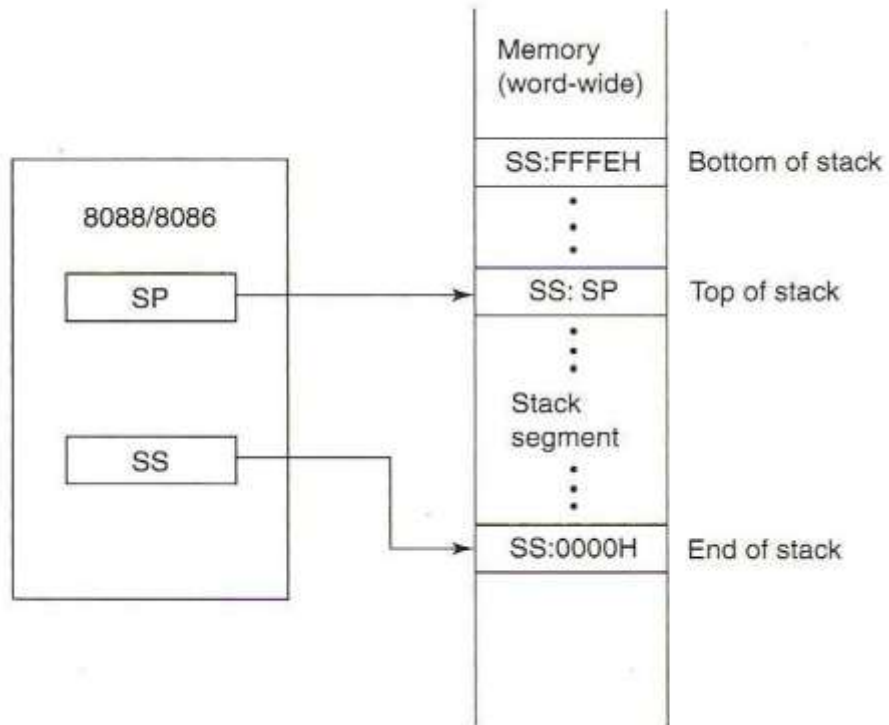


## The stack

The stack is implemented in the memory and it is used for temporary storage of information such as data and addresses. The stack is 64Kbytes long and is organized from a software point of view as 32Kwords (see **Fig Below**).

- ✚ SS register points to the lowest address word in the stack
- ✚ SP and BP points to the address within stack
- ✚ Data transferred to and from the stack are **word-wide**, not **byte-wide**.
- ✚ The first address in the Stack segment (SS : 0000) is called *End of Stack*.
- ✚ The last address in the Stack segment (SS : FFFE) is called *Bottom of Stack*.
- ✚ The address (SS:SP) is called *Top of Stack*.
- ✚ POP instruction is used to read **word** from the stack.
- ✚ PUSH instruction is used to write **word** to the stack.
- ✚ When a word is to be pushed onto the top of the stack:
  - ✓ the value of SP is first automatically decremented by two
  - ✓ and then the contents of the register written into the stack.
- ✚ When a word is to be popped from the top of the stack the
  - ✓ the contents are first moved out the stack to the specific register
  - ✓ then the value of SP is first automatically incremented by two.



Stack segment of memory

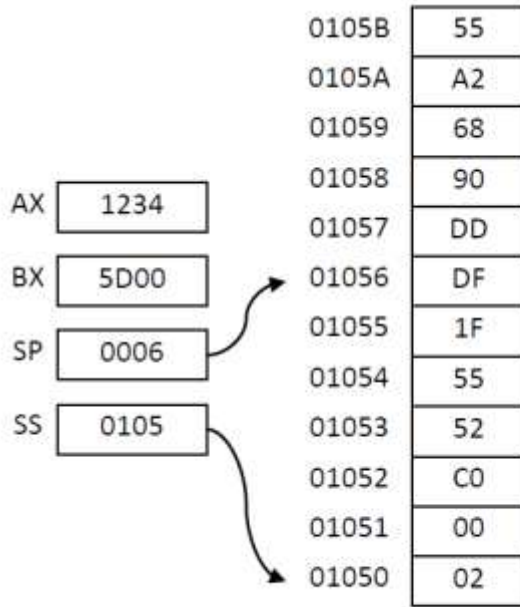
**Example:**

let **AX**=1234H ,**SS**=0105H and **SP**=0006H. Fig below shows the state of stack prior and after the execution of next program instructions:

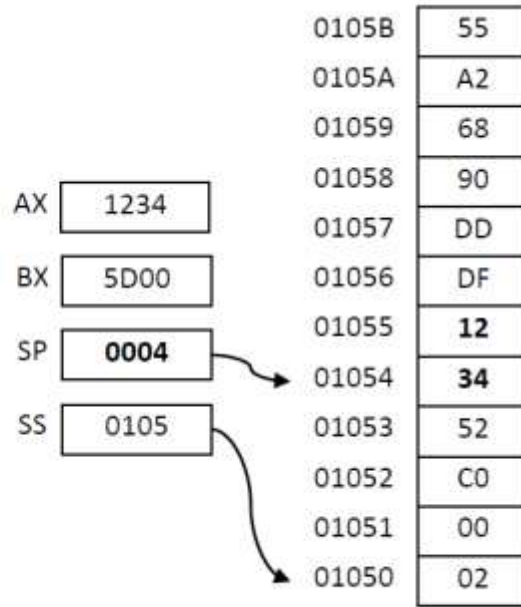
PUSH AX

POP BX

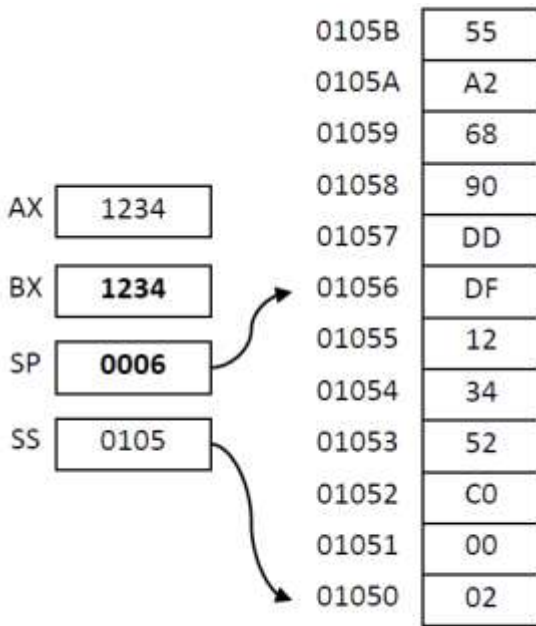
POP AX



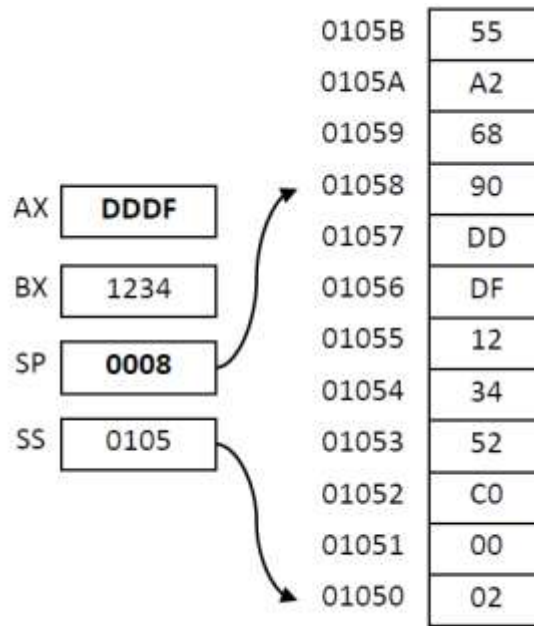
(a) Initial state



(b) After execution of PUSH AX



(c) After execution of POP BX



(d) After execution of POP AX

Example Below lists a short program that pushes the contents of AX, BX, and CX onto the stack. The first POP retrieves the value that was pushed onto the stack from CX and places it into AX. The second POP places the original value of BX into CX. The last POP places the value of AX into BX.

**EXAMPLE**

MOV AX,1000H ;load test data

MOV BX,2000H

MOV CX,3000H

PUSH AX ;1000H to stack

PUSH BX ;2000H to stack

PUSH CX ;3000H to stack

POP AX ;3000H to AX

POP CX ;2000H to CBX

POP BX ;1000H to BX