Assignment 1

Chapter 2

Problem 4

(Register WREG is __ bit wide)

Answer: WREG is 8 bit wide

Problem 34

(In Q32 to place the result to file register the D bit must be__)

Answer: The D bit must be 1

Problem 39

(What is the difference between monwf and movf)

Answer:

Movwf moves the content of WREG to a fileregister.

movf moves the content of the fileregister to wreg or itself.

Problem 48

(What is the statut of the C and Z flags agter following code”movlw FFH addwf 1)

Answer: C flag is 1 and Z flag is 1

Problem 53

(Show a simple code to (a) load 11H into location 0-5 (B) add them to gether and place the result in WREG as the values are added. use EQU to assign names R0-R5 to location 0-5)

Answer:

```
R0 equ 0x10
R1 equ 0x10
R2 equ 0x10
R3 equ 0x10
R4 equ 0x10
R5 equ 0x10
org 0
movlw 11H
movwf R0
movwf R1
movwf R2
movwf R3
movwf R4
movwf R5
movlw 0
movf R0,w
addwf R1,w
addwf R1,w
addwf R2,w
addwf R3,w
addwf R4,w
addwf R5,w
End $
```

Chapter 3

Problem 7

(True or False The target of a BNZ can be anywhere in the 2M address space)

Answer: False BNZ is 2-byte instruction address must be withing 256 bytes of the program counter

Problem 12

(Show code for a nested loop to perform an action 1000 times)

Answer:

```
counter1 equ 0x10
counter2 equ 0x11
movlw D'10
movwf counter1
  loop:
  movlw D'100
  movwf counter2
     loop2:
     Nop
     Decfsz Counter2
     bra   loop2
     decfsz counter1
     bra loop1
     bra ending
 ending:
 bra $
```

Problem 19

(True or False the RCALL target address can be anywhere in the 2M address)

Answer: False Rcall is relavtive call that can be used when the call is half of the current segment

Problem 20

(True or false the call target address can be anywhere in the 2M address space)

Answer: True. Call is 4 bit instruction

Problem 28

(Find the instruction cycle if the crystal frequency is 20Mhz

Assuming the cycle consists from 4 oscillator periods.

20Mhz/4 = 5MHz ➔ Intstruction cycle = 1/5MHz = 200nanoseconds

Answer: instruction cycle: 200 nanoseconds

Chapter 4

Problem 12

(Write program to get 8-bit data from Port D)

Answer:

```
BSF portC
BSC portB
BSC portD
kierros1:
  BTFSC portC, 8
  Bra Kierros2
  BCF portB,8
  BCF portD,8
  Goto kierros1
kierros2:
  BSF portB,8
  BSF portD,8
  Goto Kierros1
```

Problem 15

Write a program to toggle all the bits of Port B and Port c continuously

(a) using AAH and 55H
(b) using COMF instruction

(a)

```
counter egu 0x10
luku equ 0x11

Org 0
movlw 55H
movwf luku
movlw AAH

Silmukka:
  movff luku portB
  call delay
  movff luku portC
  call delay
  addwf portB, f
  call delay
  addwf portC, f
  Bra Silmukka

Delay:
  movlw .250
  movwf counter
Tauko:
nop
nop
nop
  decf counter
  bnz Tauko
movlw AAH
return
```

(b)

```
counter egu 0x10

Org 0
movlw 55H
movwf portB
movwf portC

Silmukka:                |          Delay:
  compf portB,f          |            movlw .250
  compf portC,f          |            movwf counter
  call delay             |          Tauko:
  Bra Silmukka           |          nop
                         |          nop
                         |          nop
                         |            decf counter
                         |            bnz Tauko
                         |          movlw AAH
                         |          return
```

Problem 21

(Write a program to toggle RD3,RD7 and RD5 constantly without disturbing the rest of the bitts)

```
Org 0

clrf pordD
Silmukka:
BTFSC portD,3
  Bra pone
  BTG portD,3
  BTG portD,7
  BTG portD, 5
  Bra Silmukka
pone:
  BTG portD,3
  BTG portD,7
  BTG portD, 5
  Bra Silmukka
```

Problem 24

(Write a program to monitor the RE0 bit when it is high send 99H to port B if its low send 66H to port C)

```
Org 0

setf PortE
clrf portB
clrf portC
Silmukka:
  BTFSS port E, 0
    Bra Onolla
    movlw 99H
    movwf portB, f
    Bra Silmukka
    Onolla:
      movwl 66H
      movwf portC, f
      Bra Silmukka
```