ECE 3301
Introduction to Microcontrollers

Assignment 5

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1 (25) List the different types of reset that can reset the PIC18F? Describe how the power-on reset and the manual reset operate?

- Power-On Reset (POR)

  Upon power-up, a power-on reset pulse is generated internally whenever VDD rises above a certain threshold. This allows the PIC18F chip to start inthe initialized state when VDD is adequate for operation.

- Manual Reset

  A manual reset is performed by driving the $\overline{MCLR}$ pin to LOW via external circuitry. The internal on-chip circuitry connected to the $\overline{MCLR}$ pin ensures that the pin is LOW for at least 2 µs (minimum requirement for reset).

- Brown-out reset (BOR)
- Watchdog timer (WDT) reset
- RESET instruction

2 (20) Write a single assembly instruction to configure PIC18F:

2.a all bits of Port C as inputs.

```
SETF TRISC
```

2.b all bits of Port D as outputs.

```
CLRF TRISD
```

2.c Bits 0 through 4 of Port B as inputs.

For digital input:

```
SETF TRISB
```

For analog input:

```
CLRF ADCON1
```

2.d Bit 3 of Port A as output.

```
BCF TRISA, 3
```

3 (20) Repeat Q2 using C code, more than one line of C code is accepted.

3.a all bits of Port C as inputs.

```
TRISC = 0xFF;
```

3.b all bits of Port D as outputs.

```
TRISD = 0;
```

3.c Bits 0 through 4 of Port B as inputs.

For digital input:

```
TRISB &= 0xE0;    // mask off lower 5 bits and keep higher 3 bit intact
TRISB += 0x1F;    // make lower 5 bit all 1 => bits 0 to 4 as inputs
```

For analog input:

```
ADCON1 &= 0xF0;   // mask off PCFG to make AN0 through AN12 analog input
```

3.d Bit 3 of Port A as output.

```
TRISAbits.TRISA3 = 0;
```

4 (5) What is the default clock frequency of the PIC18F4321?

According to page 31 of the PIC18F4321 Datasheet, the default output frequency of INTOSC on Reset is 1 MHz

5 (5) In the PIC18F458, how many pins are designated as I/O port pins? how many pins are assigned to Vcc and GND?

According to page 2 of the PIC18F458 Datasheet,

- 33 pins are designated as I/O port pins;
- 2 pins are assigned to Vcc; and
- 2 pins are assigned to GND

6 (25) For the table below use the following assembly code to fill the table, note that lines 1, 2, 3, and 9 are dirctives not instructions.

```
1. PRDL EQU   0x50         ; Assign an alias for GBR 0x50
2. PRDH EQU   0x51         ; Assign an alias for GBR 0x51
3.      ORG   0x100        ; Start program at program memory address 0x100
4.      MOVLW 0xF9         ; Move 0xF9 to the WREG
5.      MULLW B'11111001'  ; Mutiply binary value B'11111001' by the content of WREG
6.      MOVFF PRODH, PRDL  ; Move the high product output byte from SFR PRODH register to G
7.      MOVFF PRODL, PRDH  ; Move the low product output byte from SFR PRODL register to GP
8. HERE BRA   HERE         ; Create continuous loop
9.      END                ; End the program
```

No.	Label	Opcode/ Directive	Operand	Comments
1.	PRDL	EQU	0x50	; Assign an alias for GBR 0x50
2.	PRDH	EQU	0x51	; Assign an alias for GBR 0x51
3.		ORG	0x100	; Start program at program memory address 0x100
4.		MOVLW	0xF9	; Move 0xF9 to the WREG
5.		MULLW	B'11111001'	; Mutiply binary value B'11111001' by the content of WREG
6.		MOVFF	PRODH, PRDL	; Move the high product output byte from SFR PRODH register to GPR 0x50
7.		MOVFF	PRODL, PRDH	; Move the low product output byte from SFR PRODL register to GPR 0x51
8.	HERE	BRA	HERE	; Create continuous loop
9.		END		; End the program