

EXPERIMENT 5

AIM: To write an assembly program to sort numbers in ascending order

Prerequisite: TASM assembler

Theory:

Firstly we need to load all the contents that are needed to be arranged in ascending order to register CL. Then we need to travel from the memory location to compare the two numbers. If the first number is greater than the second number then there will be a swap. Then we need to fix the position for the last number and also decrease the count by 1. Again start checking and comparing till all the numbers are checked. After running the program we can see the ascending order in the dump.

ALGORITHM:

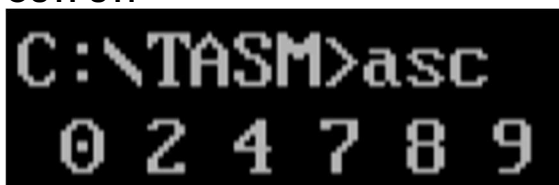
1. Load data from offset 500 to register CL (for count).
2. Travel from starting memory location to last and compare two numbers if the first number is greater than the second number then swap them.
3. First pass, fix the position for last number.
4. Decrease the count by 1.
5. Again travel from starting memory location to (last-1, by help of count) and compare two numbers if the first number is greater than the second number then swap them.
6. Second pass fixes the position for the last two numbers.
7. Repeat

CODE:

```
.MODEL SMALL
.DATA
    TABLE DB 9,7,5,6,5,1
    VAL1 DB 5
    NL DB ',', '$'
.CODE
MAIN PROC
    MOV AX, @DATA
    MOV DS, AX
    LEA BX, TABLE
    MOV DL, VAL1
LBL1:
    LEA BX, TABLE
```

```
        MOV CL,5
LBL2:   MOV AL,[BX]
        MOV DL,[BX+1]
        CMP AL,DL
        JB LBL3
        MOV [BX],DL
        MOV [BX+1],AL
LBL3:   INC BX
        LOOP LBL2
        MOV DL,VAL1
        DEC DL
        MOV VAL1,DL
        CMP DL,00
        JNE LBL1
        MOV CL,6
        LEA BX,TABLE
DISPLA: LEA DX,NL
        MOV AH,09H
        INT 21H
        MOV DL,[BX]
        ADD DL,30H
        MOV AH,02H
        INT 21H
        INC BX
        LOOP DISPLA
        MOV AH,4CH
        INT 21H
MAIN    ENDP
        END    MAIN
```

OUTPUT:



```
C:\TASM>asc
0 2 4 7 8 9
```

Conclusion:

From the above experiment we are able to arrange the given numbers in the program and set it in ascending order. Also to check the output we need to enter 'td ascend.exe' and run the program. From the view option, we need to select the dump so that the contents are seen in ascending order.

AIM: To write an assembly program to sort numbers in descending order

Prerequisite: TASM assembler

Theory:

Firstly we need to load all the contents that are needed to be arranged in descending order to register CL. Then we need to travel from the memory location to compare the two numbers. If the first number is smaller than the second number then there will be a swap. Then we need to fix the position for the last number and also decrease the count by 1. Again start checking and comparing till all the numbers are checked. After running the program we can see the descending order in the dump.

ALGORITHM:

1. Load data from offset 500 to register CL (for count).
2. Travel from starting memory location to last and compare two numbers if the first number is smaller than the second number then swap them.
3. First pass, fix the position for last number.
4. Decrease the count by 1.
5. Again travel from starting memory location to (last-1, by help of count) and compare two numbers if the first number is smaller than the second number then swap them.
6. Second pass fix the position for the last two numbers.
7. Repeat.

CODE:

```
DATA SEGMENT
STRING1 DB 99H,12H,56H,45H,36H

DATA ENDS

CODE SEGMENT

ASSUME CS:CODE,DS:DATA

START: MOV AX,DATA
MOV DS,AX
MOV CH,04H
UP2: MOV CL,04H
LEA SI,STRING1
```

```
UP1:MOV AL,[SI]
MOV BL,[SI+1]
CMP AL,BL
JNC DOWN
MOV DL,[SI+1]
XCHG [SI],DL
MOV [SI+1],DL
```

```
DOWN: INC SI
DEC CL
JNZ UP1
DEC CH
JNZ UP2
INT 3
CODE ENDS
END START
```

OUTPUT:

[] CPU 80486			1-[↑][↓]		
cs:0000	B8AD48	mov ax,48AD	ax	0000	c=0
cs:0003	8ED8	mov ds,ax	bx	0000	z=0
cs:0005	B504	mov ch,04	cx	0000	s=0
cs:0007	B104	mov cl,04	dx	0000	o=0
cs:0009	BE0000	mov si,0000	si	0000	p=0
cs:000C	8A04	mov al,[si]	di	0000	a=0
cs:000E	8A5C01	mov bl,[si+01]	bp	0000	i=1
cs:0011	3AC3	cmp al,bl	sp	0000	d=0
cs:0013	7308	jnb 001D	ds	489D	
cs:0015	8A5401	mov dl,[si+01]	es	489D	
cs:0018	8614	xchg [si],dl	ss	48AC	
cs:001A	885401	mov [si+01],dl	cs	48AE	
cs:001D	46	inc si	ip	0000	
ds:0000 CD 20 FF 9F 00 EA FF FF = f 0					
ds:0008 AD DE E0 01 C5 15 AA 01 i 0 0 0 0					
ds:0010 C5 15 89 02 20 10 92 01 0 0 0 0					
ds:0018 01 03 01 00 02 FF FF FF 0 0 0 0					
			ss:0002	6474	
			ss:0000	0000	

Conclusion:

From the above experiment we are able to arrange the given numbers in the program and set it in descending order. Also to check the output we need to enter 'td descend.exe' and run the program. From the view option, we need to select dump so that the contents are seen in descending order.