Comparison of the unsigned and signed numbers:

- **CMP instruction** changes the flag bits **CF, AF, SF, PF, ZF, and OF** according to the comparison result.

Comparison of the unsigned numbers:

CF and ZF are used to indicate the comparison result of the unsigned operands.

Comparison results	**Flags**
Destination > source	CF=0 and ZF=0
Destination < source	CF=1
Destination = source	ZF=1

Comparison of the signed numbers: SF, OF, and ZF are used to indicate the comparison result of the signed operands.

Comparison results	**Flags**
Destination > source	SF=OF and ZF=0
Destination < source	SF ≠ OF
Destination = source	ZF=1

Example:
MOV AX, 40
CMP AX, 30 ; Result = 10, SF = 0, OF = 0, ZF = 0

Example:
MOV AX, 10
CMP AX, 15 ; Result = -5, SF = 1, OF = 0

Example:
MOV AX, 5
CMP AX, 5 ; Result = 0, ZF = 1

Example:
MOV AX, 25
CMP AX, 0 ; Result = 25, ZF = 0, CF = 0

Example:
MOV AX, 10
CMP AX, 15 ; Result = -5, CF = 1

Example:

MOV AX, 5
CMP AX, 5 ; Result = 0, ZF = 1

Example: For each of the following Assembly instructions, show the results of the Compare instructions, SF, ZF, CF, and OF flags.

MOV AL, 12 ; 12 and 10 are unsigned numbers (12 > 10)
CMP AL, 10 ; result = 2, CF = 0, ZF = 0

MOV AL, 0 ; 0 and 2 are unsigned numbers (0 < 2)
CMP AL, 2 ; result = -2, CF = 1

Example: For each of the following signed arithmetic instructions, show the values of the destination operand, SF, ZF, and OF flags.

```
MOV AL, 127     ; AL = +127 = 7Fh
ADD AL, 1       ; AL = -128 = 80h, SF = 1, ZF = 0, OF = 1

MOV AL, 80h     ; AL = 80h = -128
ADD AL, 0FEh    ; AL = 7Eh = +126, SF = 0, ZF = 0, OF = 1

MOV AL, 03h     ; AL = 03h = +3
SUB AL, 04h     ; AL = -1 = FFh, SF = 1, ZF = 0, OF = 0, SF ≠ OF (destination < source)

MOV AL, 03h     ; AL = +3
SUB AL, 01h     ; AL = +2 = 02h, SF = 0, ZF = 0, OF = 0, SF = OF (destination > source)

MOV AL, 5       ; AL = +5 = 05h
SUB AL, 5       ; AL = +0 = 00h, SF = 0, ZF = 1, OF = 0 (destination = source)
```
