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Recursion in Assembly

Question 1:

Write a code to calculate the terms of fibanocci sequence by recursion. From main, pass the required terms to the recursive procedure and assume:

- f(0) = 0
- f(1) = 1

Take the terms as word variables.

Answer:

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ORG 100h

.DATA

    SERIES  DW  0, 1, 8 DUP(0)      ; (Global) Array that holds terms of the series
    TERM1   DW  0                   ; (Local)  N-2 term
    TERM2   DW  0                   ; (Local)  N-1 term
    N       DW  0                   ; (Local)  Number of terms remaining.
    SIZE    DW  8                   ; (Global) Number of terms to be added in array.

.CODE

MAIN PROC

    LEA SI, SERIES
    ADD SI, 4

    PUSH SIZE                       ; 1. Passed Parameters from MAIN.
    PUSH 0
    PUSH 1

    CALL FIBO                       ; 2. Called PROC.

RET
MAIN ENDP


FIBO PROC

    MOV BP, SP

    MOV AX, [BP+6]                  ; 3. Loaded First Parameter in PROC.
    MOV N, AX
    CMP N, 0                        ; 4. Checked Base Criteria.
```

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    JNE AGAIN

    MOV AX, [BP+2]
    MOV [SI], AX
    JMP EXIT                        ; 5. RET if Fulfilled.

    AGAIN:  DEC N
            MOV BP, SP

            MOV AX, [BP+2]          ; 8. Loaded Previously called Parameters.
            MOV TERM2, AX
            MOV BX, AX
            MOV AX, [BP+4]
            MOV TERM1, AX

            MOV AX, TERM1
            ADD AX, TERM2

            MOV TERM1, BX
            MOV TERM2, AX

            MOV [SI], AX
            ADD SI, 2

            PUSH N                  ; 6. Prepared Parameters for next Call.
            PUSH TERM1
            PUSH TERM2
            CALL FIBO               ; 7. Called Again.

EXIT:                               ; 9. Processed and Exit.
RET 6

FIBO ENDP
```

Output: