

## CEN 214 Microprocessors Lab Assignment 2

### NEW INSTRUCTIONS:

**LOOP:** <label>:

.....  
**LOOP label1**

**Description:** Performs a loop operation using the CX register as a counter. Each time the LOOP instruction is executed, the count register is decremented, then checked for 0. If the count is 0, the loop is terminated and program execution continues with the instruction following the LOOP instruction. If the count is not zero, a near jump is performed to the destination (label) operand, which is presumably the instruction at the beginning of the loop.

The target instruction is specified with a relative offset. This offset is generally specified as a label in assembly code, but at the machine code level, it is encoded as a signed, 8-bit immediate value, which is added to the instruction pointer. Offsets of -128 to +127 are allowed with this instruction.

**Algorithm:**

```
CX = CX - 1
if CX <> 0 then
    jump to label
else
    no jump, continue
```

### **DEC [operand]**

**Description:** Subtracts 1 from the destination operand.

**Algorithm:** operand = operand - 1

### **INC [operand]**

**Description:** Adds 1 to the destination operand.

**Algorithm:** operand = operand + 1

### **Examples:**

1. Write a program that calculates the sum of the numbers from 1 to 100 and saves to the memory address 0100:1000h.
2. Write a program that reads value from [0100:1000h] - [0100:1200h] memory range and writes back to [0300:1000h] - [0300:1200h] memory range. Add 1 to every word before writing back to memory. You have to use DS: SI addressing for reading and ES: DI addressing for writing.