BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE, PILANI (RAJ.)

Second Semester 2017-18 CS F111 Computer Programming

LABORATORY SESSION #12

(Advanced Structures)

The following details of students are made available in a file (as comma separated fields): ID number, name, gender (M or F), age (a whole number), residential status (H for hostel resident, D for day scholar), and CGPA. Two sample rows (i.e., two student records) of the data file (data.txt) are shown below:

```
2014A7PS0108P,Indra Gopinath,F,21,H,8.55
2017B1TS1055P,Mohammed Farhan,M,18,D,0.0
```

Write a C program, made modular using user-defined functions to accomplish the tasks listed below. But first, copy the file `/home/share/12.c` onto your current folder. The `main()` function with function calls, function prototypes as well as definitions are all there. The data file is available at `/home/share/12.data` you can use.

(a) Read each student record from the data file, and store in an array of structures, each element of the array representing a record. Write a function with the following prototype to do this task.

```
void populateRecords(STUD arr[], int no_studs);
                    /* function to get data into the array */
```

(b) Generate and store in the record the email address (BITS University email address) of each student. The definition of the function for generating the email address, given the student ID number, has been provided to you.

```
void generateEmailAddress(char idno[], char email[]);
                    /* function definition already given */
```

Read the function definition and learn how it works, and also how to write meaningful comments for C code.

Now write the following function that calls `generateEmailAddress()` and then stores the email address in the right field of each student record:

```
void storeEmailAddresses(STUD arr[], int no_studs);
```

(c) Print out details of all students by writing a function whose prototype is:

```
void printRecords(STUD [], int);
```

```
2014A7PS0108P Indra Gopinath
Gender: F
Age: 21
Residence status: Hostel
CGPA: 8.55
Email: f2014108@pilani.bits-pilani.ac.in
-----------------------------------------------
2017B1TS1055P Mohammed Farhan
Gender: M
Age: 18
Residence status: Day scholar
CGPA: Not available
Email: f20171055@pilani.bits-pilani.ac.in
-----------------------------------------------
```

(d) Calculate and print the average CGPA of all CGPAs that are available:

```
float calculateAvgCG(STUD *, int);
```

(e) Calculate and print the number of: (i) male and female students, and (ii) hostel residents and day scholars using the same function:

```
void printCount(STUD *, int gndr_sort, int resi_sort);
```

This function accomplishes the task based on how it is called:

```
printCount(arr,1,0); /* count students according to gender*/
printCount(arr,0,1); /* count according to resident status*/
```

(f) Print the CGPA of all the students sorted according to the ID numbers. It is not a good idea to sort the entire array of structures based on a specific field, but rather use a different strategy wherein the original array is left untouched.