Assignment 2 - Writeup

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a) Write the following short note on working registar of PIC 18

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The working register or WREG is a temporary storage for information on CPU

1) It has a size of CPU
2) It is also called as "Program Memory Space"
3) It is used to perform arithemetic and logical instructions like MOVE and ADD

This means move literal value a in the WREG
A program to add two numbers WREG

MOVLW = 03 H
~~MOVLW~~ ADDLW = 50 H
Here 53 H is stored in WREG

4) It is same as an ~~accu~~ accumulator in other microprocessor.

b] Memory of PIC18F458 (all types) and memory banking?

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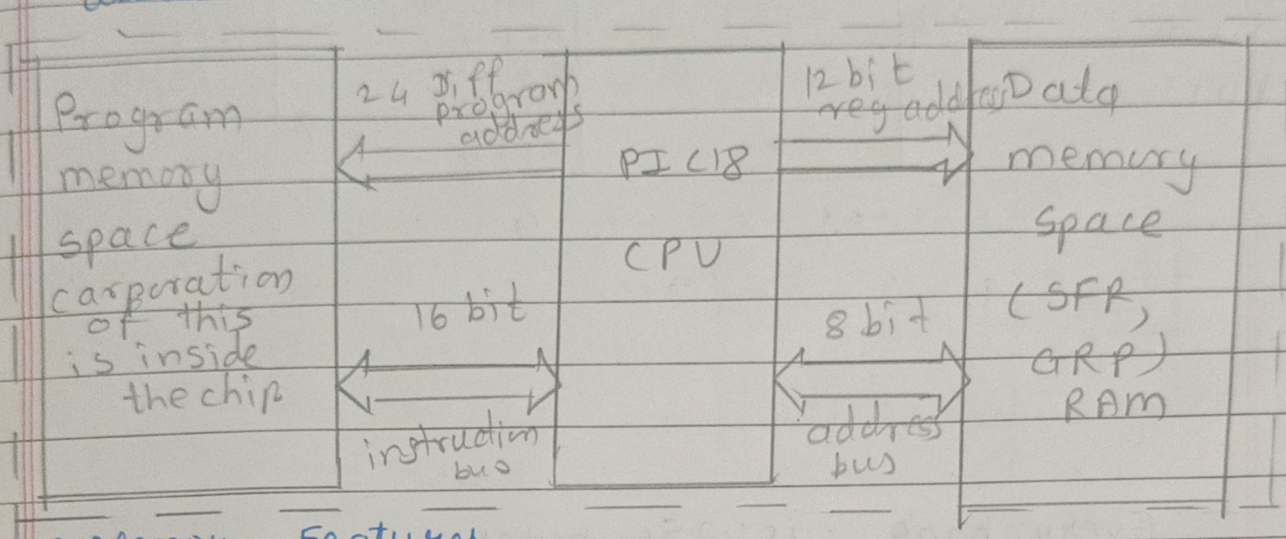
Memory consists of a seperate of directly addressed locations. A location is reffered as an information

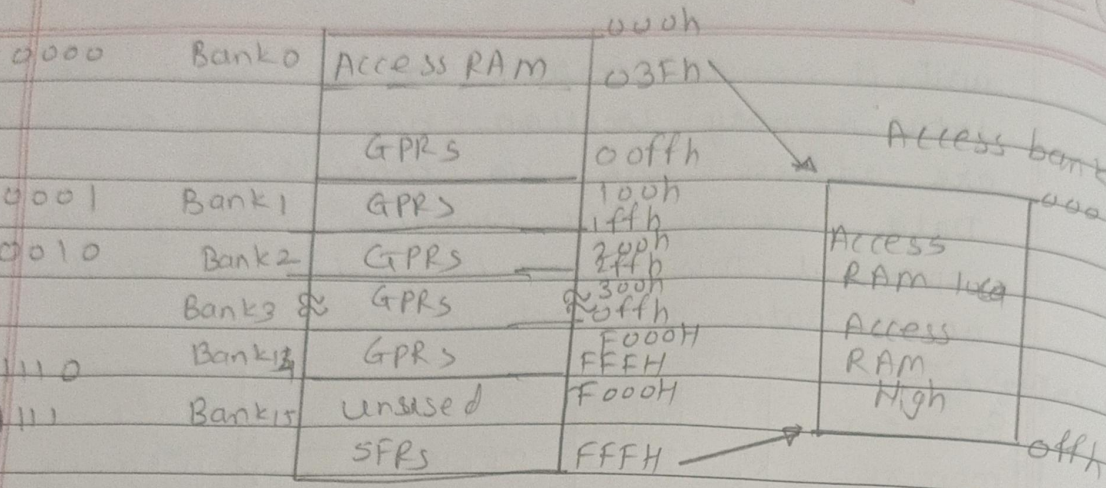
unit. A memory Location can be used to store data memory location has two components are address and its consists.

Data memory and program memory are seperated. This makes it possible to simultaneously access data and instructions.

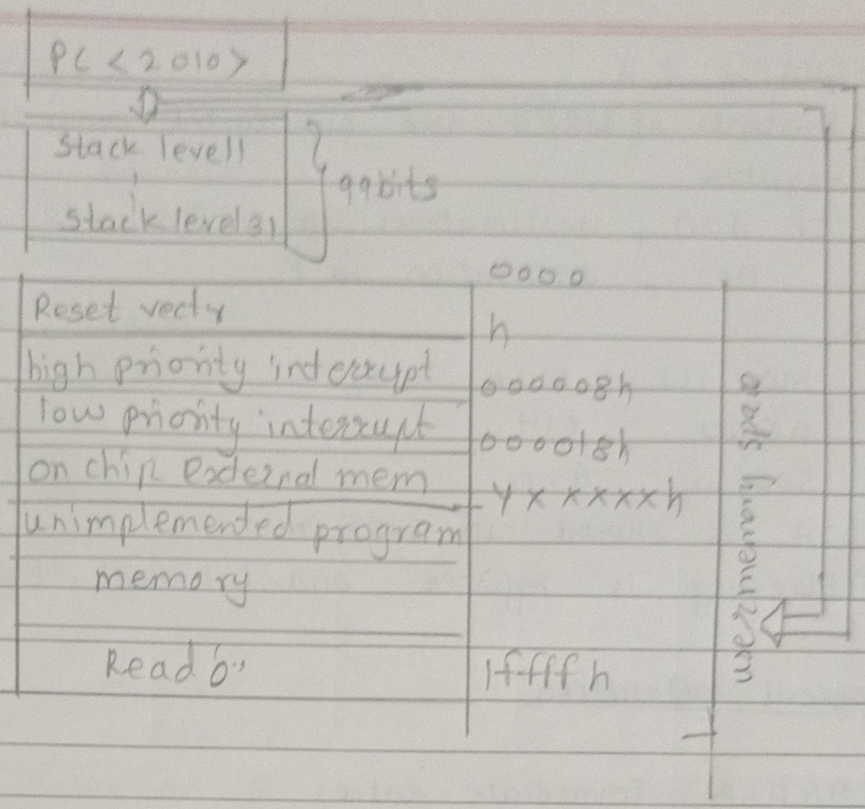


- Memory Features.

- 4096 bytes of data memory
- General purpose registers are used to ~~control~~ hold dynamic data
- Special function register are used to control operation of peripheral function.
- Only one bank is active at a time and is specified by the BSR register
- PIC 18 implements access banks to reduce problems caused by bank switching
- Access bank consists of lowest 96 bytes and highest 160 bytes of data memory space.



- Every bank is 256 bytes
- PIC 18 has 2MB Program Space
  1MB = 16 banks.
  Hence PIC18 has 16 banks.
- 0-96 of first banks access RAM (low) higher 196 of last bank. access RAM (High)
- Unused space is for some SRF's that can be added in latter ~~diagram~~ versions.
- PC is 21 bits long which enables user program to access upto 2MB of program memory
- After power ON, PIC 18 starts executing instructions from address
- Location or address 0x08 is reserved for high priority ISR and 0x18 for low priority ISR
- Upto 128 KB of programm memory MCU chipset present time



c] Instruction for arithematic, logical branch & bituise operations Give 2 examples of each type.

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Arithematic instructions:

1). ADDWF f, d

contents of file registers f and WREG are added.

IF d = 0 , destination is WREG.

d = 1 , destination is f

Eg: MOVLW 12H

AEU 13H In this program 25H is stored in WREG

ADD A,0 addressing mode is direct & inherent.

2) SUBFW f, d

Contents of WREG are subtracted from the file register

IF d=0, destination is WREG

d=1, destination is f

Eg:

```
MOV LW    01H
AEQU      03H
SUBFW     A, 0
```

02H is stored in WREG

Addressing is register and inherent.

Logical instruction

1) ANDLW Immediate data

Immediate data and data inside the WREG are 'Anded'

Eg:
```
MOVLW   B'  '10001000'
ANDLW   B'  '01011000'
```

$(00001000)_2$ is stored in the WREG

Addressing mode is immediate and inherent.

2) IORLW intermediate data

Intermediate data and data inside WREG is 'ORED'

Eg:
```
MOVLW   B'  '00100101'
IORLW   B'  '11010001'
```

$(11110101)_2$ is stored in WREG A

Addressing mode is intermediate & inherent.

BRANCH:

1) BNZ address
   - Branch if not zero

2) BZ address
   - Branch is zero.

BITWISE

1) BCF F, b:
   Clear bit b
   A EQU B' '00011111'
   BCF A, 4
   Value on A becomes (0001 0111)2

2) BSF F, b:
   Set bit B
   AEQU B' '00011111'
   BCF A, 1
   Value of A becomes (10010111)2