              │  │
↓                │  │
Print "|"        │  │
↓                │  │
◇ ←──────────────┼──┘
↓                │
Increment j      │
↓                │
⟨j < SIZE⟩───────┘
↓
Print newline
↓
⟨i < SIZE - 1⟩───────┐
yes                  │
↓                    │
Print "---|---"      │
↓                    │
Print newline        │
↓                    │
◇ ←──────────────────┘
↓
Increment i
↓
⟨i < SIZE⟩──────────────┐ (back to top)
↓
Print newline
↓
◉
```

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Void makeMove(char board[SIZE][SIZE])
This function register a player move on the board
It takes a number between 1 to 9 and places the player marker (X or O) in the respective square.
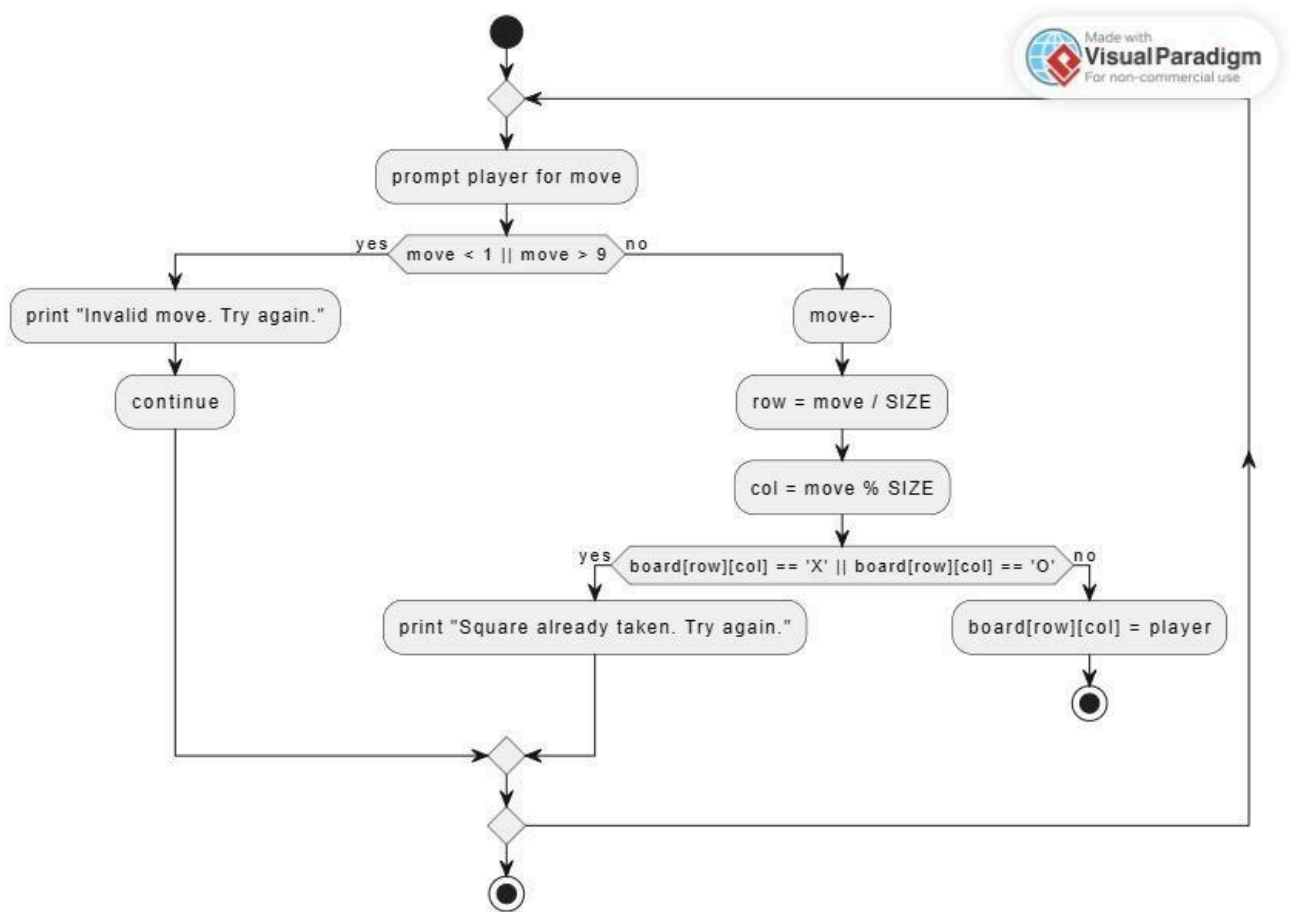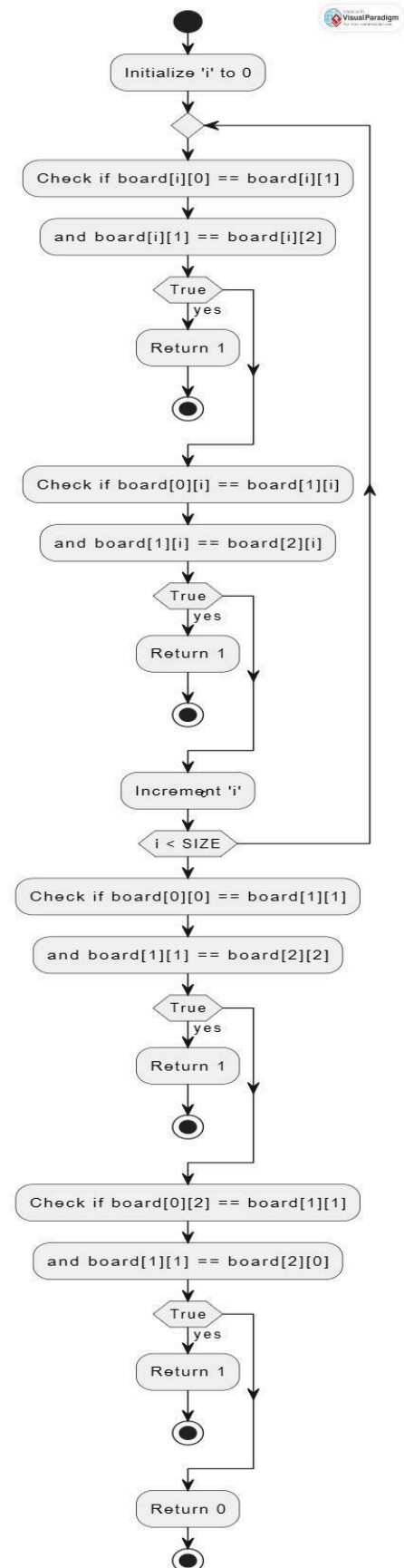
Int checkWin(char board[SIZE][SIZE])
Used to check the winner.

At first it checks all the horizontal and virtical lines to chick if there are 3 same mark in a row.

Than it checks the diagonals for same signs.

If there is a winner, it returns 1, if not, it returns 0.

Int main()

in the main function, 3 options are given. And depending on the choice given by the player. If start game is chosen, startGame() function is called and the game starts.
Pressing 2 can show the rules of the game.
Pressing 3 make the game close