ID1063 Second Lab Exam
EE

Time: 3 hours

Total Marks: 8+8=16

1. **Note:** In this programming problem, you will implement a function very similar to that of strcmp in string.h. Therefore, do not use the strcmp function in your program.

   We say that one English string is *earlier* than another if the character in the first string is earlier in the alphabet than the second one in the first place where the two strings differ. For example, the string CIRCLE is earlier than the string CIRCUIT because in the first position where the strings differ, the first string has the letter L, which is earlier than U, the letter in the second string. A string which is contained in another is considered to be earlier than the latter, eg: the string CIR is earlier than CIRCLE. Write a function that accepts two strings and returns 1 if the first one is earlier than the other, 2 if the second string is earlier than the first and 0 if the strings are equal. You may ignore cases, or assume that all have the same case (either all lower or all upper). Accept a collection of strings from the user and find the earliest string in the collection using your function.

   Example run:

   Enter the number of strings: 4

   Enter string 1: RABBIT

   Enter string 2: LIGHT

   Enter string 3: LIGAMENT

   Enter string 4: SHARP

   Output: The earliest string is LIGAMENT.

2. Create a structure called Polynomial to store the degree n and the coefficients $a_0, a_1, \ldots, a_n$ of a real polynomial $P(x) = a_0 + a_1x + \ldots + a_nx^n$. You may assume that $n \leq 20$. Write a program that accepts the coefficients of a polynomial from the user (stored in your structure variable) and prints the coefficients of (i) the derivative of the given polynomial,

(ii) the integral of the given polynomial (with zero for the constant term).

Example run:

Enter the degree of the first polynomial: 3

Enter the value of a3: 2

Enter the value of a2: 3.5

Enter the value of a1: -3

Enter the value of a0: 1

Output:

The coefficients of the derivative are: 6, 7, -3.

The coefficients of the integral are: 0.5, 1.67, -1.5, 1, 0.