# Lab Week 9 & 10: Using Shift & Rotate Instructions

## Objectives

The objective of this lab is to implement different programs related to logic and shift instructions.

## Lab Tasks

**Task 1:** Write a program to reverse bit pattern of the contents of AL register.

**Task 2:** Use ROL to count the number of 1 bits in BX, without changing BX. Put answer in AX.

**Task 3:** Use ROL to count the number of 0 bits in BX, without changing BX. Put answer in DX.

**Task 4:** Write a single instruction that clears the high 8 bits of AX and does not change the low 8 bits.

**Task 5:** Write a single instruction that sets the high 8 bits of AX and does not change the low 8 bits.

**Task 6:** Write a program to read a number in binary from user. Use following algorithm:

CLEAR BX

INPUT A CHARACTER

WHILE CHARACTER <> CR DO

CONVERT CHARACTER TO BINARY VALUE

LEFT SHIFT BX

INSERT VALUE INTO LSB OF BX

INPUT A CHARACTER

END\_WHILE

**Task 7:** Write a program to display a number in binary on console. Use following algorithm:

FOR 16 TIMES DO

ROTATE LEFT BX

IF CF = 1

THEN

OUTPUT ‘1’

ELSE

OUTPUT ‘0’

END\_IF

END\_FOR

**Task 8:** Write a program to read a number in hexadecimal from user. Use following algorithm:

CLEAR BX

INPUT HEX CHARACTER

WHILE CHARACTER <> CR DO

CONVERT CHARACTER TO BINARY VALUE

LEFT SHIFT BX FOUR TIMES

INSERT VALUE INTO LOWER 4 BITS OF BX

INPUT A CHARACTER

END\_WHILE

**Task 9:** Write a program to display a number in hexadecimal. Use following algorithm:

FOR 4 TIMES DO

MOVE BH TO DL

SHIFT DL 4 TIMES TO THE RIGHT

IF DL < 10

THEN

CONVERT TO CHARACTER IN ‘0’….’9’

ELSE

CONVERT TO CHARACTER IN ‘A’….’F’

END\_IF

OUTPUT CHARACTER

ROTATE BX LEFT 4 TIMES

END\_FOR