CS69003
Computing Systems Lab – I
Lab Test - 1
Time: 2 Hours

Write a C program to implement a SET datatype. Specifically, you will need to do the following:

1. Define a type (using typedef) called SET that can store a set of integers. The number of integers in the set can be anything (no upper limit). You are free to design your own internal storage for the set.
2. Write the following C functions:

    a. **void Init(SET *S)**: Initializes the set *S* to an empty set. This should be called on every set once before it is used.
    b. **int Insert(SET *S, int x)**. The function adds the integer *x* to the set *S* if it is not already there. If *x* is already present in *S*, no change is done to the set. The function returns 0 if there is no error, 1 if there is an error.
    c. **int Delete(SET *S, int x)**. The function deletes the integer *x* from the set *S* if it is there. If *x* is not present in *S*, no change is done to the set. The function returns 0 if there is no error, 1 if there is an error.
    d. **int IsMember(SET S, int x)**: returns 1 if *x* is present in the set *S*, 0 otherwise.
    e. **SET Union(SET S1, SET S2)**: returns the union of sets *S1* and *S2*. The new set is returned. The old sets *S1* and *S2* should be left unchanged.

3. Finally, write a **main()** function to test your program. The **main()** function should do the following:
    a. Define three variables *X*, *Y*, and *Z* of type SET.
    b. Call **Init()** on each of *X*, *Y*, and *Z* to initialize them.
    c. Read in any 5 integers from the keyboard and insert them one by one in set *X*.
    d. Read in another 5 integers from the keyboard and insert them one by one in set *Y*.
    e. Read in an integer x from the keyboard. Print if it is a member of *X* or not.
    f. Read in an integer y from the keyboard. Delete it from *Y*. Print *Y*.
    g. Compute the union of *X* and Y and store it in *Z*. Print *Z*.

Your program should be properly indented. For the sake of time, you need not add comments to your program, except for a comment at the beginning of the C file to write your name and roll no. (do not forget to do this). Name your C file <your roll no.>_test.c (for ex., 07CS6001_test.c). Submit only the C file to the mail account. The mail sent should contain your name, roll no., and the word “Lab test 1” in the subject line.