COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE

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Number Guessing Game

OBJECTIVE:

The Number Guessing Game is a console-based application written in MASM assembly language, where the computer randomly selects a number between 1 and 100, and the player is tasked with guessing the number. The program provides feedback whether the player's guess is too low, too high, or correct. The game continues until the player guesses the correct number.

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Tools and Libraries:

- **MASM (Microsoft Macro Assembler):** Assembly language compiler used to write and assemble the program.
- **Irvine32 Library:** Provides essential functions such as WriteString, ReadInt, and Clrscr for handling input/output and screen operations.

Functional Overview:

1. Prompts the user to guess a number between 1 and 100.
2. Accepts the user's input as a guess.
3. Compares the guess with a secret number.
4. Provides feedback on whether the guess is too high, too low, or correct.
5. Repeats the prompt until the correct guess is made.
6. Upon a correct guess, congratulates the player and exits.

CODE OVERVIEW:

1. **Data Section:**
    - Contains string literals used for user prompts and feedback.
    - Holds the secret number (number) and the player’s guess (guess).
    - Stores the newline character for formatting output.

2. **Code Section:**

- **main PROC:** The entry point of the program. The procedure begins by clearing the screen (Clrscr), displaying the initial prompt, and accepting the user's guess.
- The guess is then compared with the secret number using the CMP instruction:
    - If the guess is too low, the program displays a "Too low" message and prompts the user again.
    - If the guess is too high, it shows a "Too high" message and asks the user to try again.
    - If the guess is correct, it displays a congratulatory message and exits the program.

CODE:

```
TITLE Number Guessing Game (NumberGuessingGame.asm)

; Program Description:
; A simple number guessing game where the computer picks a random number between 1 and 100,
; and the player has to guess it.
; Authors: Muhammad Faheem and Huzaifa Sardar Khan

.686
.MODEL FLAT, STDCALL
.STACK

INCLUDE Irvine32.inc

.DATA

    prompt1     BYTE "Guess a number between 1 and 100: ", 0
    prompt2     BYTE "Your guess is too low. Try again: ", 0
    prompt3     BYTE "Your guess is too high. Try again: ", 0
    correct_msg BYTE "Congratulations! You guessed the correct number!$"
    number      DWORD 50
```

```
    guess       DWORD 0
    newline     BYTE 0Ah, 0Dh, '$'

.CODE
main PROC

CALL Clrscr

start_game:
    MOV EDX, OFFSET prompt1
    CALL WriteString


    CALL ReadInt
    MOV guess, EAX


    MOV EAX, guess
    CMP EAX, [number]
    JE correct_guess
    JL too_low
    JG too_high

too_low:
    MOV EDX, OFFSET prompt2
    CALL WriteString
    JMP start_game

too_high:

    MOV EDX, OFFSET prompt3
    CALL WriteString
    JMP start_game

correct_guess:
```

```
    MOV EDX, OFFSET    correct_msg
    CALL WriteString

    exit

main ENDP

END main
```

OUTPUT: