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

1111 0101

1010 1010 +

11001 1111

Penambahan

0000 1111

0000 1111 +

0001 1110

1111 1111

1000 0000 +

1 0111 1111

Penambahan (negative)

1 1000 0000 = -128

0111 1111

0000 0001+

1000 0000 = +128 Hasil sesungguhnya

1 1000 0010

0111 1101

0000 0001 +

0111 1110 = -126

Penambahan

0001 1000

0001 1001 +

0011 0001

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)

Ix=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
LD A, 80H
LD B,80H
ADD A,B
JP P,1900
LD C,60H
```

```
1900,.....
JP   NC,1806
```

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
LD BC, 1900h
LD (BC),DE
SUB HL, (1900)
```

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

```
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
```

B=0

B=12 3 4 5..ABCDEF 10

A=1E 1C 1A 18 16…0

```
ORG 1900
LD A, FFh
LD B,00h
1905 INC B
SUB A,05h
JP NZ,1905
LD C,B
HALT
```

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<-> 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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