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CO215, CO Lab 2021, Assignment 4

Roll number: CSB19057

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Objectives:

1. To get started with assembly language programming;
2. To learn the basic structure of an assembly language program;
3. To learn the types of assembly language statements and their structures;
4. To learn the steps of assembling, linking and execution;
5. To work with simple assembly language program.

Exercises:

3) Assembly directives used are -
DB - used to declare a byte type variable
DW - used to declare a word type variable
PROC – It is used to identify the start of a procedure.
END – The END directive is put after the last statement of a program to tell the assembler that this is the end of the program module.
ENDP - used along with the name of the procedure to indicate the end of a procedure to the assembler.
OFFSET – It tells the assembler to determine the offset or displacement of a named data item from the start of the segment which contains it.

4) Executable instructions used are -
Mov- Used to copy data from one source to the other destination
Add- Used Used to add the provided byte to byte/word to word.
Lea- Used to load the address of operand into the provided register.
Loop- Used to loop a group of instructions until the condition satisfies, i.e., CX = 0
Int- Used to interrupt the program during execution and calling service specified.

5)
TITLE sum1: **Program to compute the sum of an array of integers**

```
.MODEL SMALL
.STACK 100H
.DATA
```

```
array DB 1, 22, 3,44,5
num DB 5
output_msg DB 'Sum of the integers:$'
sum DW ?
ten DB 10
.CODE
main PROC
.STARTUP
mov bx, OFFSET array
mov cl, num
mov ch,0
mov ax, 0
sum_loop:
add al, [bx]
add bx, 1
loop sum_loop
div ten
mov sum, ax ;sum was stored in ax and now moved to memory location
mov bx, ax
; print output message
mov ah, 09h
lea dx, output_msg
int 21h

mov ah,02h
mov dl,bl
add dl,30h
int 21h

; print quotient
mov ah,02h
mov dl,bh
add dl,30h
; print remainder
int 21h
;.EXIT
mov ah ,4ch
mov al ,0
int 21h
main ENDP
END main
```

Learning outcome:

This assignment has led to the understanding of following-

1. Programming in assembly language 8086
2. basic structure of an assembly language program;
3. types of assembly language statements and their structures;
4. the steps of assembling, linking and execution;