Project 1: Digits and Multiplication

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1 Description

This Python program has been modified to incorporate functions that draw a tic-tac-toe board with alternating X's and O's. The program utilizes the following functions:

1. `print_divider`: This function prints three minus signs separated by plus signs, creating a visual divider between rows.
2. `print_X_or_O`: This function takes a number as input and prints an 'O' if the number is even, and an 'X' if the number is odd.
3. `print_row`: This function takes a row number as input and calls `print_X_or_O` to print the corresponding X's or O's, separated by vertical bars.
4. `print_board`: This function takes a starting value (either 0 or 1) as input to determine whether the first row starts with an 'X' or an 'O'. It calls `print_row` and `print_divider` to print the tic-tac-toe board.

By utilizing these functions, the program generates a tic-tac-toe board with alternating X's and O's. The board is displayed on the console, providing a visual representation of the game state.

2 Code

```
1
2 #!/usr/bin/env python3
3 # -*- coding: utf-8 -*-
4 """
5 Created on Tue May 30 12:03:10 2023
6
7 # tictac.py
8
9 # This program uses functions to draw a tic-tac-toe board
    with alternating X's
10 and O's.
```

```
# It defines several functions:
# - print_divider: Prints three minus signs separated by plus signs to create a
 visual divider between rows.
# - print_X_or_O: Takes a number as input and prints an 'O' if the number is
even, and an 'X' if the number is odd.
# - print_row: Takes a row number as input and calls print_X_or_O to print the
corresponding X's or O's, separated by vertical bars.
# - print_board: Takes a starting value as input (either 0 or 1) to determine
whether the first row starts with an 'X' or an 'O'.
#   It calls print_row and print_divider to print the tic-tac-toe board.

# The program concludes by calling print_board with an even argument (0),
starting the board with an 'X'.

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"""

# Function to print three minus signs separated by plus signs
def print_divider():
    print("---+---+---")

# Function to print 'X' or 'O' based on the input number
def print_X_or_O(num):
    c = (num % 2) * 9
    print(chr(79 + c), end='')

# Function to print a row with 'X's or 'O's and vertical bars
def print_row(row_num):
    print_X_or_O(row_num)
    print(" | ", end='')
    print_X_or_O(row_num + 1)
    print(" | ", end='')
    print_X_or_O(row_num + 2)
    print()  # Move to the next line

# Function to print the tic-tac-toe board using print_row and print_divider
def print_board(start_with_X):
    print_row(start_with_X)
    print_divider()
    print_row(start_with_X + 3)
    print_divider()
```

```
52     print_row(start_with_X + 6)
53
54 # Calling print_board with an even argument to start with 'X
       '
55 print_board(0)
```

3 Example Output

```
---+---+---
X | O | X
---+---+---
O | X | O
---+---+---
X | O | X
```

4 Code Explanation

The provided Python code demonstrates the use of functions to draw a tic-tac-toe board with alternating X's and O's:

- `print_divider()`: This function prints three minus signs separated by plus signs to create a visual divider between rows. It is used to enhance the readability and structure of the tic-tac-toe board.
- `print_X_or_O(num)`: This function takes a number as input and determines whether to print an 'O' or an 'X'. It performs this decision by checking if the number is even or odd. If the number is even, it prints an 'O', and if the number is odd, it prints an 'X'.
- `print_row(row_num)`: This function takes a row number as input and calls `print_X_or_O()` to print the corresponding X's or O's for that row. It separates the X's or O's using vertical bars to create the visual representation of a tic-tac-toe row.
- `print_board(start_with_X)`: This function takes a starting value (either 0 or 1) as input to determine whether the first row should start with an 'X' or an 'O'. It calls `print_row()` and `print_divider()` to print the tic-tac-toe board. The starting value is used to determine the sequence of X's and O's in the rows.

By utilizing these functions, the program generates a tic-tac-toe board with alternating X's and O's. The `print_board()` function is then called with an even argument (0), which starts the board with an 'X'. The resulting board is displayed on the console, representing the current state of the tic-tac-toe game.

This approach of using functions improves code readability, modularity, and reusability. It allows for easy customization of the starting value to create

different initial board configurations. The code demonstrates how functions can be utilized to implement complex logic and produce desired outcomes in a structured and organized manner.