

LAB 2 (Task 3-5)

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TASK 3

- Write an ALP that will examine the contents of a set of 10 bytes starting from location **'ARRAY1'** for the presence of data '0Ah' and replace it with the ASCII character 'E'.

Code:

```
.model tiny
.486
.data
ARRAY1      db 69h,0ah,74h,77h,0ah,88h,88h,0ah,0ah,0ah
reax  db 'E'
.code
.startup
    mov cl,09h
    lea bx, ARRAY1
b1:   mov al,[bx]
      cmp al,0Ah
      jne b2
      mov al,reax
      mov [bx],al
b2:   inc bx
      dec cl
      jnz b1
.exit
end
```

Screen Shot-

```
DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: ...
0063:0100 B109      MOV     CL,09
0063:0102 8D1E1A01   LEA     BX,[011A]
0063:0106 8A07      MOV     AL,[BX]
0063:0108 3C0A      CMP     AL,0A
0063:010A 7505      JNZ     0111
0063:010C A02401   MOV     AL,[0124]
0063:010F 8807      MOV     [BX],AL
0063:0111 43        INC     BX
0063:0112 FEC9      DEC     CL
0063:0114 75F0      JNZ     0106
0063:0116 B44C      MOV     AH,4C
0063:0118 CD21      INT     21
0063:011A 690A7477  IMUL    CX,[BP+SI],7774
0063:011E 0A88880A  OR      CL,[BX+SI+0A88]
-d 116
0063:0110          B4 4C-CD 21 69 0A 74 77 0A 88      .L.?i.tw..
0063:0120 88 0A 0A 0A 45 50 FF 76-06 B8 F9 09 BA 2D 15 52 ....EP.v.....-R
0063:0130 50 1E 07 9A 42 07 5A 02-8B E5 5D CB 55 8B EC FF P...B.Z...l.U...
0063:0140 76 06 9A 2D 14 EF 06 8B-E5 5D CB 55 8B EC 83 3E v...-.....l.U...>
0063:0150 06 57 02 73 13 8A 46 08-2A E4 50 FF 76 06 9A 0E .W.s..F.*.P.v...
0063:0160 00 DB 09 83 C4 04 EB 30-8B 76 06 8A 04 22 C0 74 .....0.v..."t
0063:0170 25 2A E4 50 0E EB F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0063:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0063:0190 07 FF 46 06 EB D2      -      ..F...
-S
```

```
DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: ...
-d 116
0063:0110          B4 4C-CD 21 69 0A 74 77 0A 88      .L.?iEtwe.
0063:0120 88 45 45 0A 45 50 FF 76-06 B8 F9 09 BA 2D 15 52 .EE.EP.v.....-R
0063:0130 50 1E 07 9A 42 07 5A 02-8B E5 5D CB 55 8B EC FF P...B.Z...l.U...
0063:0140 76 06 9A 2D 14 EF 06 8B-E5 5D CB 55 8B EC 83 3E v...-.....l.U...>
0063:0150 06 57 02 73 13 8A 46 08-2A E4 50 FF 76 06 9A 0E .W.s..F.*.P.v...
0063:0160 00 DB 09 83 C4 04 EB 30-8B 76 06 8A 04 22 C0 74 .....0.v..."t
0063:0170 25 2A E4 50 0E EB F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0063:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0063:0190 07 FF 46 06 EB D2      -      ..F...
-g 116
AX=FF45 BX=0123 CX=0000 DX=0000 SP=FFFE BP=0000 SI=0000 DI=0000
DS=0063 ES=0063 SS=0063 CS=0063 IP=0116 NV UP EI PL ZR NA PE NC
0063:0116 B44C      MOV     AH,4C
-d 116
0063:0110          B4 4C-CD 21 69 45 74 77 45 88      .L.?iEtwe.
0063:0120 88 45 45 0A 45 50 FF 76-06 B8 F9 09 BA 2D 15 52 .EE.EP.v.....-R
0063:0130 50 1E 07 9A 42 07 5A 02-8B E5 5D CB 55 8B EC FF P...B.Z...l.U...
0063:0140 76 06 9A 2D 14 EF 06 8B-E5 5D CB 55 8B EC 83 3E v...-.....l.U...>
0063:0150 06 57 02 73 13 8A 46 08-2A E4 50 FF 76 06 9A 0E .W.s..F.*.P.v...
0063:0160 00 DB 09 83 C4 04 EB 30-8B 76 06 8A 04 22 C0 74 .....0.v..."t
0063:0170 25 2A E4 50 0E EB F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0063:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0063:0190 07 FF 46 06 EB D2      -      ..F...
-S
```

Task 4

- Write an ALP that will count the number of negative numbers in an array of 16-bit signed data stored from location 'ARRAY1'. The number of elements in the array is present in location 'COUNT'. The count of negative numbers must be stored in location 'NEG1'

CODE:-

```
.model tiny
.486
.data
ARRAY1    dw 3333h,0abcdh,0bcdah,0ffffh,6969h
COUNT    dw 05h
NEG1 db 0
.code
.startup
    mov cl, NEG1
    lea bx, ARRAY1
    mov si,COUNT
    mov ax,00h
b1:   cmp [bx],ax
      jge b2
      inc cl
b2:   inc bx
      inc bx
      dec si
      jnz b1
      mov NEG1,cl
.exit
end
```

ScreenShot

```
DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: ...
-u 100
0063:0100 8A0E2E01      MOV     CL,[012E]
0063:0104 8D1E2201      LEA     BX,[0122]
0063:0108 8B362C01      MOV     SI,[012C]
0063:010C B8000000      MOV     AX,0000
0063:010F 3907          CMP     [BX],AX
0063:0111 7D02          JGE     0115
0063:0113 FEC1      INC     CL
0063:0115 43           INC     BX
0063:0116 43           INC     BX
0063:0117 4E           DEC     SI
0063:0118 75F5          JNZ     010F
0063:011A 880E2E01      MOV     [012E],CL
0063:011E B44C          MOV     AH,4C
-d 11E
0063:0110          -                B4 4C                .L
0063:0120 CD 21 33 33 CD AB DA BC-FF FF 69 69 05 00 00 52 .!33.....ii...R
0063:0130 50 1E 07 9A 42 07 5A 02-8B E5 5D CB 55 8B EC FF P...B.Z...l.U...
0063:0140 76 06 9A 2D 14 EF 06 8B-E5 5D CB 55 8B EC 83 3E v...-.....l.U...>
0063:0150 06 57 02 73 13 8A 46 08-2A E4 50 FF 76 06 9A 0E .W.s..F.*.P.v...
0063:0160 00 DB 09 83 C4 04 EB 30-8B 76 06 8A 04 22 C0 74 .....0.v..."t
0063:0170 25 2A E4 50 0E E8 F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0063:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0063:0190 07 FF 46 06 EB D2 2B C0-5D CB 55 8B EC 83      ..F...+.l.U...
-S
```

```
DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: ...
-d 11E
0063:0110          -                B4 4C                .L
0063:0120 CD 21 33 33 CD AB DA BC-FF FF 69 69 05 00 00 52 .!33.....ii...R
0063:0130 50 1E 07 9A 42 07 5A 02-8B E5 5D CB 55 8B EC FF P...B.Z...l.U...
0063:0140 76 06 9A 2D 14 EF 06 8B-E5 5D CB 55 8B EC 83 3E v...-.....l.U...>
0063:0150 06 57 02 73 13 8A 46 08-2A E4 50 FF 76 06 9A 0E .W.s..F.*.P.v...
0063:0160 00 DB 09 83 C4 04 EB 30-8B 76 06 8A 04 22 C0 74 .....0.v..."t
0063:0170 25 2A E4 50 0E E8 F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0063:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0063:0190 07 FF 46 06 EB D2 2B C0-5D CB 55 8B EC 83      ..F...+.l.U...
-g 11E
AX=0000 BX=012C CX=0003 DX=0000 SP=FFFE BP=0000 SI=0000 DI=0000
DS=0063 ES=0063 SS=0063 CS=0063 IP=011E NU UP EI PL ZR NA PE NC
0063:011E B44C          MOV     AH,4C
-d 11E
0063:0110          -                B4 4C                .L
0063:0120 CD 21 33 33 CD AB DA BC-FF FF 69 69 05 00 03 52 .!33.....ii...R
0063:0130 50 1E 07 9A 42 07 5A 02-8B E5 5D CB 55 8B EC FF P...B.Z...l.U...
0063:0140 76 06 9A 2D 14 EF 06 8B-E5 5D CB 55 8B EC 83 3E v...-.....l.U...>
0063:0150 06 57 02 73 13 8A 46 08-2A E4 50 FF 76 06 9A 0E .W.s..F.*.P.v...
0063:0160 00 DB 09 83 C4 04 EB 30-8B 76 06 8A 04 22 C0 74 .....0.v..."t
0063:0170 25 2A E4 50 0E E8 F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0063:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0063:0190 07 FF 46 06 EB D2 2B C0-5D CB 55 8B EC 83      ..F...+.l.U...
-S
```

TASK 5

-Write an ALP that will transfer data from 'ARRAY1' to 'ARRAY2'. The number of elements in the array is 10. The array is a double word array. The starting address of ARRAY2 = starting address of ARRAY1 + 20d.

CODE:-

```
.model tiny
.486
.data
array1 dd
88888888h,99999999h,77777777h,69696969h,42069420h,42042069h,69420420h,4206969
4h,21212121h,42424242h
.code
.startup
    lea si,array1+20
    lea di,array1+40
    mov cl,05h
b1:   mov eax,[si]
    mov [di],eax
    inc si
    inc di
    add si,02h
    add di,02h
    inc si
    inc di
    dec cl
    jnz b1
    lea si,array1
    lea di,array1+20
    mov cl,05h
b2:   mov eax,[si]
    mov [di],eax
    inc si
    inc di
    add si,02h
    add di,02h
    inc si
    inc di
    dec cl
    jnz b2
.exit
end
```

ScreenShot

```

DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: ...
0863:0136 46          INC     SI
0863:0137 47          INC     DI
0863:0138 FEC9       DEC     CL
0863:013A 75EC       JNZ     0128
0863:013C B44C       MOV     AH,4C
0863:013E CD21       INT     21
0863:0140 88888888     MOV     [BX+SI+8888],CL
0863:0144 99          CWD
0863:0145 99          CWD
0863:0146 99          CWD
0863:0147 99          CWD
0863:0148 7777       JA      01C1
0863:014A 7777       JA      01C3
0863:014C 6969696920     IMUL    BP,[BX+DI+69],2069
-d 13c
0863:0130          -          B4 4C CD 21          .L.!
0863:0140 88 88 88 88 99 99 99 99-77 77 77 77 69 69 69 69 .....wwwwiiii
0863:0150 20 94 06 42 69 20 04 42-20 04 42 69 94 96 06 42 ..Bi .B .Bi...B
0863:0160 21 21 21 21 42 42 42 42-8B 76 06 8A 04 22 C0 74 !!!!!BBBBB.v..."t
0863:0170 25 2A E4 50 0E E8 F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0863:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0863:0190 07 FF 46 06 EB D2 2B C0-5D CB 55 8B EC 83 3E 06 ..F...+.l.U...>.
0863:01A0 57 02 73 15 8A 46 0A 2A-E4 50 FF 76 08 FF 76 06 W.s..F.*.P.v..v.
0863:01B0 0E EB B2 FC 83 C4 06 EB-3F C4 76 06          .....?.v.
-S_

```

```

DOSBox 0.74, Cpu speed: 3000 cycles, Frameskip 0, Program: ...
-d 13c
0863:0130          -          B4 4C CD 21          .L.!
0863:0140 88 88 88 88 99 99 99 99-77 77 77 77 69 69 69 69 .....wwwwiiii
0863:0150 20 94 06 42 69 20 04 42-20 04 42 69 94 96 06 42 ..Bi .B .Bi...B
0863:0160 21 21 21 21 42 42 42 42-8B 76 06 8A 04 22 C0 74 !!!!!BBBBB.v..."t
0863:0170 25 2A E4 50 0E E8 F4 00-83 C4 02 23 C0 74 05 FF %*.P.....#.t..
0863:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0863:0190 07 FF 46 06 EB D2 2B C0-5D CB 55 8B EC 83 3E 06 ..F...+.l.U...>.
0863:01A0 57 02 73 15 8A 46 0A 2A-E4 50 FF 76 08 FF 76 06 W.s..F.*.P.v..v.
0863:01B0 0E EB B2 FC 83 C4 06 EB-3F C4 76 06          .....?.v.
-g 13c
AX=9420 BX=0000 CX=0000 DX=0000 SP=FFFE BP=0000 SI=0154 DI=0168
DS=0863 ES=0863 SS=0863 CS=0863 IP=013C NU UP EI PL ZR NA PE NC
0863:013C B44C       MOV     AH,4C
-d 13c
0863:0130          -          B4 4C CD 21          .L.!
0863:0140 88 88 88 88 99 99 99 99-77 77 77 77 69 69 69 69 .....wwwwiiii
0863:0150 20 94 06 42 88 88 88 88-99 99 99 99 77 77 77 77 ..B.....www
0863:0160 69 69 69 69 20 94 06 42-69 20 04 42 20 04 42 69 iiii ..Bi .B .Bi
0863:0170 94 96 06 42 21 21 21 21-42 42 42 C0 74 05 FF ..B!!!!BBBBB.t..
0863:0180 46 06 EB 0D 8B 76 06 8A-04 3A 46 08 75 03 96 EB F....v...:F.u...
0863:0190 07 FF 46 06 EB D2 2B C0-5D CB 55 8B EC 83 3E 06 ..F...+.l.U...>.
0863:01A0 57 02 73 15 8A 46 0A 2A-E4 50 FF 76 08 FF 76 06 W.s..F.*.P.v..v.
0863:01B0 0E EB B2 FC 83 C4 06 EB-3F C4 76 06          .....?.v.
-S_

```