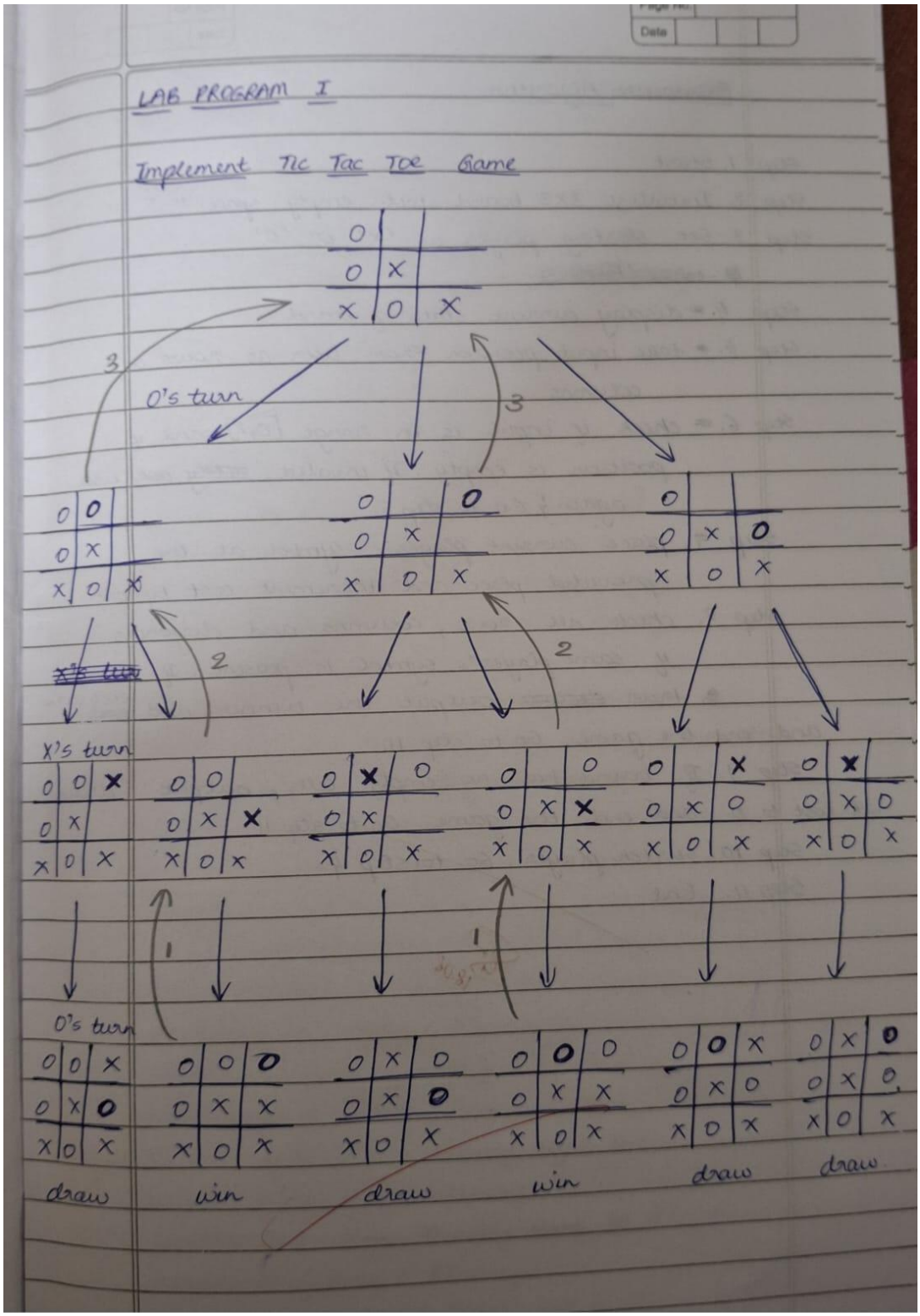
LAB PROGRAM 1:

Implement a game of tic-tac-toe

PSEUDOCODE:



Date

Algorithm

Step 1. Start

Step 2. Initialize 3×3 board with empty space " "

Step 3. Set starting player as 'X' or 'O'

Step 4. display current state of board

Step 5. take input position from user as rows and columns

Step 6. check if input is in range [0,2] and if position is empty. If invalid, ask user again & Go to step 5

Step 7. place current player's symbol at the provided place and increment cost by one

Step 8. check all rows, columns and diagonals if same player's symbol is present. If its true output the winner and cost value and end the game. Go to step 11.

Step 9. If board has no empty cells, output "draw" set cost to 0 and end the game. Go to step 11

Step 10. switch player. Go to step 4

Step 11. End

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CODE:

```
def print_board(board):
    for row in board:
        print(" | ".join(row))
        print("-" * 5)


def check_winner(board):
    for row in board:
        if row.count(row[0]) == 3 and row[0] != " ":
            return row[0]
    for col in range(3):
        if board[0][col] == board[1][col] == board[2][col] != " ":
            return board[0][col]
    if board[0][0] == board[1][1] == board[2][2] != " ":
        return board[0][0]
    if board[0][2] == board[1][1] == board[2][0] != " ":
        return board[0][2]
    return None


def play_tic_tac_toe():
    board = [[" " for _ in range(3)] for _ in range(3)]
    current_player = "X"
    moves = 0
    print("Tic Tac Toe positions:")
    print("1 | 2 | 3")
    print("4 | 5 | 6")
    print("7 | 8 | 9\n")

    while moves < 9:
        print_board(board)
        try:
```

```
            pos = int(input(f"Player {current_player}, enter your move (1-9): "))
            if pos < 1 or pos > 9:
                print("Invalid position! Choose between 1 and 9.")
                continue
            row, col = divmod(pos - 1, 3)
            if board[row][col] != " ":
                print("Cell already taken! Try again.")
                continue
            board[row][col] = current_player
            moves += 1
            winner = check_winner(board)
            if winner:
                print_board(board)
                print(f"Player {'1 (X)' if winner == 'X' else '2 (O)'} wins in {moves} moves! Cost = {moves}")
                return
            current_player = "O" if current_player == "X" else "X"

        except ValueError:
            print("Please enter a valid number between 1 and 9.")

    print_board(board)
    print("It's a Draw! Cost: 0")
play_tic_tac_toe()
```

OUTPUT:

```
Sinchana Hemanth (1BM23CS330)
Tic Tac Toe positions:
1 | 2 | 3
4 | 5 | 6
7 | 8 | 9

  |   |
-----
  |   |
-----
  |   |
-----
Player X, enter your move (1-9): 1
X |   |
-----
  |   |
-----
  |   |
-----
Player O, enter your move (1-9): 3
X |   | O
-----
  |   |
-----
  |   |
-----
Player X, enter your move (1-9): 5
X |   | O
-----
  | X |
-----
  |   |
-----
Player O, enter your move (1-9): 6
X |   | O
-----
  | X | O
-----
  |   |
-----
Player X, enter your move (1-9): 9
X |   | O
-----
  | X | O
-----
  |   | X
-----
Player 1 (X) wins in 5 moves! Cost = 5
```