**Computer Organization & Assembly Language**

**Lab 02**

**Topics:**

1. Details of Registers
2. Assembly Instructions
3. Addressing Modes
4. ASCII codes
5. Assembler Directives

**Registers:**

* **Temporary storage of data**
* **Fastest storage area**
* **Quickly accessible by CPU**
* **Built into CPU**
* **Optimization of processing time**

**Assembly Instructions:**

* **There are different kinds of assembly instructions**
* **In order to pass any data to registers we use mov instruction**
* **To perform addition and subtraction of numbers, keywords, ADD and SUB are used**
* **Keywords INC and DEC are used**

**Addressing Modes:**

* **Register Addressing: In register addressing, both the operands are registers**
* **Immediate Addressing: In Immediate addressing, one of the operand is register and the other one is immediate value.**
* **Memory Addressing: In Memory addressing, one of the operands is register and the other access static data directly i.e (Store address of the memory)**

**Assembler Directives:**

* .MODEL directive
* .STACK directive
* .DATA directive
* .CODE directive

**Code Structure:**

.386

.model flat,stdcall

.stack 4096

.code

main PROC

; Move the values into the registers

mov al, 97

mov ax, 2

mov bx, 3

mov cx, 1

mov dx, 5

add ax, bx ; 5

add cx, dx ; 6

sub ax, cx ; The result is FFFFFFFF

main ENDP

END main

**Tasks:**

1. Write an assembly language program to Addition and Subtraction any value stored in the registers in memory. The add register will be ax or cx and subtract register will be bx, dx. Also try these on al, ah, bl, bh, cl, ch, dl, dh.
2. Write an assembly language program to Addition and Subtraction any value stored in the registers in memory. The add register will be ax or cx and subtract register will be bx, dx. Also try these on al, ah, bl, bh, cl, ch, dl, dh. Those students whose roll number end on even number add and subtract value by 2 and for odd one add and subtract by 3
3. Write an assembly language program to ADD two values and see the values in memory. And Move one value to ax and other value to bx and watch the value of al, ah, ax ,bx, bh, bl.
4. Write an assembly language program to subtract two values and see the values in memory. And Move one value to cx and other value to dx and watch the value of cl, ch, cx ,dx, dh, dl.
5. Write an assembly language program to add two values and see the values in memory. The two values must be one of you last 4 digits of roll number and the other must be yours friend. And Move one value to cx and other value to dx and watch the value of cl, ch, cx ,dx, dh, dl.
6. Write an assembly language program to subtract two values and see the values in memory. The values must be one of the current year and the other one would your birth year. And Move one value to cx and other value to dx and watch the value of cl, ch, cx ,dx, dh, dl.
7. Write assembly language to add two binaries number
8. Write assembly language to add two hex number
9. Write assembly language to add two octal number
10. Write an assembly language program that takes course gpa in registers