Section 16

PDS Lab **Assignment - 4** **21.08.2018**

Instructions:

*Create a sub directory named as **Lab4**.*

Give the name of the programs as <p>_1.c, <p>_2.c, .. etc. for the problem 1, 2….., respectively. Here <p> implies the part number. For example, Part-A

*Store all the programs under this assignment in the directory **Lab4**.*
*Zip the entire directory **Lab5** and rename it as **<R>_Lab5_tar.gz**. where <R> denotes your Roll No.*
You should upload your zipped file to the Moodle course web page latest by 11:55 hrs.

Part-A

1. Read a binary number of n bits for a given n. Store the binary number into an array. Convert the binary number into its equivalent decimal value. For example, for 5 bits binary number 10101, the decimal value is 21.

2. Read two sets of numbers and store them into two arrays say A and B. Find the sets C and D such that $C = A \cup B$ and $D = A \cap B$, where $\cup$ and $\cap$ denote the union and intersection operations on sets. Stores the results into two arrays say C and D. Print the arrays C and D.

3. Read a text from the keyboard about yourself. Your text should be at least 150 words and at most 200 words. You should store the text into a suitable array. For the input text count the following.
   a) Frequency of occurrence of all vowels.
   b) Which character(s) occurs the maximum time?
   c) The words which occurs the minimum and maximum time.
   [Hint: There may be more than one words, which occur the least and most times. Print all of them.]

Part-B

4. A 3D vector X is represented as $X = ix + jy + kz$. The symbols bear usual meaning. You should store such a vector in an array. Read two vectors say X and Y from the keyboard. Find their DOT and CROSS products. From their products values, check if the two vectors are orthogonal or parallel.

5. An encoding mechanism is decided as follows.
   It is a two-step method to convert a word into another word of the same length.
   a) The first and the last letters are swapped, then the second letter and the last but one letters and so on.
   b) The word obtained after swapping of letters are then undergo the following conversions.
      i. Convert lower case to upper case and vice-versa.
      ii. Change a character to another with the following rule.

          A → D or a → d
          B → E or b → e
          C → F or c → f
          …. …. …. …. ….
          W → Z or w → z
          X → a or x → a
          Y → B or y → b
          Z → C or z → c

   For example, if the word is “Welcome”, then your program should print “HPTFOHz” .

Part-C

6. Write a program which will read an arbitrary long sequence of bits terminated with a null character (‘\0’) say `S`. Read another small sequence of bits terminated with a null character (‘\0’) say *`s`*. Count the number of occurrences of *`s`* in `S`.
   For example, for the input sequence
   `S` = 0100100010011101000100 and `s` = “0100”, your program will print 4.

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Submission instruction

Zip your ***Lab4*** directory. Upload your zip file into the Moodle server.