PDS Lab Section 08

Lab Day 6 – Jane 01, 2021

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 per the guidelines mentioned after the problem statements and upload them in Moodle.

Important: Document your programs meaningfully using appropriately named variable and sufficient amount of comments as suggested in an earlier email. There wil be marks for documentation.

1. Write a C program to achieve the following.
   - **a.** In the main function, declare a character string called **hexNum** of size 10. Prompt the user to enter a character string of size less than 10 and read the entered string into **hexNum**. Call the function **filterString** with **hexNum** as argument. Then call the function **hex2bin** with **hexNum** as argument. **[5 Marks]**
   - **b.** The function **filterString** should strip out all non-hex digits from the string **hexNum.** It should also convert any lower case character into upper case. It should then display the stripped string. For example, if "ab3d1kLB" is the argument to the function, it should display "AB3D1B". **[5 Marks]**
   - **c.** The function **hex2bin** should take character string **hexNum** as its argument and convert the hex string to the equivalent binary number and store the result in a local integer array of size 40 named as **bin**. It should display **bin** in proper format. For example, if the string **hexNum** containsthe characters **[3,A,5]** then the display should be **001110100101** **[10 Marks]**

   Name your C program file as LD6_1_<roll_no>.c. **[20 Marks]**

2. Write a C program that in the main function would prompt the user to enter the number of the terms (say k) of the following series he/she wants to be displayed. Write a function named **print_term** to compute the nth term of the series. Based on the user's input, call the function **print_term** in the main function in a loop with appropriate argument to print the first k terms of the following series: **[10 Marks]**

   t(n) = 3*t(n-1)*t(n-2) - 2*t(n-2)*t(n-3) + 1, t(0)=0,t(1)=1,t(2)=2.

   Name your C program file as LD6_2_<roll_no>.c.

3. Write a C program to achieve the following.
   - **a.** In the main function, declare an integer array named **plain-data** of size 25. Call the function **random-fill** with the array **plain-data** as argument to fill the array **plain-data** with randomly generated integers in the range [10, 25]. Then, call the function **encode** with **plain-data** as argument. **[1 Mark]**
   - **b.** The function **random-fill** should take the integer array **plain-data** as its argument and fill the array **plain-data** with randomly generated integers in the range [10,25]. Display the filled array. **[1 Mark]**
   - **c.** The function **encode** should take the integer array **plain-data** as its argument. It should declare a local integer array named **cypher-data** of size 10. It should **recursively** add three numbers from the most significant position in the array **plain-data** and store the result in the array **cypher-data** and display the result. For example, if the contents of the array **plain-data** is **[10,15,12,17,20,25,19],** then the array **cypher-data** should contain **[37,62,19].** Note: Non-recursive **encode** routine will be awarded 0 marks. **[8 Marks]**

   Name your C program file as LD6_3_<roll_no>.c.

Submit your .c files in Moodle against the assignment submission link for Lab Day 6.