Chapter 8

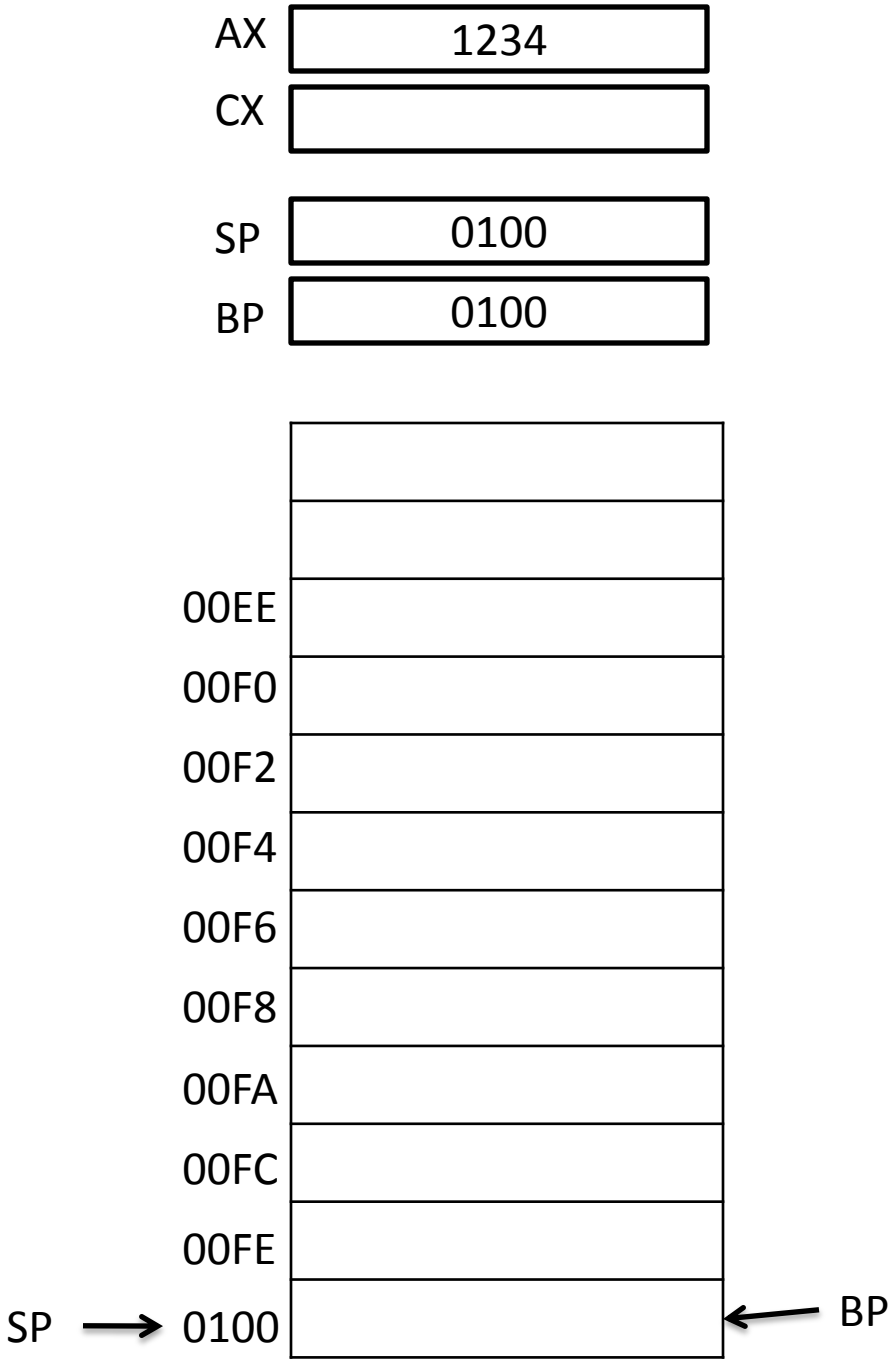
The Stack and Introduction to Procedures

PUSH

PUSH source

•source is a 16-bit register / memory word

PUSH AX

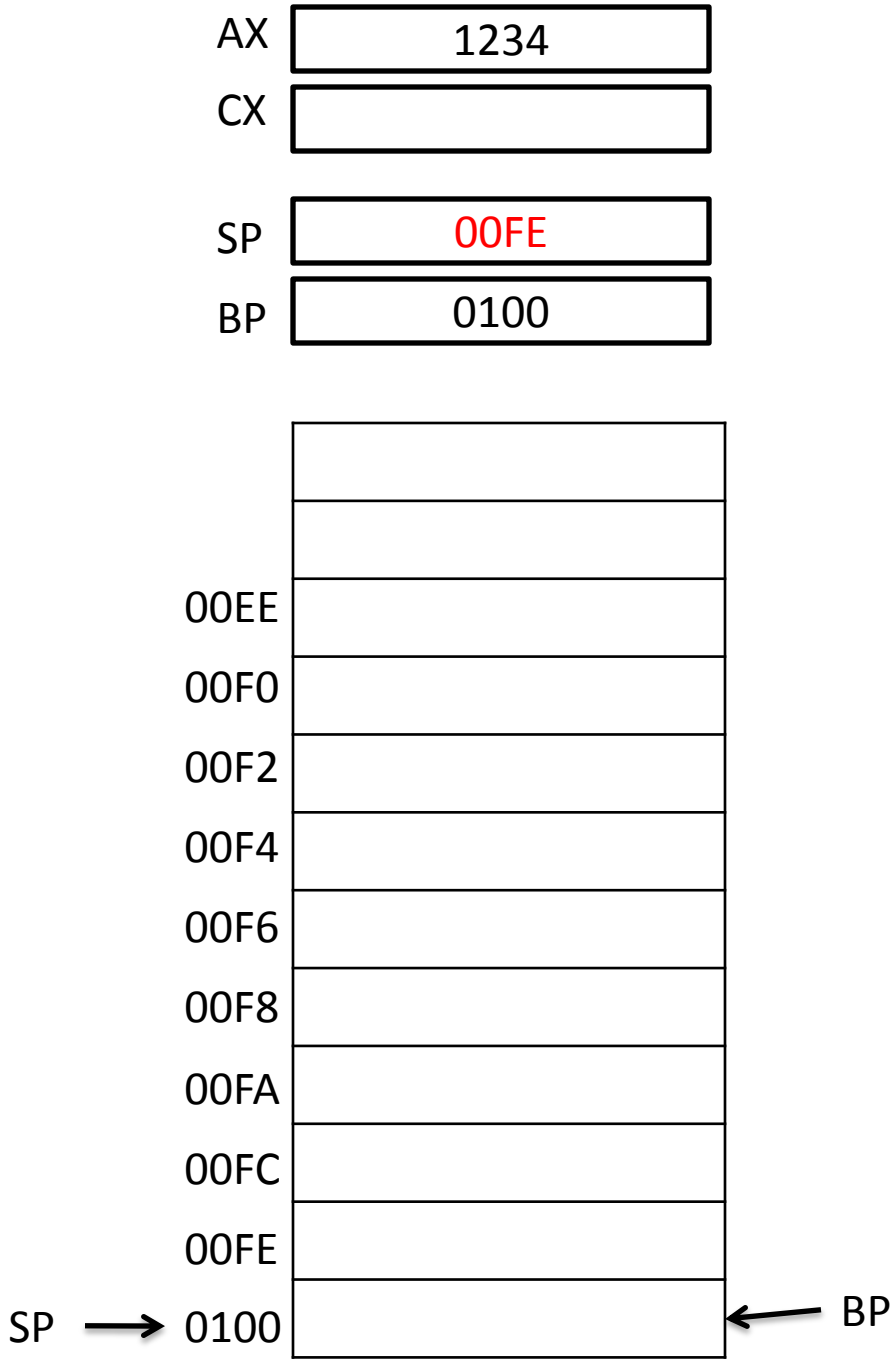


PUSH

PUSH source

•source is a 16-bit register / memory word

PUSH AX

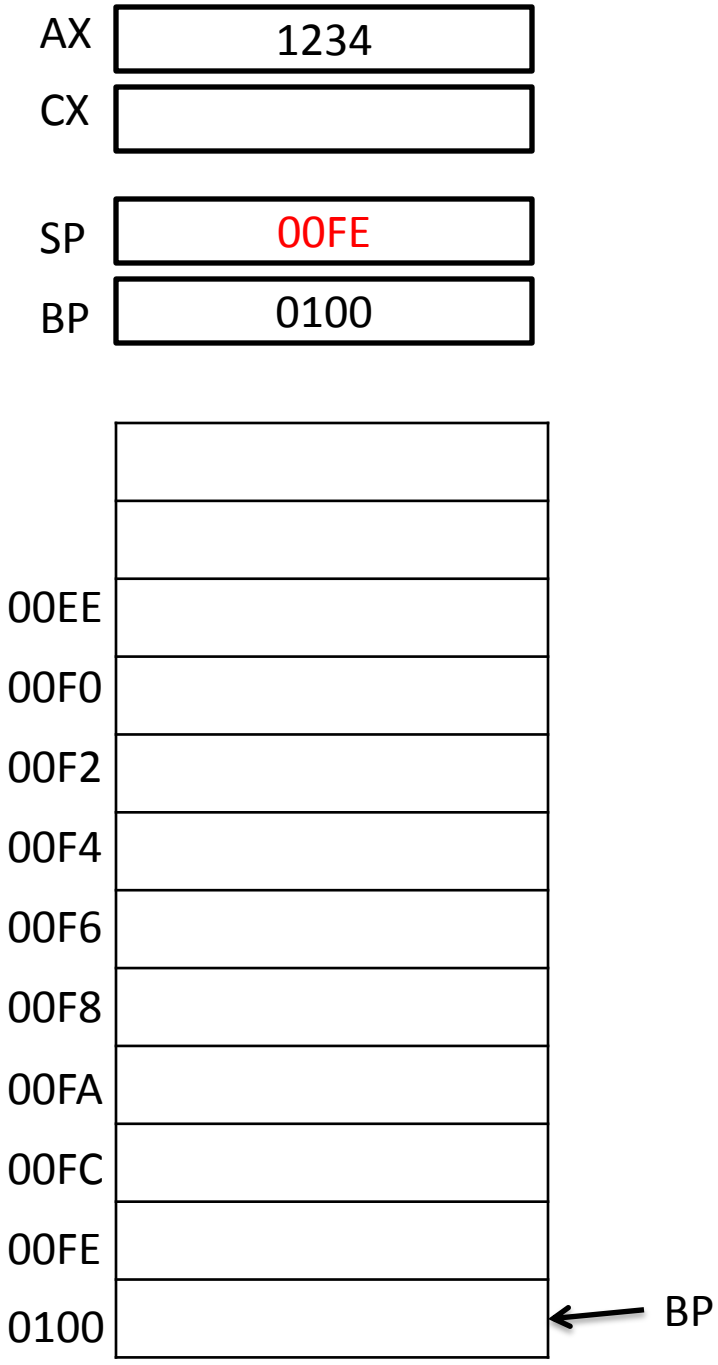


PUSH

PUSH source

•source is a 16-bit register / memory word

PUSH AX

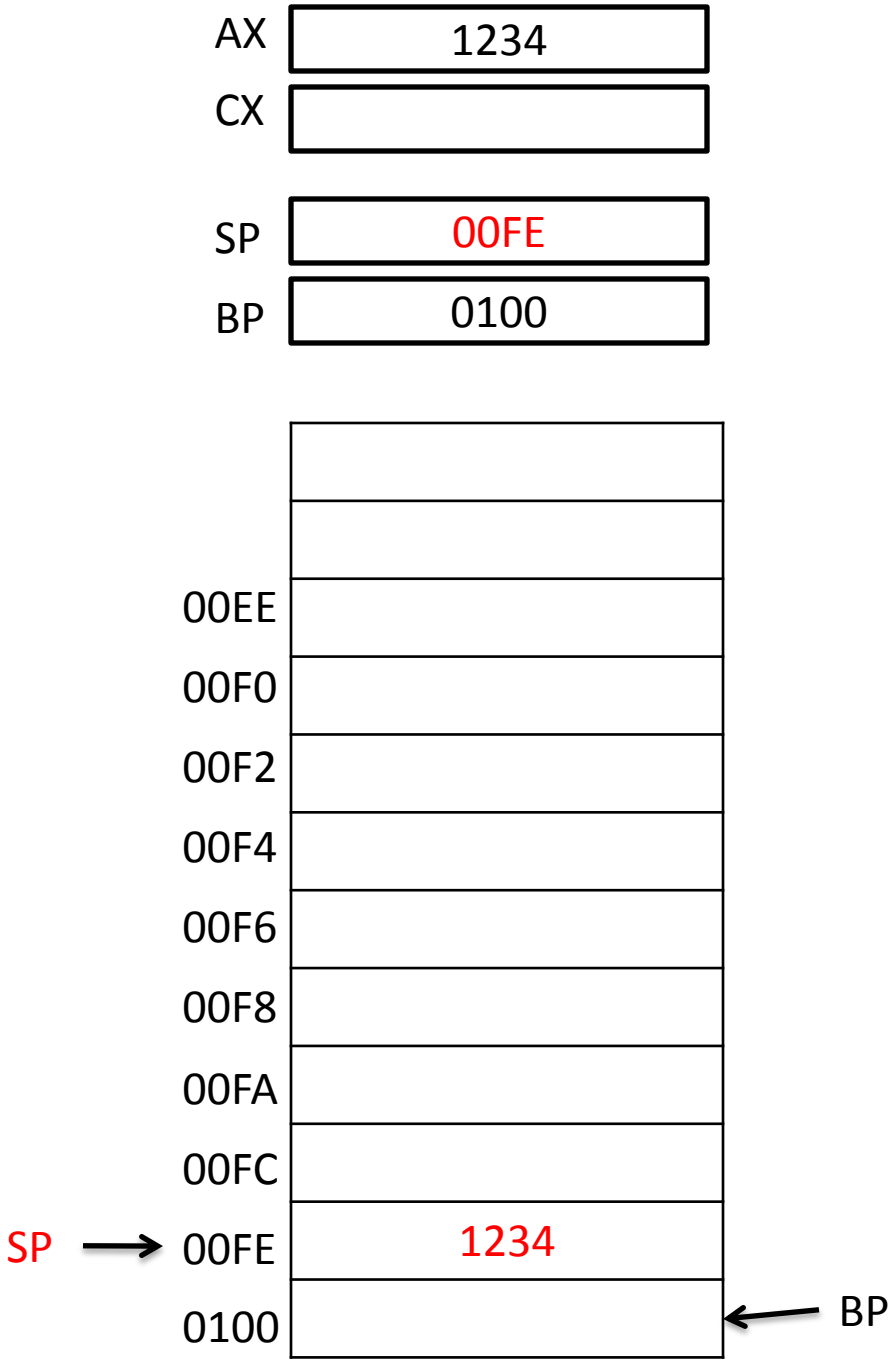


PUSH

PUSH source

•source is a 16-bit register / memory word

PUSH AX

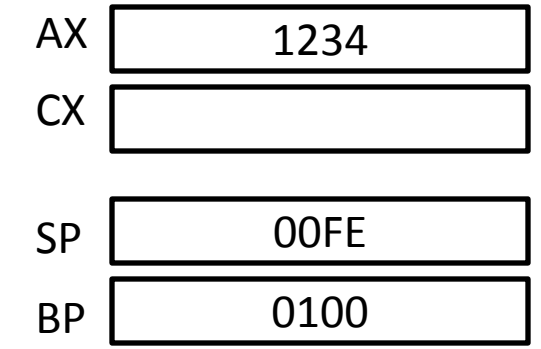


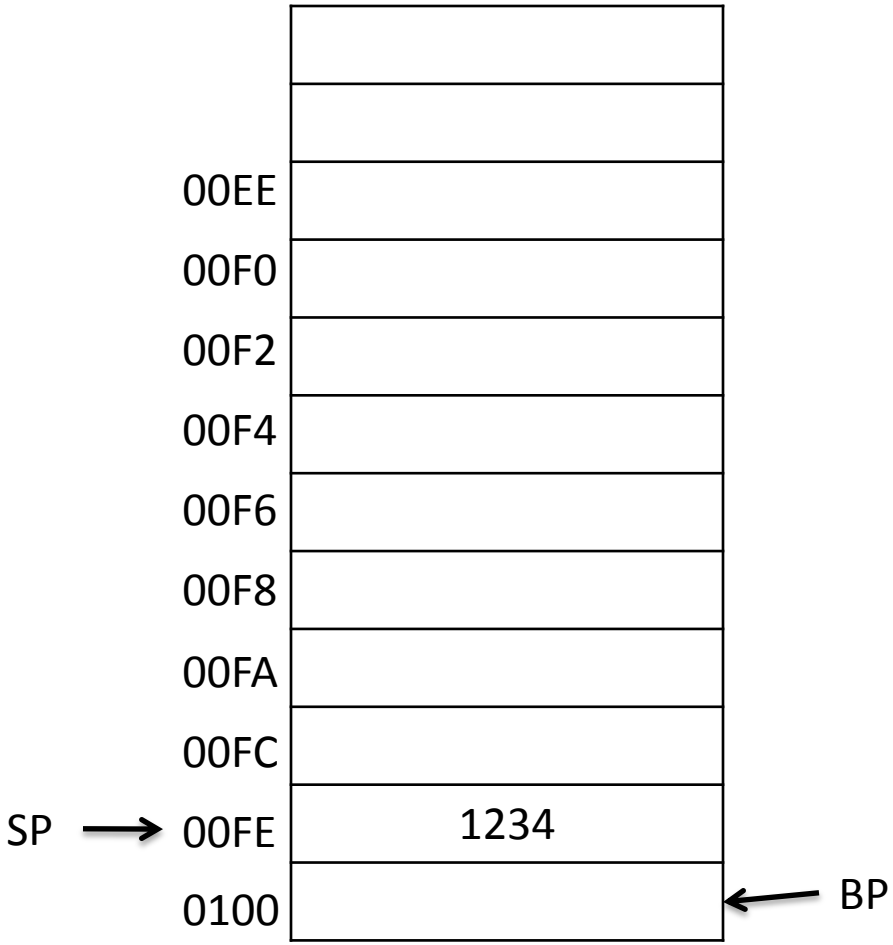
POP

POP destination

•destination is a 16-bit register(except IP register) / memory word

POP CX



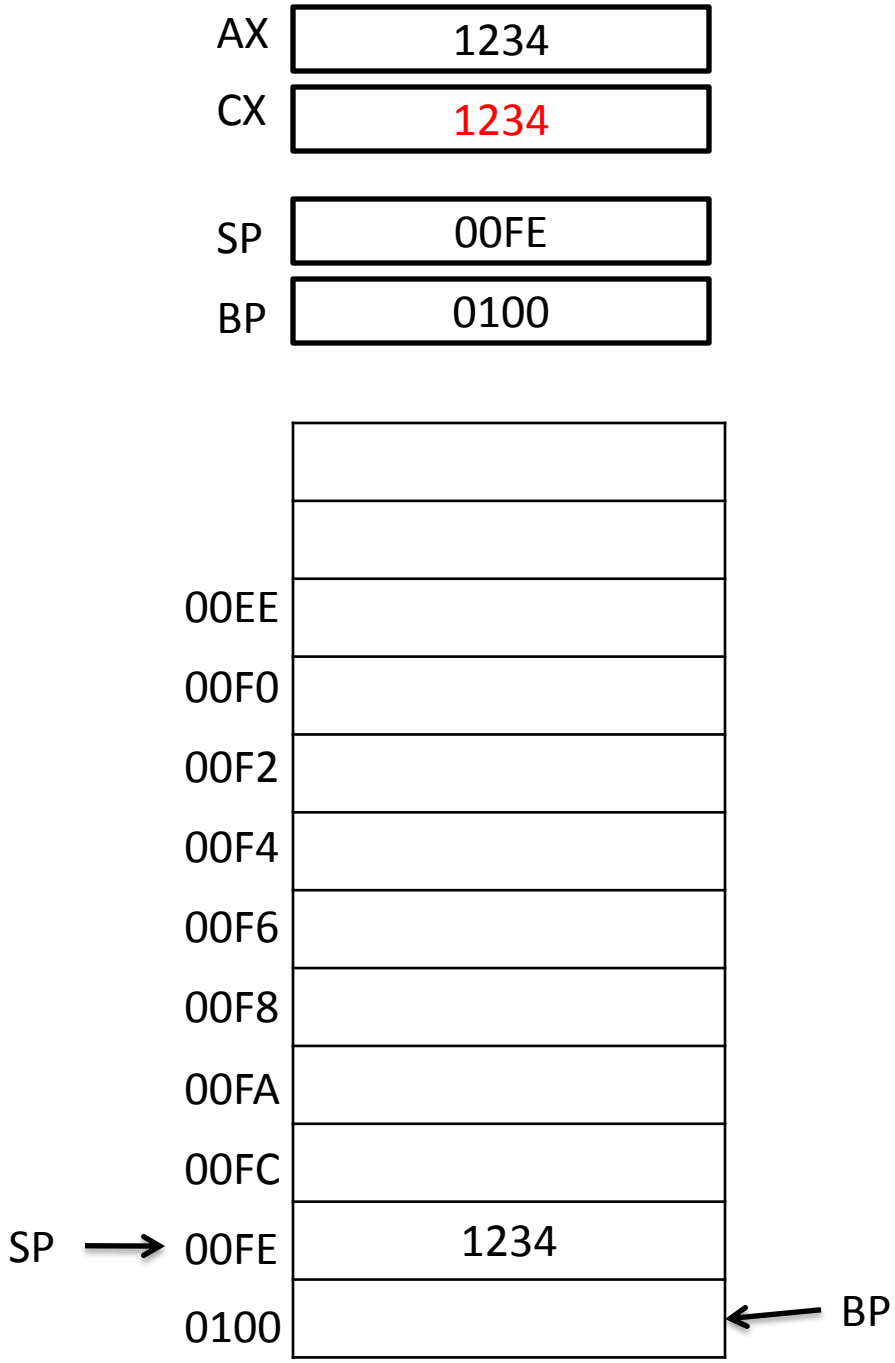


POP

POP destination

•destination is a 16-bit register(except IP register) / memory word

POP CX

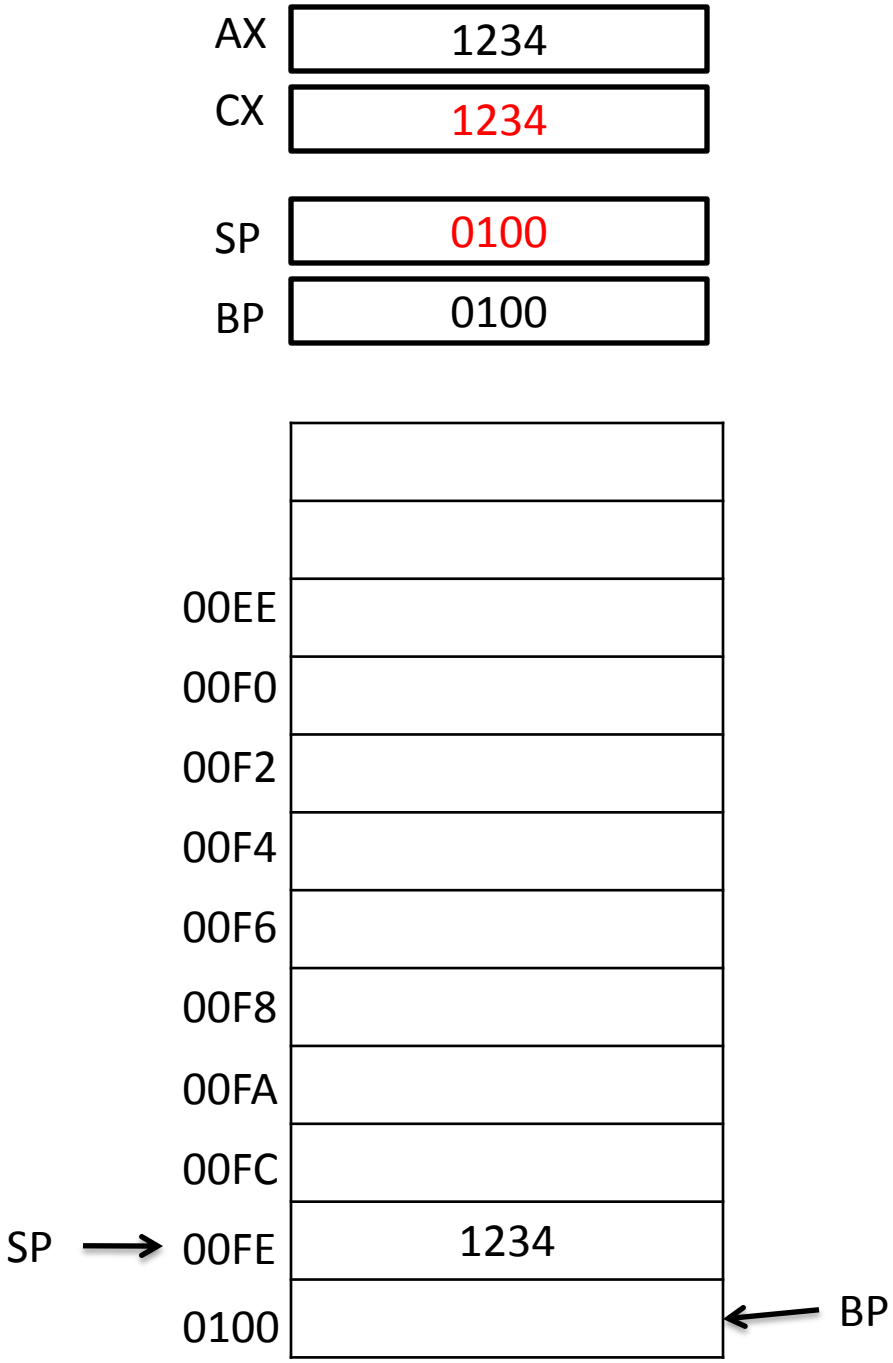


POP

POP destination

•destination is a 16-bit register(except IP register) / memory word

POP CX

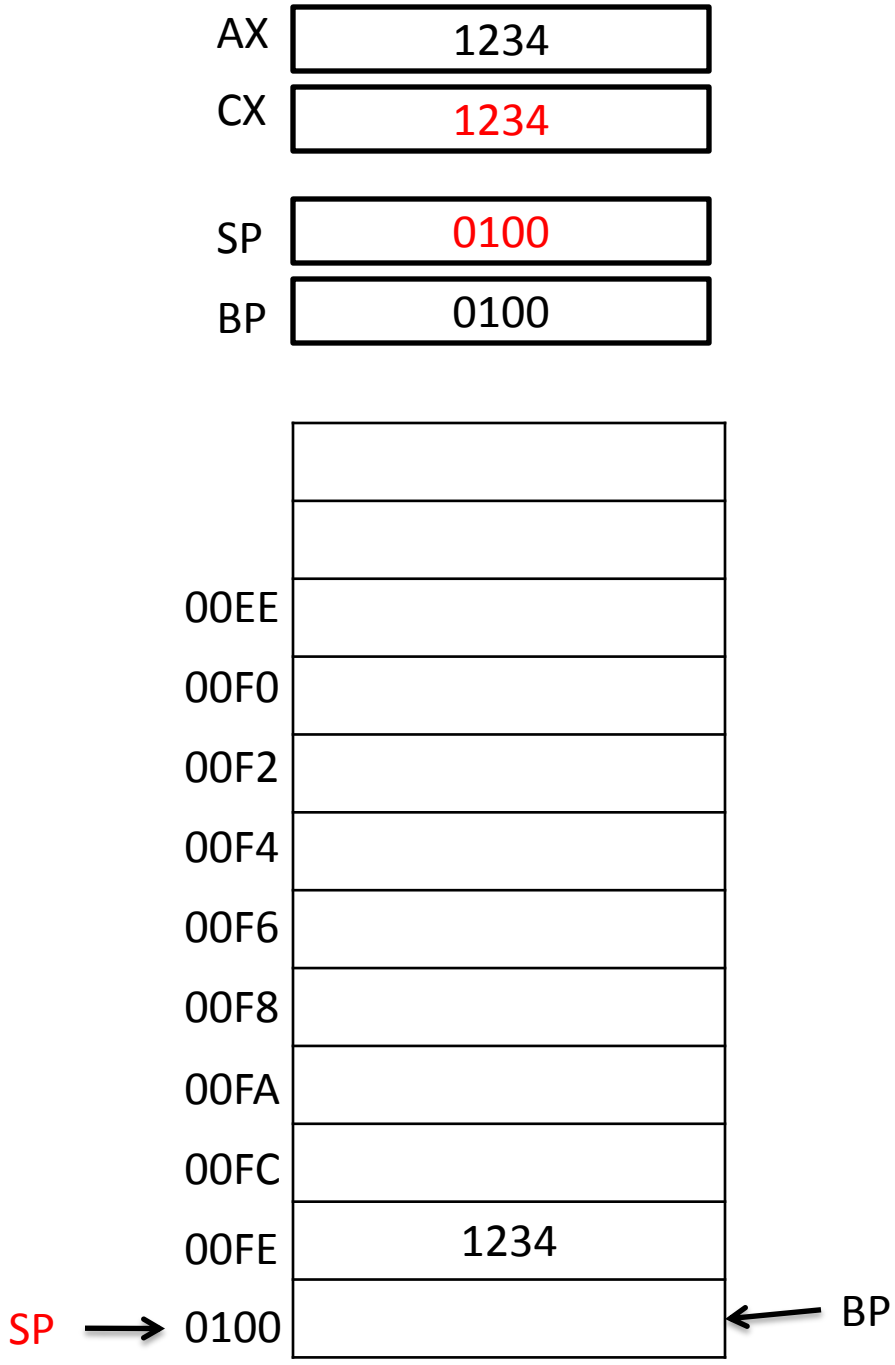


POP

POP destination

•destination is a 16-bit register(except IP register) / memory word

POP CX



PUSHF and POPF

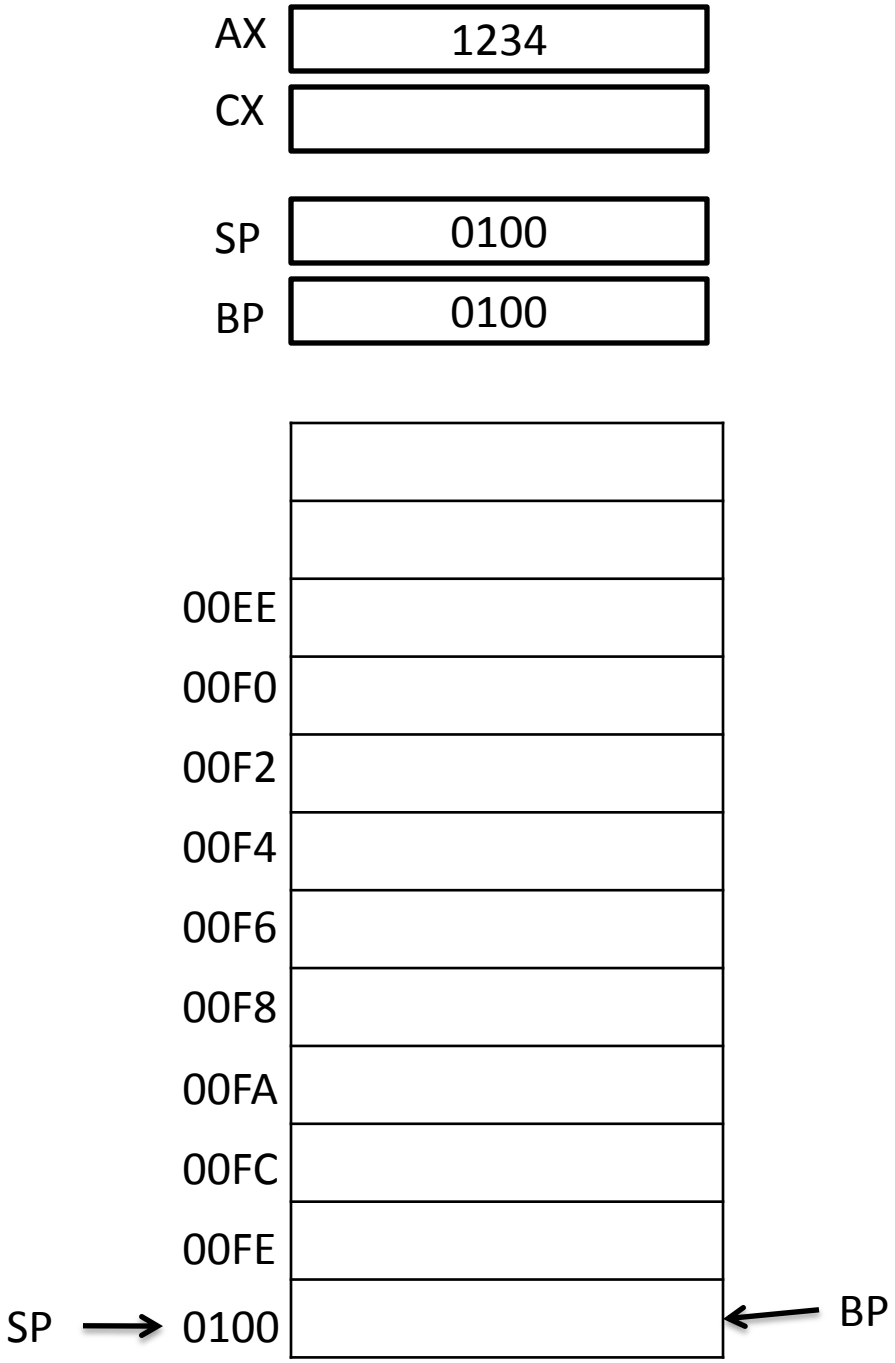
PUSHF

- No source operand is allowed here
- Pushes the contents of FLAGS register onto the stack

PUSHF

POPF

- Reverse of PUSHF
- Pops the top of the stack into FLAGS register



Order of PUSH and POP

PUSH A
PUSH B
PUSH C
...
…
POP C
POP B
POP C

Procedure Declaration

```
name      PROC      type
; body of the procedure
          RET
name      ENDP
```

"name" is the user-defined name of the procedure

"type" is optional, can be "FAR"/"NEAR"

"RET" causes control back to the calling procedure

```
name        PROC        type
; body of the procedure
            RET
name        ENDP
```

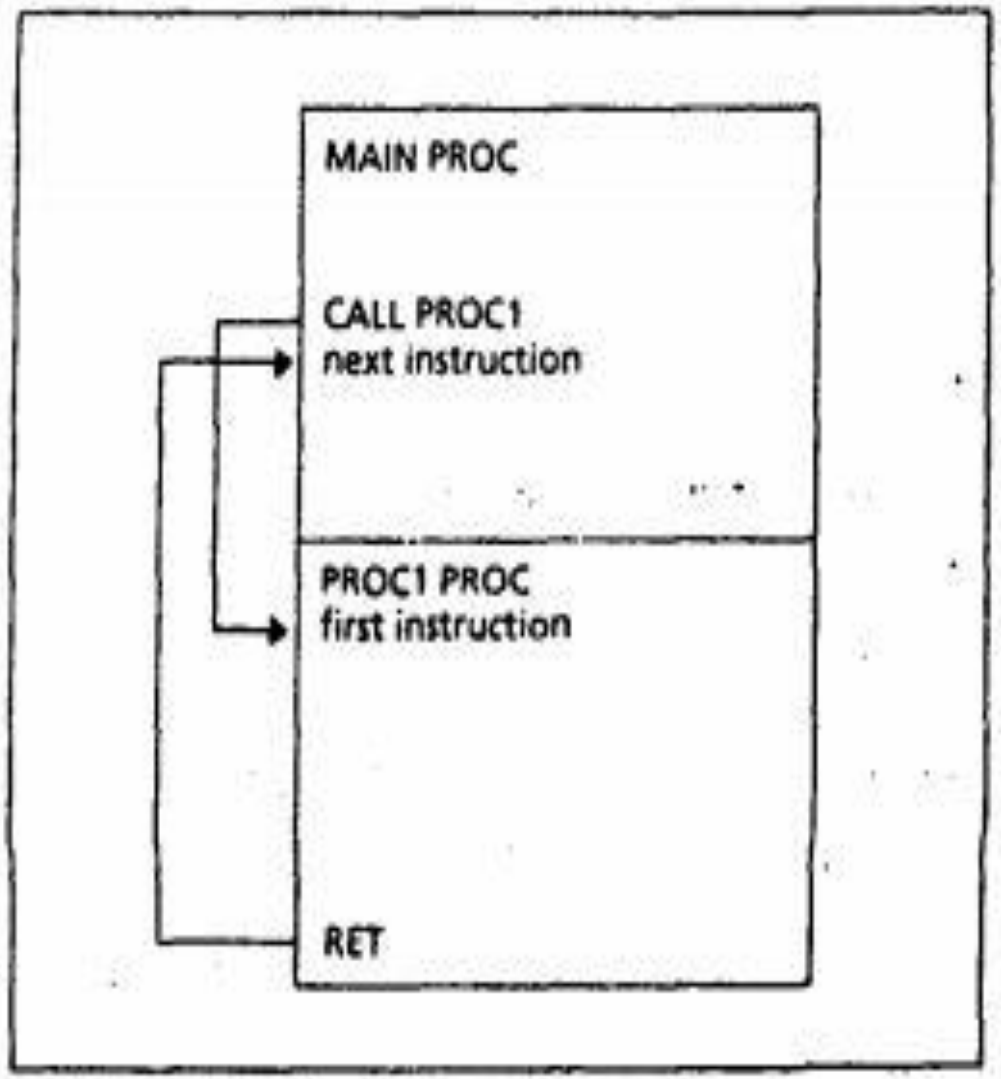


Fig: Procedure CALL and RET

CALL

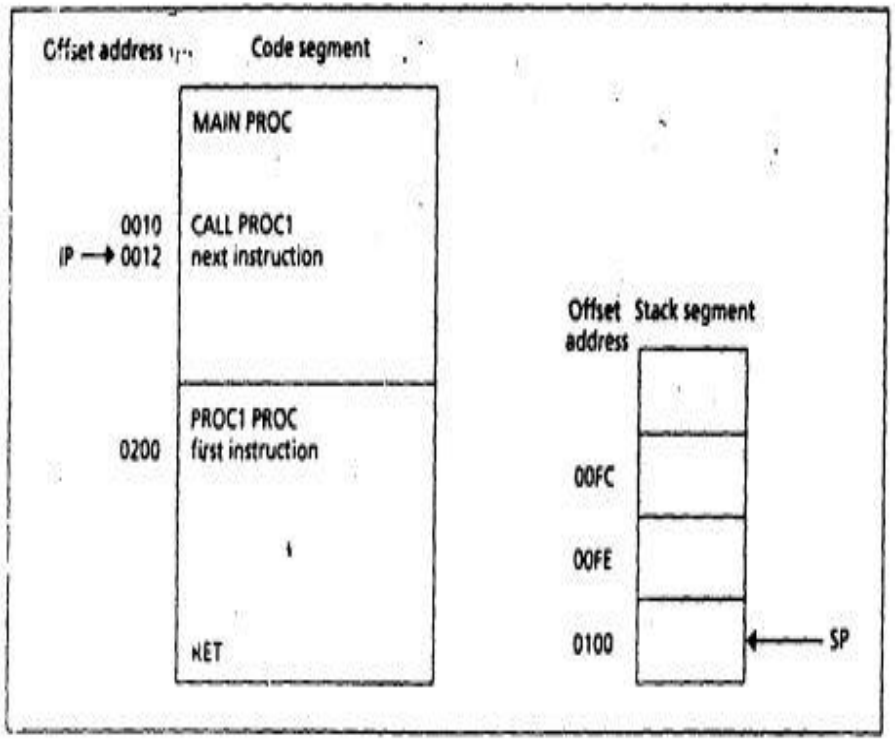


Figure 8.4A Before CALL

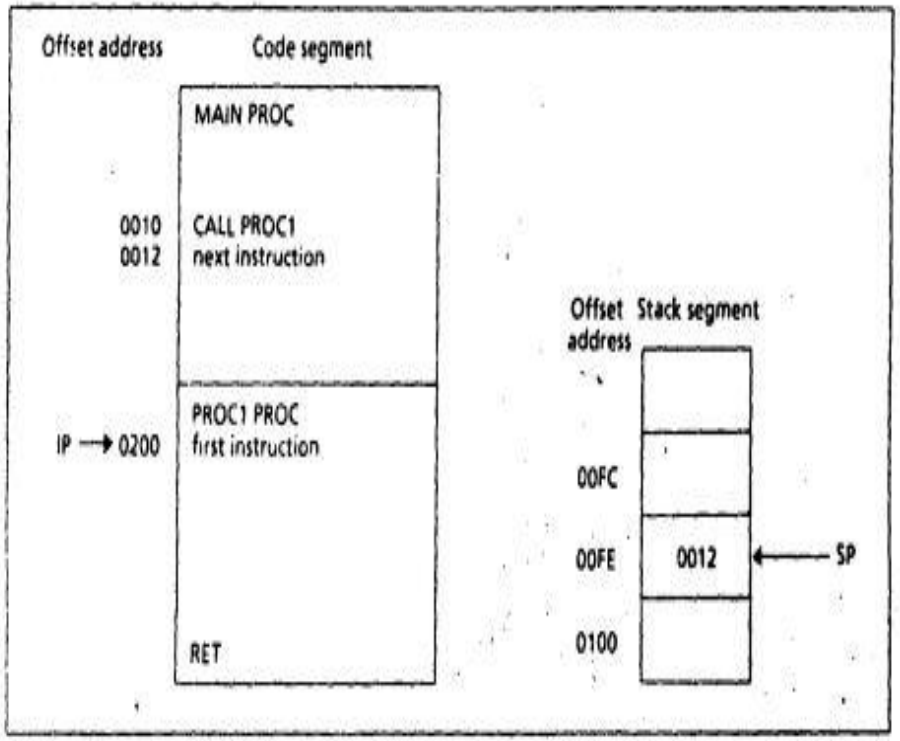


Figure 8.4B After CALL

RET

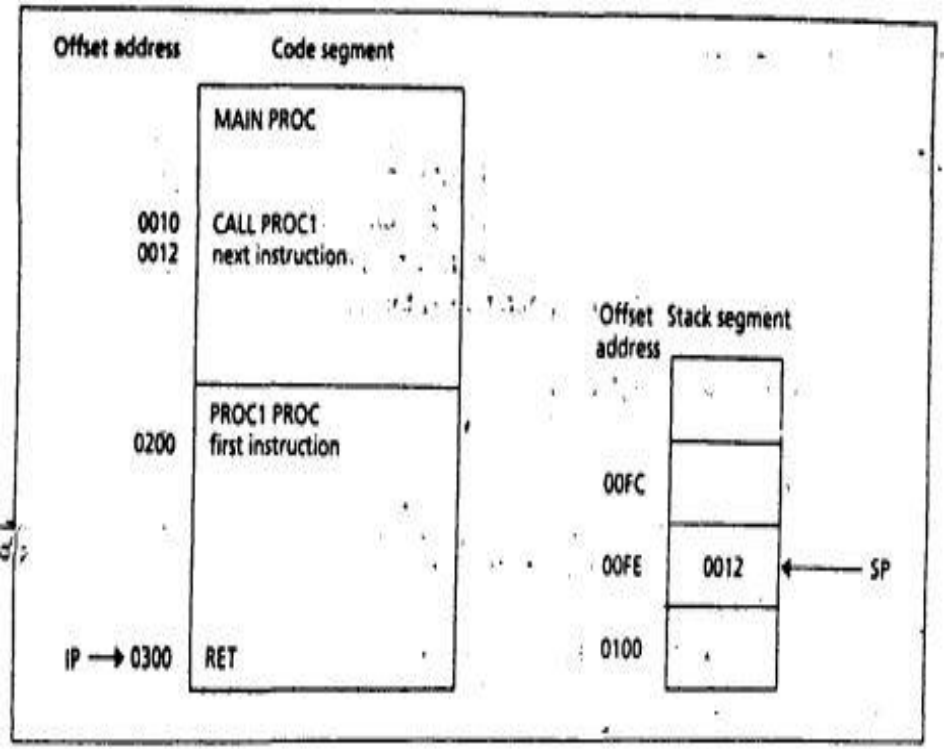


Figure 8.5A Before RET

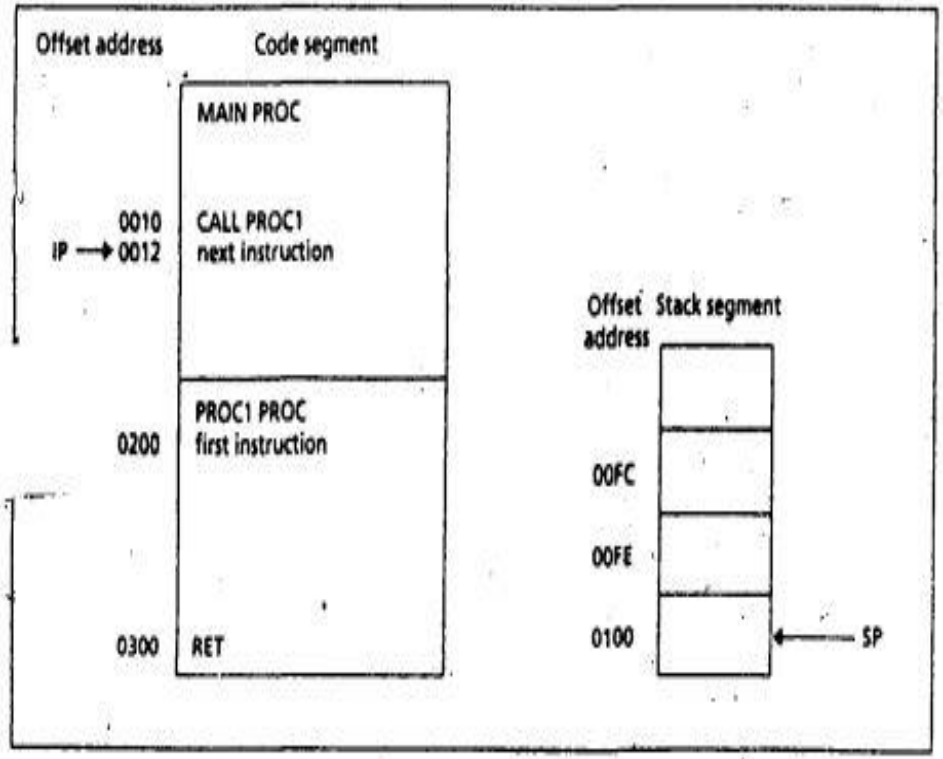


Figure 8.5B After RET

Chapter 17

Recursion

Activation Record

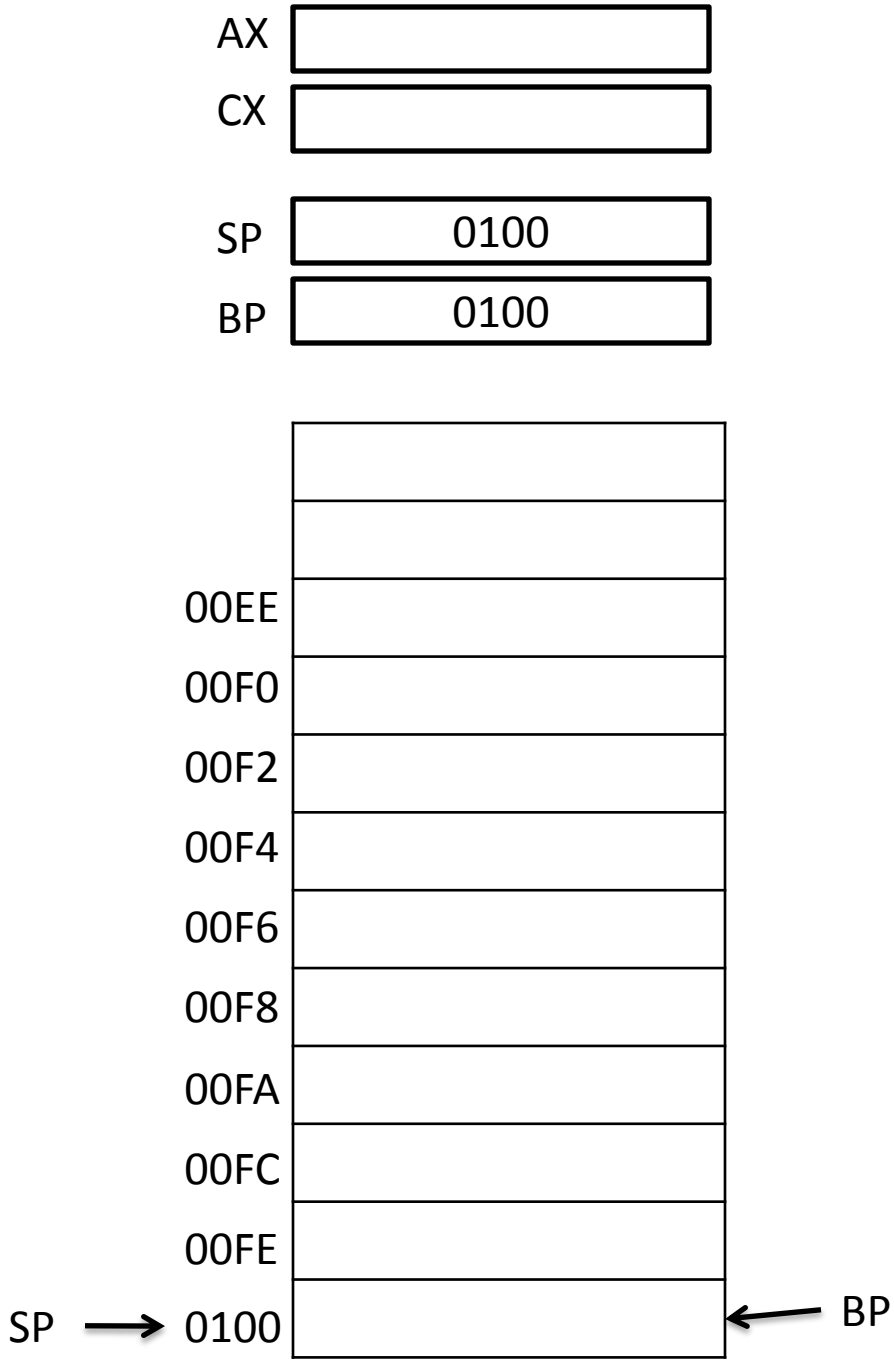
- Record to be stored before CALLing a recursive function

Factorial

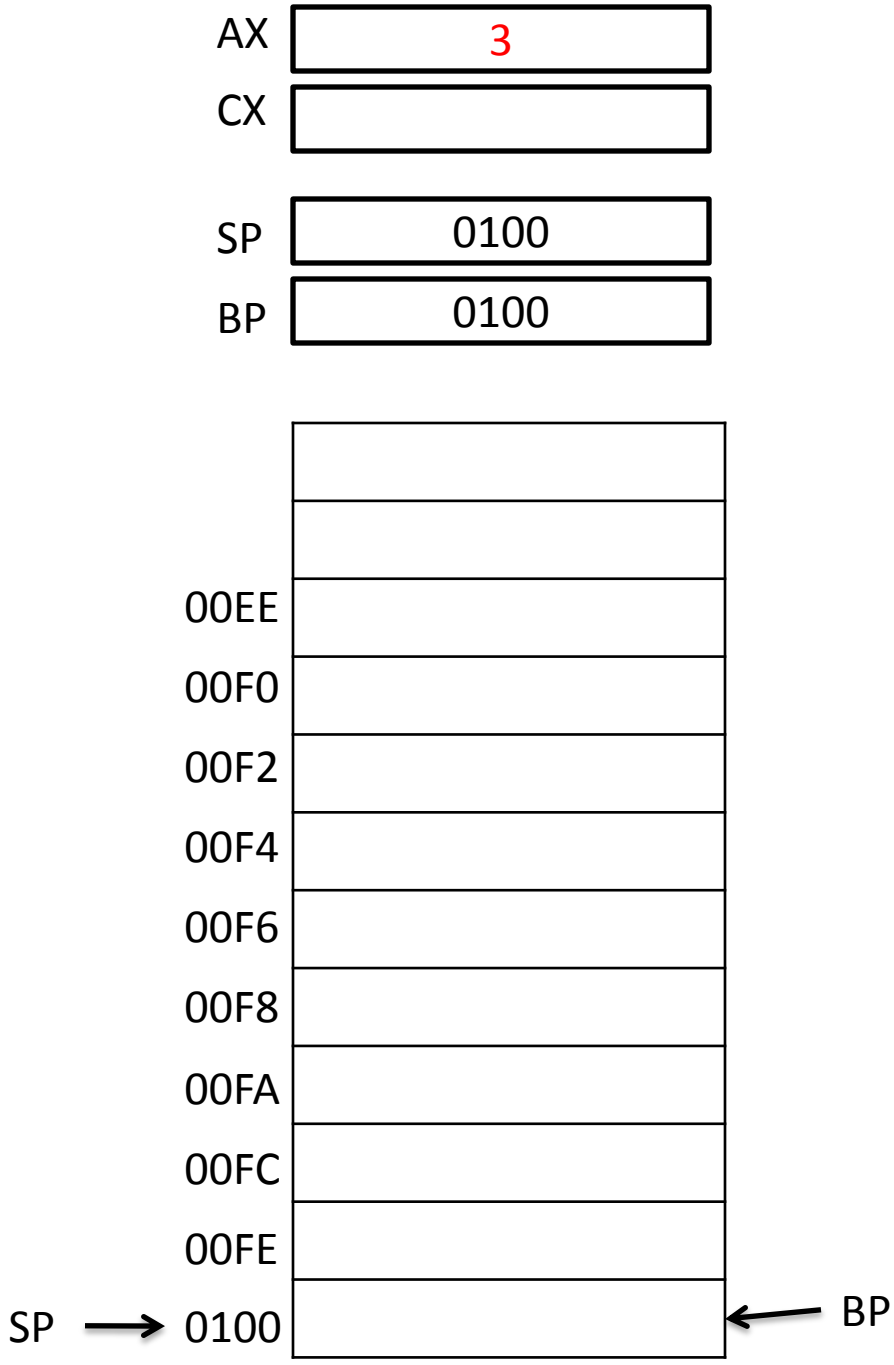
- Factorial(n)=n! =n*(n-1)*(n-2)*……*3*2*1

  Factorial(n)=n*Factorial(n-1)

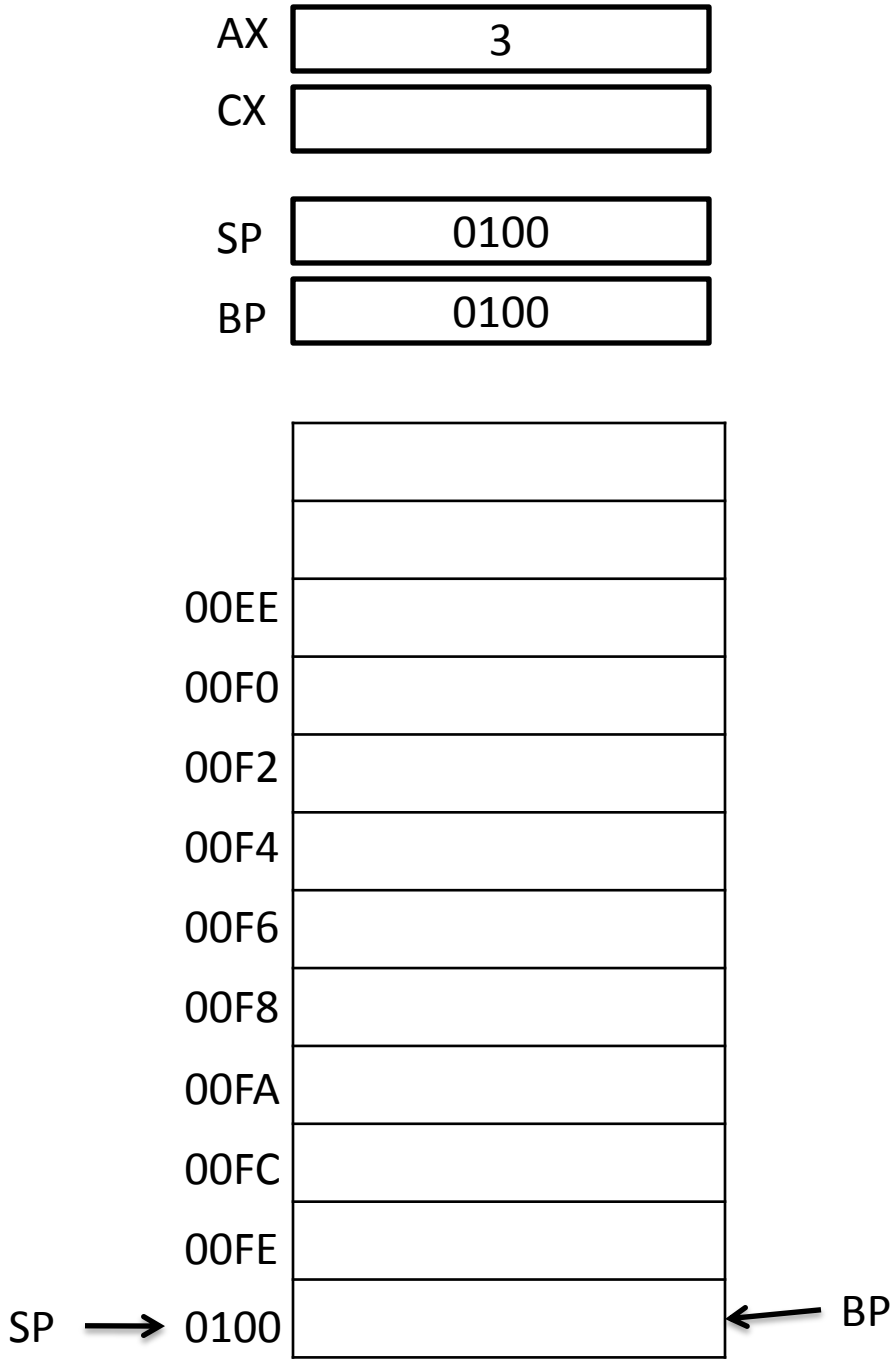
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



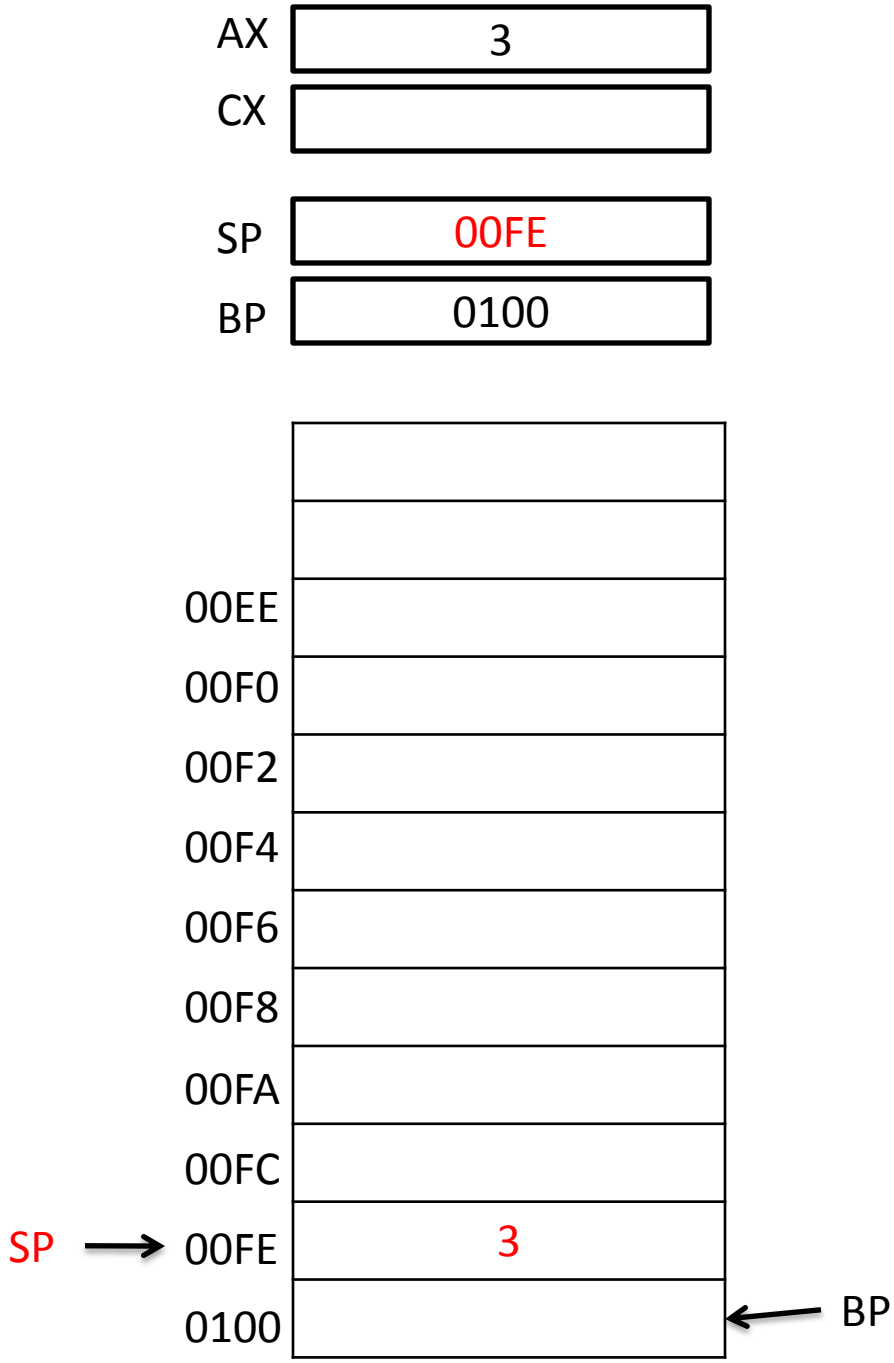
```
        MAIN  PROC
0000                MOV     AX,3
0002                PUSH    AX
0004                CALL    FACTORIAL
0006                MOV     AH,4CH
0008                INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH    BP
000C                MOV     BP,SP
000E                CMP     WORD PTR[BP+4],1
0010                JG      END_IF
0012                MOV     AX,1
0014                JMP     RETURN
0016    END_IF:     MOV     CX, [BP+4]
0018                DEC     CX
001A                PUSH    CX
001C                CALL    FACTORIAL
001E                MUL     WORD  PTR[BP+4]
0020    RETURN :    POP     BP
0022                RET     2
        END         MAIN
```



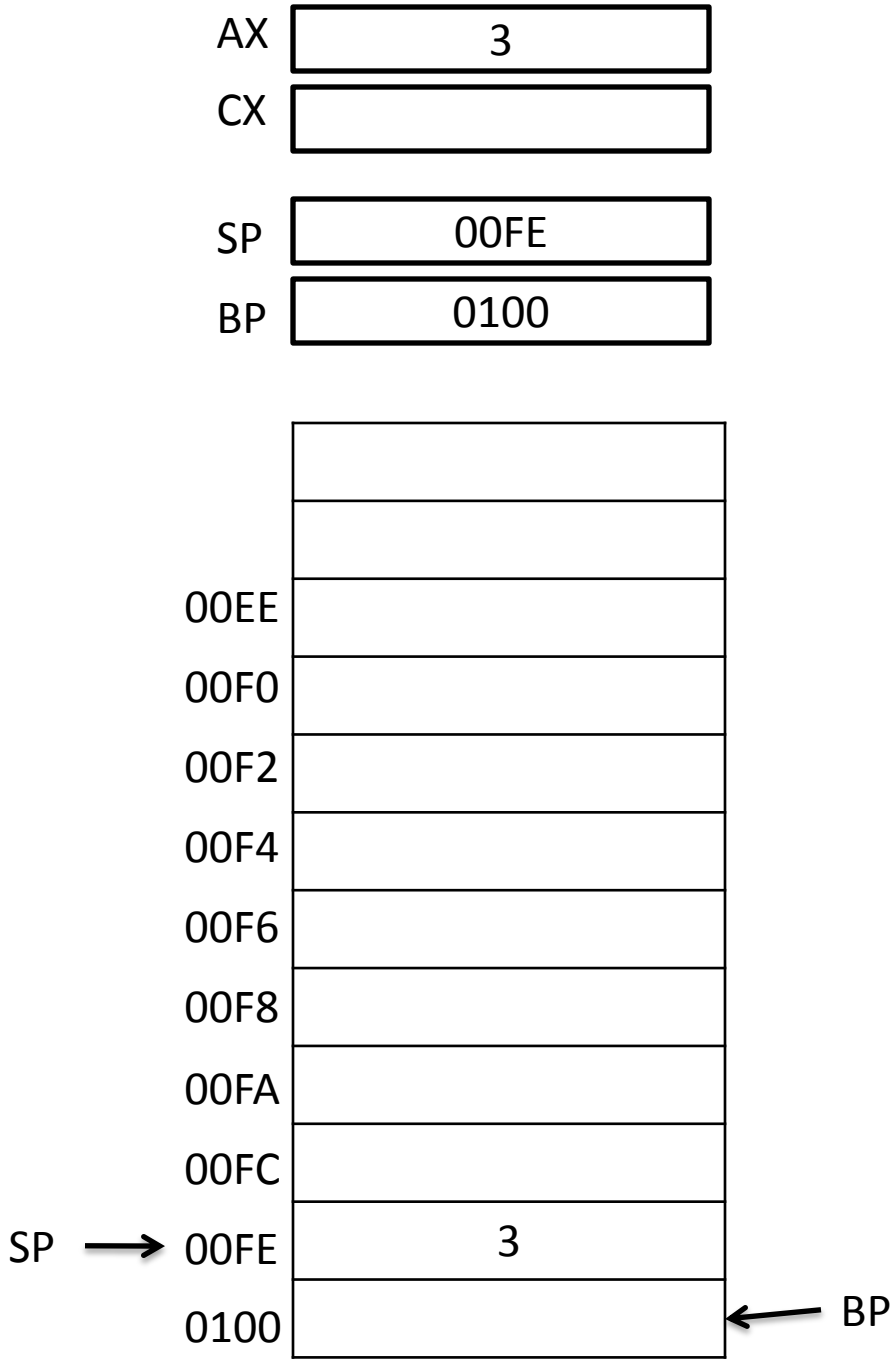
```
        MAIN  PROC
0000                MOV       AX,3
0002                PUSH      AX
0004                CALL      FACTORIAL
0006                MOV       AH,4CH
0008                INT       21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH      BP
000C                MOV       BP,SP
000E                CMP       WORD PTR[BP+4],1
0010                JG        END_IF
0012                MOV       AX,1
0014                JMP       RETURN
0016    END_IF:     MOV       CX, [BP+4]
0018                DEC       CX
001A                PUSH      CX
001C                CALL      FACTORIAL
001E                MUL       WORD  PTR[BP+4]
0020    RETURN :    POP       BP
0022                RET       2
        END         MAIN
```



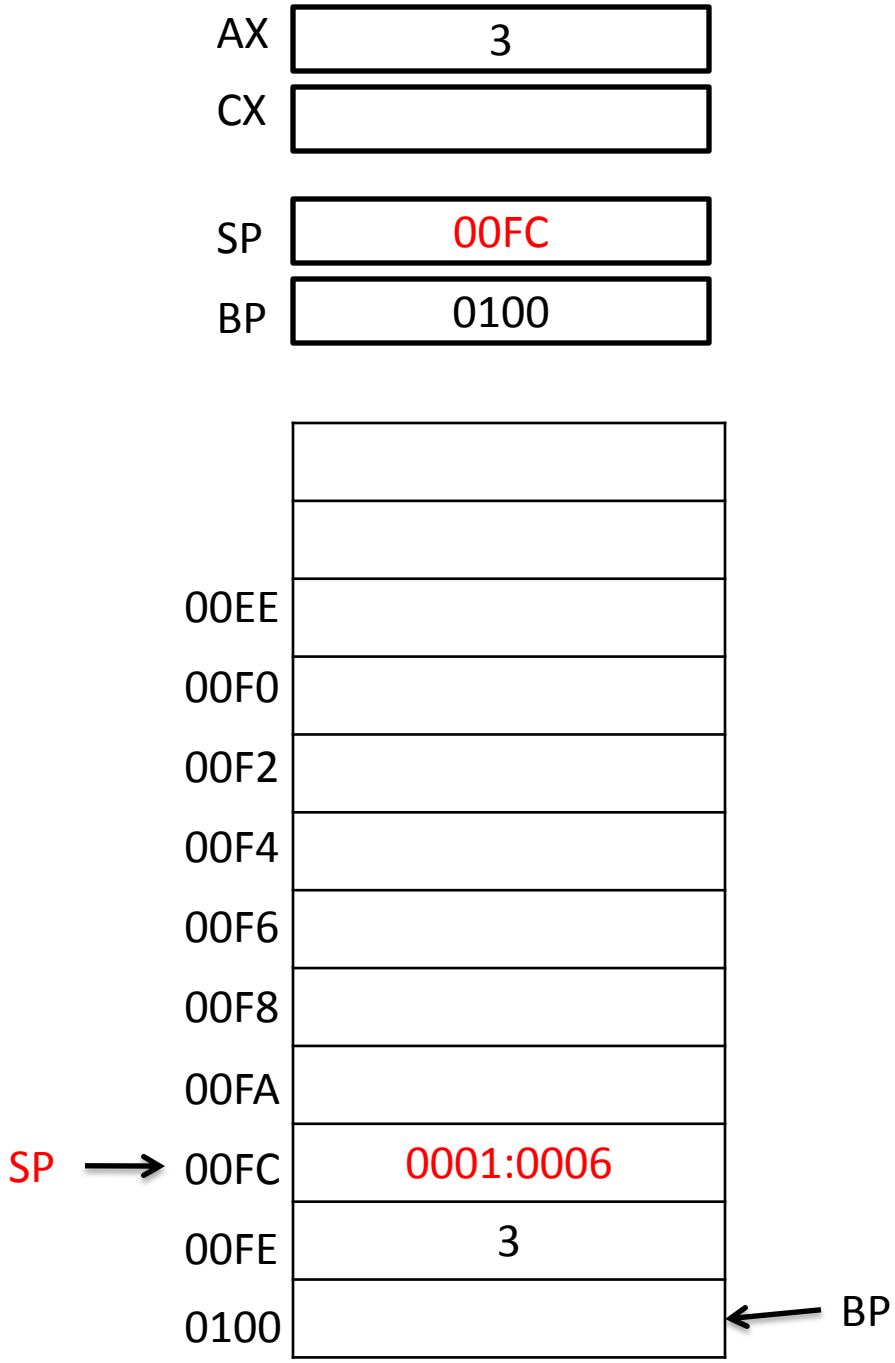
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



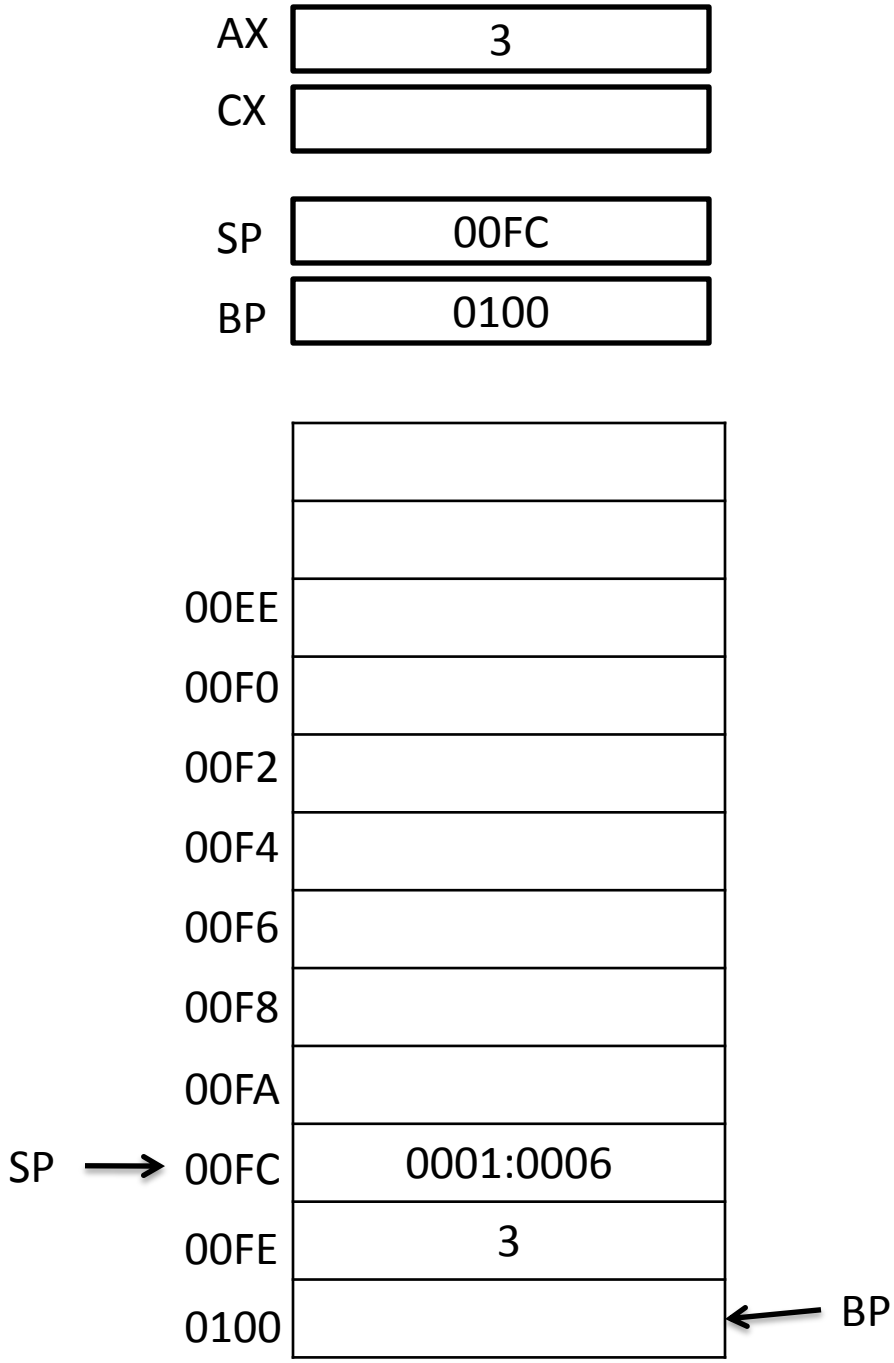
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



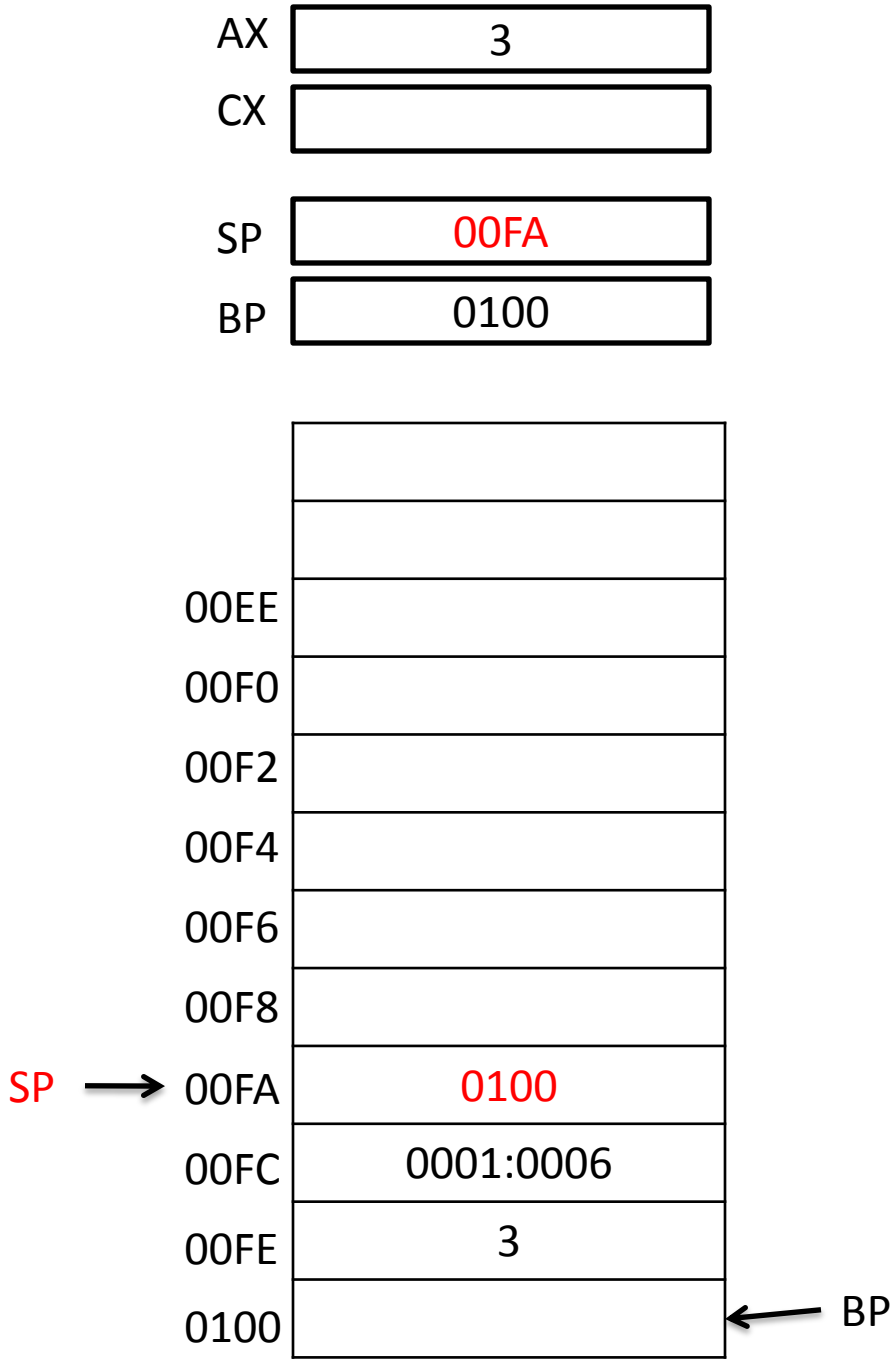
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



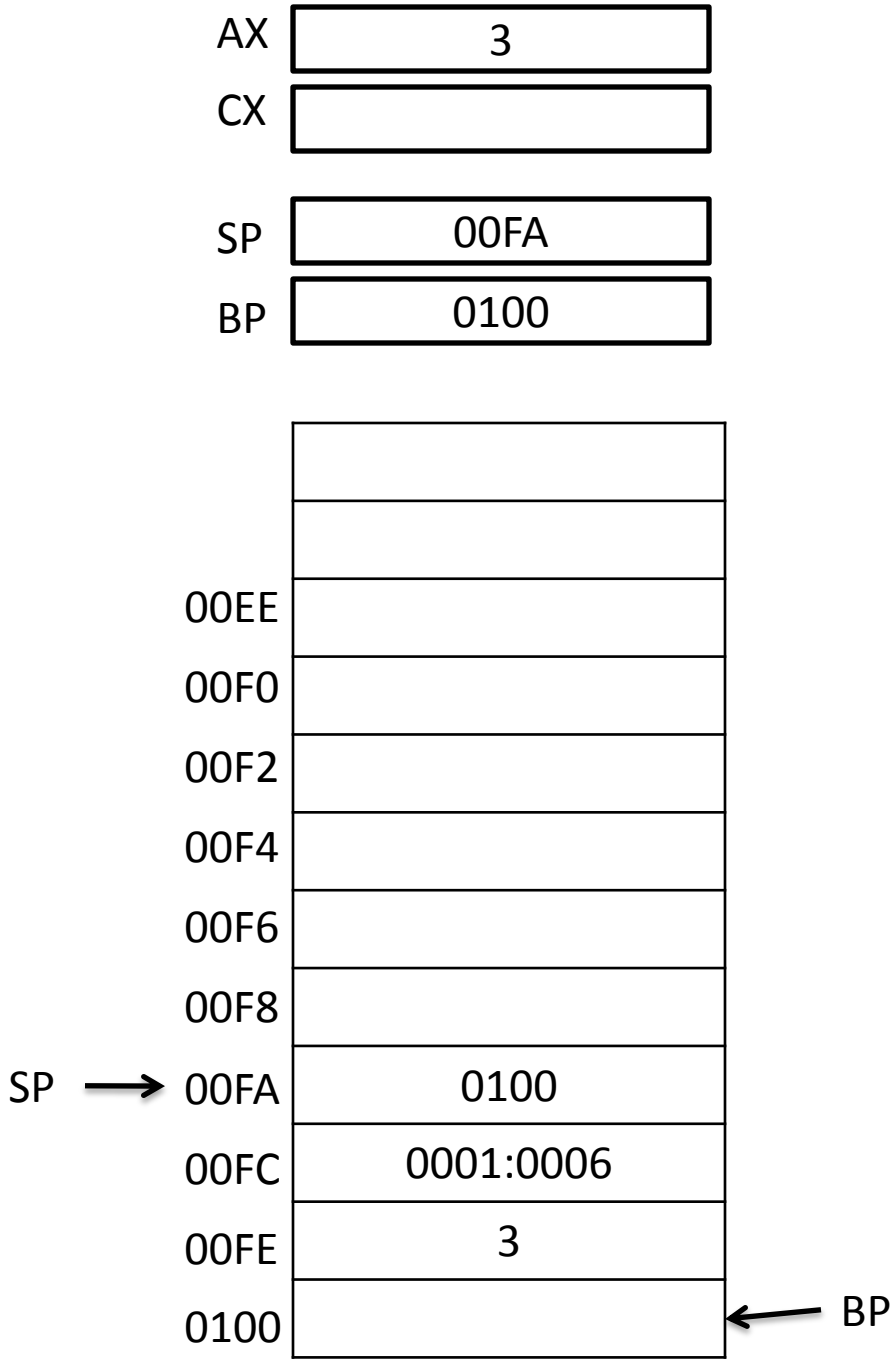
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



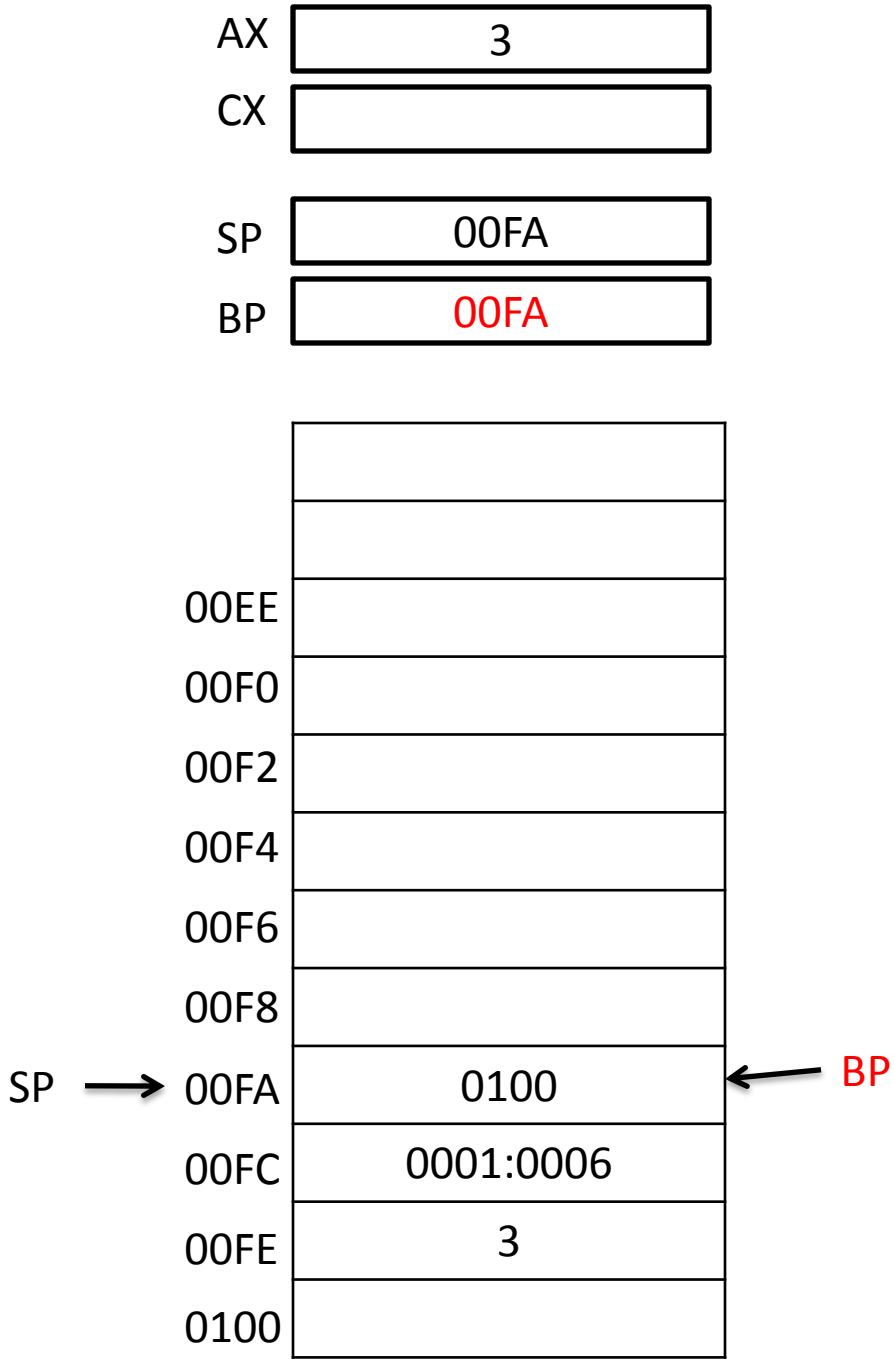
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



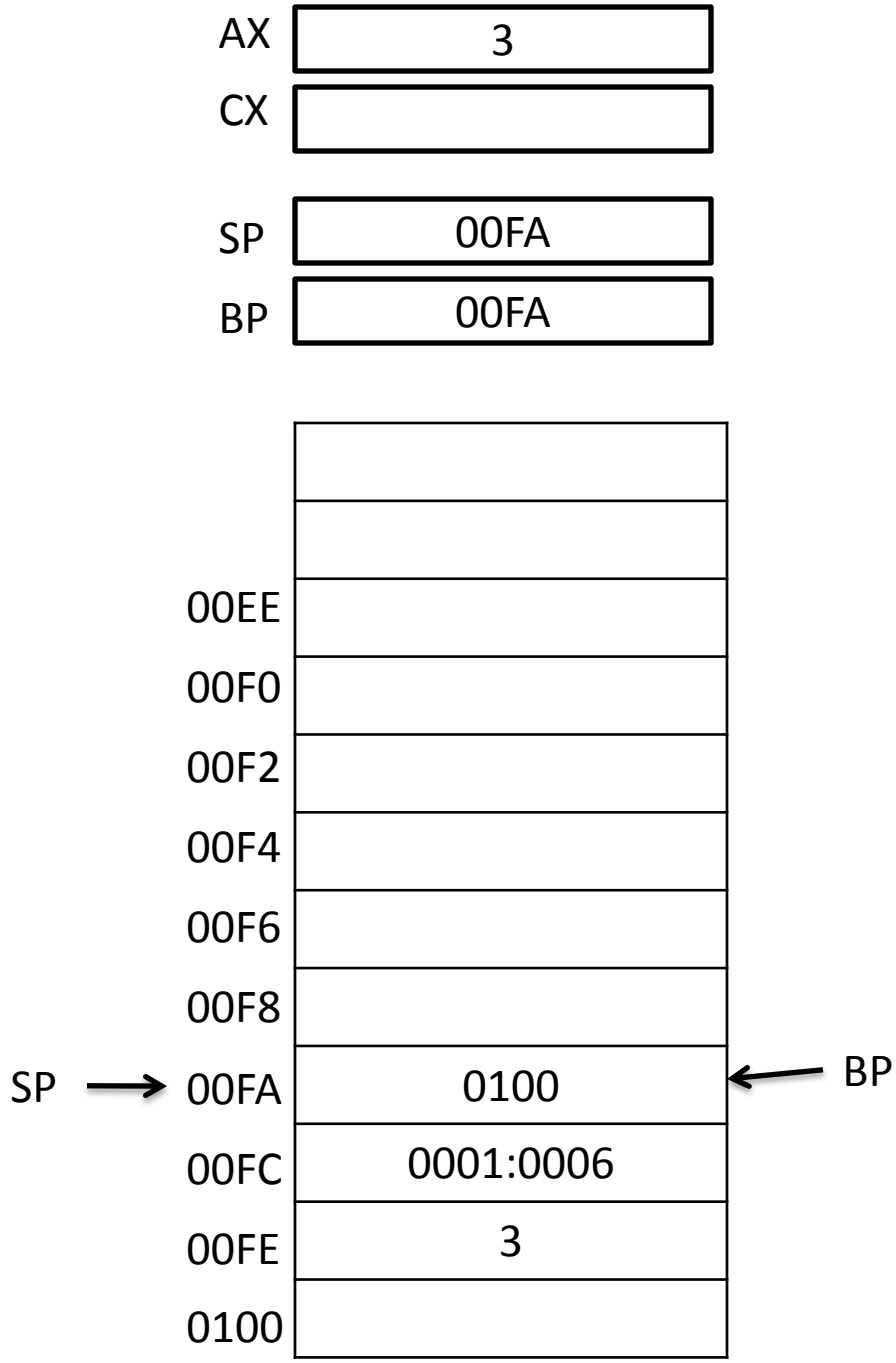
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



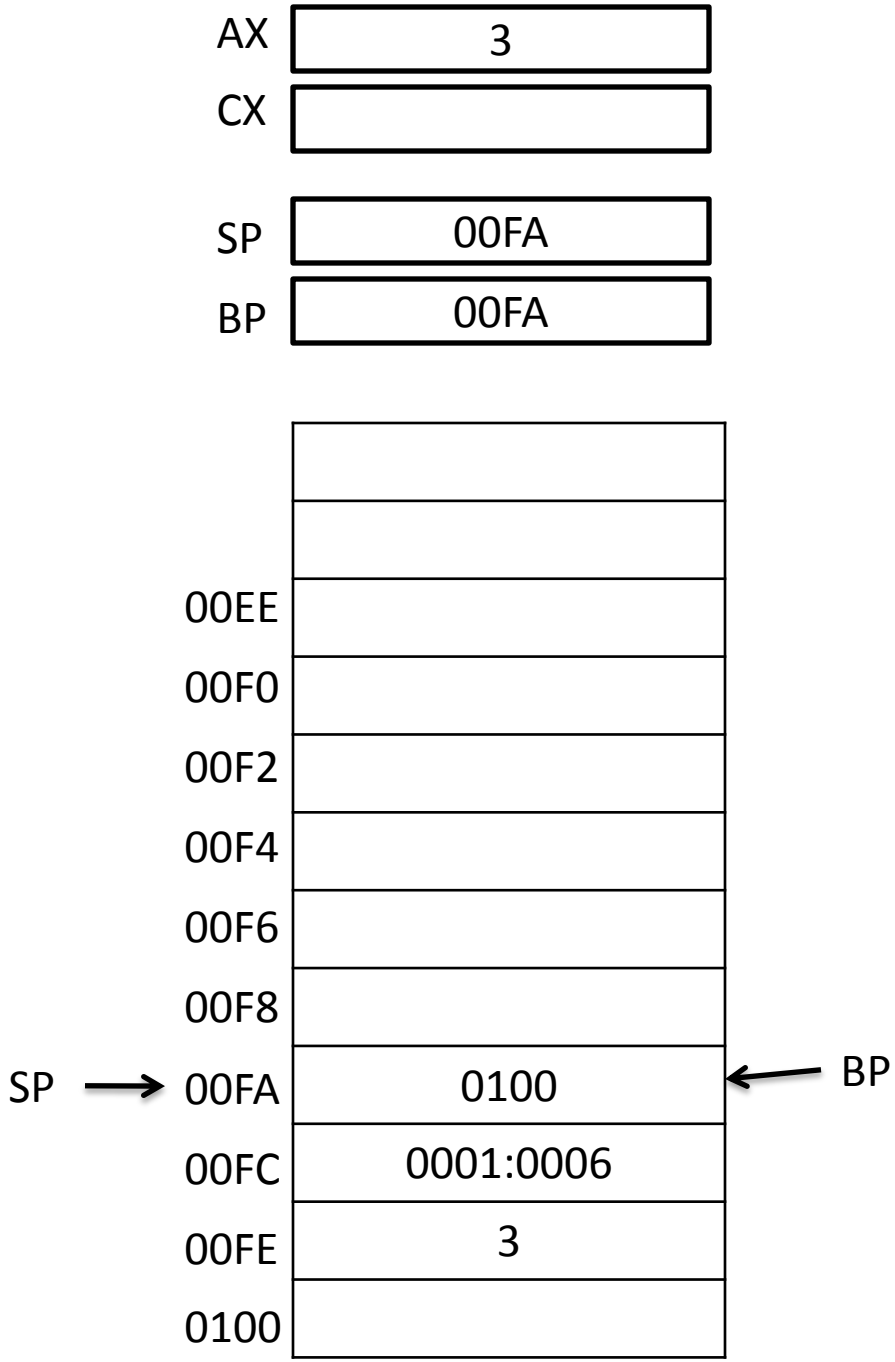
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



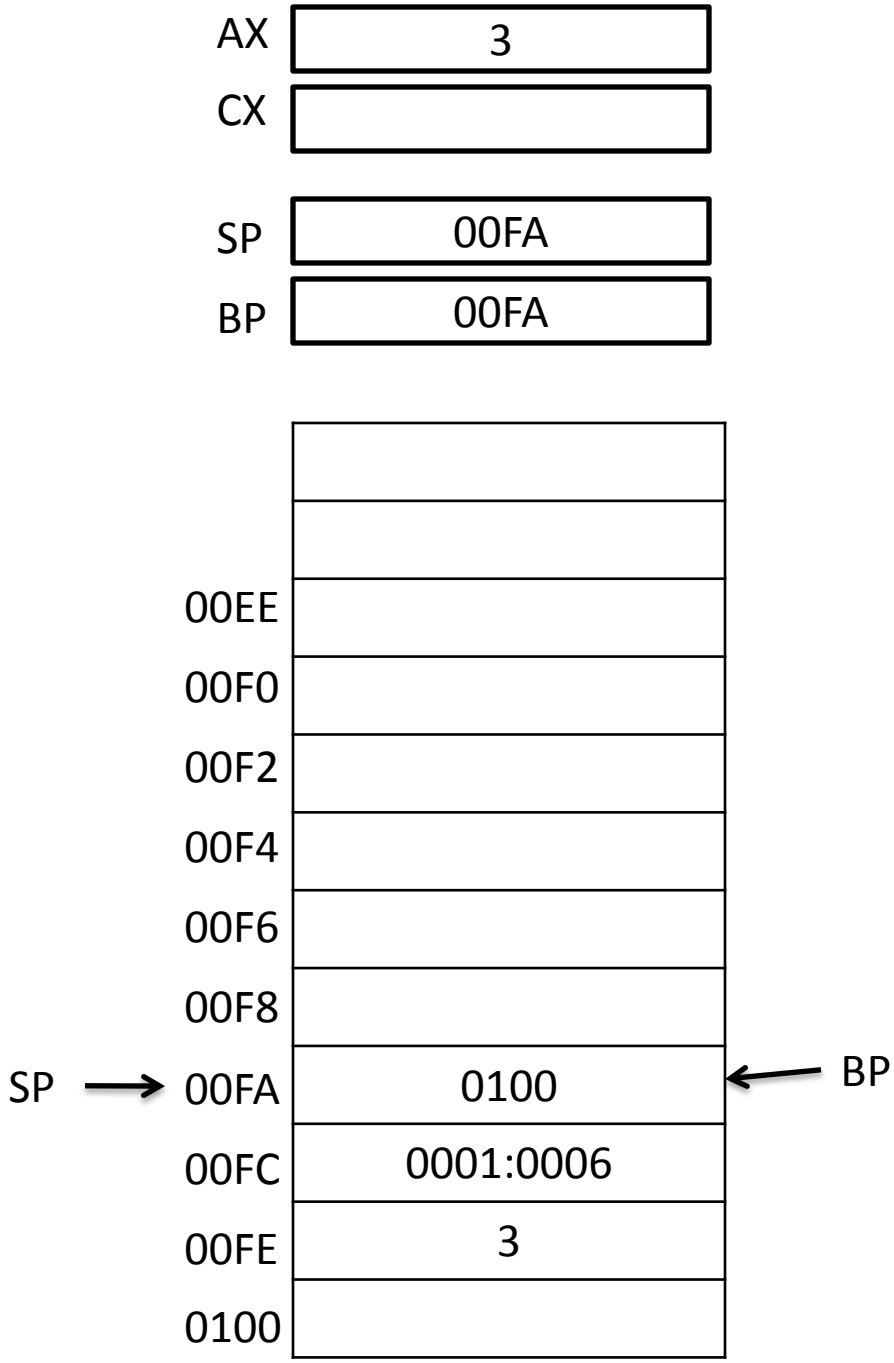
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



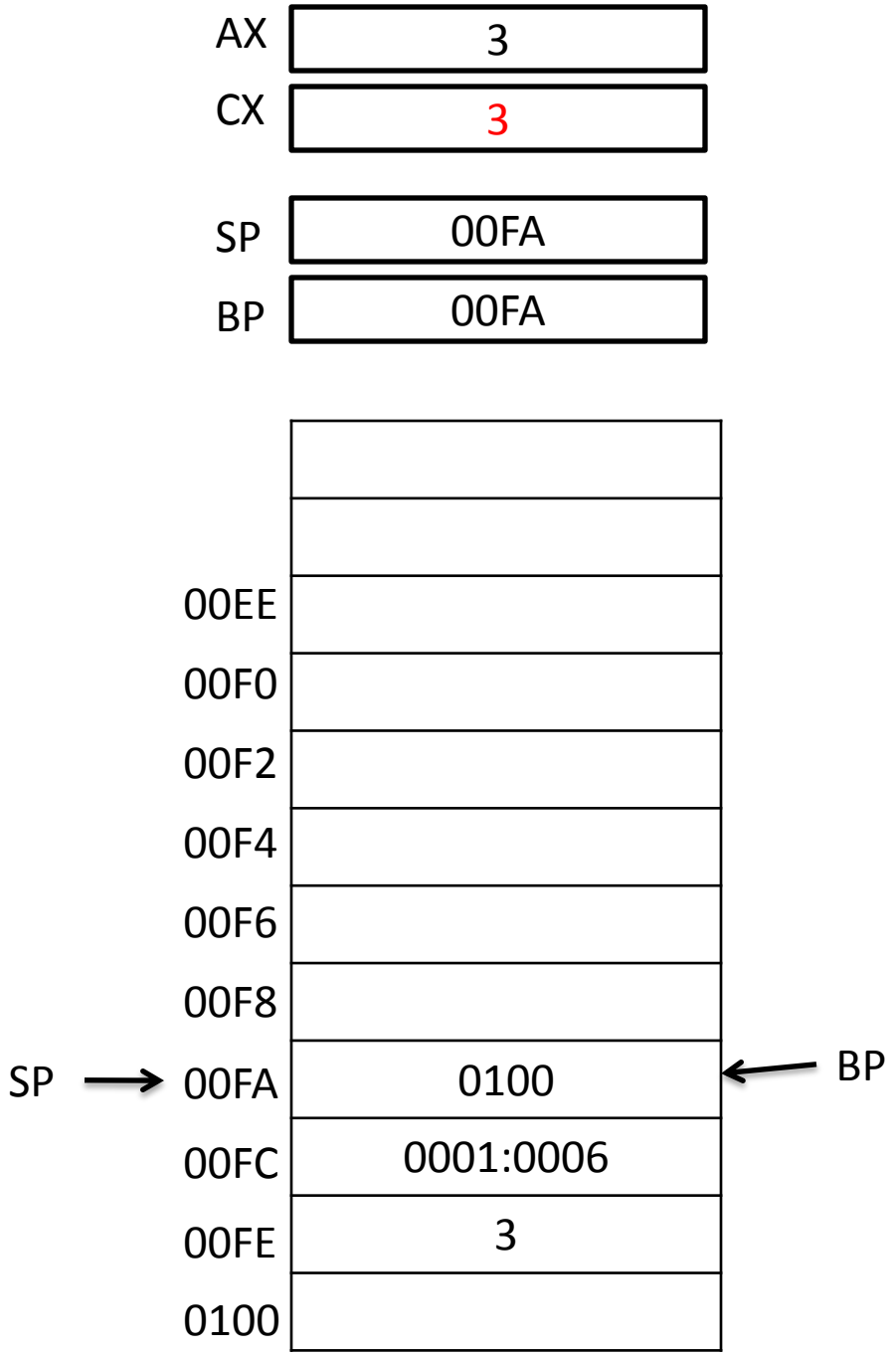
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



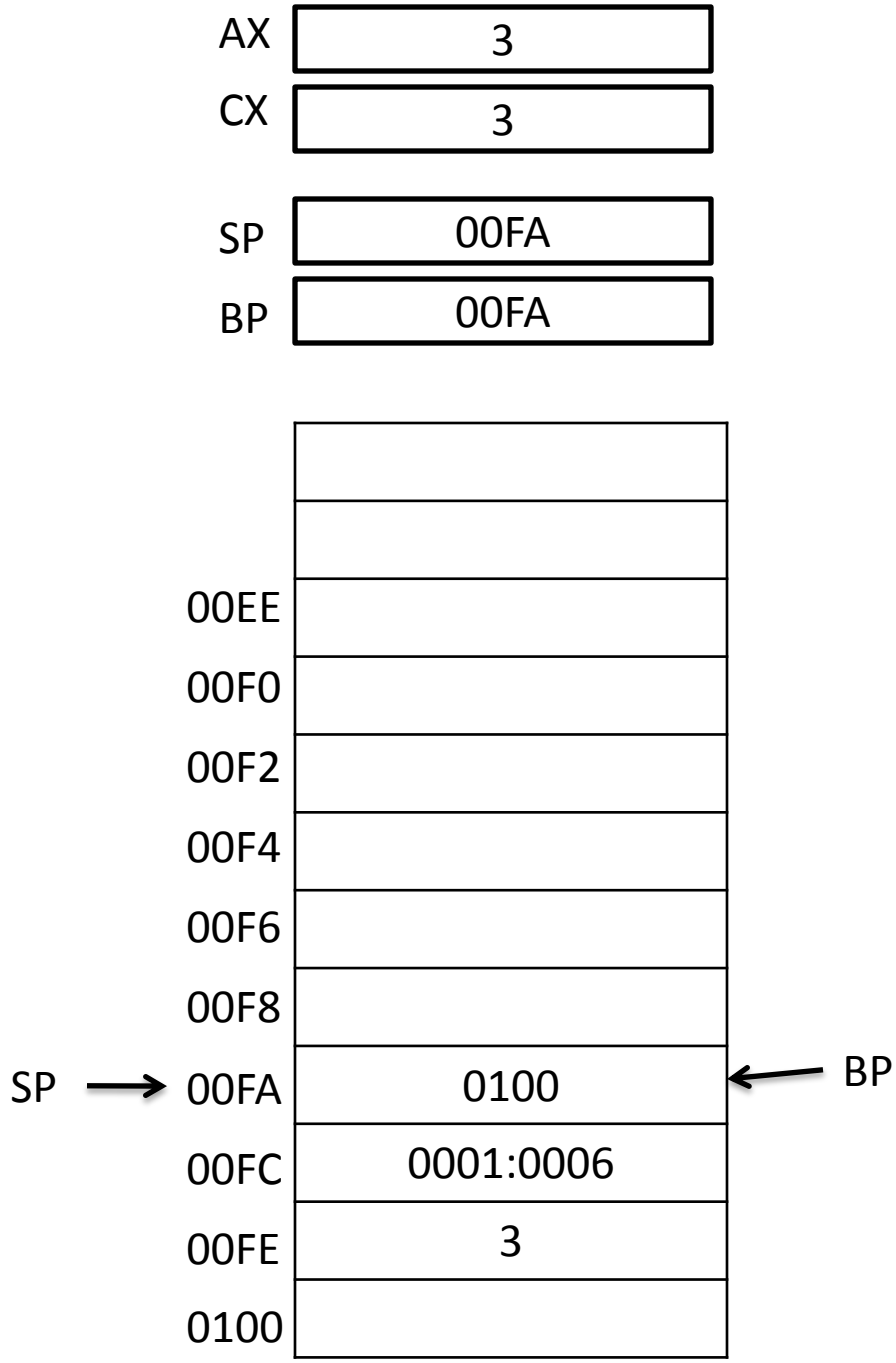
```
                MAIN  PROC
0000                    MOV         AX,3
0002                    PUSH        AX
0004                    CALL        FACTORIAL
0006                    MOV         AH,4CH
0008                    INT         21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH        BP
000C                    MOV         BP,SP
000E                    CMP         WORD PTR[BP+4],1
0010                    JG          END_IF
0012                    MOV         AX,1
0014                    JMP         RETURN
0016    END_IF:         MOV         CX, [BP+4]
0018                    DEC         CX
001A                    PUSH        CX
001C                    CALL        FACTORIAL
001E                    MUL         WORD  PTR[BP+4]
0020    RETURN :        POP         BP
0022                    RET         2
                END         MAIN
```



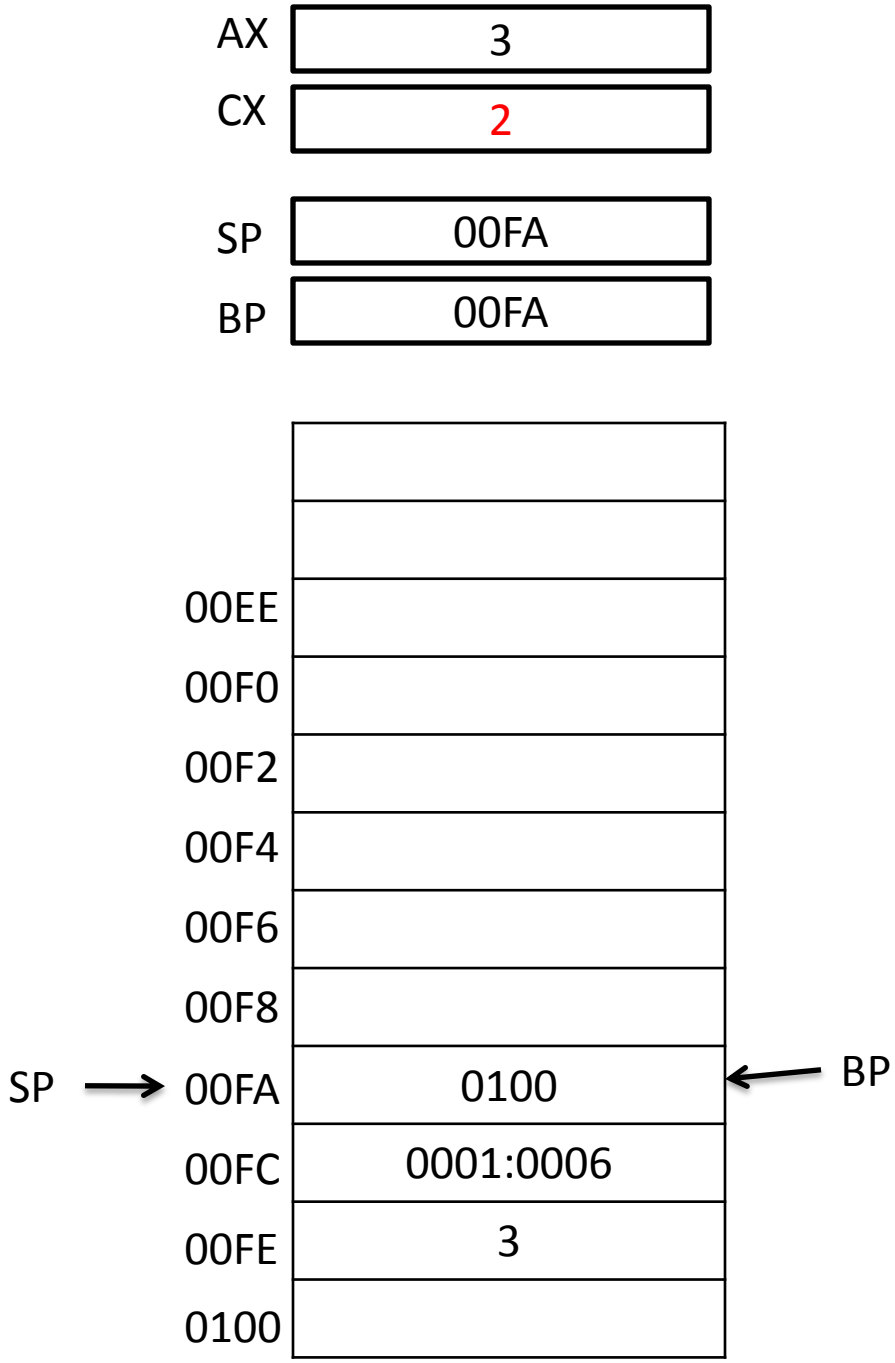
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



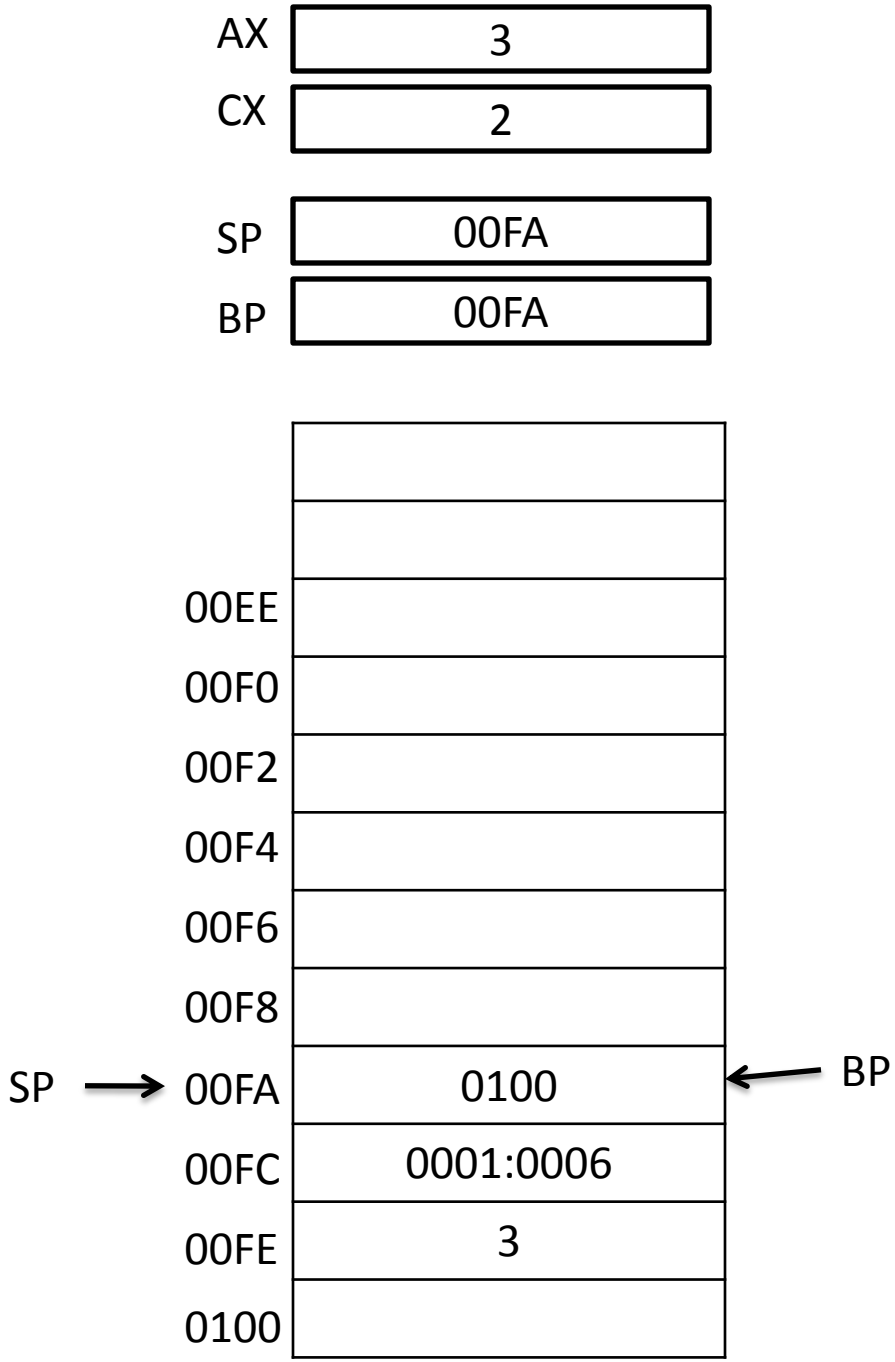
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



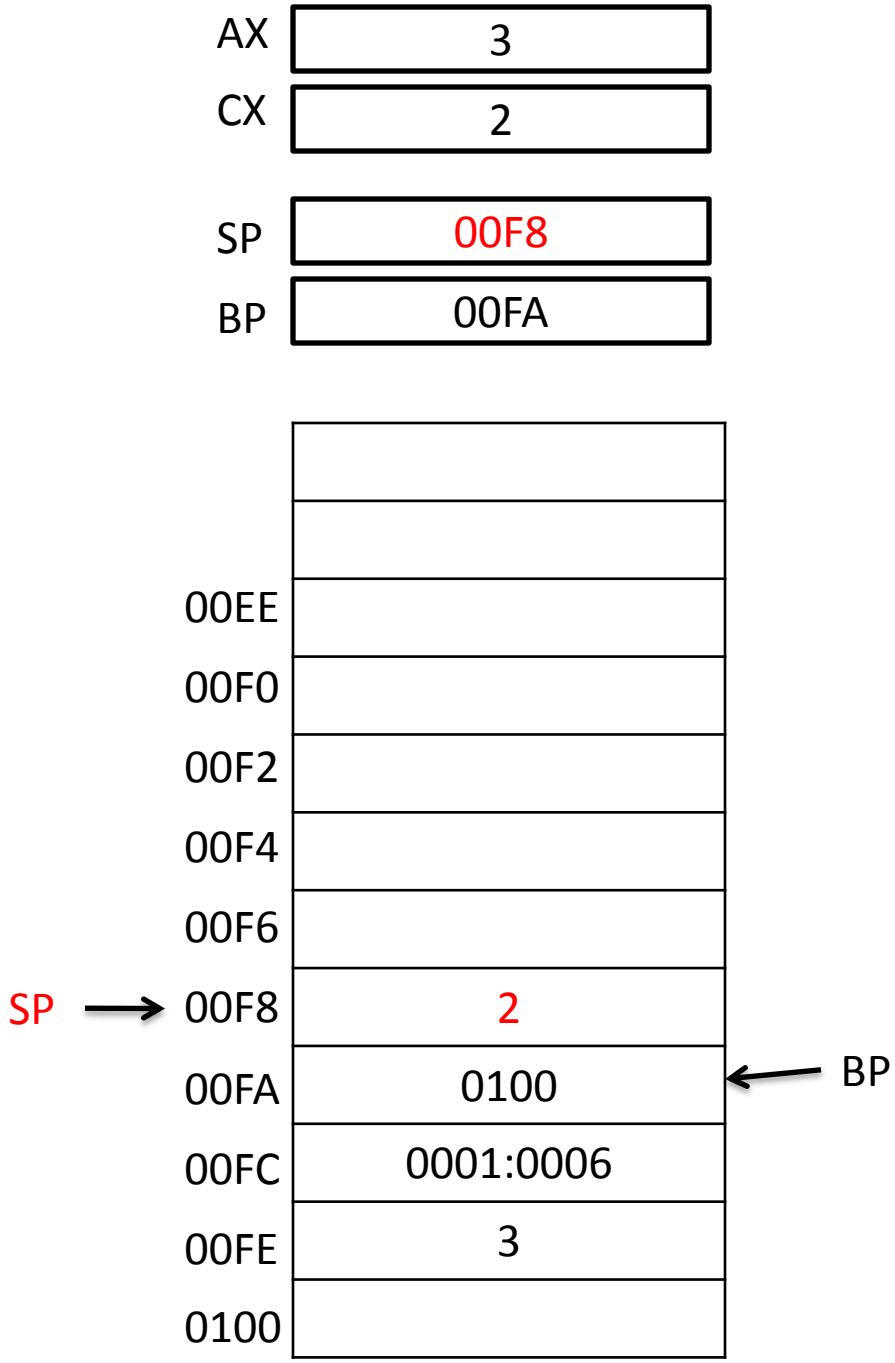
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



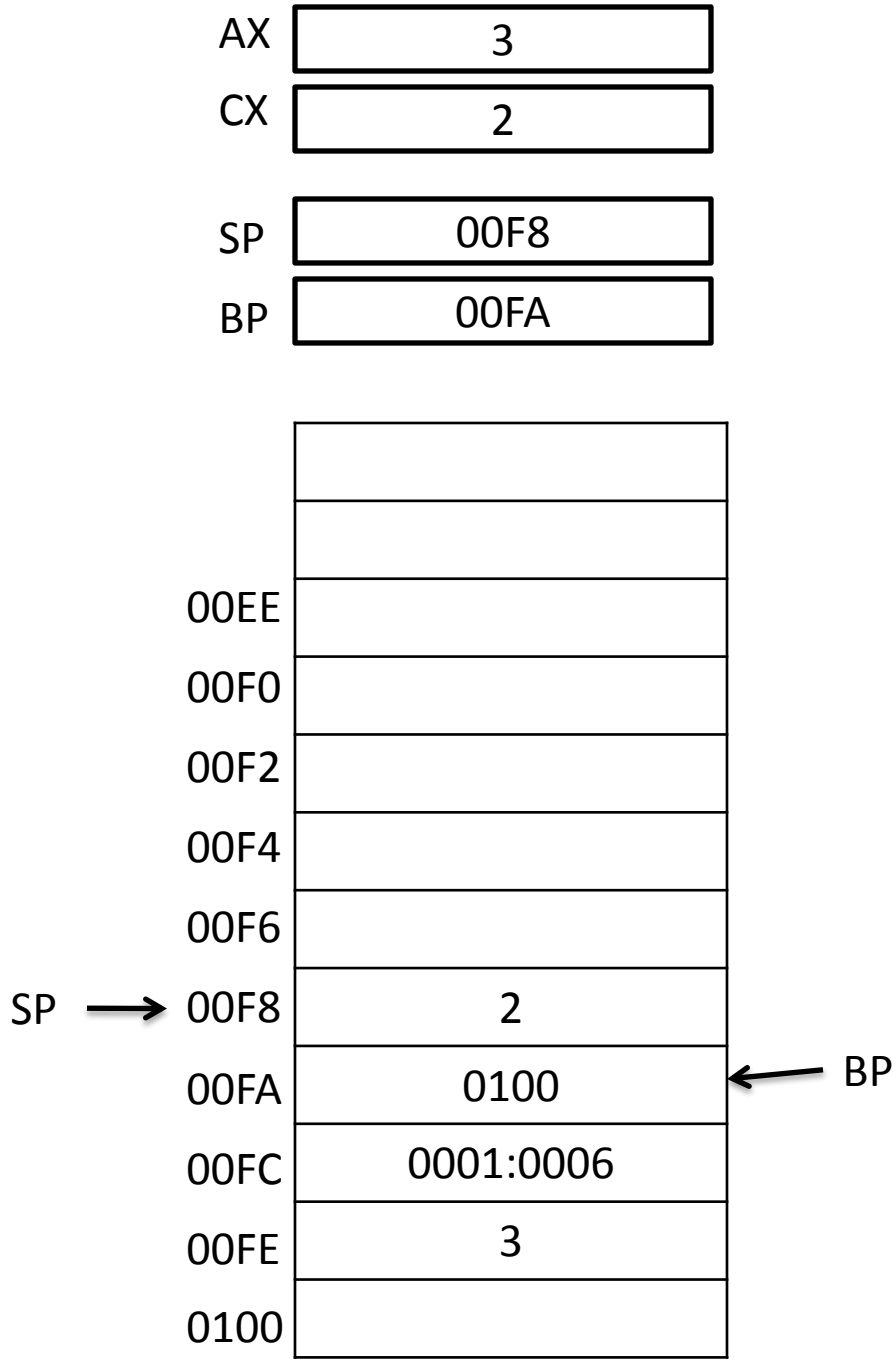
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



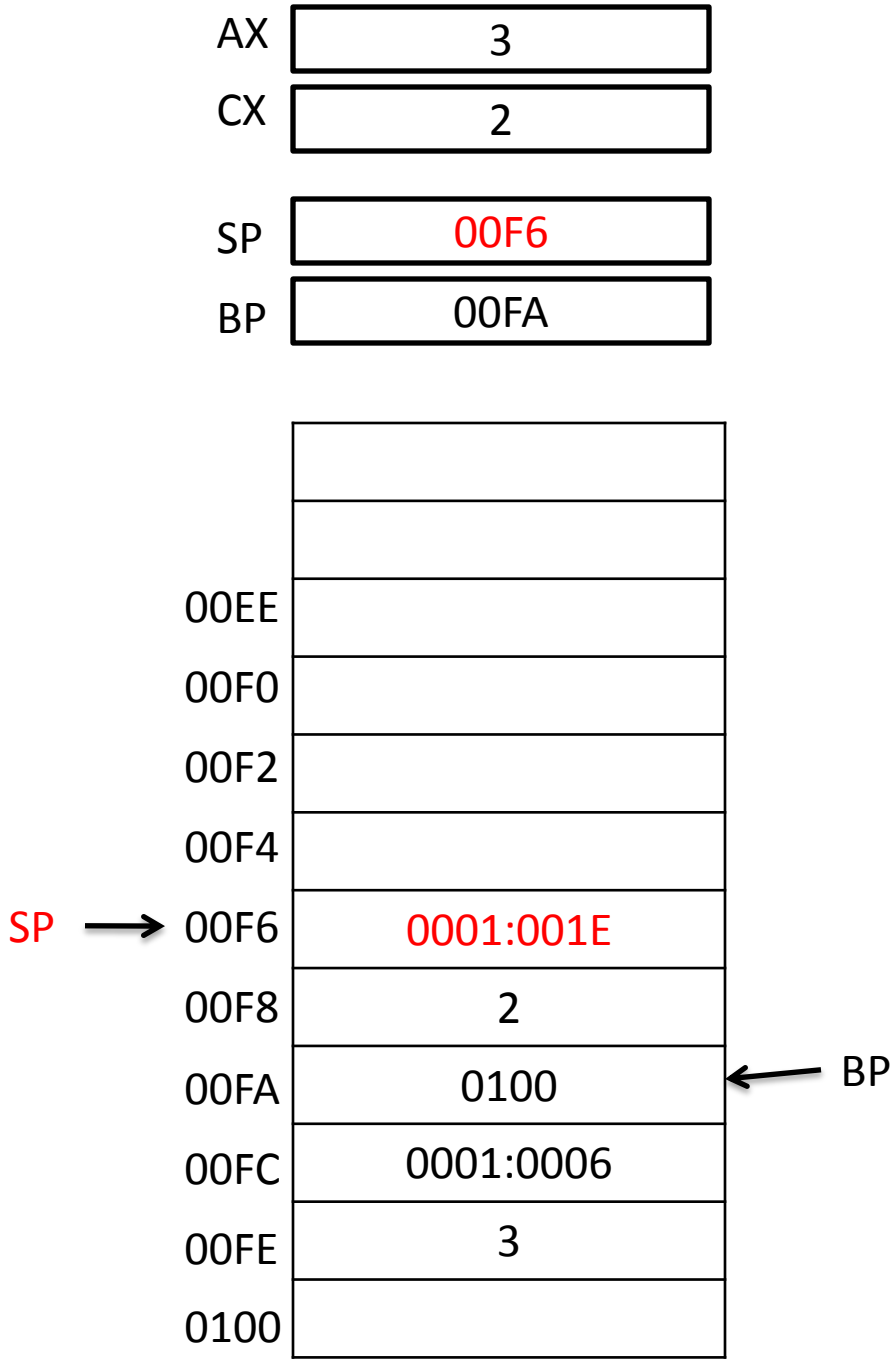
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



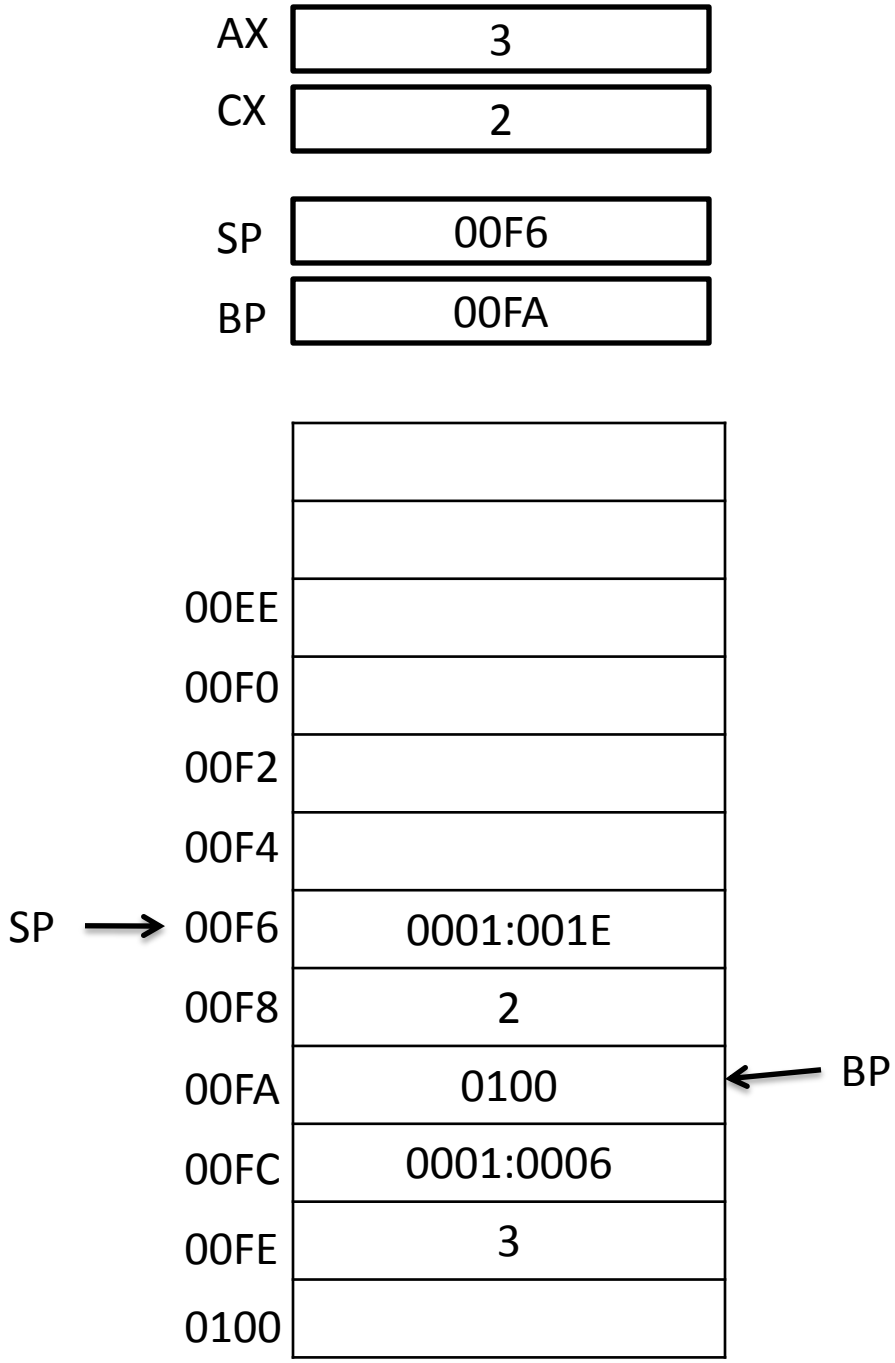
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



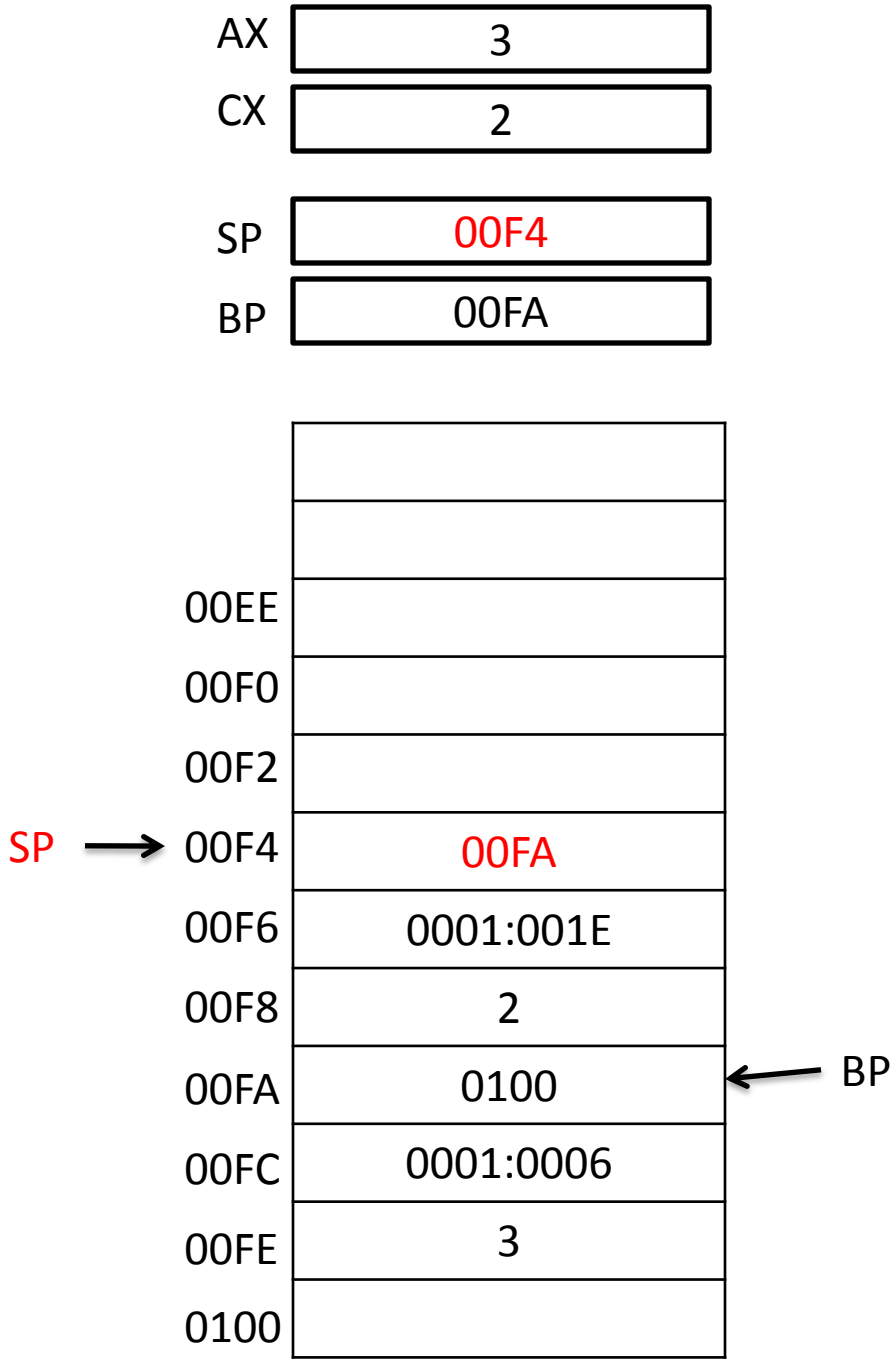
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



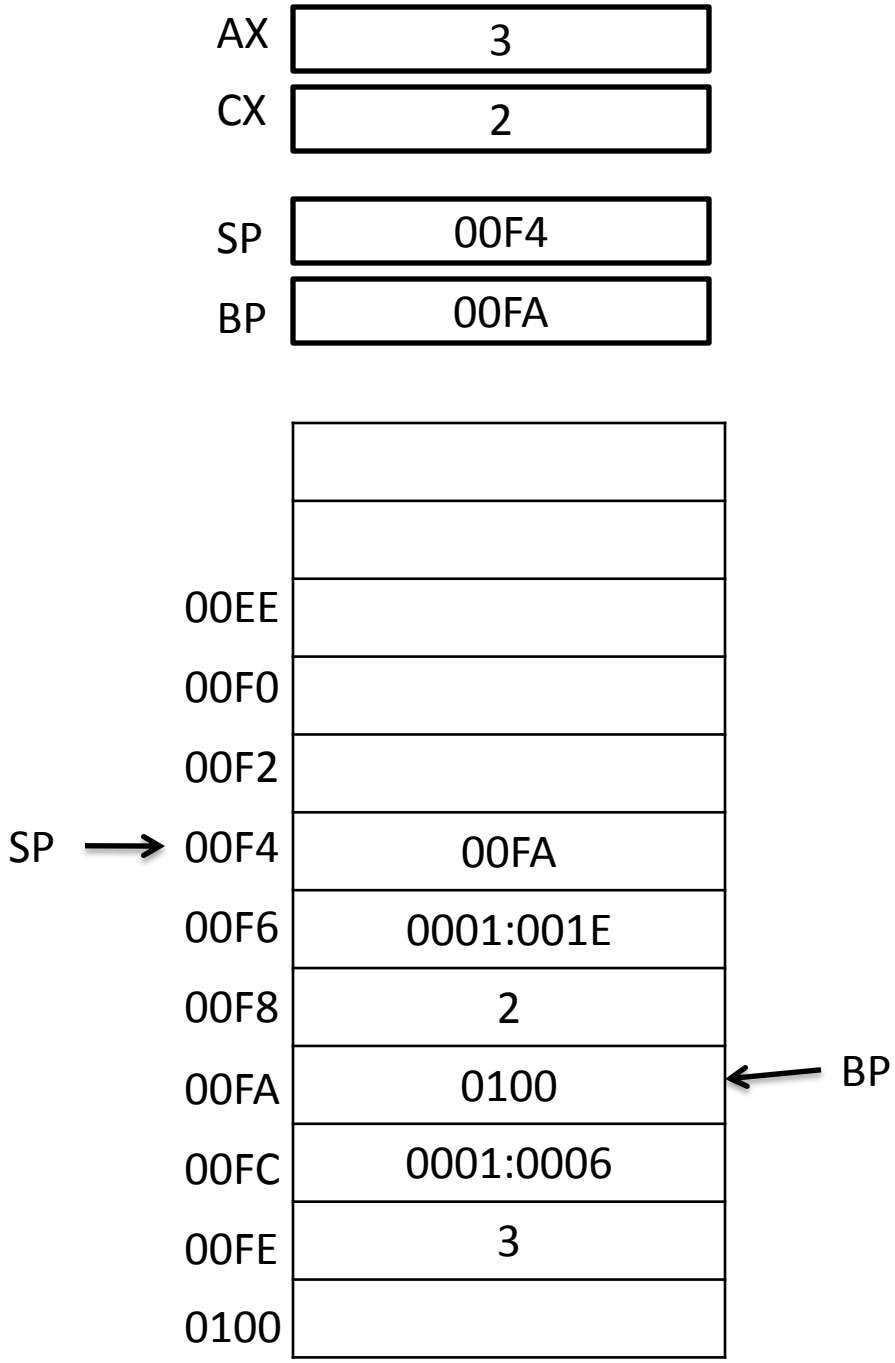
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



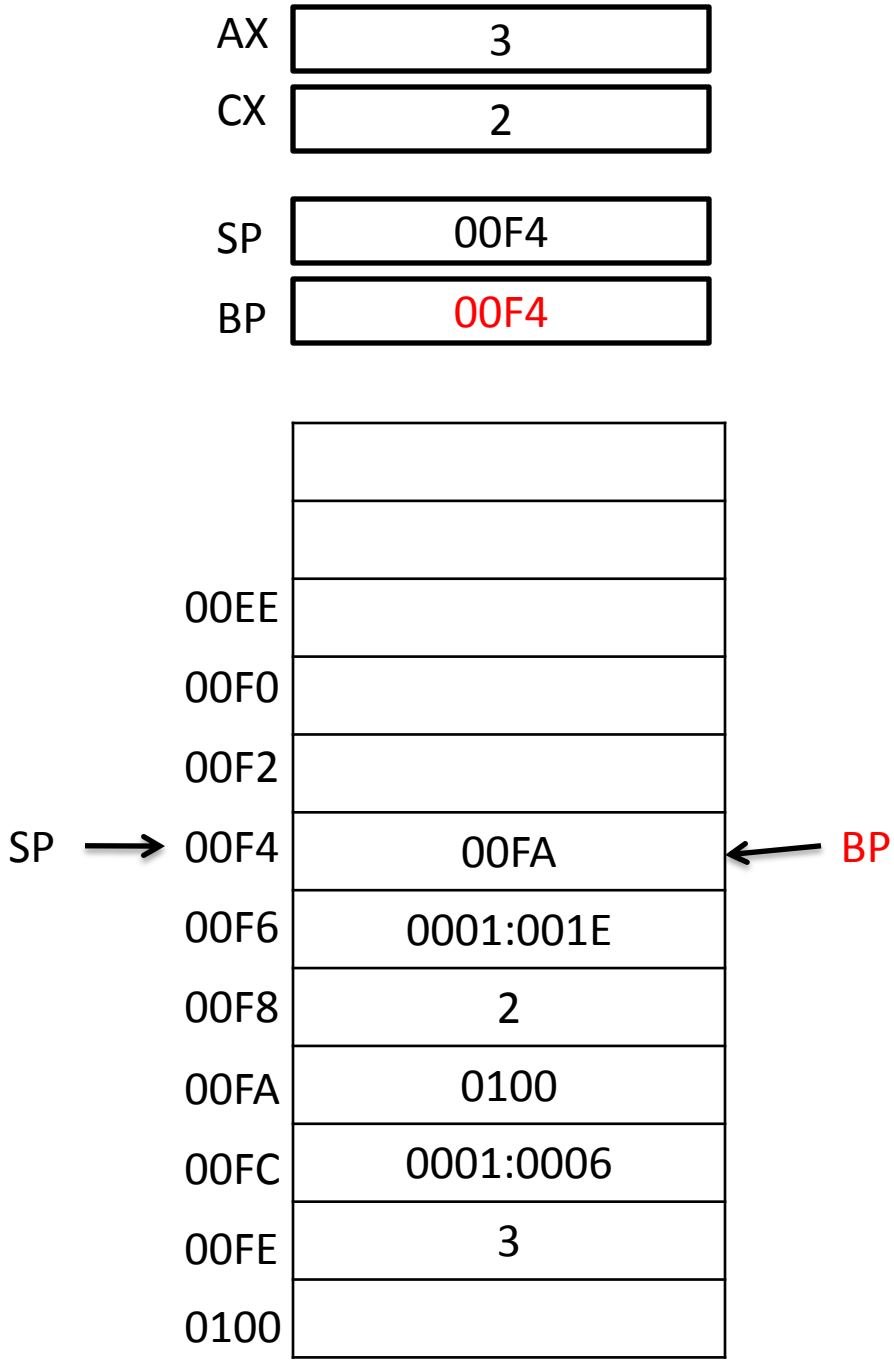
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



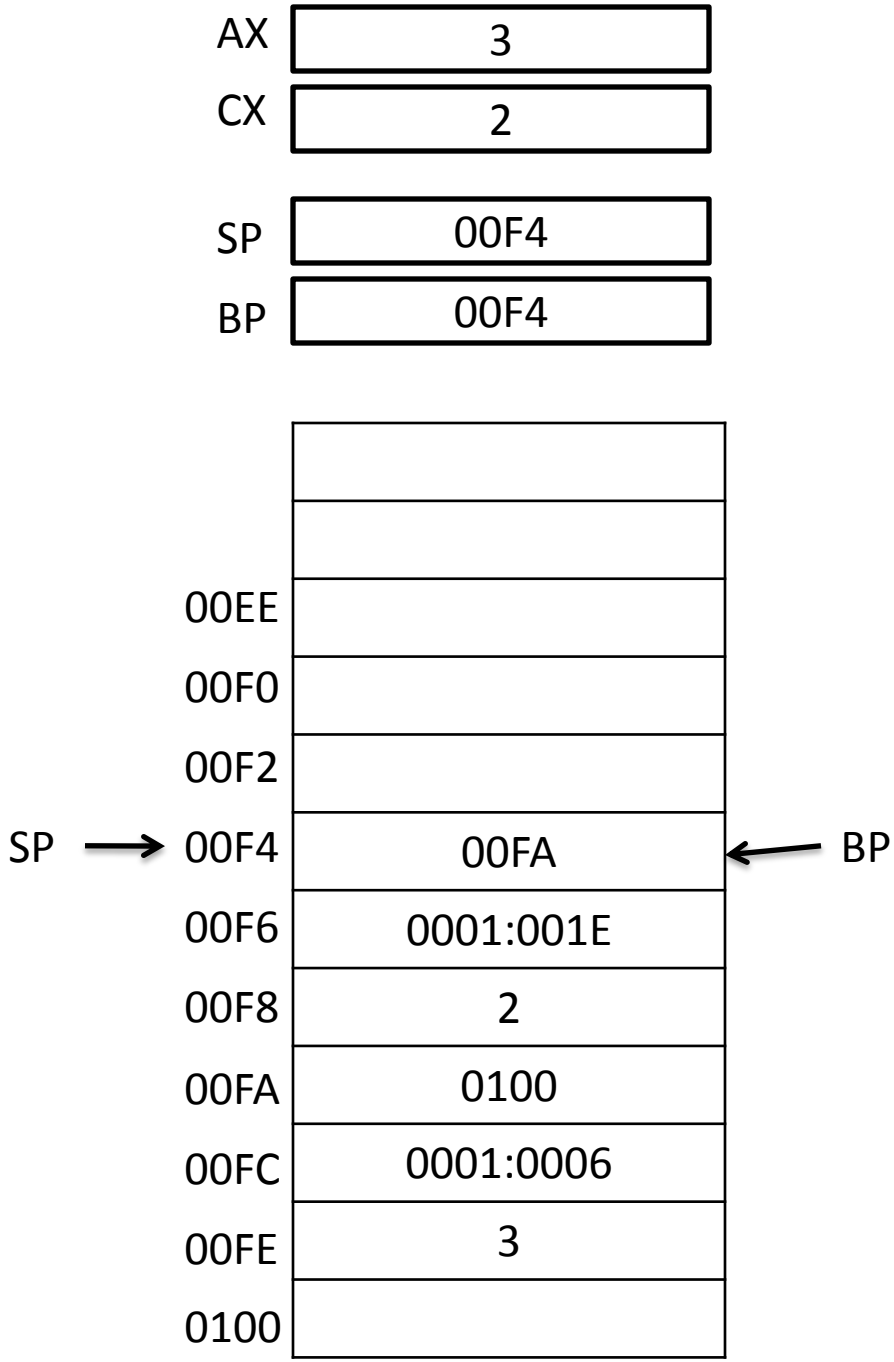
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



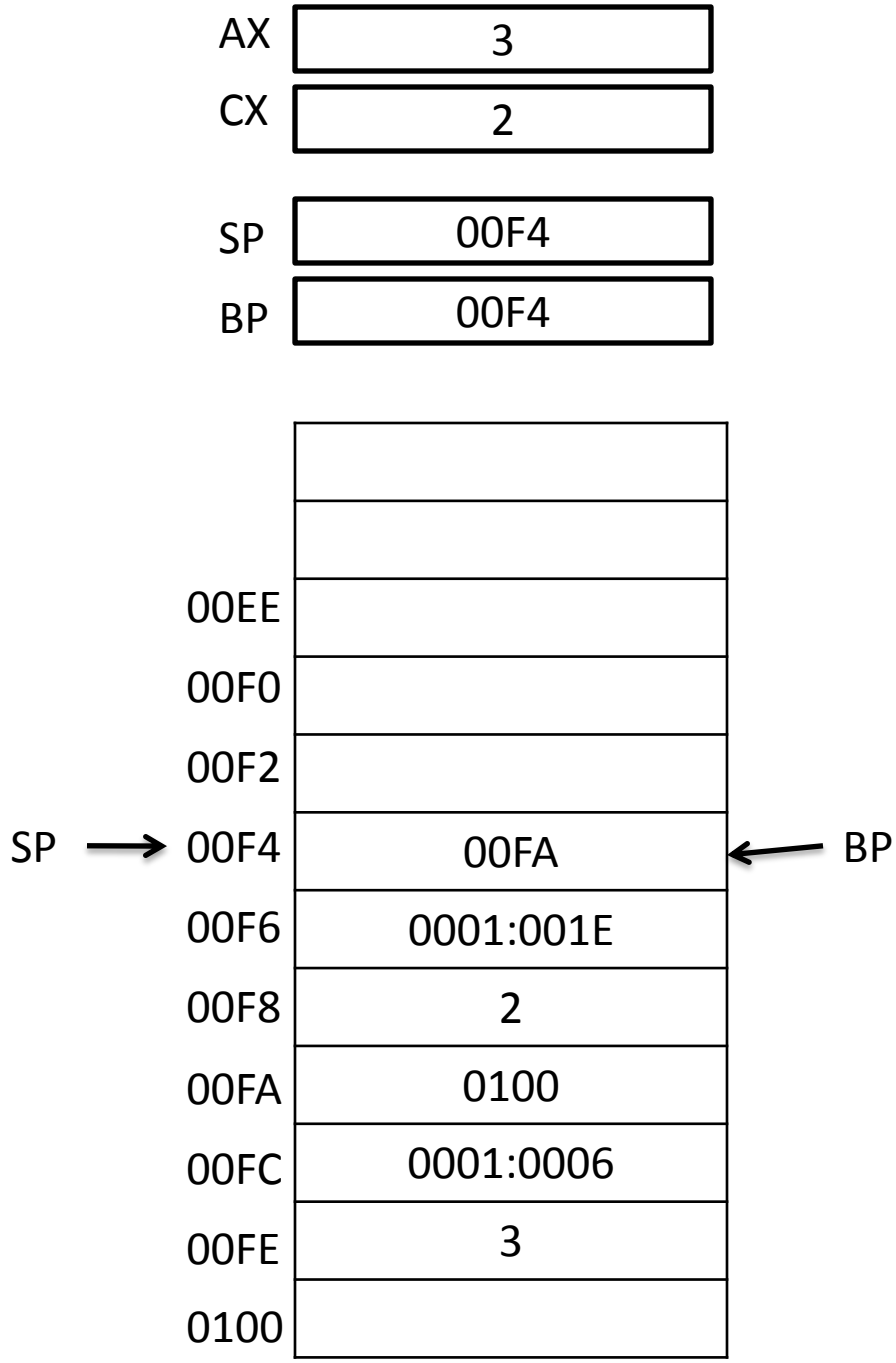
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016            END_IF: MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020            RETURN :POP     BP
0022                    RET     2
                END     MAIN
```



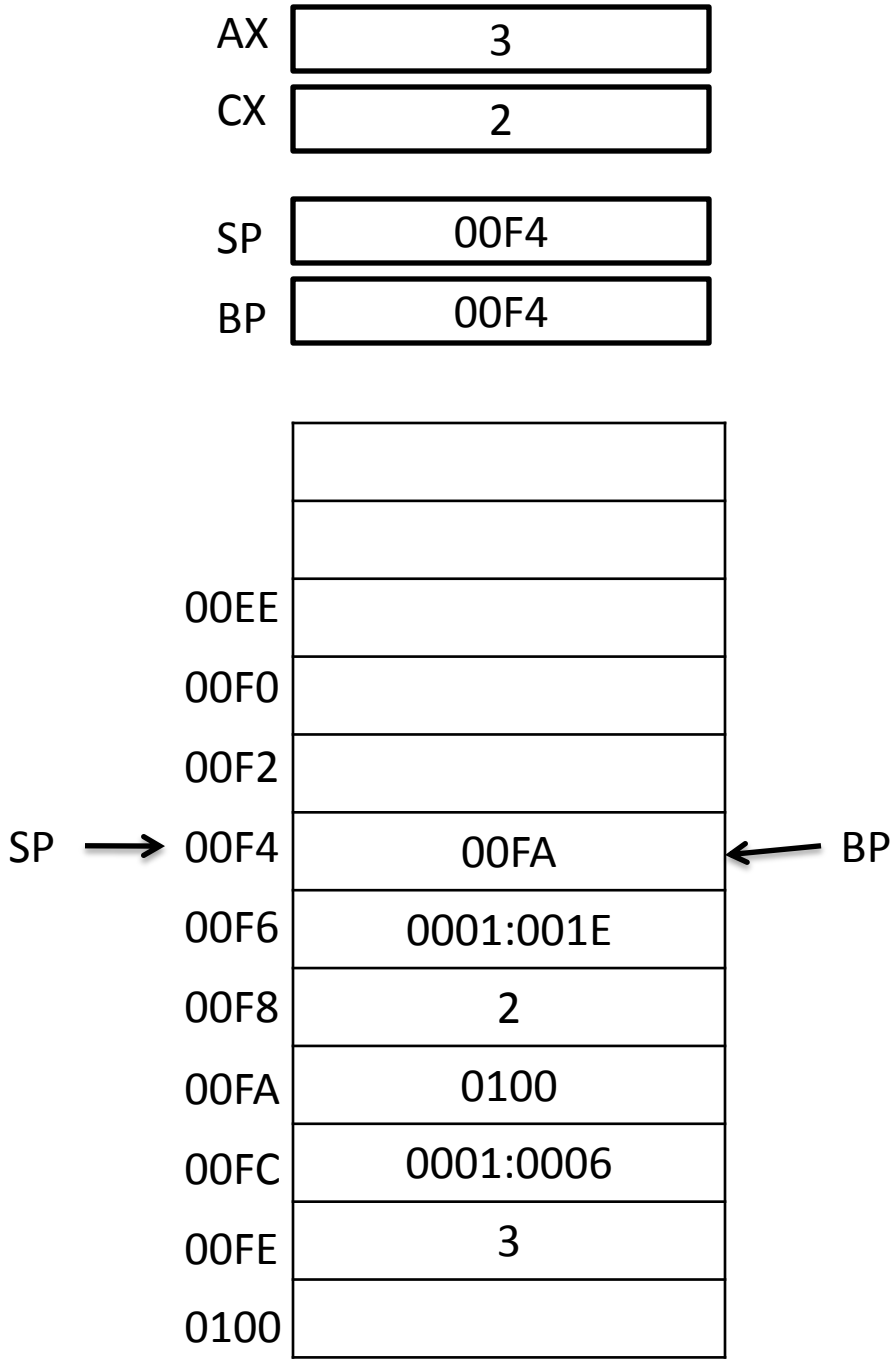
```
        MAIN  PROC
0000                MOV     AX,3
0002                PUSH    AX
0004                CALL    FACTORIAL
0006                MOV     AH,4CH
0008                INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH    BP
000C                MOV     BP,SP
000E                CMP     WORD PTR[BP+4],1
0010                JG      END_IF
0012                MOV     AX,1
0014                JMP     RETURN
0016    END_IF:     MOV     CX, [BP+4]
0018                DEC     CX
001A                PUSH    CX
001C                CALL    FACTORIAL
001E                MUL     WORD  PTR[BP+4]
0020    RETURN :    POP     BP
0022                RET     2
        END         MAIN
```



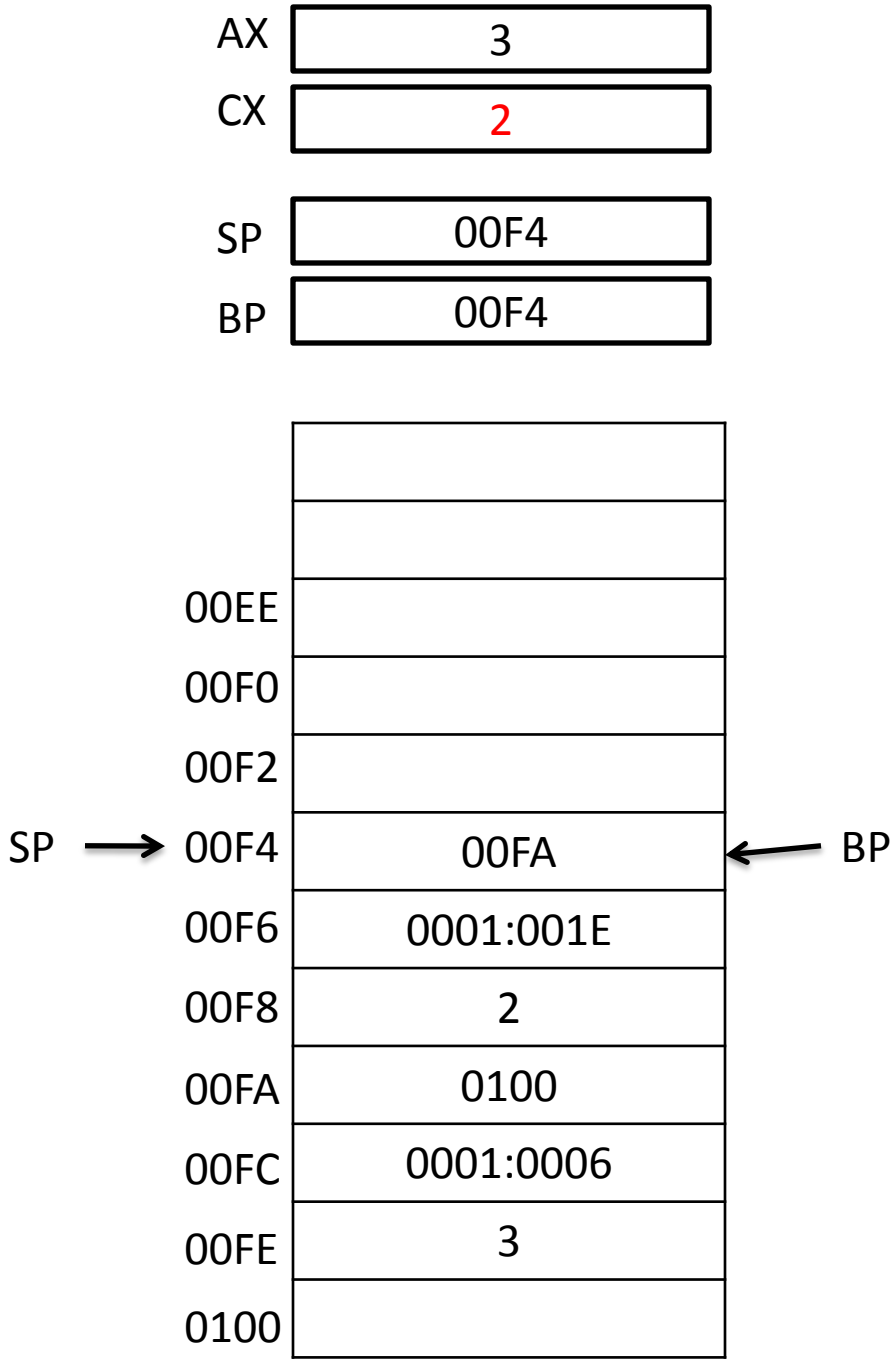
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



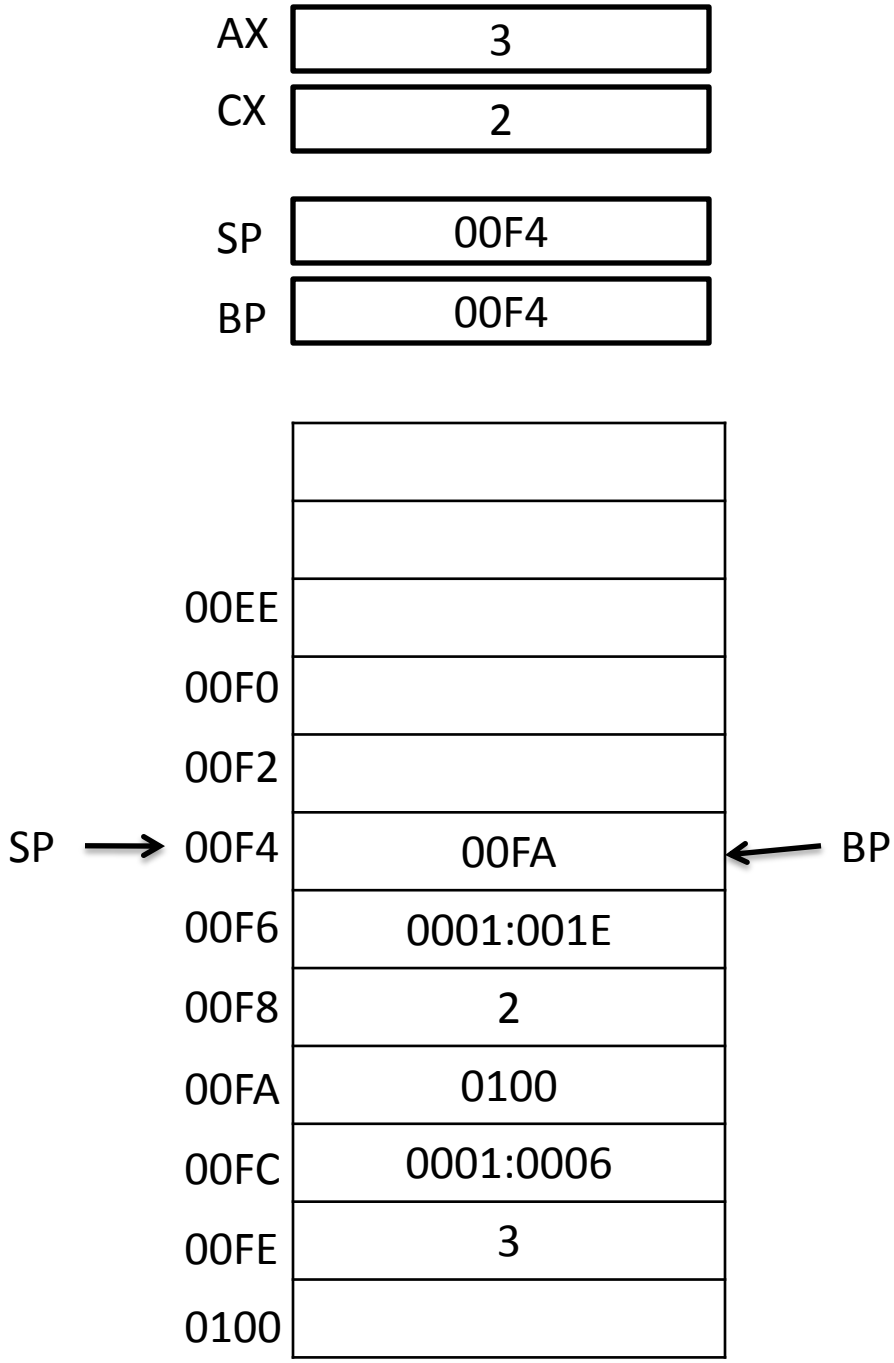
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016    END_IF:         MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020    RETURN :        POP     BP
0022                    RET     2
                END     MAIN
```



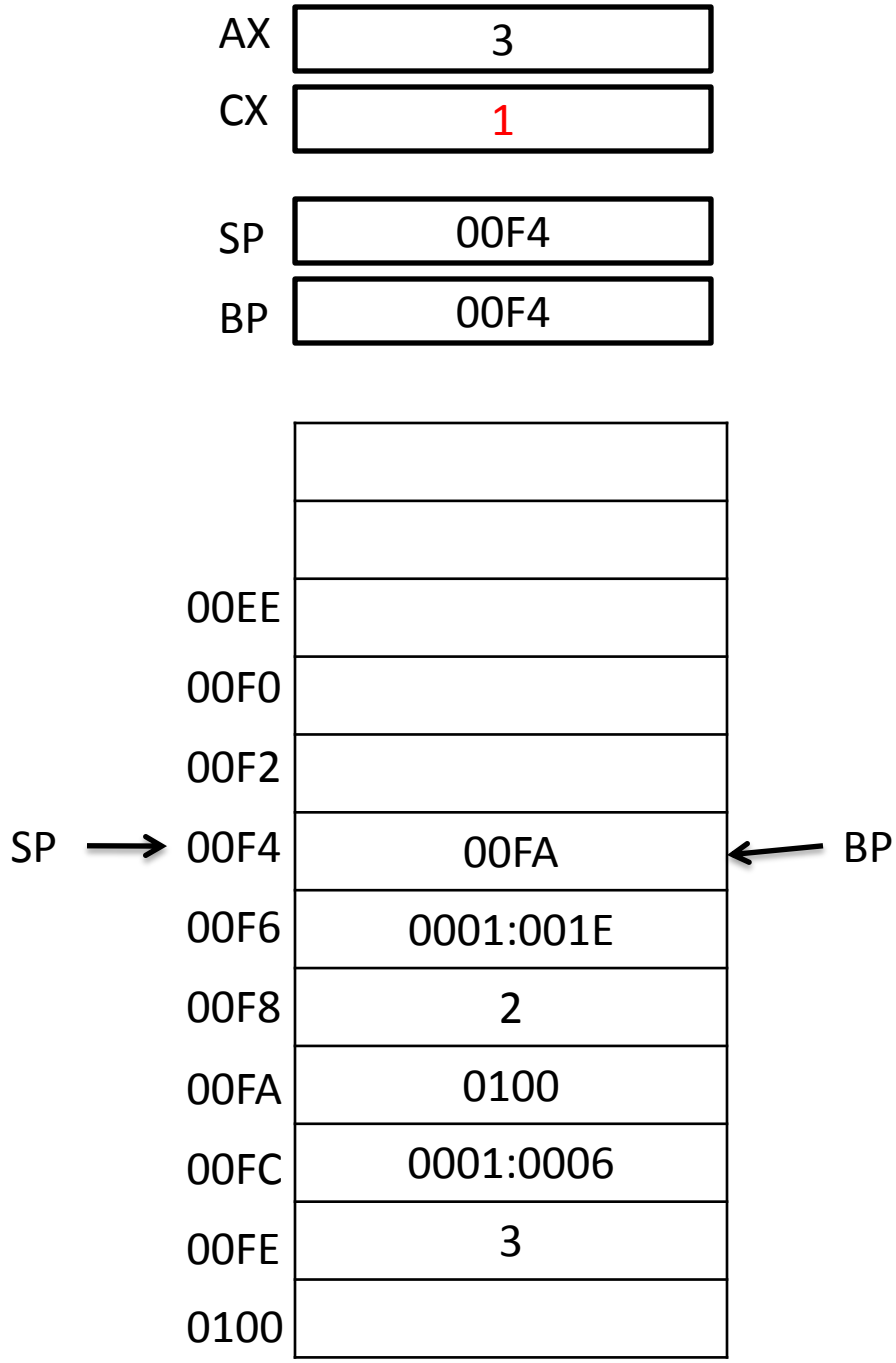
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016    END_IF:         MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020    RETURN :        POP     BP
0022                    RET     2
                END     MAIN
```



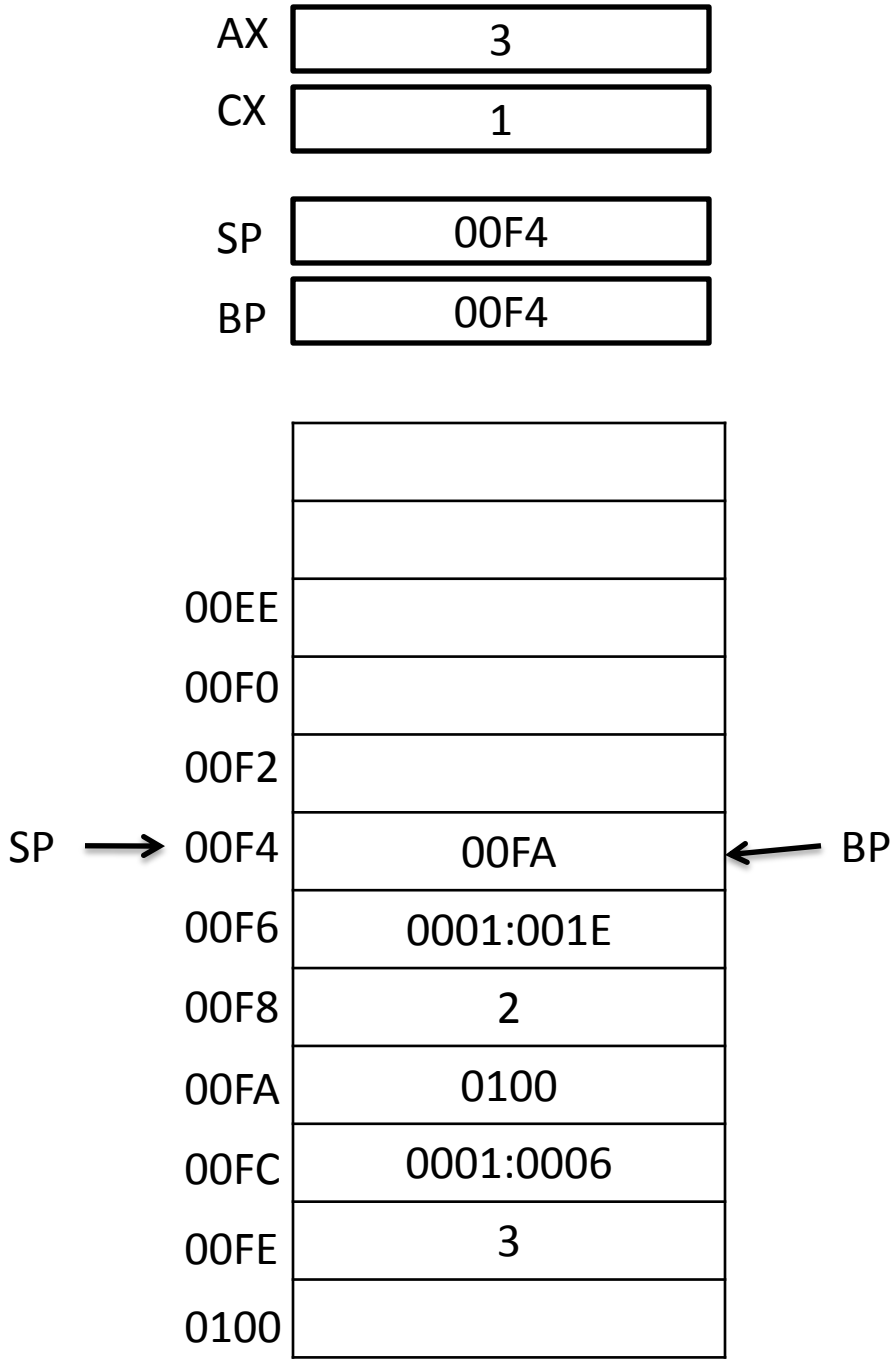
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016            END_IF: MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020            RETURN : POP    BP
0022                    RET     2
                END     MAIN
```



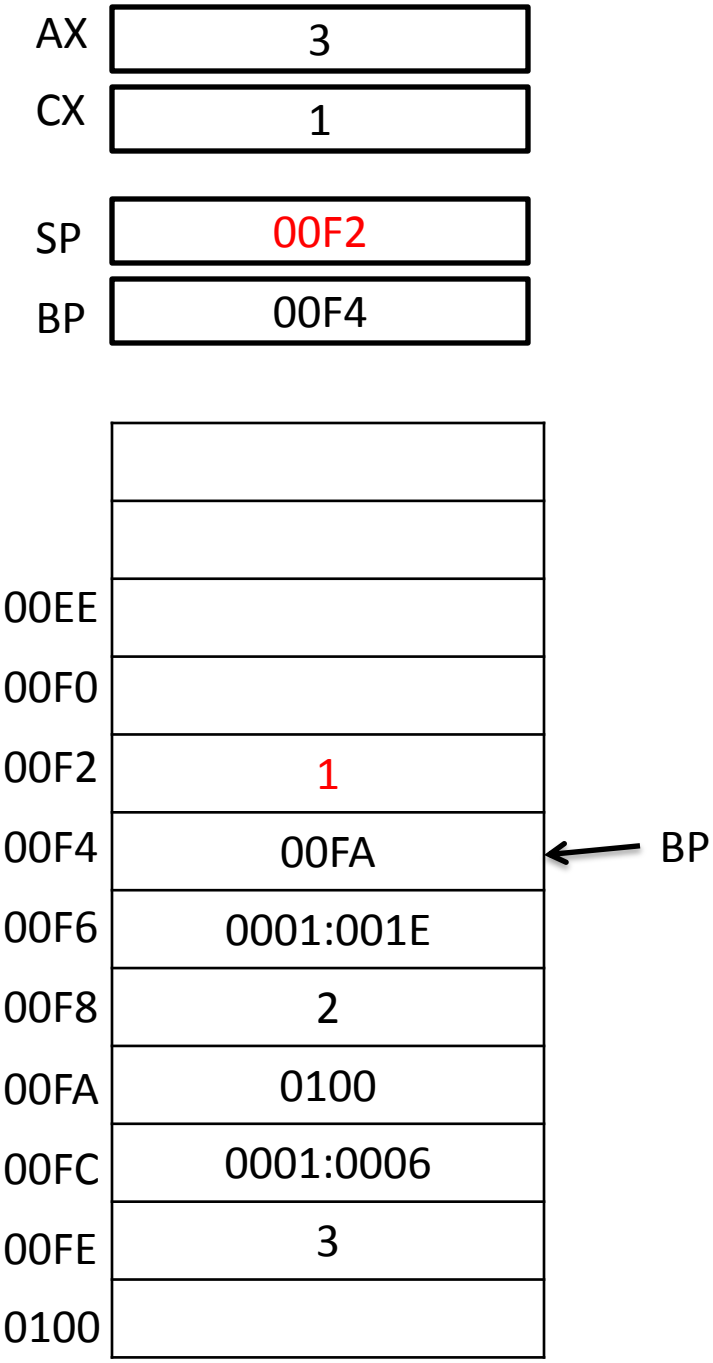
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



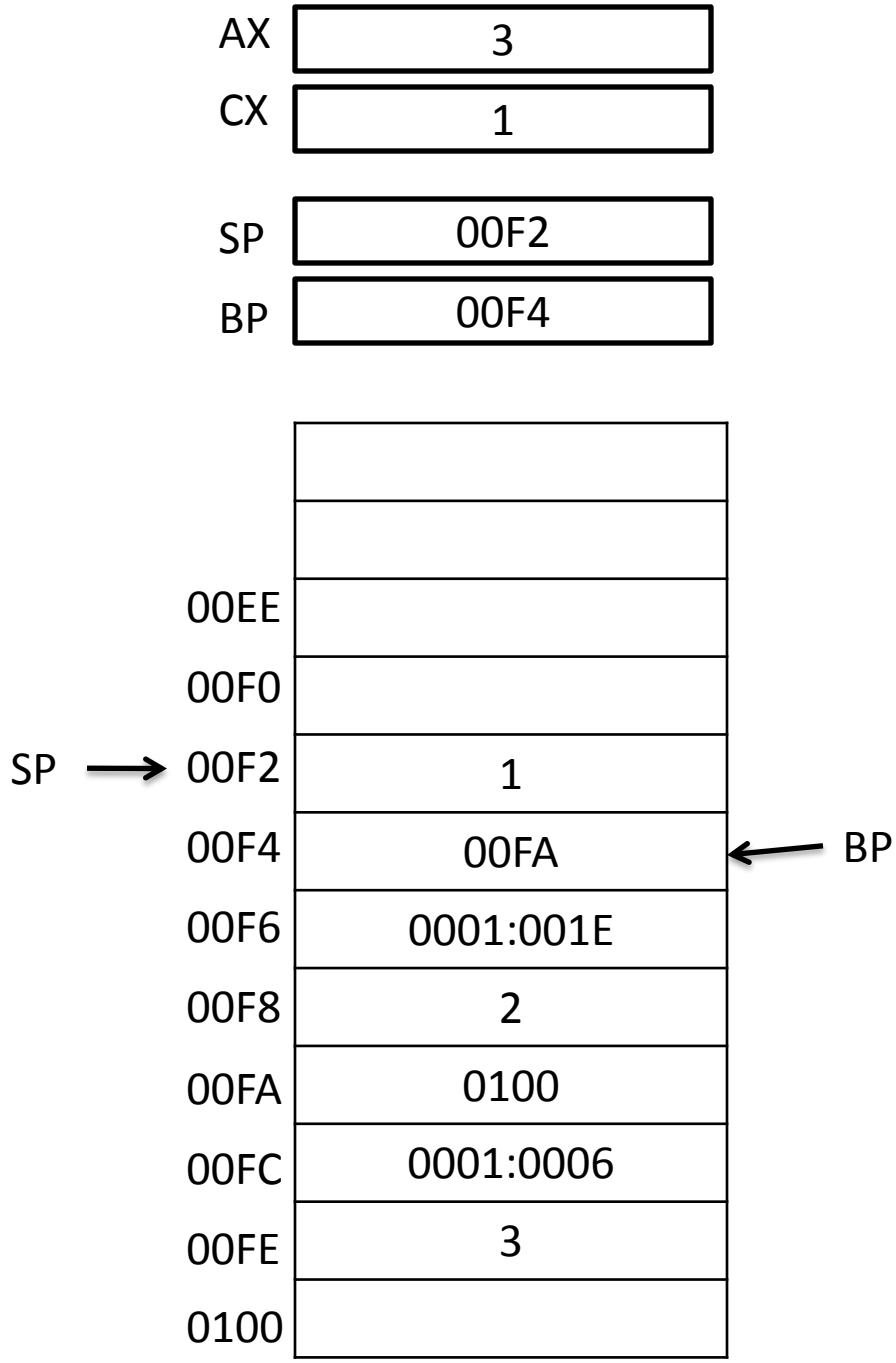
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



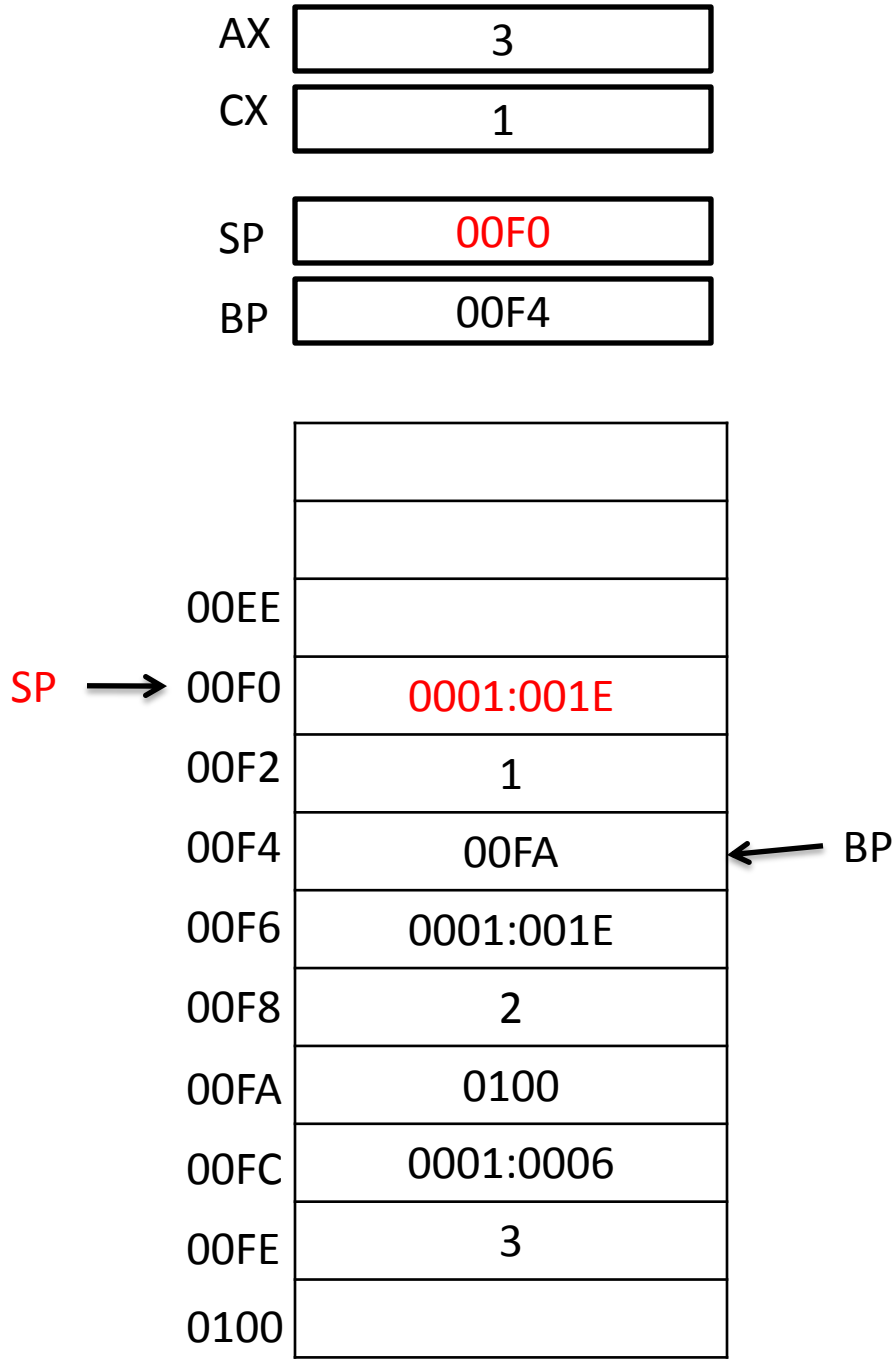
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



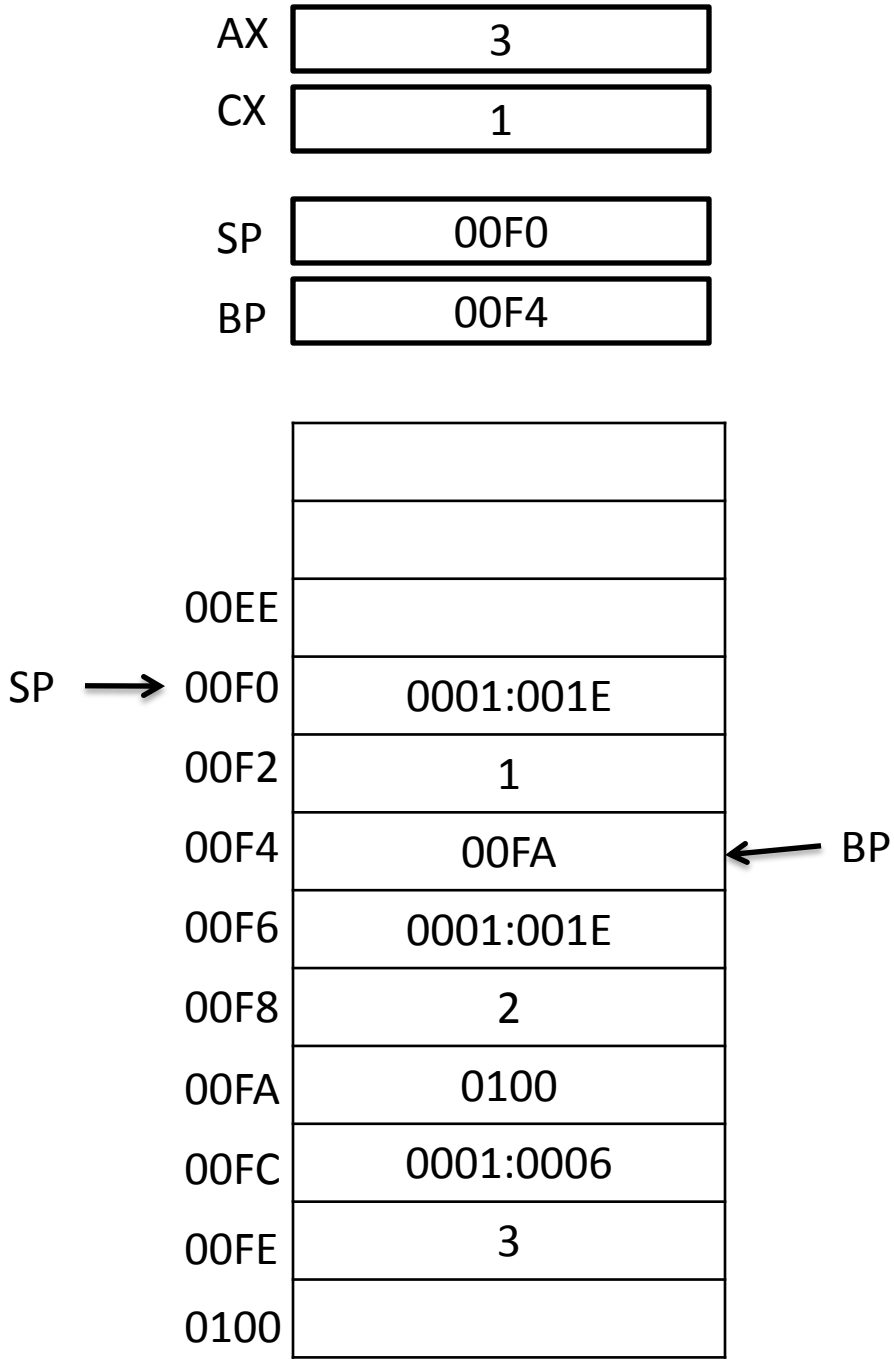
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



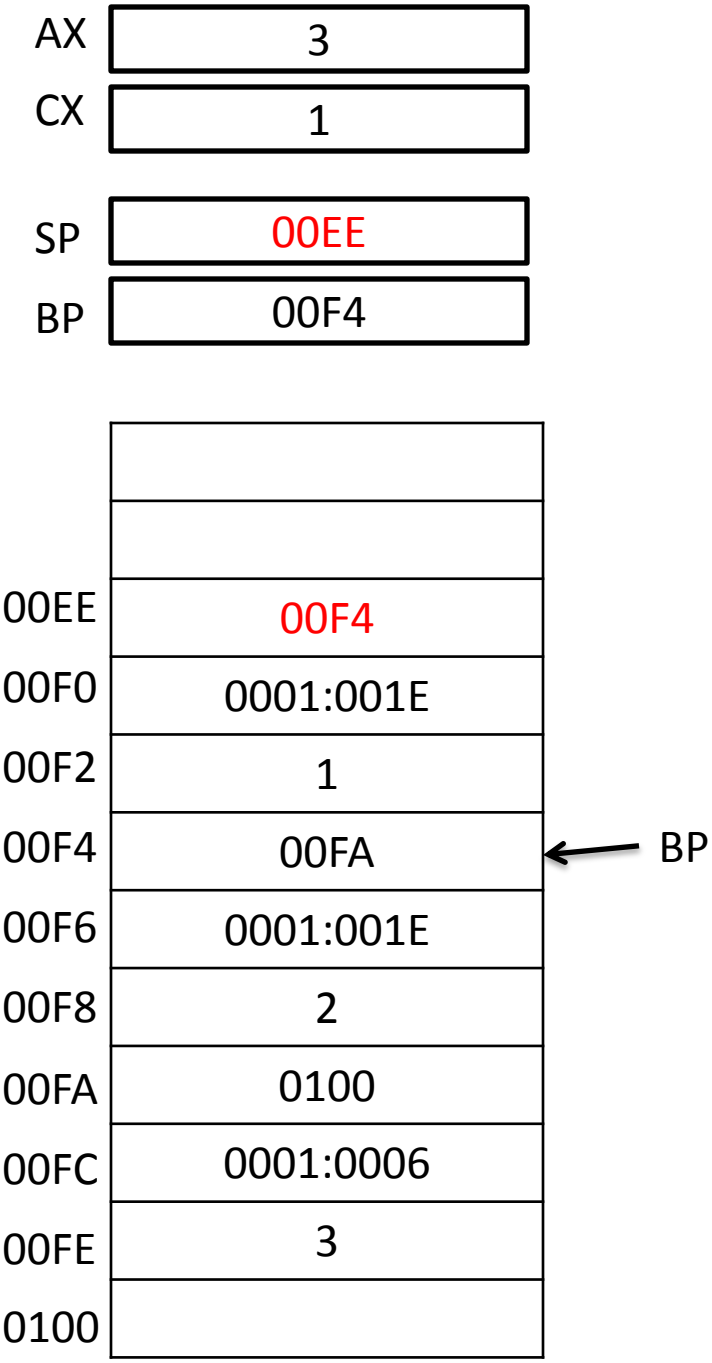
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



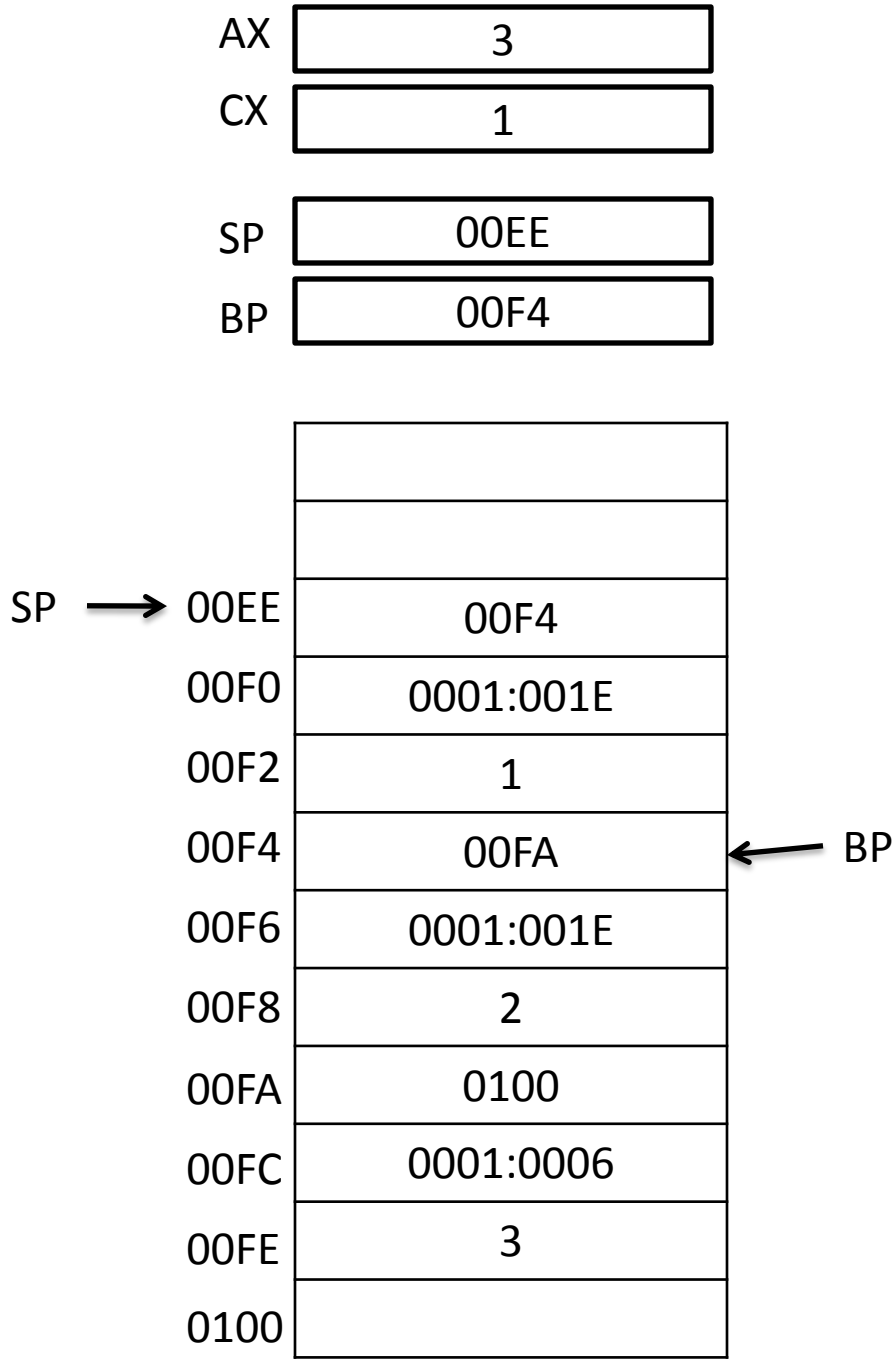
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



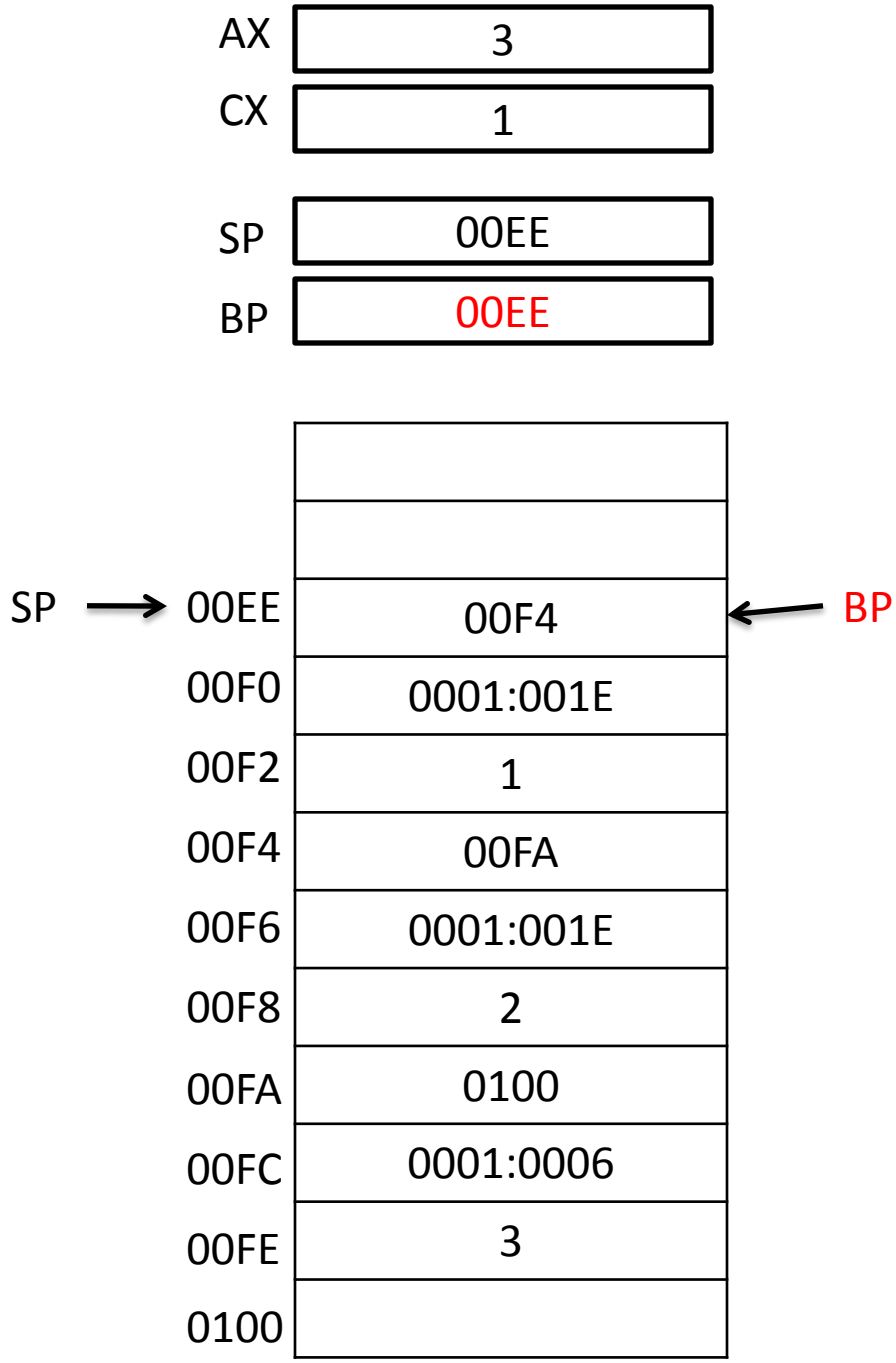
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



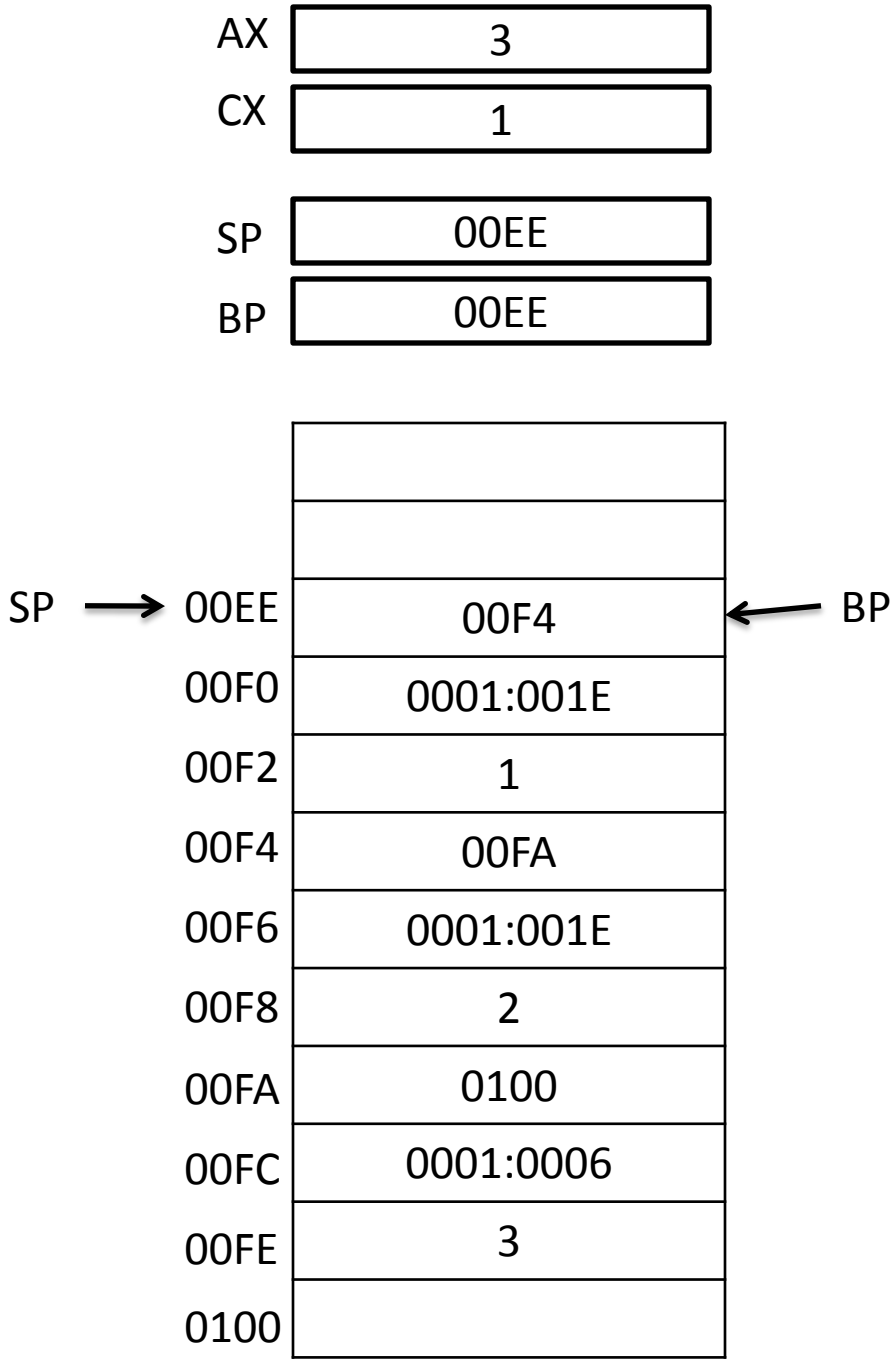
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



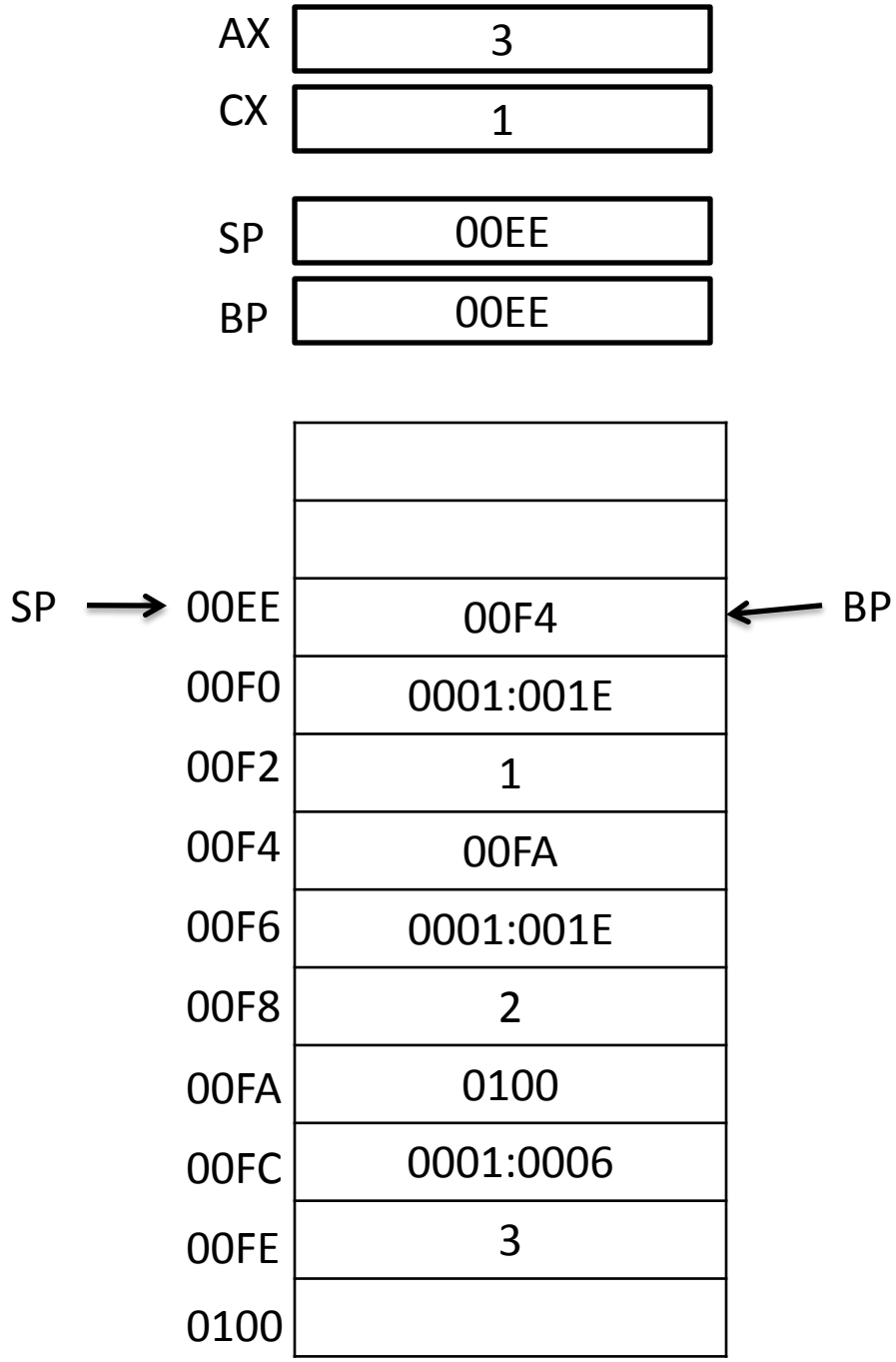
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



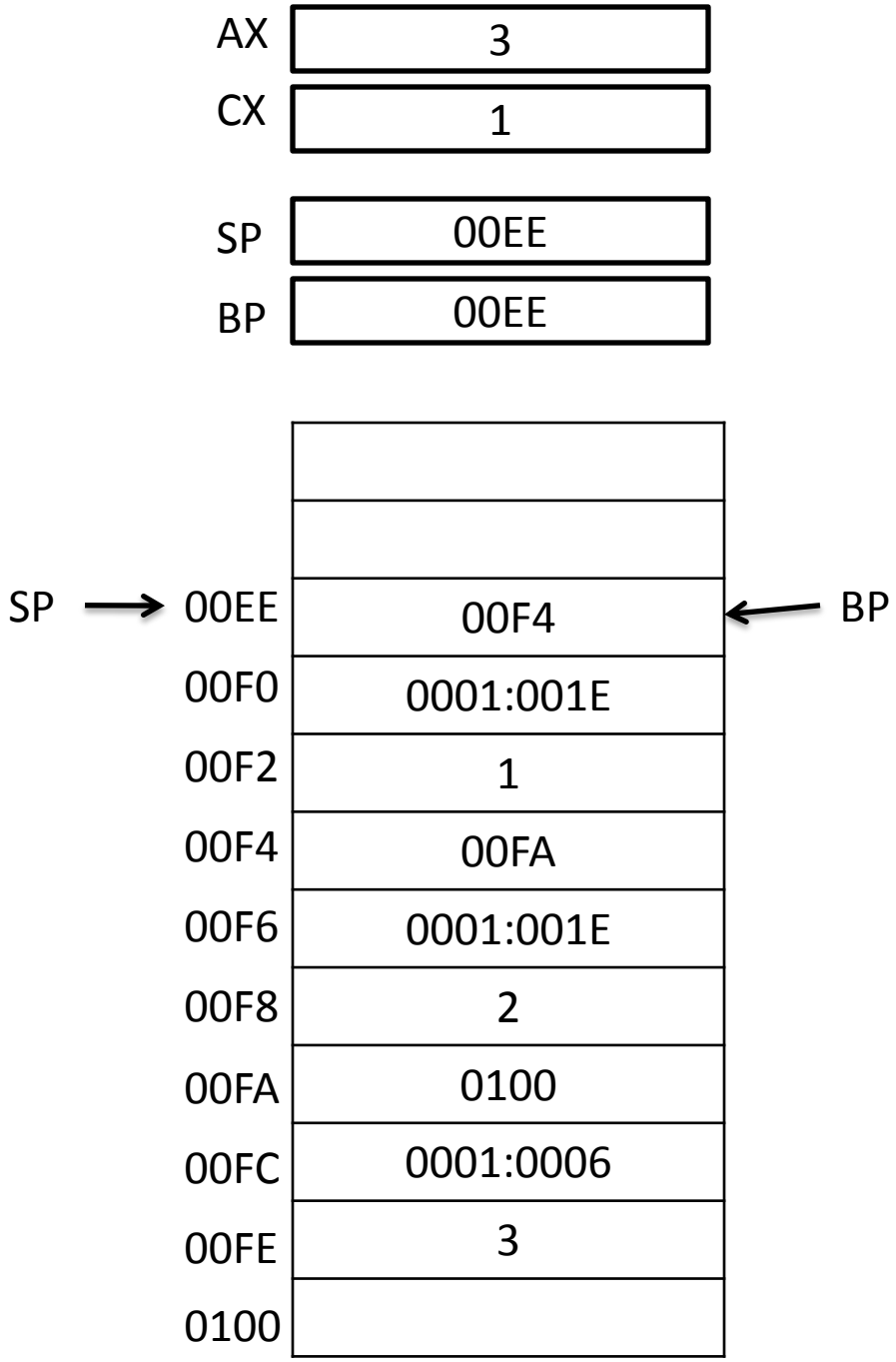
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



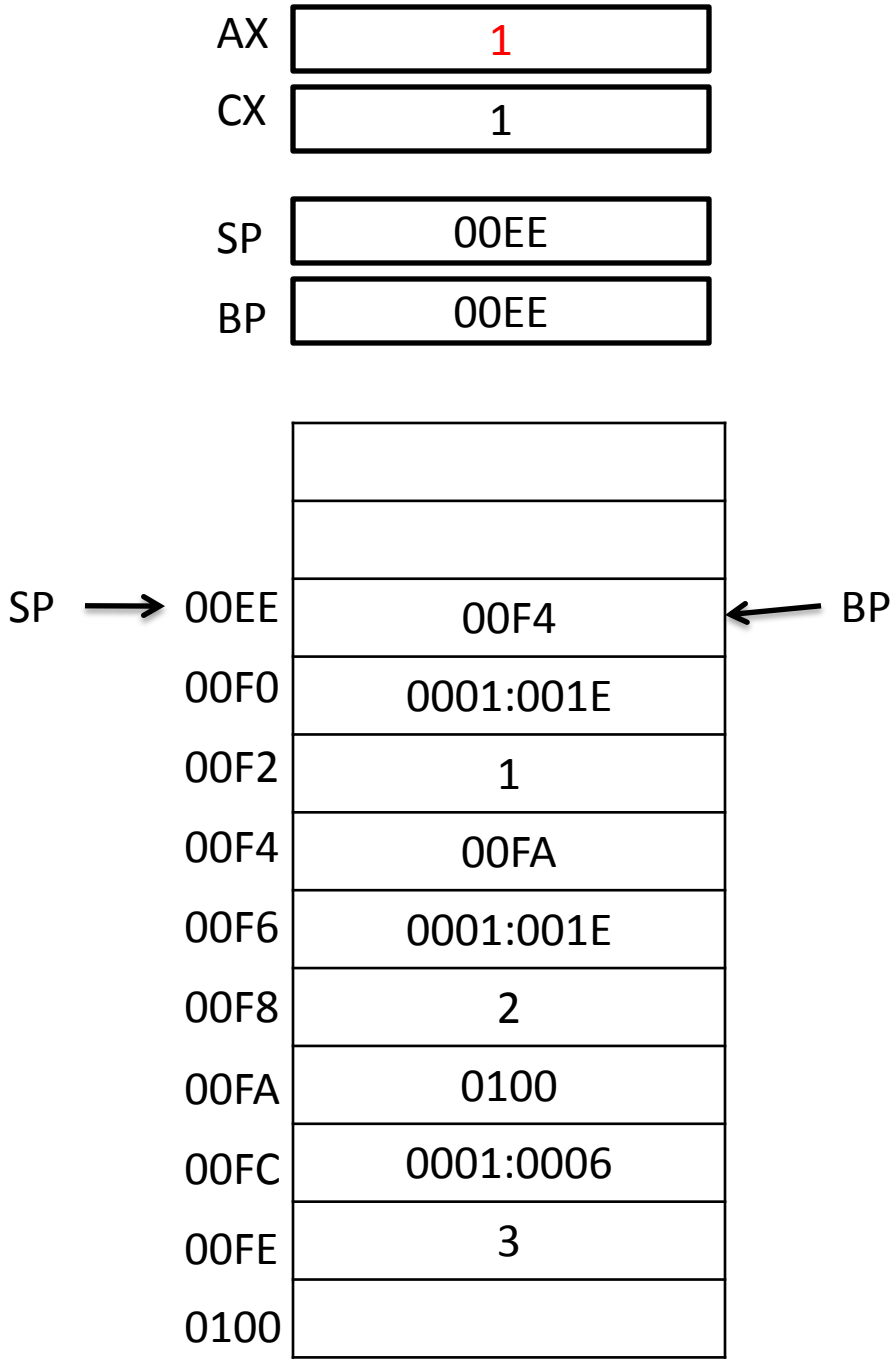
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



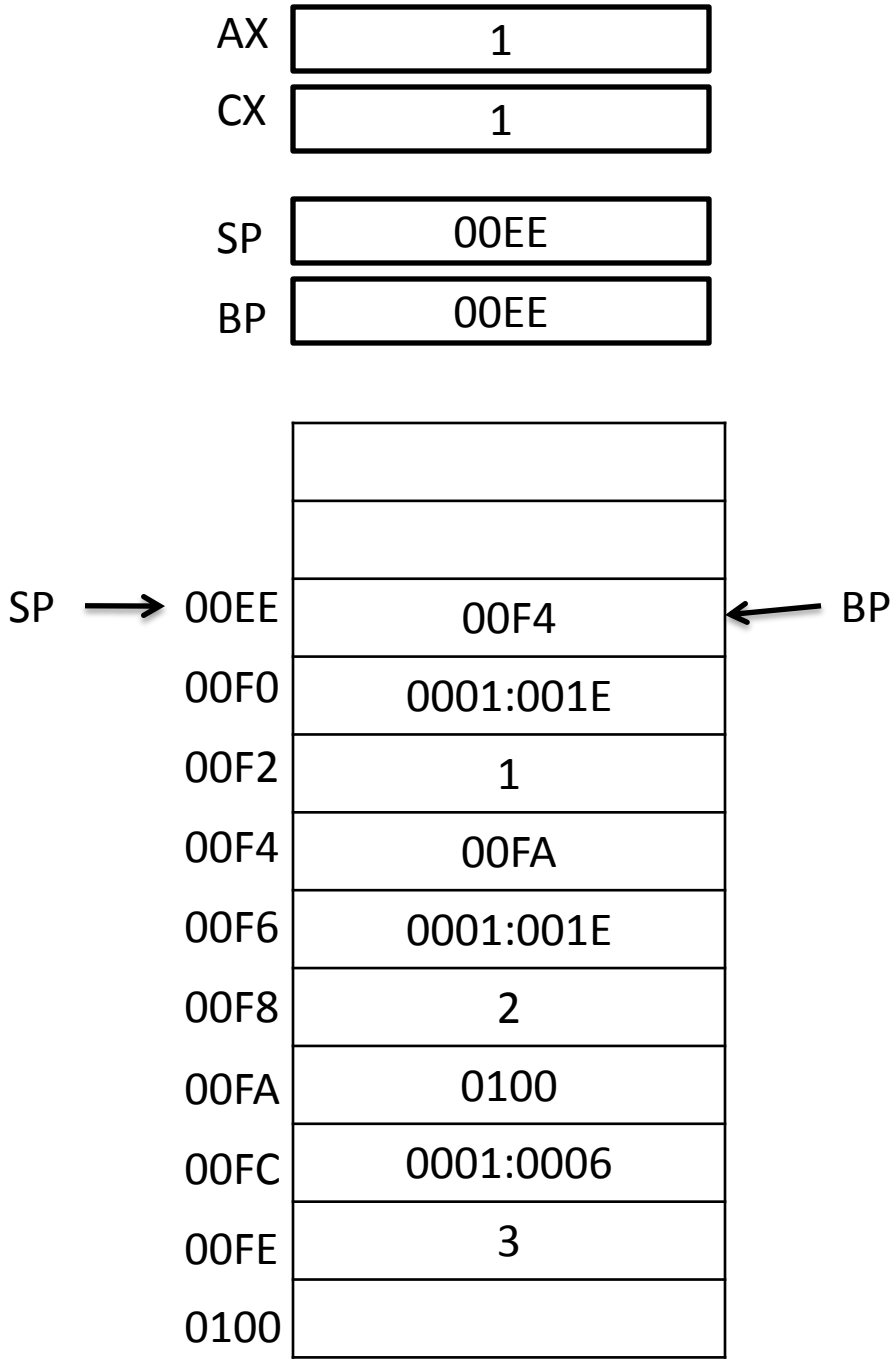
```
                MAIN  PROC
0000                    MOV         AX,3
0002                    PUSH        AX
0004                    CALL        FACTORIAL
0006                    MOV         AH,4CH
0008                    INT         21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH        BP
000C                    MOV         BP,SP
000E                    CMP         WORD PTR[BP+4],1
0010                    JG          END_IF
0012                    MOV         AX,1
0014                    JMP         RETURN
0016            END_IF: MOV         CX, [BP+4]
0018                    DEC         CX
001A                    PUSH        CX
001C                    CALL        FACTORIAL
001E                    MUL         WORD  PTR[BP+4]
0020            RETURN : POP        BP
0022                    RET         2
                END         MAIN
```



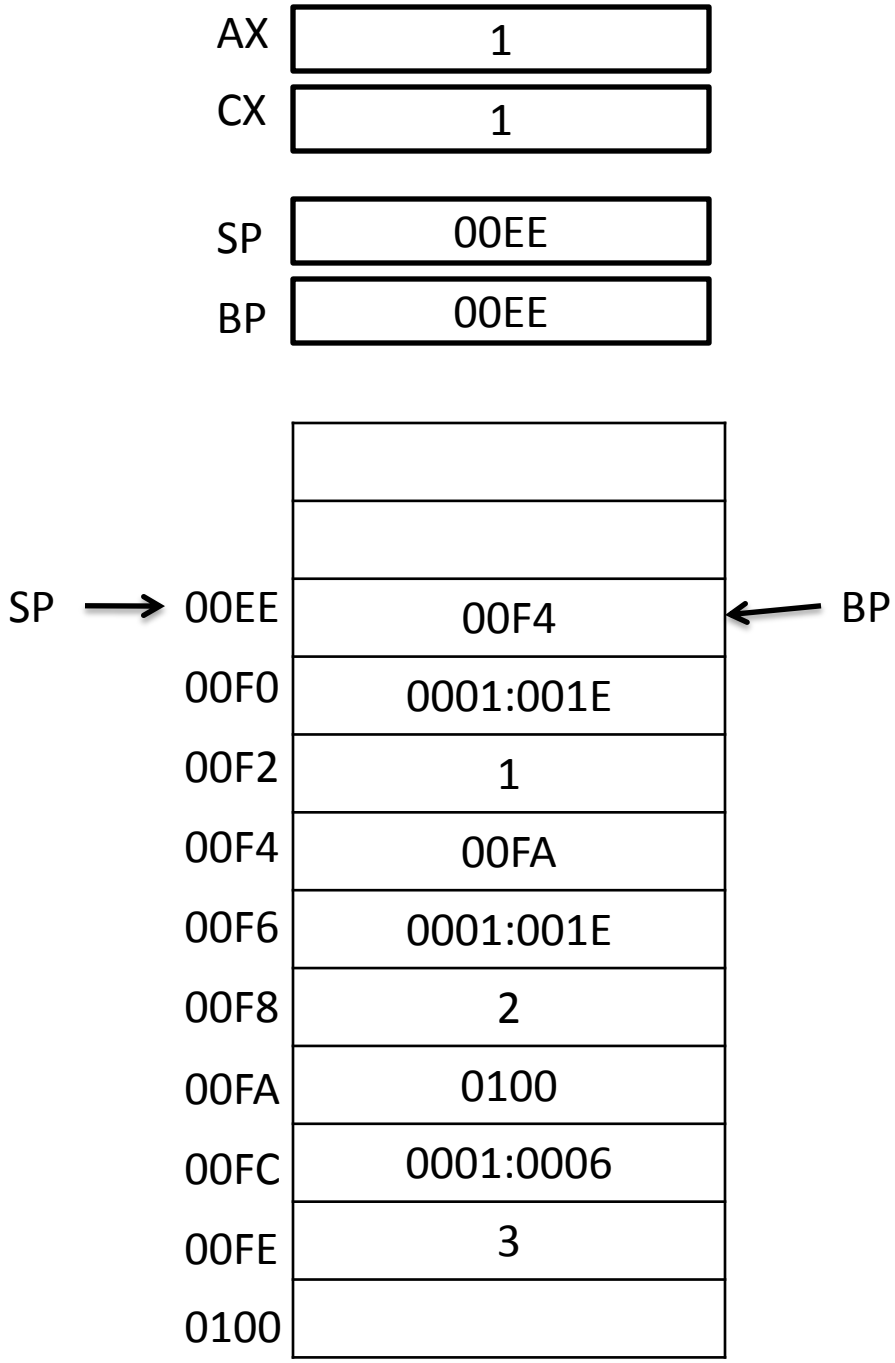
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016    END_IF:         MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020    RETURN :        POP     BP
0022                    RET     2
                END     MAIN
```



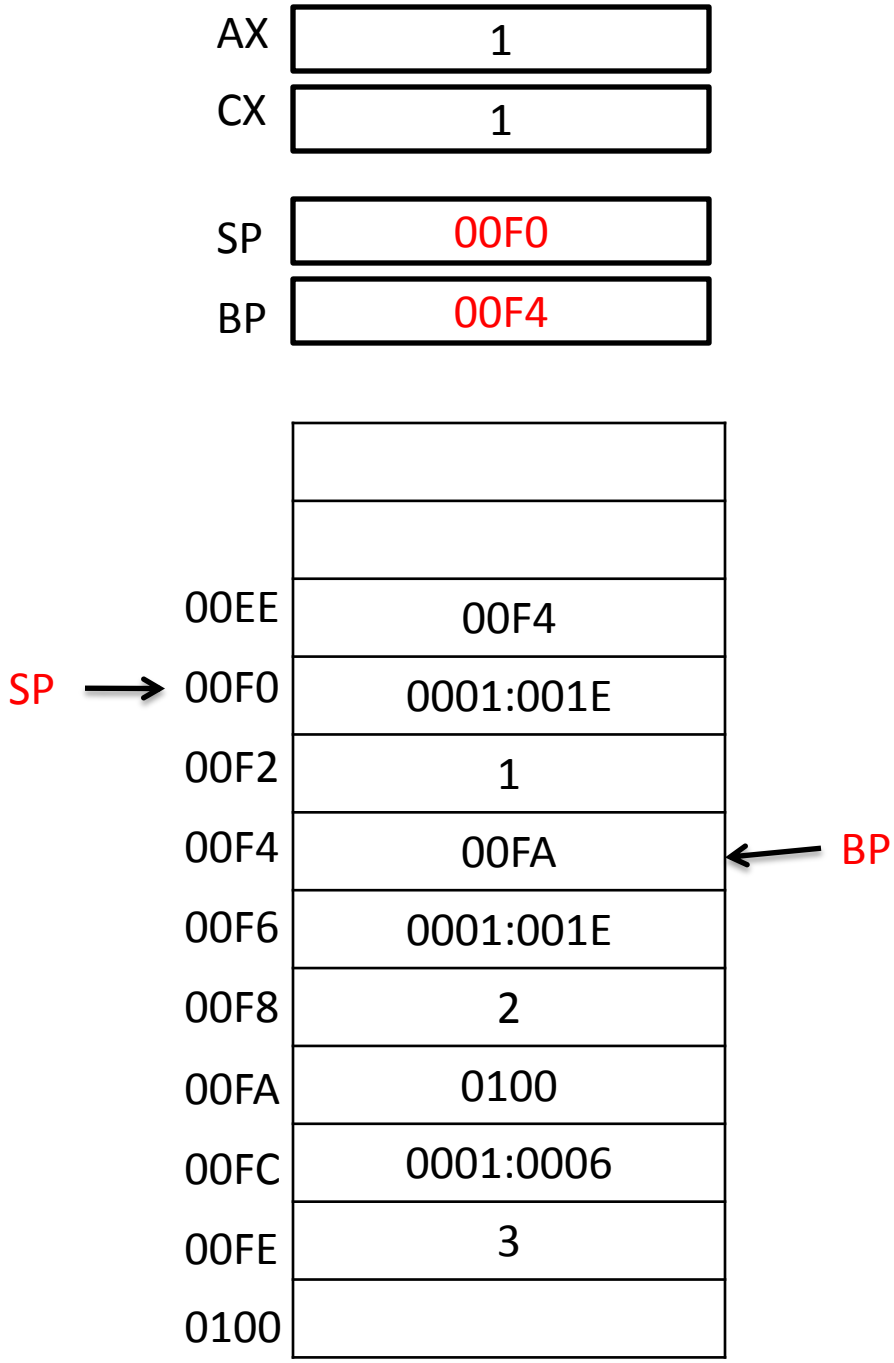
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



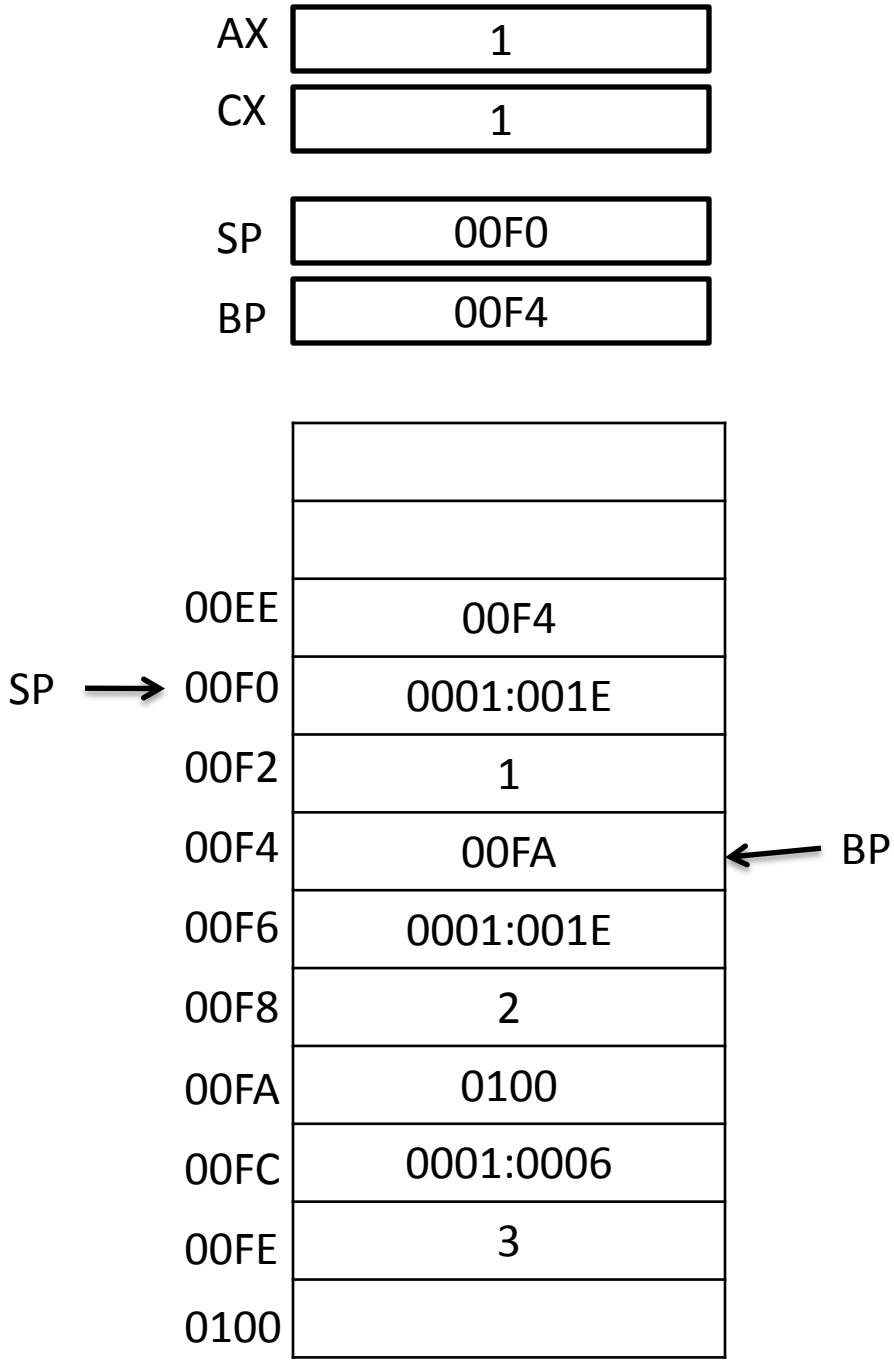
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



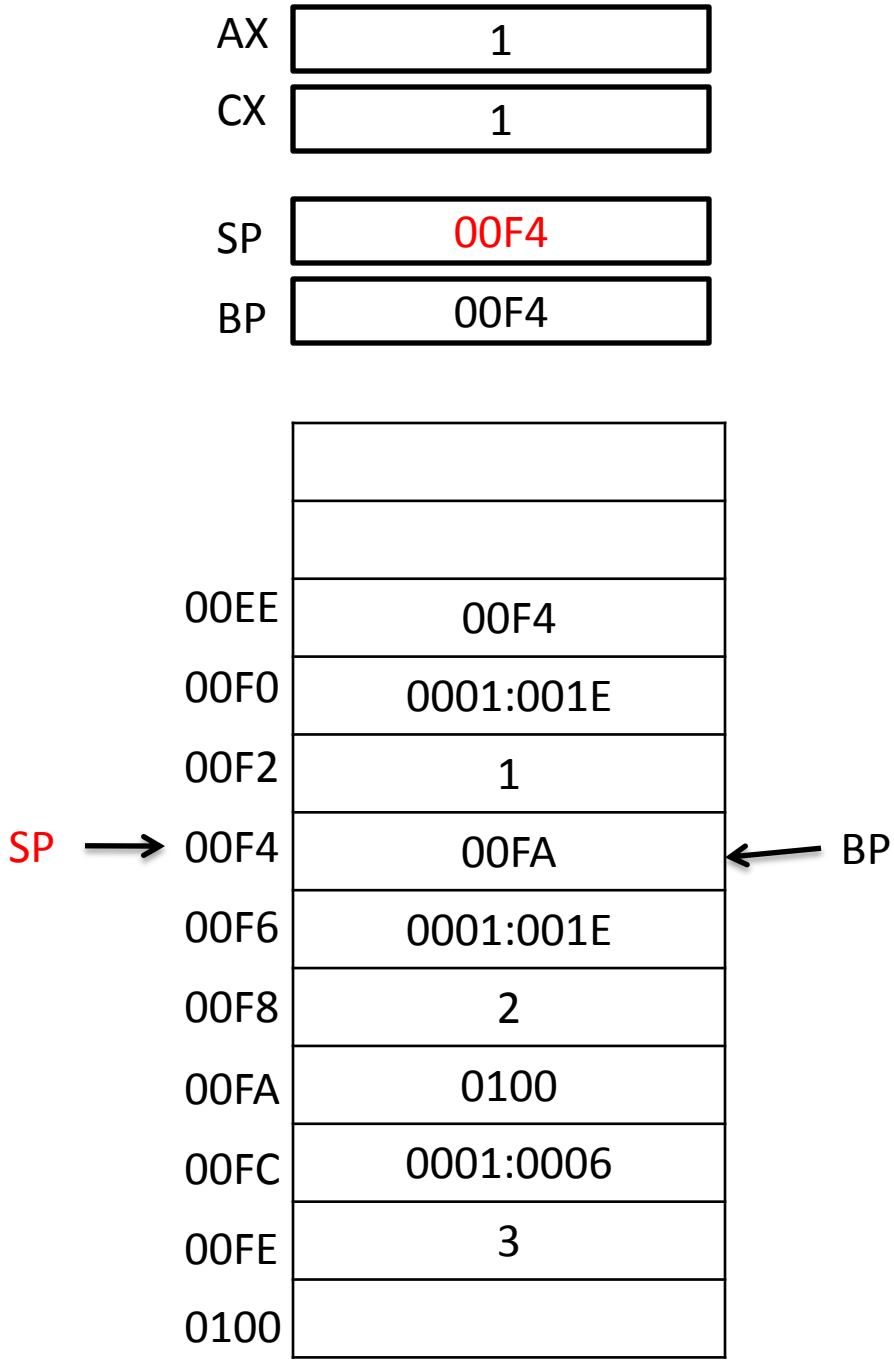
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



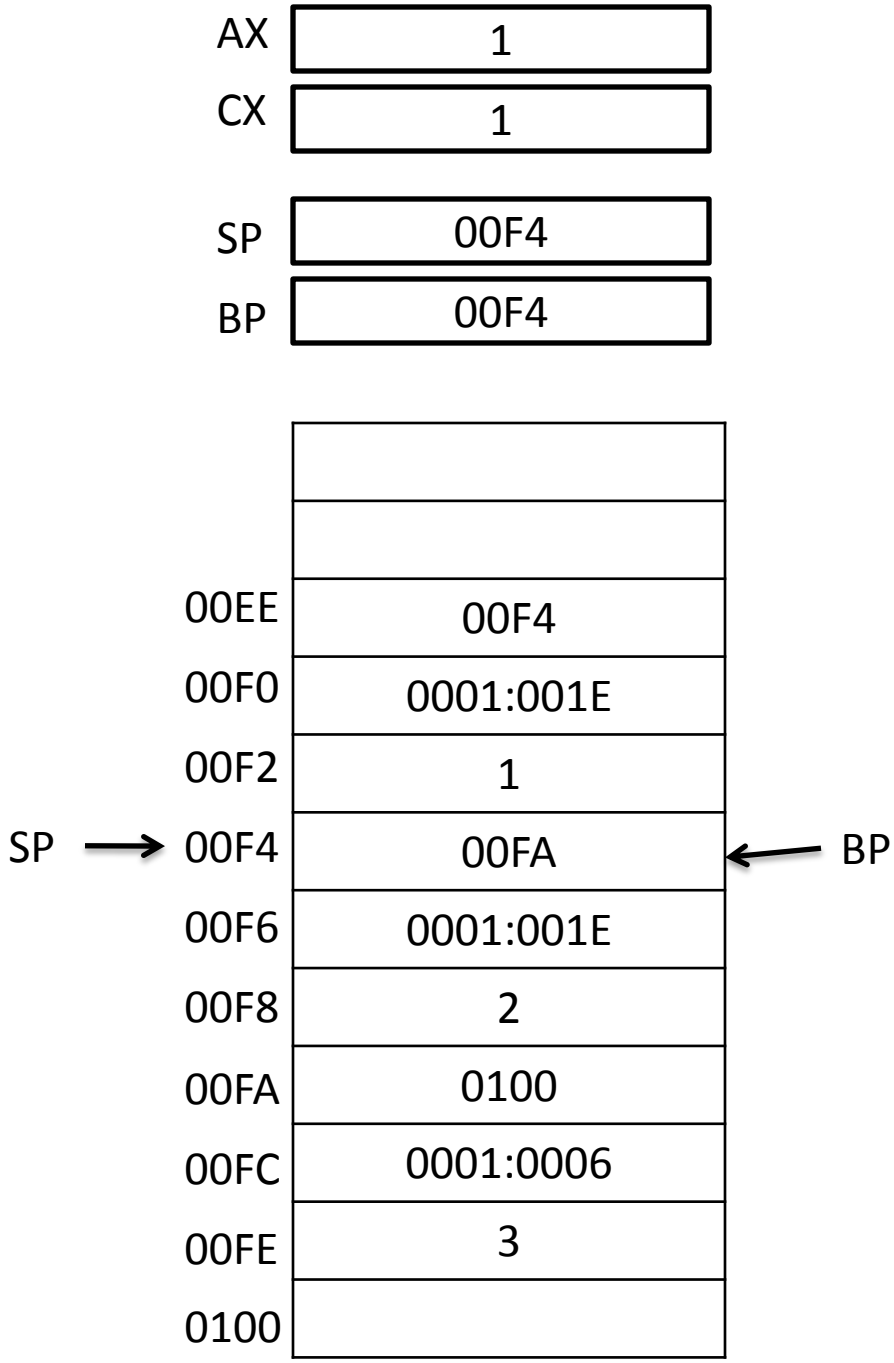
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



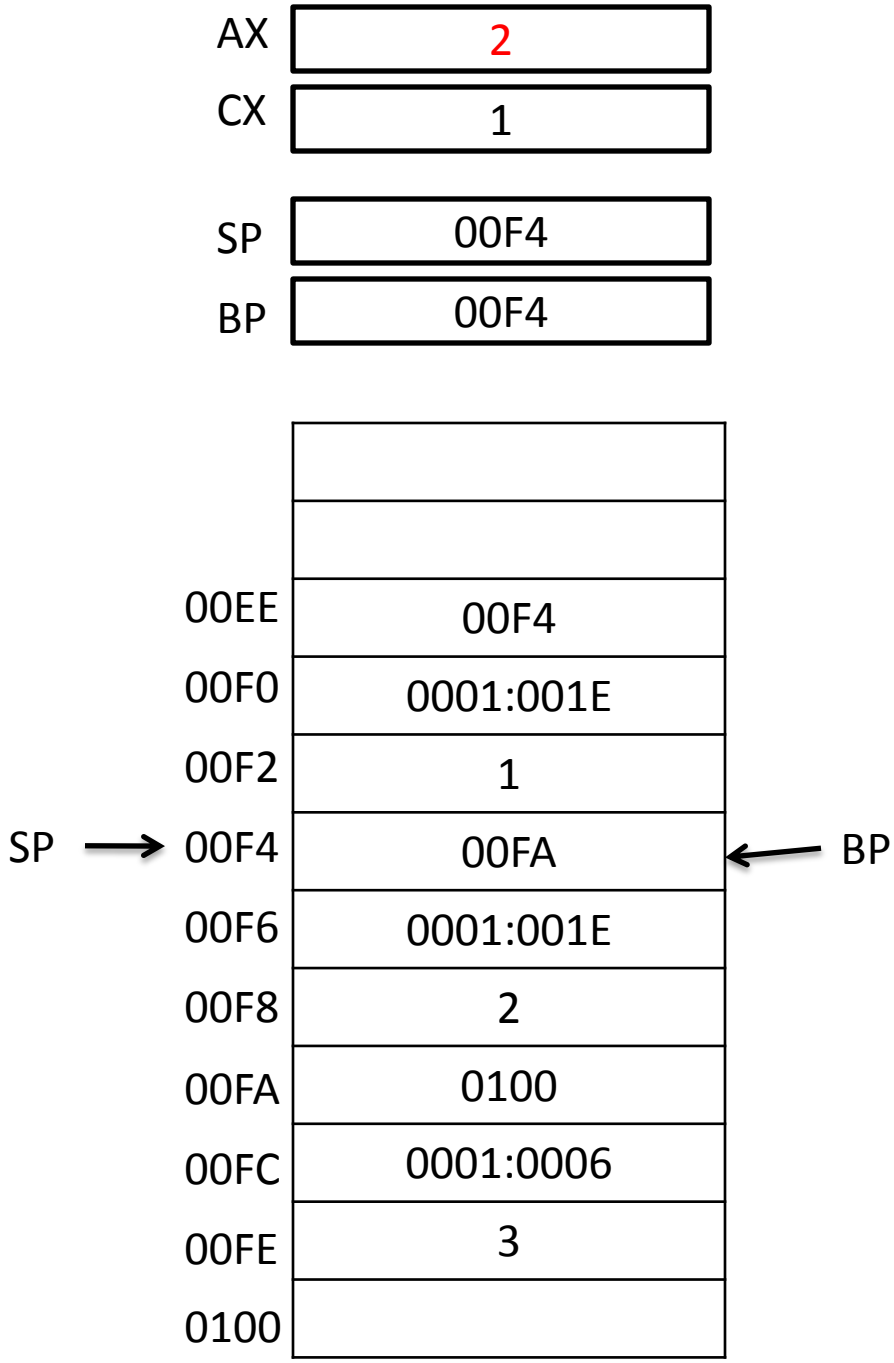
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



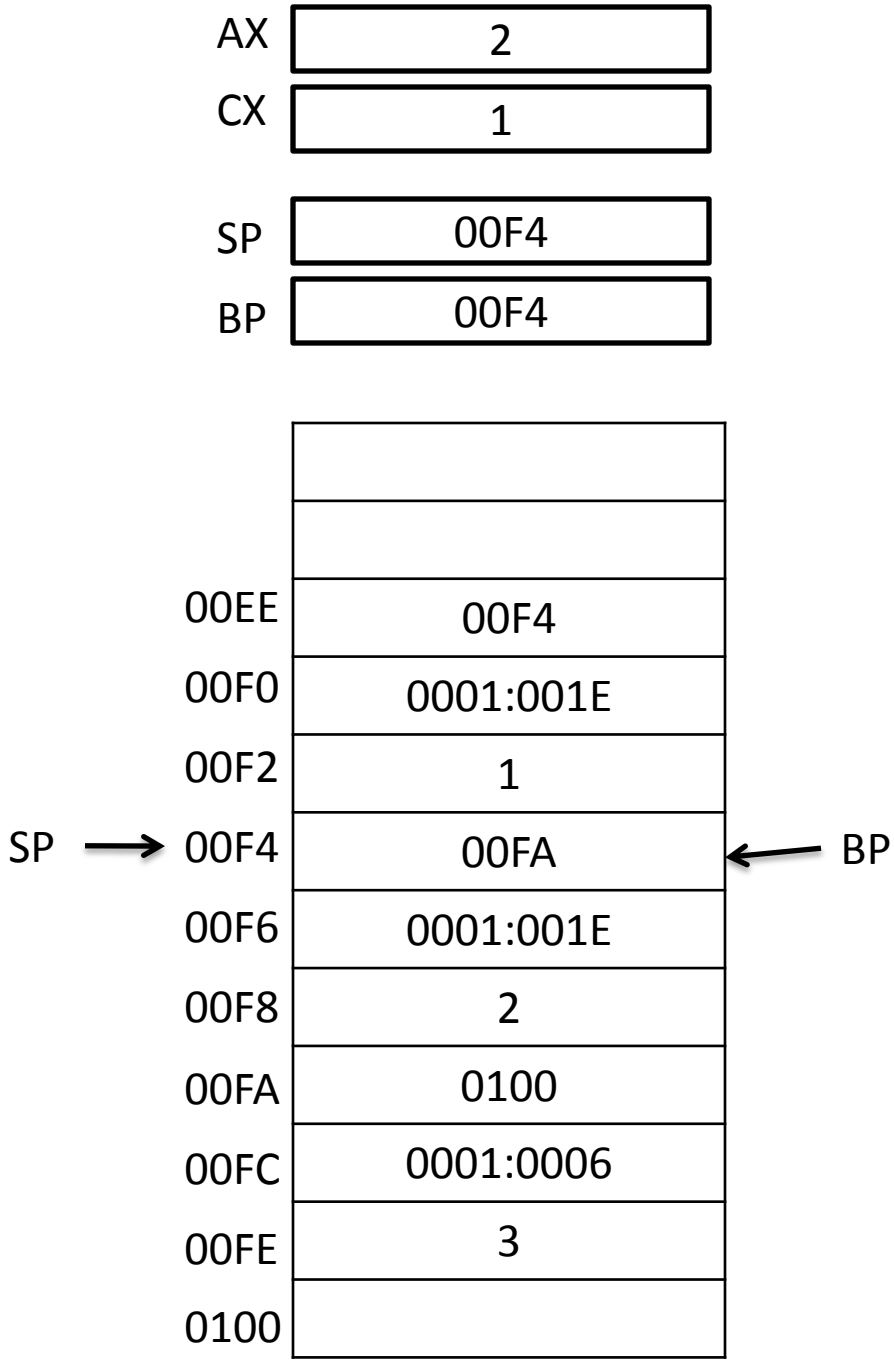
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016            END_IF: MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020            RETURN : POP    BP
0022                    RET     2
                END     MAIN
```



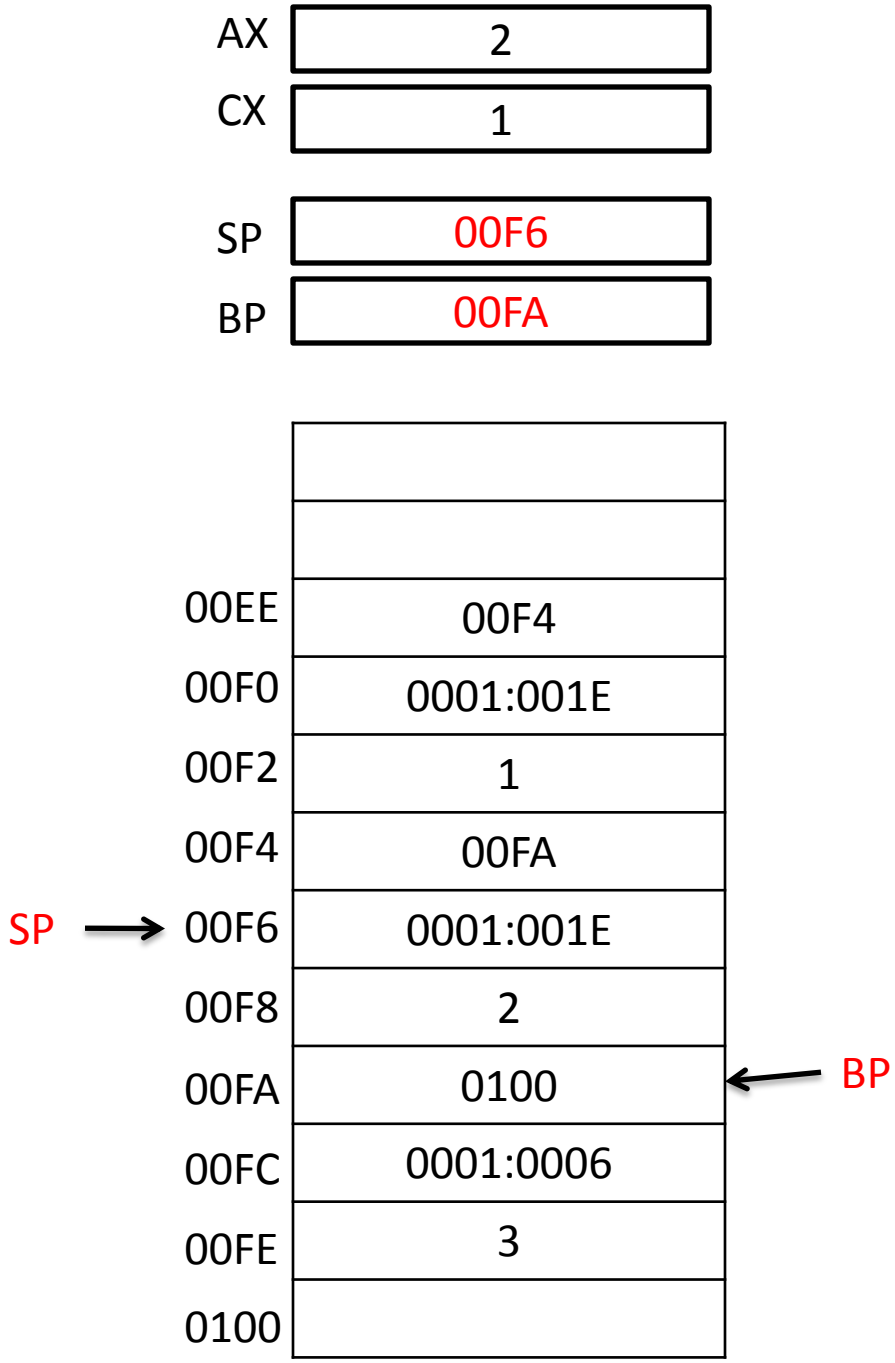
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



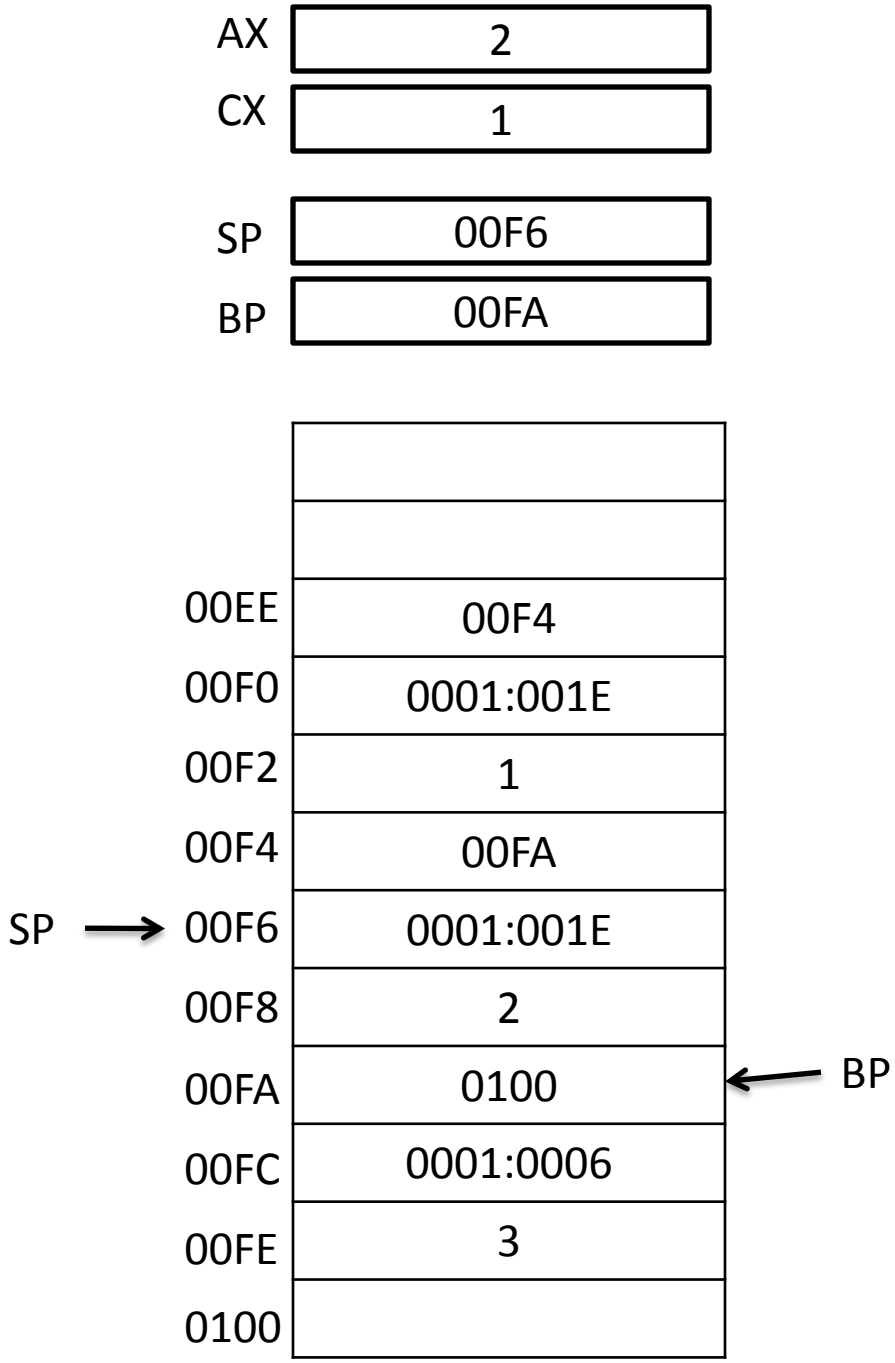
```
                MAIN  PROC
0000                    MOV     AX,3
0002                    PUSH    AX
0004                    CALL    FACTORIAL
0006                    MOV     AH,4CH
0008                    INT     21H
                MAIN ENDP
                FACTORIAL PROC NEAR
000A                    PUSH    BP
000C                    MOV     BP,SP
000E                    CMP     WORD PTR[BP+4],1
0010                    JG      END_IF
0012                    MOV     AX,1
0014                    JMP     RETURN
0016            END_IF: MOV     CX, [BP+4]
0018                    DEC     CX
001A                    PUSH    CX
001C                    CALL    FACTORIAL
001E                    MUL     WORD  PTR[BP+4]
0020            RETURN : POP    BP
0022                    RET     2
                END     MAIN
```



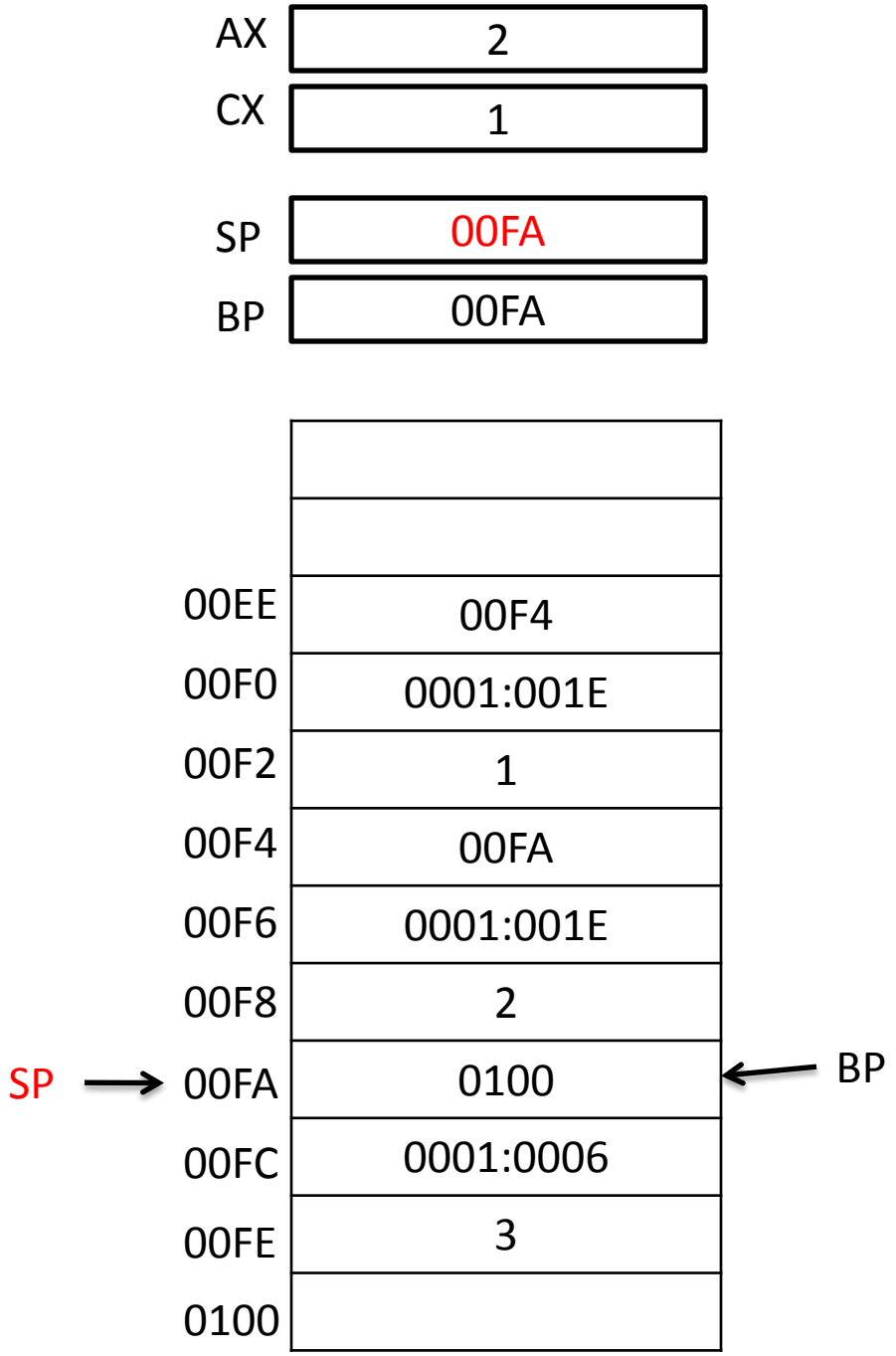
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



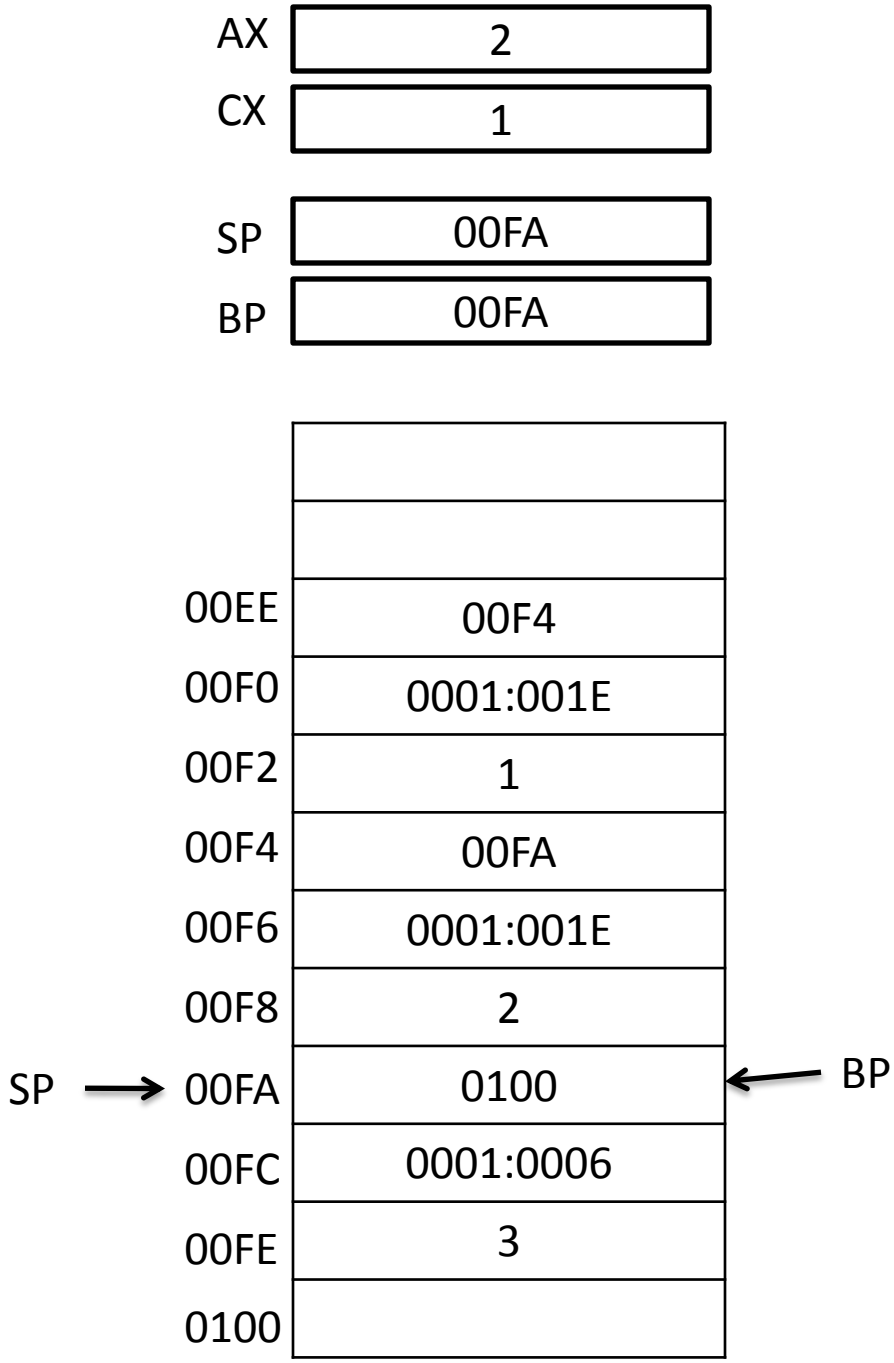
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



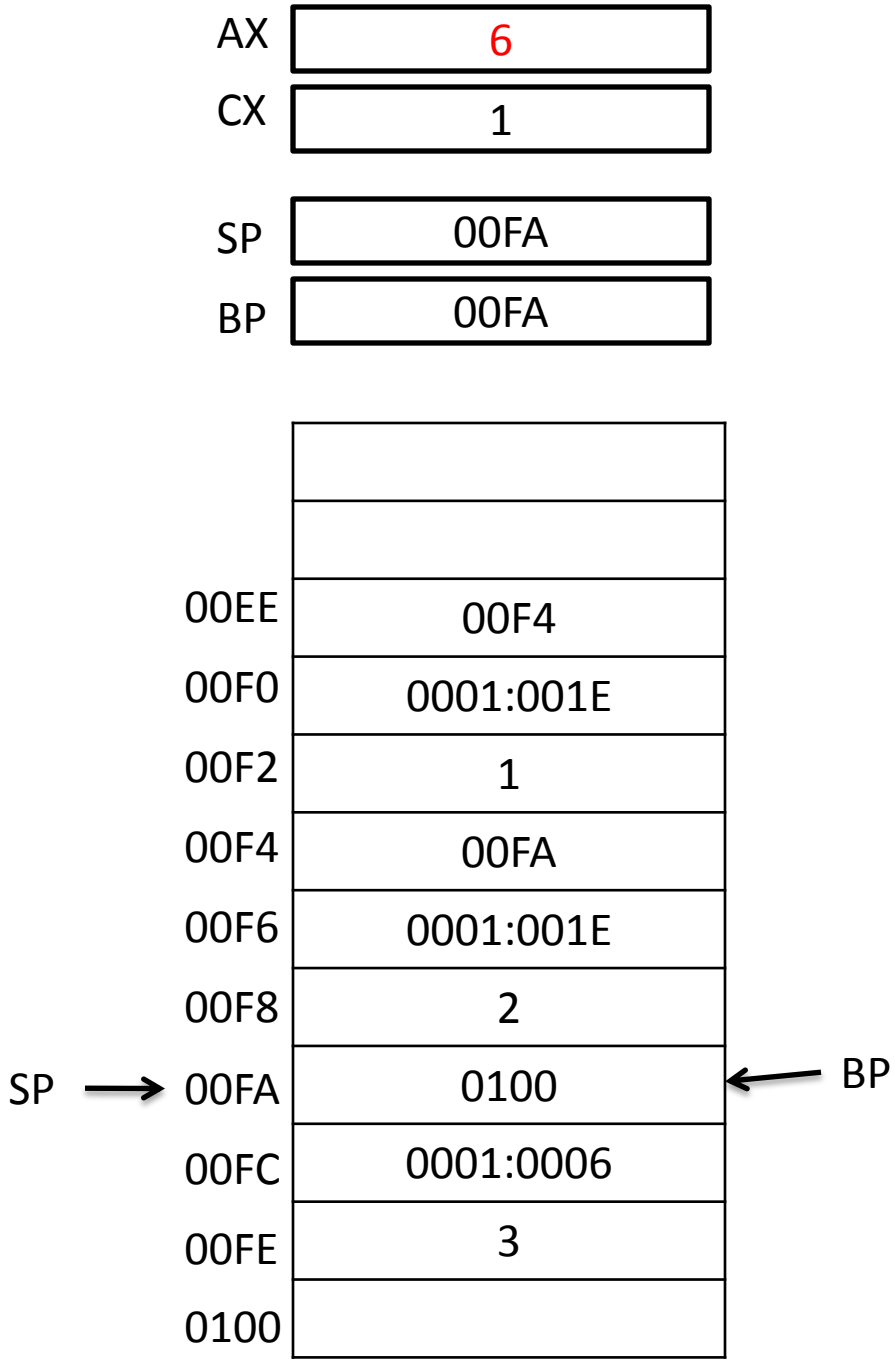
```
        MAIN  PROC
0000                MOV         AX,3
0002                PUSH        AX
0004                CALL        FACTORIAL
0006                MOV         AH,4CH
0008                INT         21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A                PUSH        BP
000C                MOV         BP,SP
000E                CMP         WORD PTR[BP+4],1
0010                JG          END_IF
0012                MOV         AX,1
0014                JMP         RETURN
0016    END_IF:     MOV         CX, [BP+4]
0018                DEC         CX
001A                PUSH        CX
001C                CALL        FACTORIAL
001E                MUL         WORD  PTR[BP+4]
0020    RETURN :    POP         BP
0022                RET         2
        END         MAIN
```



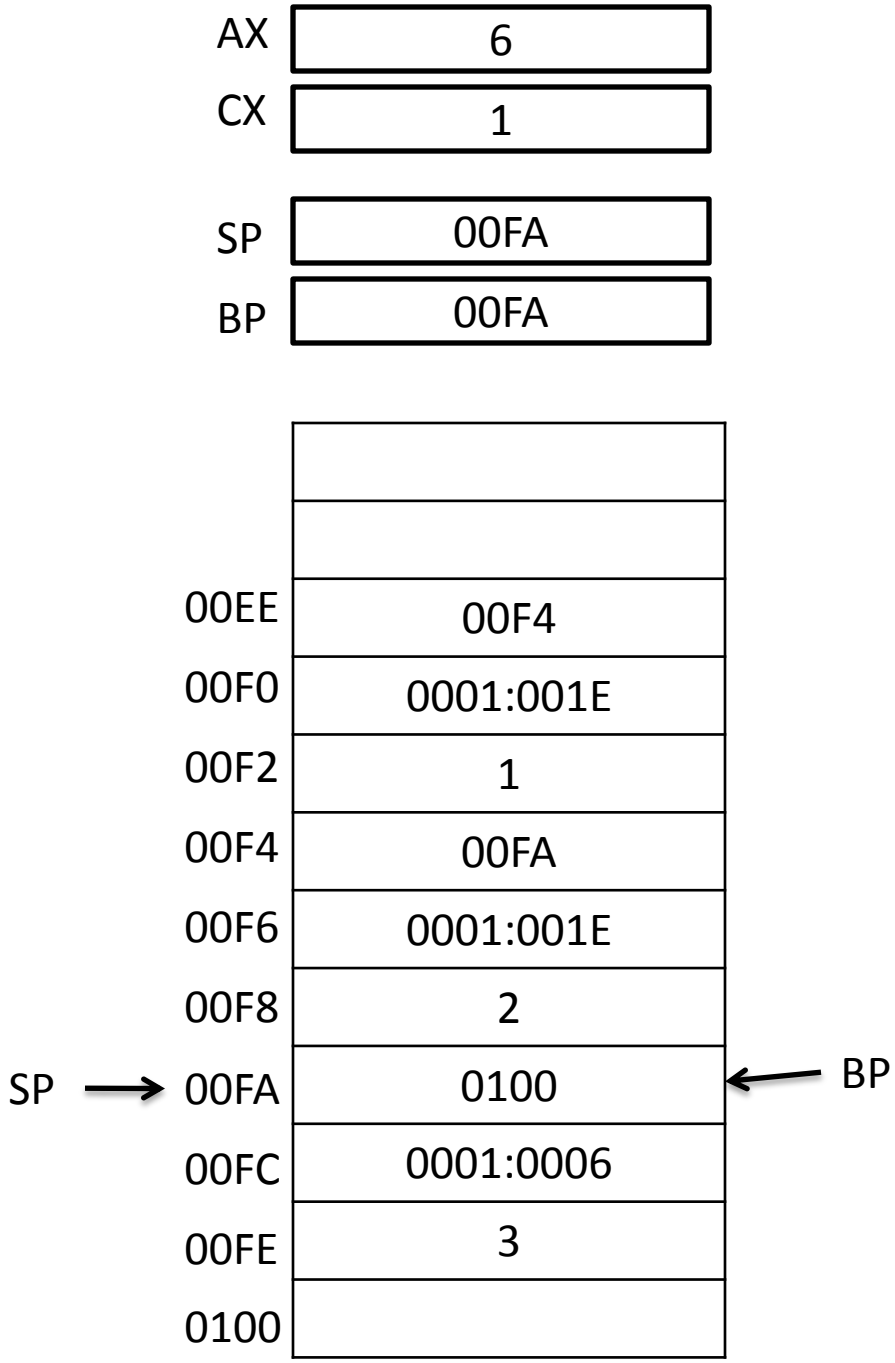
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



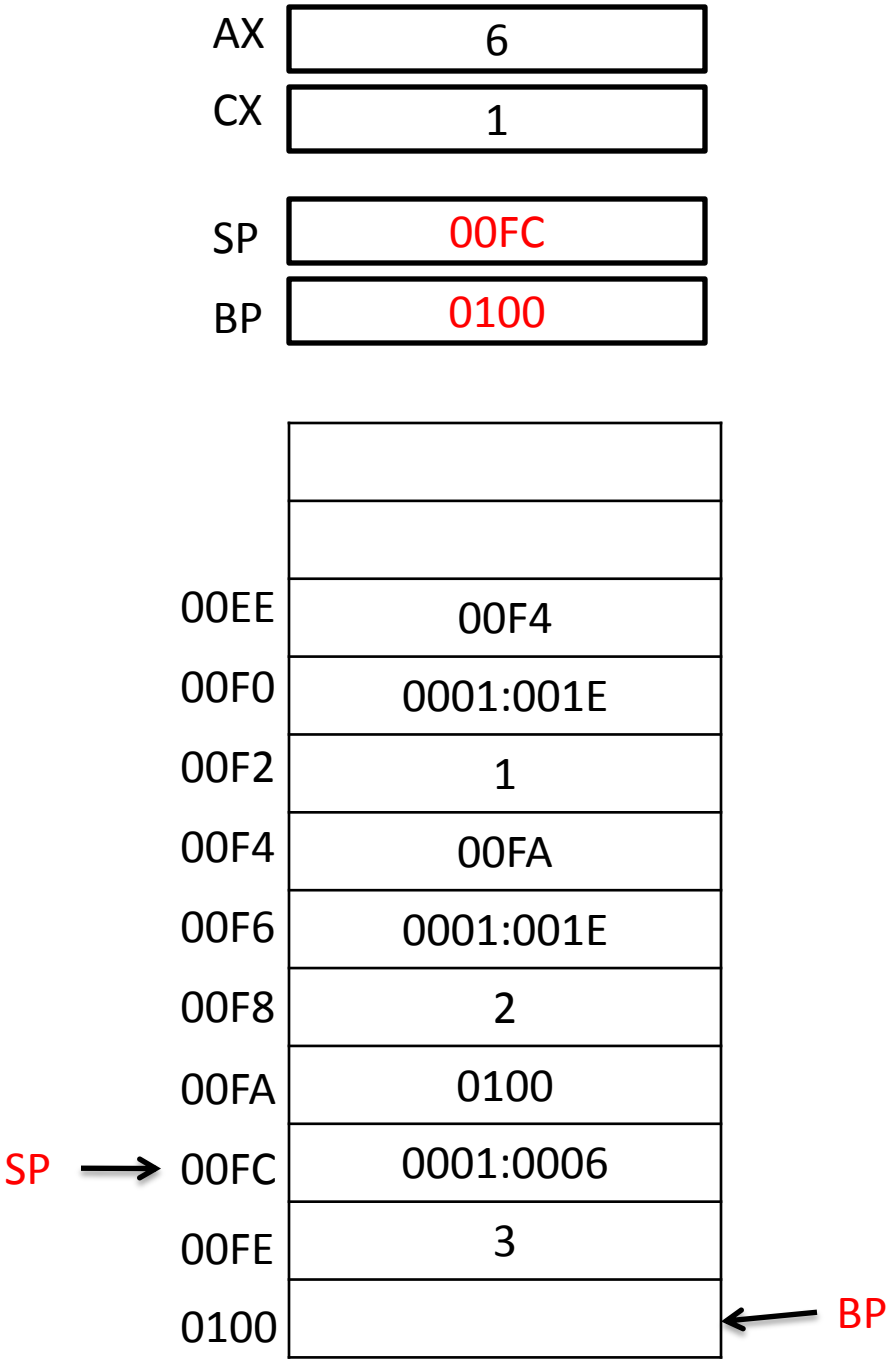
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



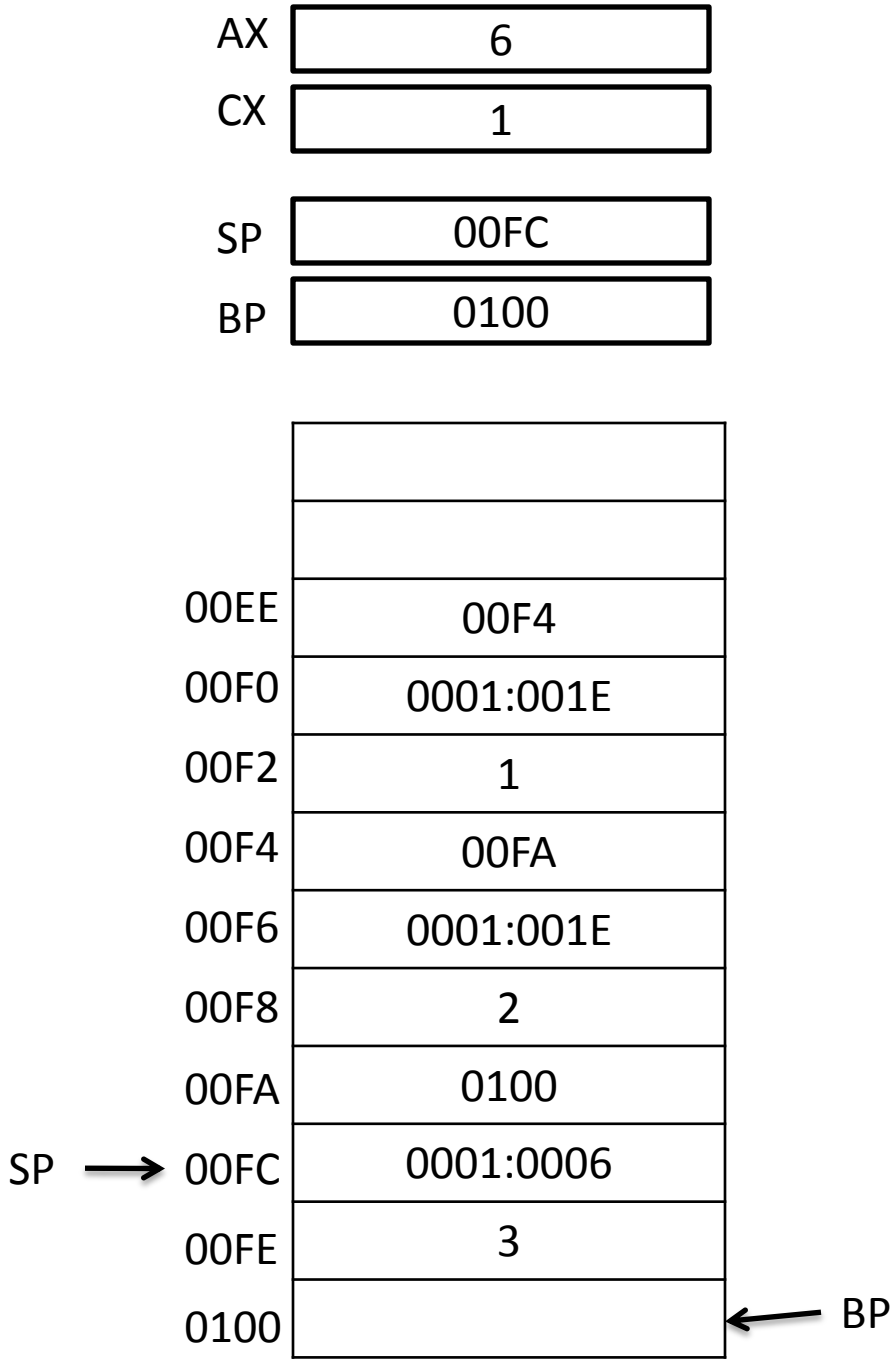
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



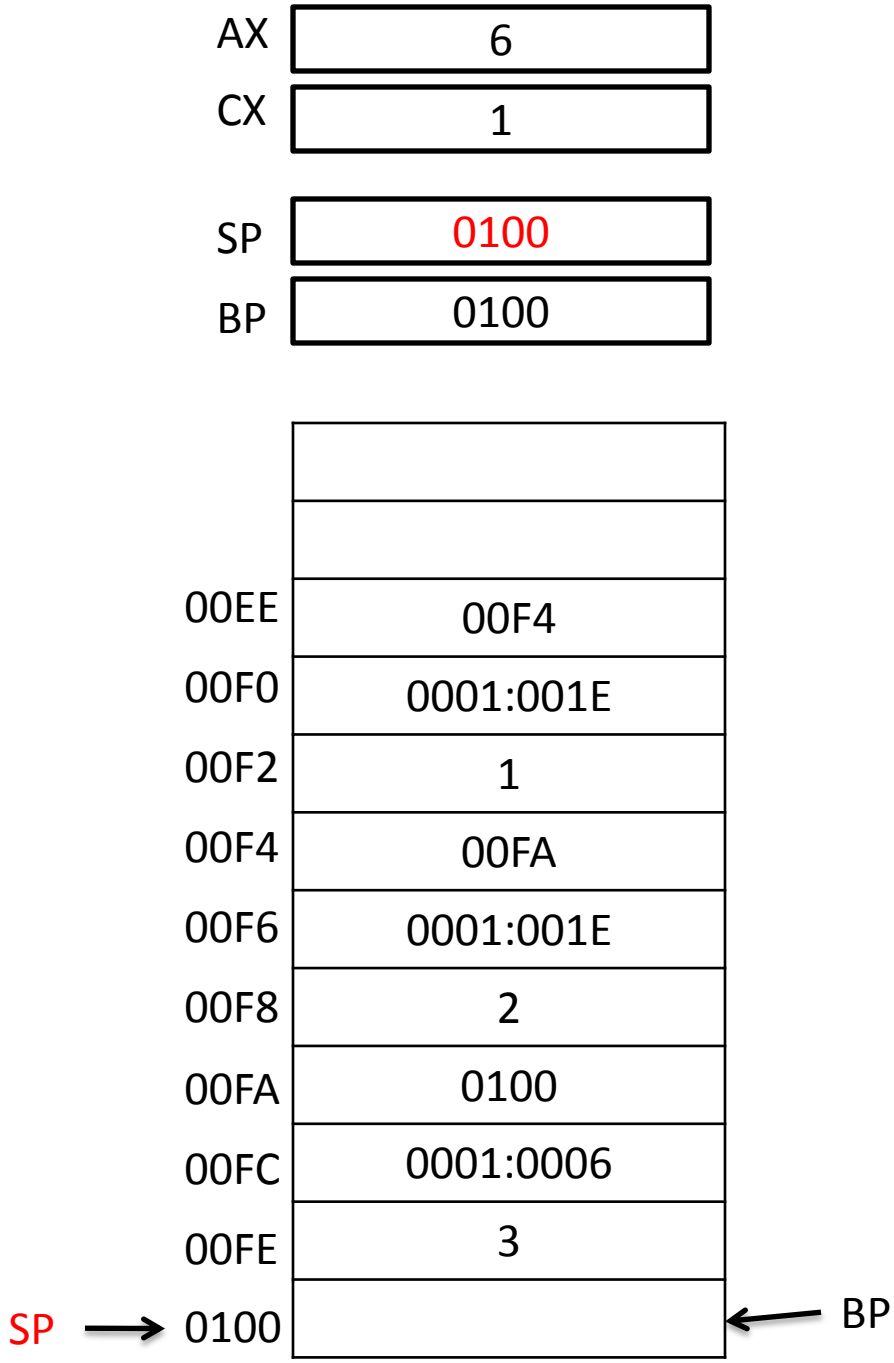
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



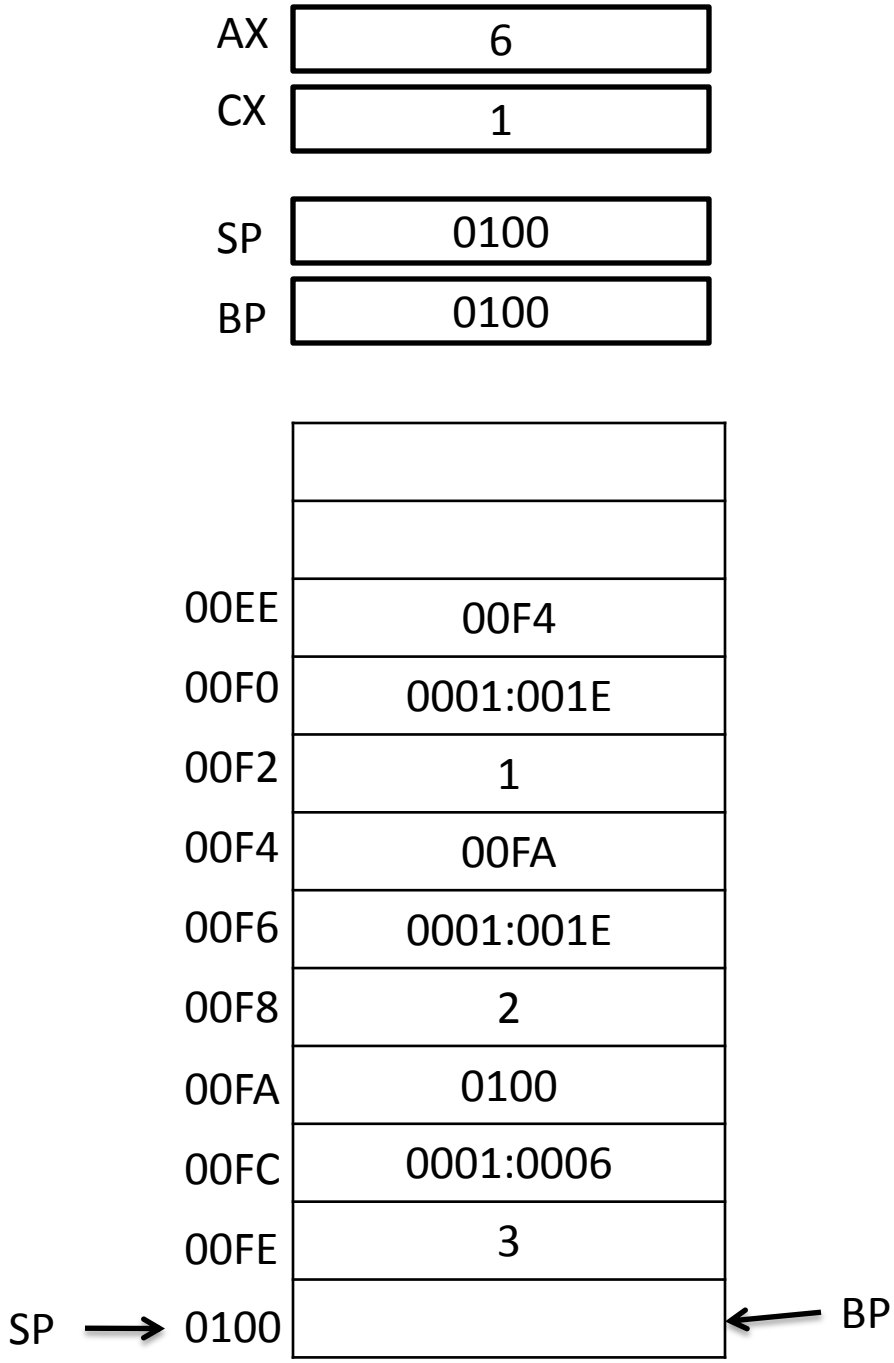
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



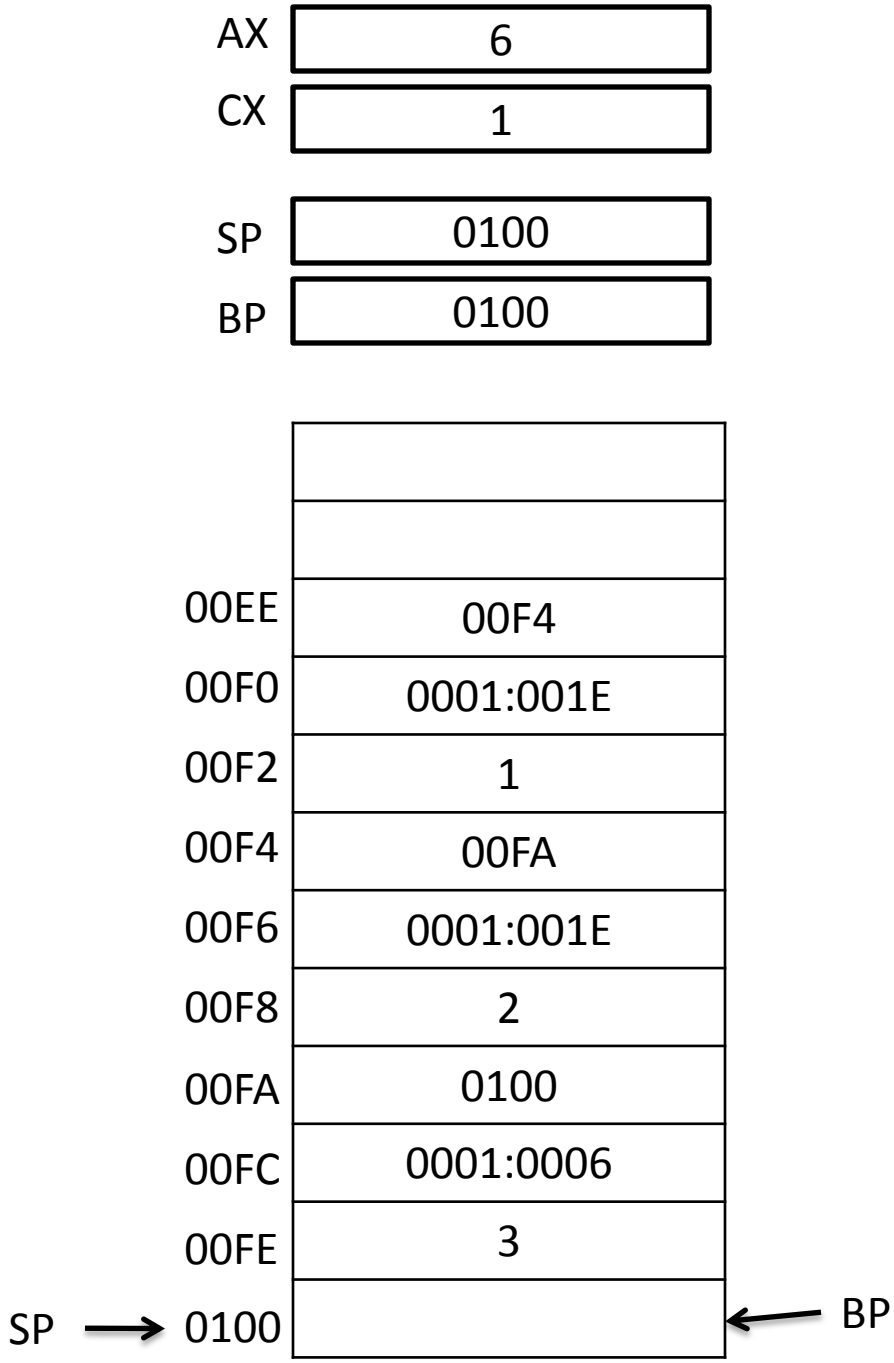
```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```



```
        MAIN  PROC
0000            MOV     AX,3
0002            PUSH    AX
0004            CALL    FACTORIAL
0006            MOV     AH,4CH
0008            INT     21H
        MAIN ENDP
        FACTORIAL PROC NEAR
000A            PUSH    BP
000C            MOV     BP,SP
000E            CMP     WORD PTR[BP+4],1
0010            JG      END_IF
0012            MOV     AX,1
0014            JMP     RETURN
0016    END_IF: MOV     CX, [BP+4]
0018            DEC     CX
001A            PUSH    CX
001C            CALL    FACTORIAL
001E            MUL     WORD  PTR[BP+4]
0020    RETURN : POP    BP
0022            RET     2
        END     MAIN
```