LAB2: BUBBLE SORTING

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; PROGRAM :: SORT A GIVEN SET OF 'N' NUMBERS IN ASCENDING AND DESCENDING
; ORDER USING BUBBLE SORT ALGORITHM

.MODEL SMALL

DISPLAY MACRO MSG
      LEA DX, MSG
      MOV AH, 09H
      INT 21H
ENDM

.DATA
LIST DB 02H, 01H, 34H, 0F4H, 09H, 05H
NUMBER EQU $-LIST
MSG1 DB 0DH, 0AH, "1 >> SORT IN ASCENDING ORDER$"
MSG2 DB 0DH, 0AH, "2 >> SORT IN DESCENDING ORDER$"
MSG3 DB 0DH, 0AH, "3 >> EXIT$"
MSG4 DB 0DH, 0AH, "ENTER YOUR CHOICE  :: $"
MSG5 DB 0DH, 0AH, "INVALID CHOICE ENTERED...$"

.CODE
START : MOV AX, @DATA
      MOV DS, AX
      LEA SI, LIST
      MOV CH, NUMBER-1        ; CL STORES THE NUMBER OF ELEMENTS IN LIST
      DISPLAY MSG1            ; DISPLAY THE MENU...
      DISPLAY MSG2
      DISPLAY MSG3
      DISPLAY MSG4
      MOV AH, 01H
      INT 21H
      SUB AL, 30H
      CMP AL, 01H             ; INPUT=1? SORT IN ASCENDING ORDER
      JE ASCSORT
      CMP AL, 02H             ; INPUT=2? SORT IN DESCENDING ORDER
      JE DESSORT
      CMP AL, 03H             ; INPUT=3? EXIT
      JE FINAL
      DISPLAY MSG4
      JMP FINAL
ASCSORT:MOV BL, 00H
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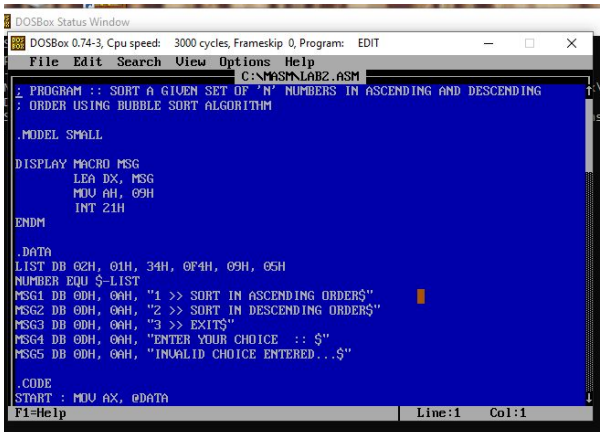
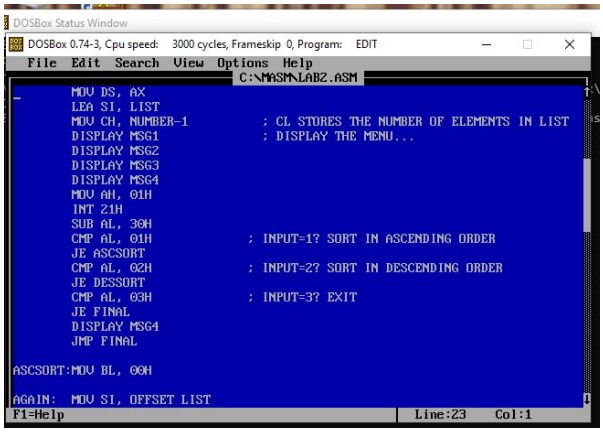
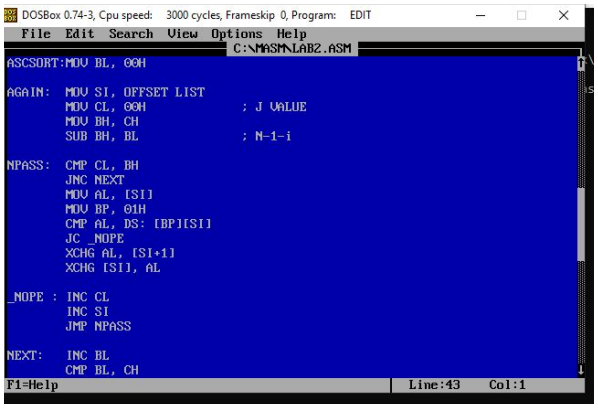
AGAIN:  MOV SI, OFFSET LIST
        MOV CL, 00H            ; J VALUE
        MOV BH, CH
        SUB BH, BL             ; N-1-i
NPASS:  CMP CL, BH
        JNC NEXT
        MOV AL, [SI]
        MOV BP, 01H
        CMP AL, DS: [BP][SI]
        JC _NOPE
        XCHG AL, [SI+1]
        XCHG [SI], AL
_NOPE : INC CL
        INC SI
        JMP NPASS
NEXT:   INC BL
        CMP BL, CH
        JC AGAIN
        JMP FINAL

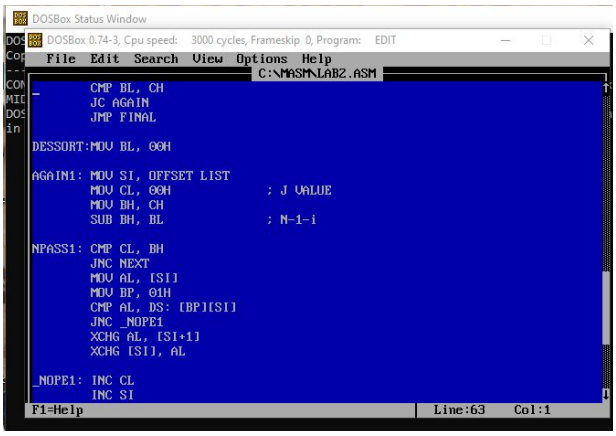
DESSORT:MOV BL, 00H
AGAIN1: MOV SI, OFFSET LIST
        MOV CL, 00H            ; J VALUE
        MOV BH, CH
        SUB BH, BL             ; N-1-i
NPASS1: CMP CL, BH
        JNC NEXT
        MOV AL, [SI]
        MOV BP, 01H
        CMP AL, DS: [BP][SI]
        JNC _NOPE1
        XCHG AL, [SI+1]
        XCHG [SI], AL
_NOPE1: INC CL
        INC SI
        JMP NPASS1
NEXT1:  INC BL
        CMP BL, CH
        JC AGAIN1
FINAL : MOV AH, 4CH
        INT 21H
END START
```

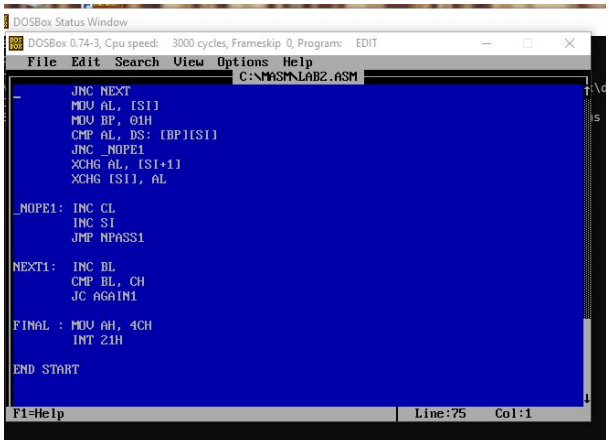
Program:


DOSBox Status Window
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\MASM\LAB2.ASM
; PROGRAM :: SORT A GIVEN SET OF 'N' NUMBERS IN ASCENDING AND DESCENDING
; ORDER USING BUBBLE SORT ALGORITHM
.MODEL SMALL
DISPLAY MACRO MSG
LEA DX, MSG
MOV AH, 09H
INT 21H
ENDM
.DATA
LIST DB 02H, 01H, 34H, 0F4H, 09H, 05H
NUMBER EQU $-LIST
MSG1 DB 0DH, 0AH, "1 >> SORT IN ASCENDING ORDER$"
MSG2 DB 0DH, 0AH, "2 >> SORT IN DESCENDING ORDER$"
MSG3 DB 0DH, 0AH, "3 >> EXIT$"
MSG4 DB 0DH, 0AH, "ENTER YOUR CHOICE :: $"
MSG5 DB 0DH, 0AH, "INVALID CHOICE ENTERED...$"
.CODE
START : MOV AX, @DATA
F1=Help
Line:1 Col:1

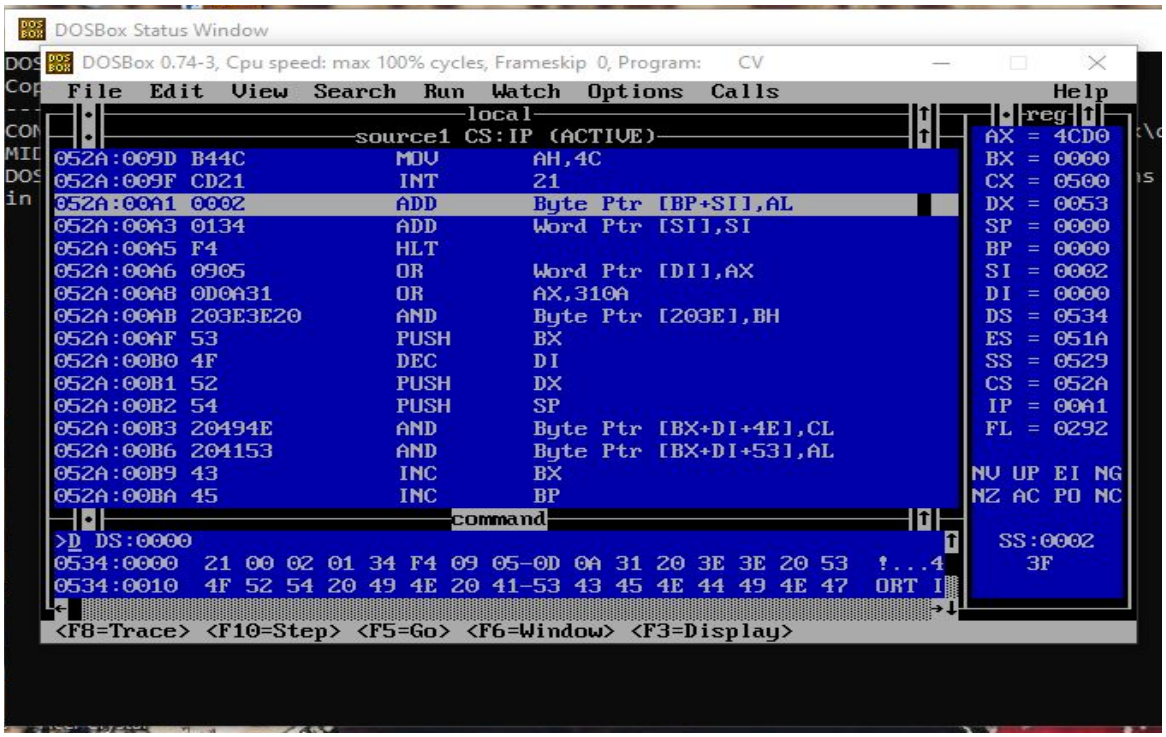

DOSBox Status Window
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\MASM\LAB2.ASM
MOV DS, AX
LEA SI, LIST
MOV CH, NUMBER-1 ; CL STORES THE NUMBER OF ELEMENTS IN LIST
DISPLAY MSG1 ; DISPLAY THE MENU...
DISPLAY MSG2
DISPLAY MSG3
DISPLAY MSG4
MOV AH, 01H
INT 21H
SUB AL, 30H
CMP AL, 01H ; INPUT=1? SORT IN ASCENDING ORDER
JE ASCSORT
CMP AL, 02H ; INPUT=2? SORT IN DESCENDING ORDER
JE DESSORT
CMP AL, 03H ; INPUT=3? EXIT
JE FINAL
DISPLAY MSG4
JMP FINAL
ASCSORT:MOV BL, 00H
AGAIN: MOV SI, OFFSET LIST
F1=Help
Line:23 Col:1


DOSBox Status Window
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\MASM\LAB2.ASM
ASCSORT:MOV BL, 00H
AGAIN: MOV SI, OFFSET LIST
MOV CL, 00H ; J VALUE
MOV BH, CH
SUB BH, BL ; N-1-i
NPASS: CMP CL, BH
JNC NEXT
MOV AL, [SI]
MOV BP, 01H
CMP AL, DS: [BP][SI]
JC _NOPE
XCHG AL, [SI+1]
XCHG [SI], AL
_NOPE : INC CL
INC SI
JMP NPASS
NEXT: INC BL
CMP BL, CH
F1=Help
Line:43 Col:1


DOSBox Status Window
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\MASM\LAB2.ASM
CMP BL, CH
JC AGAIN
JMP FINAL
DESSORT:MOV BL, 00H
AGAIN1: MOV SI, OFFSET LIST
MOV CL, 00H ; J VALUE
MOV BH, CH
SUB BH, BL ; N-1-i
NPASS1: CMP CL, BH
JNC NEXT
MOV AL, [SI]
MOV BP, 01H
CMP AL, DS: [BP][SI]
JNC _NOPE1
XCHG AL, [SI+1]
XCHG [SI], AL
_NOPE1: INC CL
INC SI
F1=Help
Line:63 Col:1


DOSBox Status Window
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: EDIT
File Edit Search View Options Help
C:\MASM\LAB2.ASM
JNC NEXT
MOV AL, [SI]
MOV BP, 01H
CMP AL, DS: [BP][SI]
JNC _NOPE1
XCHG AL, [SI+1]
XCHG [SI], AL
_NOPE1: INC CL
INC SI
JMP NPASS1
NEXT1: INC BL
CMP BL, CH
JC AGAIN1
FINAL : MOV AH, 4CH
INT 21H
END START
F1=Help
Line:75 Col:1

OUTPUT:


DOSBox Status Window
DOSBox 0.74-3, Cpu speed: max 100% cycles, Frameskip 0, Program: CV
File Edit View Search Run Watch Options Calls Help
local
source1 CS:IP (ACTIVE)
052A:009D B44C MOV AH,4C
052A:009F CD21 INT 21
052A:00A1 0002 ADD Byte Ptr [BP+SI],AL
052A:00A3 0134 ADD Word Ptr [SI],SI
052A:00A5 F4 HLT
052A:00A6 0905 OR Word Ptr [DI],AX
052A:00A8 0D0A31 OR AX,310A
052A:00AB 203E3E20 AND Byte Ptr [203E],BH
052A:00AF 53 PUSH BX
052A:00B0 4F DEC DI
052A:00B1 52 PUSH DX
052A:00B2 54 PUSH SP
052A:00B3 20494E AND Byte Ptr [BX+DI+4E],CL
052A:00B6 204153 AND Byte Ptr [BX+DI+53],AL
052A:00B9 43 INC BX
052A:00BA 45 INC BP
reg
AX = 4CD0
BX = 0000
CX = 0500
DX = 0053
SP = 0000
BP = 0000
SI = 0002
DI = 0000
DS = 0534
ES = 051A
SS = 0529
CS = 052A
IP = 00A1
FL = 0292
NV UP EI NG
NZ AC PO NC
SS:0002
3F
command
>D DS:0000
0534:0000 21 00 02 01 34 F4 09 05-0D 0A 31 20 3E 3E 20 53 !...4 1 >> S
0534:0010 4F 52 54 20 49 4E 20 41-53 43 45 4E 44 49 4E 47 ORT IN ASCENDING
<F8=Trace> <F10=Step> <F5=Go> <F6=Window> <F3=Display>