

Lab 2

P1:

```

P1: .MODEL SMALL
    .STACK 20
    .DATA
        org 1000h
        NUM1 DB 25h, 35h, 45h, 52h, 56h, 98h, 76h, 76h
        NUM2 DB 90h, 56h, 43h, 75h, 89h, 10h, 34h, 22h
        ANS DB 10 DUP(?)
        COUNT DW 8h

    .CODE
    START:
        MOV AX, @DATA
        MOV DS, AX
        MOV CX, COUNT
        MOV SI, 0h
        CLC
    REPEAT:
        MOV AL, NUM1[SI]
        ADC AL, NUM2[SI]
        MOV ANS[SI], AL
        INC SI
        LOOP REPEAT
        INT 3
        END START

```

The screenshot shows the DEBUG utility running the assembly code. The CPU window displays the following registers and memory:

Register	Value
ax	4898
bx	0000
cx	0000
dx	0000
si	0008
di	0000
bp	0000
sp	0014
ds	48AE
es	489D
ss	49B1
cs	48AD
ip	001C

The instruction window shows the following instructions:

Address	Instruction
cs:0000	mov ax, 48AE
cs:0003	mov ds, ax
cs:0005	mov cx, [1028]
cs:0009	mov si, 0000
cs:000C	clc
cs:000D	mov al, [si+100E]
cs:0011	adc al, [si+1016]
cs:0015	mov [si+101E], al
cs:0019	inc si
cs:001A	loop 000D
cs:001C	int 03
cs:001D	add [bx+si], al
cs:001F	add [bx+si], al

The status bar at the bottom indicates the current instruction address is DS:100EH.

DS:100EH

P2:

```

P2. MODEL SMALL
    .STACK 20
    .DATA
    Org 1000H
    NUM1 DB 89h, 35h, 45h, 32h, 56h, 98h, 76h, 76h
    NUM2 DB 32h, 56h, 43h, 75h, 89h, 10h, 34h, 22h
    ANS DB 9 DUP(0)
    COUNT DW 8H

    .CODE
    START:
    MOV AX, @DATA
    MOV DS, AX
    MOV CX, COUNT
    MOV SI, 0H
    CLC
    REPEAT:
    MOV AL, NUM1[SI]
    SBB AL, NUM2[SI]
    MOV ANS[SI], AL
    INC SI
    LOOP REPEAT
    INT 3
    END START

```

The screenshot shows a debugger window with the following content:

File Edit View Run Breakpoints Data Options Window Help

CPU 80486

cs:0000 B8AE48	mov ax, 48AE	ax 4854	c=0
cs:0003 BED8	mov ds, ax	bx 0000	z=0
cs:0005 8B0E2710	mov cx, [1027]	cx 0000	s=0
cs:0009 BE0000	mov si, 0000	dx 0000	o=0
cs:000C F8	clc	si 0008	p=0
cs:000D 8A840E10	mov al, [si+100E]	di 0000	a=0
cs:0011 1A841610	sbb al, [si+1016]	bp 0000	i=1
cs:0015 88841E10	mov [si+101E], al	sp 0014	d=0
cs:0019 46			
cs:001A E2F1			
cs:001C CC			
cs:001D 0000			
cs:001F 0000			

[.] = Dump

ds:100E 89 35 45 32 56 98 76 76	e5E2Ujw
ds:1016 32 56 43 75 89 10 34 22	2UCue4"
ds:101E 57 DF 01 BD CC 87 42 54	WBT
ds:1026 00 00 00 00 00 00 00 00	

es:0000 CD 20 FF 9F 00 EA FF FF = f 0

es:0008 AD DE E0 01 C5 15 AA 01

es:0010 C5 15 89 02 20 10 92 01

es:0018 01 03 01 00 02 FF FF FF

ss:0016 0000

ss:0014 0000

F1-Help F2-Bkpt F3-Mod F4-Here F5-Zoom F6-Next F7-Trace F8-Step F9-Run F10-Menu

16:22 08-02-2021

DS:100EH

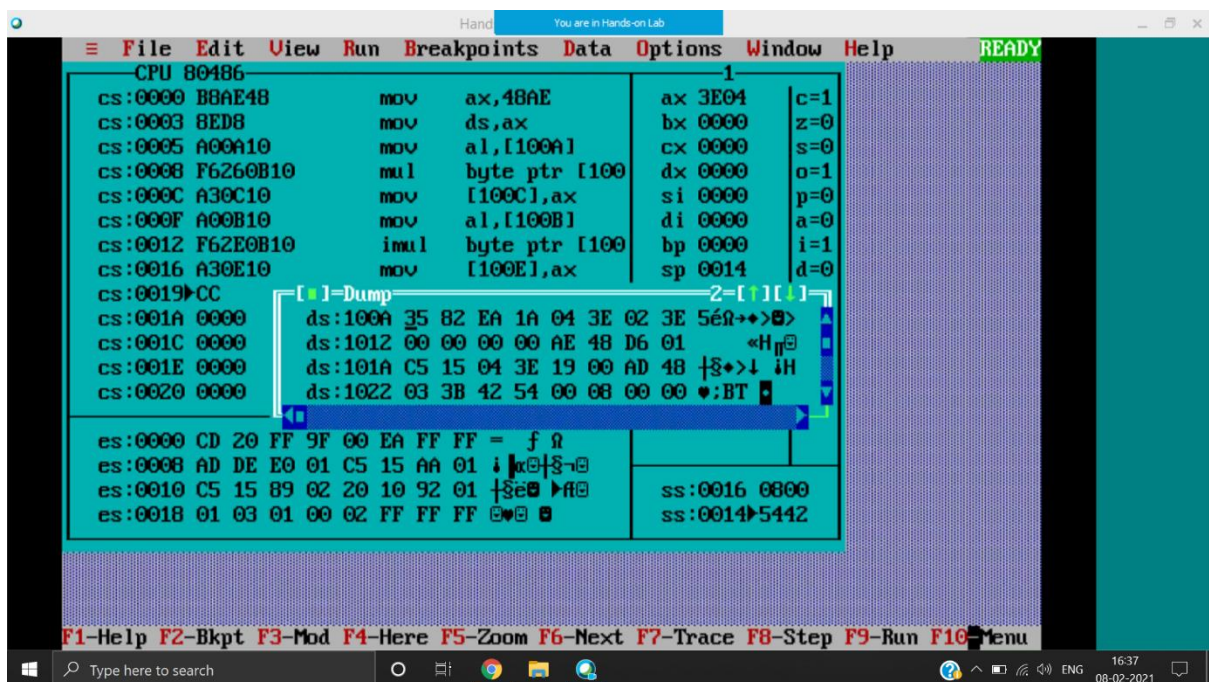
P3:

```

P3: .model small
      .stack 20
      .data
      org 1000h
      N1 DB 35h
      N2 DB 82h
      Un_Sign_PROD DW ?
      Sign_PROD DW ?

      .CODE
      START:
      MOV AX, @DATA
      MOV DS, AX
      MOV AL, N1
      MUL N2
      MOV Un_Sign_Prod, AX
      MOV AL, N1
      IMUL N2
      MOV Sign_PROD, AX
      INT 3
      END START

```



DS:100AH

Ex 1

```

Ex1 .model small
    .stack 20
    .data
    .code
START:
MOV AX, 0300H
MOV DS, AX
MOV SI, 0000H
MOV DI, 0010H
MOV CL, 04H
REPEAT:
MOV AL, [SI]
MUL [DI]
INC SI
INC DI
DEC CL
JNZ REPEAT

MOV AX, 0300H
MOV DS, AX
MOV SI, 0010H
MOV DI, 0020H
MOV CL, 04H
X1:
MOV AL, [SI]
MOV [DI], AL
INC SI
INC DI
DEC CL
JNZ X1
INT 3
END START

```

File Edit View Run Breakpoints Data Options Window Help READY

CPU 80486 1-[↑][↓]

Address	Instruction	Register	Value
cs:002E	CC	int	03
cs:002F	0003	add	[bp+di],al
cs:0031	0324	add	sp,[si]
cs:0033	00D2	add	dl,dl
cs:0035	46	inc	si
cs:0036	0003	add	[bp+di],al
cs:0038	DF01	fild	word ptr [bx+di]
cs:003A	C515	lds	dx,[di]
cs:003C	3903	cmp	[bp+di],ax
cs:003E	2F	das	
cs:003F	00AD4847	add	[di+4748],ch
cs:0043	3200	xor	al,[bx+si]
cs:0045	0000	add	[bx+si],al
cs:0047	0000	add	[bx+si],al
cs:0049	0000	add	[bx+si],al

Register	Value
ax	0339
bx	0000
cx	0000
dx	46D2
si	0014
di	0024
bp	0000
sp	0014
ds	0300
es	489D
ss	48B0
cs	48AD
ip	002E

Address	Value
ds:0300	E8 BE 0F 5D CB 55 8B EC
ds:0308	81 EC 8A 00 56 57 8B 46
ds:0310	0A 40 3D 02 00 73 05 33
ds:0318	C0 E9 DC 00 8B 5E 06 D1
ds:0320	E3 F7 87 F4 77 00 80 74

F1-Help F2-Bkpt F3-Mod F4-Here F5-Zoom F6-Next F7-Trace F8-Step F9-Run F10-Menu

DS:0300H

Ex2

```

Ex 2. MODEL SMALL
      STACK 20
      DATA
      ORG 1000H
      RES DW 1H
      COUNT DW 4H

      .CODE
      START:
      MOV AX, @DATA
      MOV DS, AX
      MOV CX, COUNT
      REPEAT:
      MOV AX, RES
      MUL COUNT
      DEC COUNT
      MOV RES, AX
      LOOP REPEAT
      INT 3
      END START
  
```

The screenshot shows the DOS DEBUG program interface. At the top, a menu bar includes File, Edit, View, Run, Breakpoints, Data, Options, Window, Help, and a green 'READY' status indicator. The main window is divided into several sections:

- Top Bar:** Displays '[CPU 80486]' on the left and '1=[↑][↓]' on the right.
- Assembly List:** A table of instructions with their addresses, hex values, mnemonics, and operands.

Address	Hex Value	Mnemonic	Operand
cs:0000	B8AE48	mov	ax,48AE
cs:0003	8ED8	mov	ds,ax
cs:0005	8B0E0C10	mov	cx,[100C]
cs:0009	A10A10	mov	ax,[100A]
cs:000C	F7260C10	mul	word ptr [100]
cs:0010	FF0E0C10	dec	word ptr [100]
cs:0014	A30A10	mov	[100A],ax
cs:0017	E2F0	loop	0009
cs:0019	CC	int	03
cs:001A	0000	add	[bx+sil],al
cs:001C	0000	add	[bx+sil],al
cs:001E	0000	add	[bx+sil],al
cs:0020	0000	add	[bx+sil],al
- Register Window:** Located on the right, it shows the current values of various registers.

Register	Value
ax	0018
bx	0000
cx	0000
dx	0000
si	0000
di	0000
bp	0000
sp	0014
ds	48AE
es	489D
ss	49AF
cs	48AD
ip	0019
- Memory Dump:** At the bottom left, it shows a hex dump of memory starting at address ds:100A.

Address	Hex Dump
ds:100A	1B 00 00 00 00 00 03 00 ↑
ds:1012	00 00 00 00 AE 48 DF 01 <H
ds:101A	C5 15 18 00 1A 00 AD 48 ↑\$↑ → iH
ds:1022	46 32 00 00 00 00 00 F2
- Additional Registers:** At the bottom right, two more registers are shown:

Register	Value
ss:0016	0000
ss:0014	0000

Navigation arrows are visible at the bottom of the window.

DS:100AH

Ex 3:

```

Ex 3. model small
      .stack 20
      .data
      org 1000H
      N1 DB 35H
      N2 DB 35H 35H
      UNSIGN_DIV DW ?
      SIGN_DIV DW ?

      .CODE
      START:
      MOV AX, @DATA
      MOV DS, AX
      MOV AL, N1
      DIV N2
      MOV UNSIGN_DIV, AX
      MOV AL, N2
      IDIV N2
      MOV SIGN_DIV, AX
      INT 3
      END START

```

```

File Edit View Run Breakpoints Data Options Window Help
[CPU 80486] 1-[F1][F2][F3][F4][F5][F6][F7][F8][F9][F10]
cs:0000 B8AE48 mov ax,48AE ax 0001 c=0
cs:0003 8ED8 mov ds,ax bx 0000 z=0
cs:0005 A10A10 mov ax,[100A] cx 0000 s=0
cs:0008 F7360C10 div word ptr [100] dx 0000 o=0
cs:000C A30E10 mov [100E],ax si 0000 p=0
cs:000F A10A10 mov ax,[100A] di 0000 a=0
cs:0012 F73E0C10 idiv word ptr [100] bp 0000 i=1
cs:0016 A31010 mov [1010],ax sp 0014 d=0
cs:0019 CC int 03 ds 48AE
cs:001A 0000 add [bx+si],al es 489D
cs:001C 0000 add [bx+si],al ss 49B0
cs:001E 0000 add [bx+si],al cs 48AD
cs:0020 0000 add [bx+si],al ip 0019

ds:100A 35 00 35 00 01 00 01 00 5 5
ds:1012 00 00 00 00 AE 48 DF 01 <H
ds:101A C5 15 18 00 1A 00 03 00 <S
ds:1022 00 00 00 00 AE 48 DF 01 <H

ss:0016 0000
ss:0014 0000

F1-Help F2-Bkpt F3-Mod F4-Here F5-Zoom F6-Next F7-Trace F8-Step F9-Run F10-Menu

```

DS:100AH