DATA STRUCTURES & ALGORITHMS 1

BATCH – B [FRIDAY January 27, 2019: 3:00 PM – 6:00 PM]

LAB ASSIGNMENT – 2 CODE:assign02

NOTES:

1. Please carefully read all assignments and there is no choice.
2. **Use the template for this assignment**
3. Each problem in this assignment has to be answered in the same c file.
4. Create a .c file following the file name convention:
    a. If your roll number is 'abc' and assignment code is 'assignXX'. Then use the following file name convention as follows: 'abc-assignXX.c'
    b. For example, if the roll number is 92 and assignment code is assign02, then the file name should be 092-assign02.c
    c. Strictly follow the file name convention. When you are ready, submit the solution via google classroom.
5. Follow naming conventions
    a. Except for variables in for-loop, none of the other variables should be a single character.
    b. The variable names and function names should indicate what they are storing/computing.

PROBLEM INSTRUCTIONS:

For the following problems write functions which satisfy the following:

1. The functions **should not have a return statement** (hence its return type should be void).
2. **All** the **arguments** to the functions should be **pointers**
3. Do **not use global or static** variables.

PROBLEMS [Total Marks: 20]:

1. [Marks: 4] Write a function which takes in an empty array of size 30 and fills it with the first 30 values of the function $T(n) = T(n-1) + T(n-3)$ for $n > 2$. Where $T(0)=0$, $T(1)=1$,$T(2)=1$.
    a. The function should only populate, you should print the result in main() after the function call.

2. [Marks: 4] In main, use dynamic allocation (malloc) to store 'n' characters (taken as input from the user) and write a function which takes as input
    a. a pointer to the first memory location
    b. Reverses the list of characters in place (i.e same memory location)

c. The function should only reverse, print the result in main()

3. [Marks: 4] Write a simple function to swap (‘int’) values stored in two variables. The function should not use a auto-variable (allocated in the stack) as temp variables instead use malloc.

4. [Marks: 4] Create a Faculty struct. It should have ‘name’ and ‘salary’. Write a function increment_salary, which takes as argument a faculty struct and increments the salary by 20%. In main() create an instance of ‘faculty’ and pass it to this function.

5. [Bonus Question Marks: 4]

For this assignment we will be creating a simple software for Student-Information Management system. Please start by creating a structure (Struct) to capture the following student information.

1. First name
2. Last name
3. Roll no (should be unique)
4. Courses [integer array of course IDs]

The maximum number of students that the system should be able to handle is 50 (hint: its OK to declare the students array as a global variable).

PLEASE WRITE FUNCTIONS TO SUPPORT THE FOLLOWING OPERATIONS:

1. addStudent: Get data from user and add a student to the list of students. (check for unique-ness of the rollno)

2. findStudent (by rollno): Find the student record for the given roll no and print the details.

3. findStudents(by course-id): Find all students who have registered for a given class

4. Print a summary of how many students have registered in each course.