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LATIHAN SOAL MIKROKONTROLER

SOAL

1. Buat program untuk mengubah data oktal 2 digit yang ada pada reg R20 menjadi Heksadesimal. Simpan hasil konversi pada Reg R21.
2. Buat program untuk mengubah data oktal 4 digit yang ada pada reg R21:R20 menjadi Heksadesimal. Simpan hasil konversi pada Reg R23:R22.
3. Buat program untuk mengubah data oktal 2 digit yang ada pada reg R20 menjadi desimal. Simpan hasil konversi pada Reg R21.
4. Buat program untuk mengubah data Desimal 2 digit yang ada pada reg R20 menjadi Heksadesimal. Simpan hasil konversi pada Reg R21.
5. Buat program untuk mengubah data Desimal 2 digit yang ada pada reg R20 menjadi oktal. Simpan hasil konversi pada reg R22:R21.
6. Buat program untuk mengubah data oktal 4 digit yang ada pada reg R21:R20 menjadi desimal. Simpan hasil konversi pada Reg R23:R22.

JAWABAN

1. Program:

```
.INCLUDE "M8535DEF.INC"
.ORG 0

RJMP MAIN
MAIN:
LDI R16, LOW(RAMEND)
OUT SPL, R16
LDI R16, HIGH(RAMEND)
OUT SPH, R16

//SIMPAN NILAI 7 UNTUK KOREKSI AND
LDI R17, $7
LDI R18, $F8

MOV R19, R20
AND R19, R17
MOV R21, R20
AND R21, R18
ASR R21
OR R21, R19
AKHIR: RJMP AKHIR
```

Hasil:

* 67 = 37

```
R18= 0xF8  R19= 0x07
R20= 0x67  R21= 0x37
R22= 0x00  R23= 0x00
```

* 77 = 3F

```
R18= 0xF8  R19= 0x07
R20= 0x77  R21= 0x3F
R22= 0x00  R23= 0x00
```

* 45 = 25

```
R18= 0xF8  R19= 0x05
R20= 0x45  R21= 0x25
R22= 0x00  R23= 0x00
```

2. Program:

```
.INCLUDE "M8535DEF.INC"
.ORG 0

RJMP MAIN

main:
LDI R16, LOW(RAMEND)
OUT SPL, R16
LDI R16, HIGH(RAMEND)
OUT SPH, R16

MOV R18,R20
ANDI R18,7
MOV R17,R20
ANDI R17,$0F8
LSR R17
OR R17,R18
MOV R22,R17

MOV R18,R21
ANDI R18,7
MOV R17,R21
ANDI R17,$0F8
LSR R17
OR R17,R18
MOV R23,R17

ANDI R17,3
LDI R26,64
MUL R17,R26
OR R22,R0
LSR R23
LSR R23

AKHIR: RJMP AKHIR
```

Hasil:

* 7777 = FFF

```
R18= 0x07  R19= 0x00
R20= 0x77  R21= 0x77
R22= 0xFF  R23= 0x0F
```

* 5364 = AF4

```
R18= 0x03  R19= 0x00
R20= 0x64  R21= 0x53
R22= 0xF4  R23= 0x0A
```

* 7765 = FF5

```
R18= 0x07  R19= 0x00
R20= 0x65  R21= 0x77
R22= 0xF5  R23= 0x0F
```

3. Program:

```
.INCLUDE "M8535DEF.INC"
.ORG 0

RJMP MAIN

MAIN:
LDI R16,LOW(RAMEND)
OUT SPL, R16
LDI R16, HIGH(RAMEND)
OUT SPH, R16

MOV R21,R20
ANDI R21,0X0F
MOV R19,R20
ANDI R19,0XF0
LSR R19
LSR R19
LSR R19
LSR R19

ADD R19,R19
RCALL DAA
ADD R19,R19
RCALL DAA
ADD R19,R19
RCALL DAA

ADD R19,R21
RCALL DAA

//PINDAH DATA KE REG TARGET
MOV R21,R19

AKHIR: RJMP AKHIR
```

Hasil:

* 77 = 63

```
R18= 0x00  R19= 0x63
R20= 0x77  R21= 0x63
R22= 0x00  R23= 0x00
```

* 53 = 43

```
R18= 0x00  R19= 0x43
R20= 0x53  R21= 0x43
R22= 0x00  R23= 0x00
```

* 21 = 17

```
R18= 0x00  R19= 0x17
R20= 0x21  R21= 0x17
R22= 0x00  R23= 0x00
```

4. Program:

```
.INCLUDE "M8535DEF.INC"
.ORG 0

RJMP MAIN
MAIN:
LDI R16,LOW(RAMEND)
OUT SPL,R16
LDI R16,HIGH(RAMEND)
OUT SPH,R16

MOV R19,R20
ANDI R20,$0F
ANDI R19,$F0
LSR R19
LSR R19
LSR R19
LSR R19

LDI R21,$0A
MUL R21,R19
MOV R21,R0
ADD R21,R20

AKHIR RJMP AKHIR
```

Hasil:

* 99 = 63

```
R18= 0x00   R19= 0x09
R20= 0x09   R21= 0x63
R22= 0x00   R23= 0x00
```

* 93 = 5D

```
R18= 0x00   R19= 0x09
R20= 0x03   R21= 0x5D
R22= 0x00   R23= 0x00
```

* 29 = 1D

```
R18= 0x00   R19= 0x02
R20= 0x09   R21= 0x1D
R22= 0x00   R23= 0x00
```

5. Program:

```
.INCLUDE "M8535DEF.INC"
.ORG

RJMP MAIN
MAIN:
LDI R16,LOW(RAMEND)
OUT SPL,R16
LDI R16,HIGH(RAMEND)
OUT SPH,R16

MOV R19,R20
ANDI R19,$0F
ANDI R20,$0F0
LSR R20
LSR R20
LSR R20
LSR R20
LDI R21,$0A
MUL R21,R20
MOV R21,R0
//SATUAN
ADD R21,R19
//DELAPANAN
MOV R22,R21
//64AN
MOV R23,R21
ANDI R21,$07
ANDI R22,$38
LSL R22
OR R21,R22
ANDI R23,$C0
LSR R23
LSR R23
LSR R23
LSR R23
LSR R23
LSR R23
MOV R22,R23

AKHIR: RJMP AKHIR
```

Hasil:

* 99 = 143

```
R18= 0x00   R19= 0x09
R20= 0x09   R21= 0x43
R22= 0x01   R23= 0x01
```

* 93 = 135

```
R18= 0x00   R19= 0x03
R20= 0x09   R21= 0x35
R22= 0x01   R23= 0x01
```

* 29 = 35

```
R18= 0x00   R19= 0x09
R20= 0x02   R21= 0x35
R22= 0x00   R23= 0x00
```

6. Program:

```
.include"m8535def.inc"
.org 0
RJMP MAIN
MAIN:
    LDI R16,LOW(RAMEND)
    OUT SPL,R16
    LDI R16,HIGH(RAMEND)
    OUT SPH,R16

    MOV R29,R21
    MOV R28,R20

    MOV R22,R20             ;SATUAN
    ANDI R22,$F

    LDI R31,8               ;KONVERSI 8-AN
    MOV R30,R20
    ANDI R30,$F0
    BREQ O3
    RCALL SHR4
    RCALL KONVERSI
O3:                         ;KONVERSI 64-AN
    LDI R31,$64
    MOV R30,R21
    ANDI R30,$F
    BREQ O4
    RCALL KONVERSI
O4:                         ;KONVERSI 512-AN
    LDI R31,5
    MOV R0,R31
    LDI R31,12
    MOV R30,R21
    ANDI R30,$F0
    BREQ END
    RCALL SHR4
    RCALL KONVERSI
```

```
    MOV R21,R29
    MOV R20,R28

END: RJMP END

ODA:
    PUSH R16
    PUSH R17
    PUSH R18
    IN R16,SREG
    BRHC L0
    LDI R18,$6
    ADD R15,R18
L0: MOV R17,R15
    ANDI R17,$F
    CPI R17,$A
    BRLO L1
    LDI R18,$6
    ADD R15,R18
L1: MOV R17,R15
    ANDI R17,$F0
    CPI R17,$A0
    BRLO L2
    LDI R18,$60
    ADD R15,R18
    BRCC L2
    ORI R16,1
L2: OUT SREG,R16
    POP R18
    POP R17
    POP R16
    RET
```

```
SHR4: ;BUAT SHIFT
    LSR R30
    LSR R30
    LSR R30
    LSR R30
    RET

KONVERSI:   ;PROSES KONVERSI
    ADD R22,R31
    MOV R15,R22
    RCALL ODA
    MOV R22,R15
    ADC R23,R0
    MOV R15,R23
    RCALL ODA
    MOV R23,R15
    DEC R30
    BRNE KONVERSI
    RET
```

Hasil:

* 7777 = 4095

```
R18= 0x00   R19= 0x00
R20= 0x77   R21= 0x77
R22= 0x95   R23= 0x40
```