

Mata Kuliah
Sistem Mikroprocessor

Aritmatika

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Aritmatika

Bagaimana menghitung aritmatika pada sistem microprocessor. Aritmatika dasar meliputi :

1. Penambahan
2. Pengurangan
3. Perkalian
4. Pembagian

Penambahan

1110 0000

1100 0000 +

1 1010 0000

Penambahan

$$\begin{array}{r} 1111\ 0101 \\ \underline{1010\ 1010} + \\ 11001\ 1111 \end{array}$$

Penambahan

0000 1111

0000 1111 +

0001 1110

1111 1111

1000 0000 +

1 0111 1111

Penambahan (negative)

$$1 \quad 1000 \ 0000 = -128$$

0111 1111

0000 0001+

$$1000 \ 0000 = +128 \text{ Hasil sesungguhnya}$$

$$1 \quad 1000 \ 0010$$

0111 1101

0000 0001 +

$$0111 \ 1110 = -126$$

Penambahan

$$\begin{array}{r} 0001\ 1000 \\ \underline{0001\ 1001} + \\ 0011\ 0001 \end{array}$$

Pemrograman

Ld A,40h

Out(00FEh),A

A15 A14,.....A7 A6 A5 A4 A3 A2 A1 A0

0 0.....1 1 1 1 1 1 1 0

Pemrograman

Ld A,(1800h)

Ld AF, 1800h

ld A,(IX+5)

lx=6030

A←----6035

10101110

10101111 +

Pemrograman

1000 0010

0111 1101

0000 0001+

0111 1110

1000 1000

0111 0111

0000 0001 +

0111 1000

Pemrograman

LD BC,1900H

LD (BC),8063H

LD HL,0001H

ADD HL,(BC)

INC HL

DEC HL

Pemrograman

```
ORG 1800          1900,.....  
LD A, 80H        JP  NC,1806  
LD B,80H  
ADD A,B  
JP P,1900  
LD C,60H
```

1 0000 1010

0 1111 0101

0 0000 0001

0 1111 0110

1 1111 1111

PENGURANGAN 16 BIT

4EF3 – 32DB

1. REGISTER

LD BC,32DB

LD HL, 4EF3

SBC HL,BC

2. IMMEDIATELY

LD HL, 4EF3

SBC HL,32DB

3. DIRECT

ORG 1900

LD 1900,32DB

LD HL,4EF3

SBC HL,(1900)

PENAMBAHAN 16 BIT

LD HL, 0100h
SUB HL, 00FFh

LD HL, 0100h
LD DE, 00FFh
SUB HL, DE

LD HL, 0100h
LD DE, 00FFh
LD BC, 1900h
LD (BC),DE
SUB HL, (1900)

LD BC, 0100h
LD DE, 00FFh
LD HL, 1900h
LD (HL),DE
SUB BC, HL

Pemrograman

003Fh=yang dikurangi(subtracted)

FFFFh=pengurang(subtracting)

Ld HL,003Fh

LD BC,19FFh

LD(BC),FFFFh

SBC HL,(BC)/.....SBC HL,(19FFH)

PENAMBAHAN 16 BIT

160AH(0001 0110 0000 1010)

23BCH(0010 0011 1011 1100)

LD BC,1900h

LD (BC),160Ah

LD HL, 23BCh

ADC HL,(BC)

LD BC,1900h

LD (BC),00FFh

LD HL, 0100h

ADC HL,(BC)

PERKALIAN 8 BIT

2Bhx05h

2B X 05=D7

LD A,2Bh

LD B,04h

B=4 3 2 1 0

LOOP ADD A,2Bh

A=2 3 4 5

DJNZ LOOP,dec B dan loncat ke loop jika NZ

LD C,A

C=D7

HALT

PERKALIAN

2X50

LD A,02H

ADD A,02H

ADD A,02H

ADD A, 02H

PERKALIAN 16 BIT

13A2 h x 08 h

ORG 1800

LD HL, 13A2h

LD B,07h

76543210

Loop ADC HL,13A2h

2345678

DJNZ loop

LD DE,HL

HALT

PEMBAGIAN 8 BIT

20:2----→

ORG 1900

LD A, 20h

LD B,00h

1904 INC B

SUB A,02h

JP NZ,1904

LD C,B

HALT

ORG 1900

LD A, FFh

LD B,00h

1905 INC B

SUB A,05h

JP NZ,1905

LD C,B

HALT

B=0

B=12

A=1E

3 4 5..ABCDEF 10

1C 1A 18 16...0

PEMBAGIAN 16 BIT

A7B8h : 08h

ORG 1900

LD HL,A7B8h

LD BC,0000h

BC=0000

1906 INC BC

BC=0001... 14F7

SBC HL,08h

HL=A7B0.....0

JP NZ,1906

LD DE,BC

HALT

PEMBAGIAN

8:2

LD A, 08H

LD B,02 H

SUB A,B

SUB A,B

SUB A,B

SUB A,B

HALT

ORG 1800

LD A, 50 H

LD B,02 H

1805, SBC A,B

JP Z,1900

Ld A, (counter NZ)

Inc A

JP NZ,1805

1900,A

halt

Ld BC,01f3

Ld HL,03a6

Add HL,BC

Ld DE, 1900h

Ld BC,DE

Ld (BC),01f3

Ld HL, 03a6

Add HL,(BC)

LD A, 01F3

LD B,03A6

LD HL,B

ADD A,HL

LD BC, 01F3

LD HL,03A6

LD DE,1900

LD (DE),BC

ADD HL,(DE)

LD A, 01F3

LD B,03A6

LD HL,B

ADD A,(HL)

LD A, 01F3

LD HL,1900

LD HL,03A6

ADD A,(1900)

LD A, 01F3

ADD A, 03A6

- Tambahkan angka 01F3h 01F3h dengan 03A6h ?
- Ld A,01f3
- Add A,03a6h

Ld A,01f3

Ld B,03a6h

Add A,B

- ORG 8020H-----→SP=8020h
- LD HL,8040H
- Ld 8040,...
- LD DE,8042H
- LD 8042,.....
- LD BC,8044H
- LD A,(HL) A=8040
- EX DE,HL DE=8040,HL=8042
- ADD A,(HL) A=8042+8040= 1 F082
- LD (BC),A BC= 1 F082
- INC HL HL=8043
- LD A,(HL) A=8043
- EX DE,HL DE=8043, HL=8040
- INC HL HL=8041
- ADC A,(HL) A=8043+8041= 1 F084
- INC BC BC= 1 F083
- LD (BC),A BC= 1 F084
- Halt

AND

LD A,65h---0110 0101

LD B,C7h---1100 0111

AND B

A=45h

AND 16 BIT

LD BC,67FDh

LD HL,81ABh

AND BC

HALT

BC=0110 0111 1111 1101

HL=1000 0001 1010 1011 di AND kan

=0000 0001 1010 1001=01A9h

COMPARE

45 \leftrightarrow 44

LD A,45h

LD B, 44h

CP B

45-44 =1=01h=0000 0001h

ZERO=0

CARRY=0

ROTATE

LD A, A5h

RRCA A

HALT

REG A=D2h

COMPLEMENT

LD A,63h ----0110 0011

CPL a

HALT

REG A=1001 1100=9C

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