**2. Design and develop an assembly program to sort a given set of ‘n’ 16-bit numbers in ascending order. Adopt Bubble Sort algorithm to sort given elements.**

**title** "sort 16-bit numbers using bubble sort"

**.model** small

**.data**

array dw 0023h,0043h,0012h,0055h,0011h ; Initialize the elements to be sorted in array

len dw 05h ; size of the array.i.e number of elements

**.code**

mov ax,@data ; initialize data segment

mov ds,ax

mov bx,len

dec bx ; load bx with (len-1)i.e no. of passes as count

outloop: mov cx,bx ; load cx register with next remaining no. of passes during sorting

mov si,0 ; Initialize si with 0 in the beginning as pointer to move between array elements

inloop: mov ax,array[si] ; load ax with the element pointed by si

inc si ; increment si to point to next element

inc si

cmp ax,array[si] ; Is the element in ax is < element pointed by si ?

jb next ; Yes, no exchange, go to next

xchg ax,array[si] ; No, exchange two elements

mov array[si-2],ax

next: dec cx ; Has all the elements compared in the array(i.e Is cx=0)?

jnz inloop ; No, go to inloop to continue

dec bx ; Has all the passes completed?(Yes/No)

jnz outloop ; No. go to outer loop

mov ah,4ch ; Yes, Terminate the program

int 21h

**end**

**Note:** Repeat the same program by changing **jb** to **ja** for descending order

**OUTPUT**

* **Edit filename.asm**
* **Masm filename.asm;**
* **Link filename;**
* **Debug filename.exe**

**-- R**

**--T**

**--T**

**--DDS:00**

00 02 01 32 01 52 **23 00 43 00 12 00 55 00 11 00 Unsorted Array**

21 36 02 65 14 78 58 96 45 52 47 85 63 14 78 96

**--G**

**--DDS:00**

00 02 01 32 01 52 **11 00 12 00 23 00 43 00 55 00 Sorted Array**

21 36 02 65 14 78 58 96 45 52 47 85 63 14 78 96

--**Q**