PDS Lab Section 05

Lab Day 5 (Lab Test 1) – May 12, 2022

Time: 9AM to 11:15AM

The top two lines of your programs must contain the following information:

//Roll No.: <Type in your roll no.>
//Name: <Type in your name>

You have to give names to your C files as specified below and upload them in Moodle well before time. Please read the instructions given below.

Document your programs meaningfully using appropriately named variables and sufficient amount of comments. There will be marks for documentation and proper code indentation.

1. Write a program that would first read a positive integer value (less than **99999)** into an integer variable n.
   a) Encode each digit in the number as follows: 0→1, 1→2, 2→3, 3→4, 4→5, 5→6, 6→7, 7→8, 8→9, 9→10. Display the integer input by the user and the encoded integer. **[10 Marks]**

   Example: input: 123 --- encoded 234, input 934 --- encoded 1045

   b) Add check sum at the end of the encoded integer. Note: Checksum is the sum of the digits of the encoded number. **[10 Marks]**

   Example: input: 123 --- encoded 234 ---- with checksum 23409,
   input 934 --- encoded 1045 --- with checksum 104510

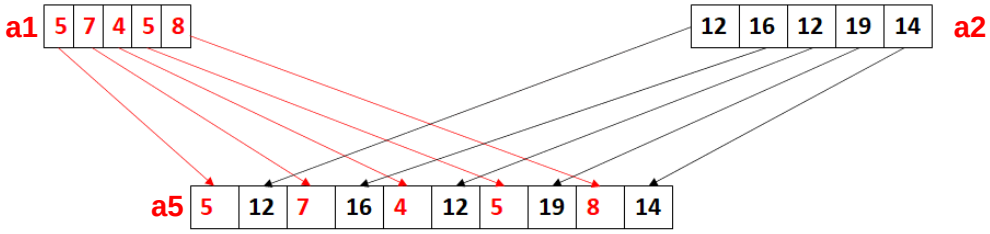
   50% penalty will apply if you solve this problem by converting the integers to either strings or arrays.
   Name your C program file as LD5_1_<roll_no>.c. **[20 Marks]**

2. Write a C program to do the following.

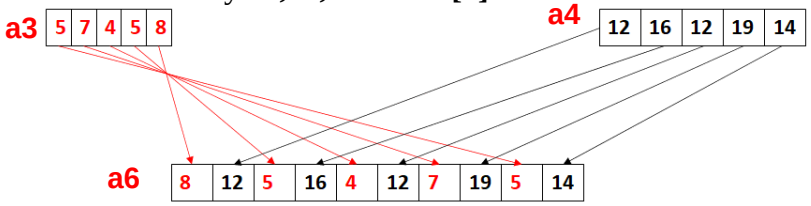
   a) Declare four integer arrays **a1,a2,a3,a4**, each of size 10. Fill the array **a1** with random numbers in the range of [10, 30]. Fill the array **a2** with random numbers in the range of [30, 60]. Fill the array **a3** with random numbers in the range of [60, 90]. Fill the array **a4** with random numbers in the range of [90, 120]. Display the four arrays of numbers nicely formatted. **[5]**
   Example display of a1:

   a1[0] = 18
   a1[1] = 25
   a1[2] = 27
   a1[3] = 12
   a1[4] = 15
   a1[5] = 15
   a1[6] = 12
   a1[7] = 19
   a1[8] = 18
   a1[9] = 19

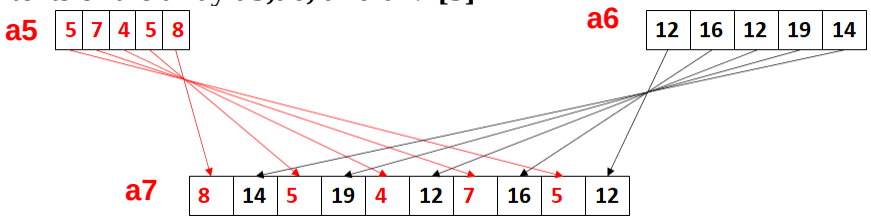
   b) Declare an integer array **a5** of size 20. Intersperse the contents of **a1**, and **a2**, into **a5** as shown in the following example. Display the contents of the array **a1,a2,and a5**. **[5]**



c) Declare an integer array **a6** of size 20. Intersperse the contents of **a3**, and **a4**, as shown below into **a6**. Display the contents of the array **a3,a4, and a6**. **[5]**



d) Declare an integer array **a7** of size 40. Merge the contents of **a5**, and **a6**, as shown below into **a7**. Display the contents of the array **a5,a6, and a7**. **[5]**



Note: The program does not take any input from the user.

Name your C program file as LD5_2_<roll_no>.c. **[20 Marks]**

3. Write a program that reads a scale factor **s** (**s** is a number in [1,6]) and number of lines **n** (**n** is a number in [1,10]). Based on the scale factor, it will display the digits between 1 to (3+**s**) repeatedly with m digits in each line, where m is the current line number (m<=n). The remaining digits will be printed at the start of the next line and this will continue. A total of n lines will be printed.

Explanation: If **s**=1 and **n**=6, we have to repeatedly print the digits between 1 to (3+1), i.e., the digits 1, 2, 3 and 4. In the first line only 1 will be printed. The next two digits will be printed in the next line. A total of 6 lines will be printed since **n**=6.

Example inputs/outputs are given below:

Example 1:

Input
Enter scale factor: 1
Enter number of lines: 6

Output
1
23
412
3412
34123
412341

Example 2:

Input
Enter scale factor: 2
Enter number of lines: 5

Output
1
23
451
2345
12345

Example 3:

Input
Enter scale factor: 3
Enter number of lines: 3

Output
1
23
456

Name your C program file as LD5_3_<roll_no>.c. **[10 Marks]**

Submit your .c files in Moodle against the assignment submission link for Lab Day 5.