EMU8086 Lab Tasks

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Section: B

Program: Computer Science

Task No 1: Arithmetic Instructions in EMU8086

1. Add two numbers and store in AX

```
MOV AX, 05H
MOV BX, 03H
ADD AX, BX
HLT
```

2. Add AX and CX

```
MOV AX, 1234H
MOV CX, 0F00H
ADD AX, CX
HLT
```

3. Subtract BX from AX

```
MOV AX, 73H
MOV BX, 11H
SUB AX, BX
HLT
```

4. Subtract with Borrow

```
MOV AL, 07H
MOV CL, 08H
SBB CL, AL
HLT
```

5. Increment AL

```
MOV AL, 09H
INC AL
HLT
```

6. Decrement BL

```
MOV BL, 0FFH
DEC BL
 HLT
```

Task Instructions:

- Change the values in each program (e.g. MOV AX, 10H) and verify results.

Task No 2: Convert Hexadecimal to Decimal

Convert 428H step-by-step:

4 * 256 = 1024

2 * 16 = 32

8 * 1 = 8

Total = 1064

So, 428H = 1064 Decimal

Lab No 3: Multiplication and Division in EMU8086

Program 1: Unsigned Multiplication (16-bit)

```
MOV AX, 0073H
MOV BX, 0010H
MUL BX
HLT
```

Program 2: Signed Multiplication (8-bit)

```
MOV AL, 73H
MOV BL, 10H
IMUL BL
HLT
```

Program 3: Unsigned Division (16-bit)

```
MOV BX, 0005H
MOV AX, 0021H
```

```
DIV BX
HLT
```

Program 4: Unsigned Division (8-bit)

```
MOV CL, 05H
MOV AL, 21H
DIV CL
HLT
```

Program 6: Add Two 16-bit Numbers

```
MOV AX, 1234H
MOV BX, 4321H
ADD AX, BX
HLT
```

Program 7: Subtract Two 8-bit Numbers

```
MOV AL, 50H
MOV BL, 20H
SUB AL, BL
HLT
```

Program 8: Subtract Two 16-bit Numbers

```
MOV AX, 4000H
MOV BX, 1234H
SUB AX, BX
HLT
```

Task No 4: Displaying Text using ALP in EMU8086

Program 1: "Hello, World!"

```
.model small
.data
message db "Hello, World!$"
```

```
.code
main:
mov ax, @data
mov ds, ax
mov ah, 09h
mov dx, offset message
int 21h
mov ah, 4ch
int 21h
end main
```

Program 2: "Welcome to EMU8086 Programming"

Program 3: "My name is Ali."

Program 4: "Microprocessor and Assembly Language"

Program 5: "Sarhad University of Science & IT"

Program 6: "MPAL Lab - Semester 4"

Program 7: "My Roll Number is CS-1234"

Program 8: "Your result has been successfully recorded."

Program 9: "This is ALP Task: Displaying Text in EMU8086"

(Same structure as Program 1, only msg content changes)

Task No 5: Jump Instructions

Program 1: JMP

```
jmp skip
mov al, 10
skip:
mov al, 20
hlt
```

Program 2: JE (Jump if Equal)

```
mov al, 5
mov bl, 5
cmp al, bl
je equal
mov al, 0
equal:
mov al, 9
hlt
```

Program 3: JNE (Jump if Not Equal)

```
mov al, 5
mov bl, 6
cmp al, bl
jne not_equal
mov al, 0
not_equal:
mov al, 9
hlt
```

Program 4: JG (Jump if Greater)

```
mov al, 8
mov bl, 3
cmp al, bl
jg greater
mov al, 0
greater:
mov al, 1
hlt
```

Program 5: JL (Jump if Less)

```
mov al, 2
mov bl, 5
cmp al, bl
jl less
```

```
mov al, 0
less:
mov al, 1
hlt
```

Program 6: JNZ Loop

```
mov cx, 5
start:
dec cx
jnz start
hlt
```

Program 7: JGE (Jump if Greater or Equal)

```
mov al, 5
mov bl, 4
cmp al, bl
jge yes
mov al, 0
yes:
mov al, 1
hlt
```

Program 8: JLE (Jump if Less or Equal)

```
mov al, 3
mov bl, 3
cmp al, bl
jle low
mov al, 0
low:
mov al, 1
hlt
```

Program 9: JZ (Jump if Zero)

```
mov al, 5
sub al, 5
jz zero
mov al, 1
zero:
mov al, 9
hlt
```

Program 10: JNZ (Jump if Not Zero)

```
mov al, 5
sub al, 3
jnz notzero
mov al, 1
notzero:
mov al, 9
hlt
```