**Lab Hard**

**Assembly Language**

1. Write a program that will prompt the user to enter   
   a hex digit character (“0” … “9” or “A” … “F”), display it on the next line in decimal, and ask the user if he or she wants to do it again. If the user types “y” or “Y”,   
   the program repeat; if the user types anything else,   
   the program terminates. If the user enters an illegal character, prompt the user to try again.

**Sample execution:**

ENTER A HEX DIGIT: 9

IN DECIMAL IT IS 9

DO YOU WANT TO DO IT AGAIN? Y

ENTER A HEX DIGIT: c

ILLEGAL CHARACTER – ENTER 0..9 OR A..F: C

IN DECIMAL IT IS 12

DO YOU WANT TO DO IT AGAIN? N

1. Write a program to let the user enter a fraction of the form M/N (M < N), and the program prints the expansion to N decimal places, according to the following algorithm:

Print “.”

Execute the following steps N times:

Divide 10 x M by N, getting quotient Q and remainder R.

Print Q.

Replace M by R and go to step 2.

Use INDEC to read M and N.

1. Write a program to find the greatest common divisor (GCD) of two integers M and N, according to the following algorithm:

Divide M by N, getting quotient Q and remainder R.

If R = 0, stop. N is the GCD of M and N.

If R <> 0, replace M by N, N by R, and repeat step 1.

Use INDEC to enter M and N and OUTDEC to print the GCD.

1. Write a program that starts with an initially undefined byte array of maximum size 100, and lets the user insert single characters into the array in such a way that the array is always sorted in ascending order. The program should print a question mark, let the user enter a character, and display the array with the new character inserted. Input ends when the user hits the ESC key. Duplicate characters should be ignored.

**Sample execution:**

?A

A

?D

AD

?B

ABD

?a

ABDa

?D

ABDa

? <ESC>