

Başkent Üniversitesi
Elektrik - Elektronik Mühendisliği Bölümü

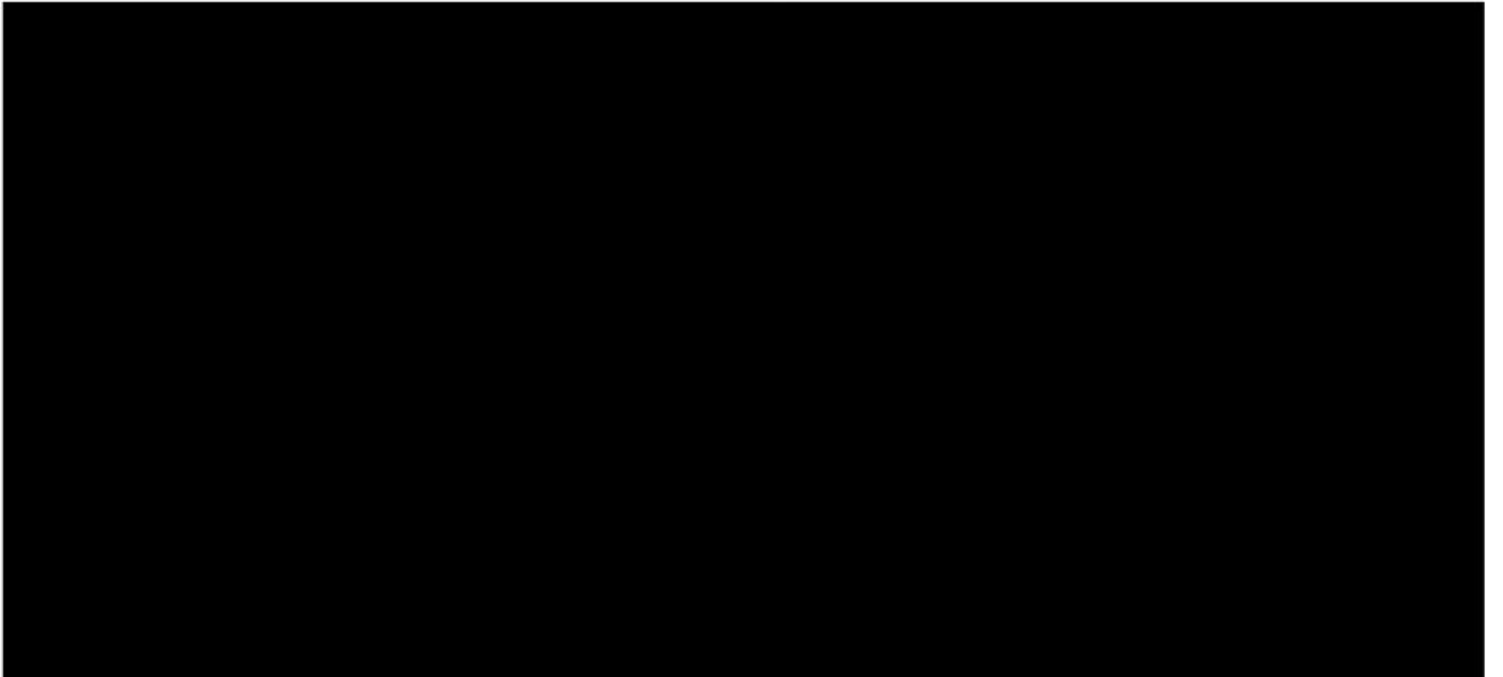
EEM 332 – Mikroişlemciler Laboratuvarı

Ön Çalışma

Deney No:4

Deney Adı:Aritmetik ve Mantık İşlemleri 1

Deney Tarihi:24/03/2006



1)

```
MOV CX,AX
MOV AX,BX
MOV BX,CX
```

2)

```
-R AX
AX 0000
:0100
-R BX
BX 0000
:0200
-R
AX=0100 BX=0200 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PO NC
152D:0100 0000      ADD  [BX+SI],AL          DS:0002=FF
-A
152D:0100 XCHG AX,BX
152D:0102
-R
AX=0100 BX=0200 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PO NC
152D:0100 87C3      XCHG  AX,BX
-T
AX=0200 BX=0100 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PO NC
152D:0102 0000      ADD  [BX+SI],AL          DS:0001=20
```

3)

```
-D DS:100
152D:0100 01 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00
-D DS:200
152D:0200 02 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00

152D:0110 MOV AX,[0100]
152D:0113 XCHG [0200],AX
152D:0117 MOV [0100],AX
```

```
-D DS:100
152D:0100 02 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00
-D DS:200
152D:0200 01 00 00 00 00 00 00 00-00 00 00 00 00 00 00 00
```

4)

```
-A 100
152D:0100 ADD AX,1
152D:0103 INC AX
152D:0104
-R
AX=0004 BX=0004 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PO NC
152D:0100 050100      ADD  AX,0001
```

-T

AX=0005 BX=0004 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0103 NV UP EI PL NZ NA PE NC
152D:0103 40 INC AX

-T

AX=0006 BX=0004 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0104 NV UP EI PL NZ NA PE NC
152D:0104 0300 ADD AX,[BX+SI] DS:0004=9A00

BU İKİ KOMUTUN İŞLEVİ AYNIDIR FAKAT “ADD AX,1” KOMUTU 3 BYTE YER KAPLARKEN, “INC AX” KOMUTU SADECE 1 BYTE YER KAPLAMAKTADIR.

5)

LEA AX,[BX] KOMUTU BX'İN DEĞERİNİ AX'E ATAR.
MOV AX,[BX] KOMUTU İSE BX DEĞERİNİN DATA SEGMENTTEKİ
OFFSET DEĞERİNİN GÖSTERDİĞİ DEĞERİ AX'E ATAR. İKİ KOMUTTA
HAFIZADA 2 BYTE YER KAPLAR.

6)

-R AX

AX 0004

:1

-R BX

BX 0004

:2

-A 100

152D:0100 ADC AX,BX

152D:0102

-R

AX=0001 BX=0002 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PE NC
152D:0100 11D8 ADC AX,BX

-T

AX=0003 BX=0002 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PE NC
152D:0102 8B07 MOV AX,[BX] DS:0002=9FFF

CARRY FLAG “0” İKEN “ADC” KOMUTU AX VE BX DEĞERLERİNİN TOPLAMINI AX'E ATAR.

-R AX

AX 0004

:1

-R BX

BX 0004

:2

-A 100

152D:0100 ADC AX,BX

152D:0102

-R

AX=0001 BX=0002 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PE CY
152D:0100 11D8 ADC AX,BX

-T

AX=0004 BX=0002 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PE NC
152D:0102 8B07 MOV AX,[BX] DS:0002=9FFF

CARRY FLAG “1” İKEN “ADC” KOMUTU AX VE BX DEĞERLERİNİN
TOPLAMINA 1 EKLEYİP AX’E ATAR.

7)

“NEG BX” KOMUTU BX REGİSTERINDAKİ DEĞERİN 2 YE TÜMLEYENİNİ
ALIR

-R

AX=0100 BX=0001 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ AC PO CY
152D:0100 F7DB NEG BX

-T

AX=0100 BX=FFFF CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI NG NZ AC PE CY
152D:0102 8B07 MOV AX,[BX] DS:FFFF=CD00

8)

-A

152D:0100 MOV BX,[0502]→C
152D:0104 SUB BX,[0503] →C-D
152D:0108 MOV AX,[0501]→B
152D:010B MUL BX →B*(C-D)
152D:010D ADD AX,[0500]→A+B*(C-D)
152D:0111 MOV [0504],AX→Z=A+B*(C-D)
A= DS:500, B= DS:501, C=DS:502, D=DS:503, Z=DS:504

9)

MUL KOMUTUNDA AL İLE CL DEĞERLERİNİ ÇARPIP AX’E ATAR, IMUL
KOMUTUNDA İSE İKİ DEĞERİN ÇARPIMININ 2 YE TÜMLEYENİNİ ALIP
AX’E ATAR.

AX=0000 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PO NC
152D:0100 A070 MOV AL,20

AX=0020 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PO NC
152D:0102 B180 MOV CL,80

AX=0020 BX=0000 CX=0080 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0104 NV UP EI PL NZ NA PO NC
152D:0104 F6E1 MUL CL

AX=**1000** BX=0000 CX=**0080** DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0106 **OV UP EI PL ZR NA PE CY**
 152D:0106 0000 ADD [BX+SI],AL DS:0000=CD

AX=0000 BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PO **NC**
 152D:0100 A070 MOV AL,20

AX=**0020** BX=0000 CX=0000 DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PO **NC**
 152D:0102 B180 MOV CL,80

AX=**0020** BX=0000 CX=**0080** DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0104 NV UP EI PL NZ NA PO **NC**
 152D:0104 F6E9 IMUL CL

AX=**F000** BX=0000 CX=**0080** DX=0000 SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0106 **OV UP EI PL ZR NA PE CY**
 152D:0106 0000 ADD [BX+SI],AL DS:0000=CD

10)

A.

i)

152D:0100 SAR AX,1

152D:0102 SAR BX,1

152D:0104

-R

AX=**0040** BX=0041 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PE NC

152D:0100 D1F8 SAR AX,1

-T

AX=**0020** BX=**0041** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PO NC

152D:0102 D1FB SAR BX,1

-T

AX=0020 BX=**0020** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
 DS=152D ES=152D SS=152D CS=152D IP=0104 NV UP EI PL NZ NA PO CY

152D:0104 2B1E0305 SUB BX,[0503] DS:0503=0303

ii)

152D:0100 SHL AX,1

152D:0102 SHL BX,1

152D:0104

-R

AX=**0040** BX=0041 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PO CY
152D:0100 D1E0 SHL AX,1
-T

AX=**0080** BX=**0041** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL NZ NA PO NC
152D:0102 D1E3 SHL BX,1
-T

AX=0080 BX=**0082** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0104 NV UP EI PL NZ NA PE NC
152D:0104 2B1E0305 SUB BX,[0503] DS:0503=0303

iii)

-R
AX=**0020** BX=**0020** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI NG **NZ** AC PO **CY**
152D:0100 39D8 CMP AX,BX
-T

AX=**0020** BX=**0020** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL **ZR** NA PE **NC**
152D:0102 D1E3 SHL BX,1

-R
AX=**0080** BX=**0082** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL **NZ** NA PE **NC**
152D:0100 39D8 CMP AX,BX
-T

AX=0080 BX=0082 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI NG **NZ** AC PO **CY**
152D:0102 D1E3 SHL BX,1

iv)

-R
AX=**0040** BX=0041 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL NZ NA PE NC
152D:0100 40 INC AX
-T

AX=**0041** BX=0041 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0101 NV UP EI PL NZ NA PE NC
152D:0101 39D8 CMP AX,BX
-T

AX=0041 BX=0041 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0103 NV UP EI PL ZR NA PE NC
152D:0103 E32B JCXZ 0130

V)

-R

AX=**0040** BX=**0041** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI PL **ZR** NA **PE** NC
152D:0100 87C3 XCHG AX,BX

-T

AX=**0041** BX=**0040** CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI PL **ZR** NA **PE** NC
152D:0102 39D8 CMP AX,BX

-T

AX=0041 BX=0040 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0104 NV UP EI PL **NZ** NA **PO** NC
152D:0104 2B1E0305 SUB BX,[0503] DS:0503=0303

B.

-R

AX=**FFF0** BX=0040 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0100 NV UP EI NG NZ NA PO NC
152D:0100 D1F8 SAR AX,1

-T

AX=**FFF8** BX=0040 CX=0000 DX=000C SP=FFEE BP=0000 SI=0000 DI=0000
DS=152D ES=152D SS=152D CS=152D IP=0102 NV UP EI NG NZ NA PO NC
152D:0102 39D8 CMP AX,BX