

# EE231002 Introduction to Programming

## Lab12. College Admission

**Due: Dec. 13, 2014**

The College of Science, which consists of four departments, Mathematics, Physics, Chemistry and Geosciences Departments, is taking applicants for the new Semester. All applicants are required to take a standard test, that has 3 subjects: Mathematics, Physics and Chemistry. This year there are 100 students applying for the admission. The Admission Office has prepared a list of these applicants in the file, `lab12.dat`. This file has 101 lines. The first line shows the abbreviation of the following lines, and is

```
AppNumber FirstName LastName Math Phys Chem 1st 2nd 3rd 4th
```

That is, each line is composed of 10 fields. In sequence they are: Application number, first name, last name, math test score, physics test score, chemistry test score, department of first priority, department of second priority, the third priority and the fourth priority.

Your assignment is to write a C program to help the admission office to select the students for each department according to the test scores and the students' priority. As a common practice, the student with the highest score would be placed to the department of his/her highest priority first. Each department can accommodate 20 new students. Thus, if the department of a student's top priority is full, then he/she will be placed to the department of the next priority. If two students have the same total score, then the one with the smaller application number will be selected first.

The output of your program is the student list of each department. For reference, the minimum score of the department is also printed. The student list is ordered by application number. Example output is

---

```
$ ./a.out < lab12.dat
```

```
Math Department: Minimum score 223
```

```
1 201400 Isabella SMITH
2 201405 Emily DAVIS
3 201407 Abigail WILSON
.....
```

```
Phys Department: Minimum score 234
```

```
1 201409 Mia TAYLOR
2 201415 Natalie MARTIN
3 201420 Sarah CLARK
.....
```

```
Chem Department: Minimum score 228
```

```
1 201403 Sophia JONES
2 201406 Madison MILLER
3 201418 Alyssa MARTINEZ
.....
```

Geos Department: Minimum score 230

```
1 201402 Olivia WILLIAMS
2 201408 Chloe MOORE
3 201419 Ashley ROBINSON
.....
```

---

Suggested data structure for each applying student is listed at the end.

### Notes.

1. Create a directory **lab12** and use it as the working directory.
2. Name your program source file as **lab12.c**.
3. The first few lines of your program should be comments as the following.

```
/* EE231002 Lab12. College Admission
   ID, Name
   Date:
*/
```

4. After you finish verifying your program, you can submit your source code by

```
$ ~ee231002/bin/submit lab12 lab12.c
```

If you see a "submitted successfully" message, then you are done. In case you want to check which file and at what time you submitted your labs, you can type in the following command:

```
$ ~ee231002/bin/subrec lab12
```

It will show your submission records for lab12.

5. You should try to write the program as efficient as possible. The format of your program should be compact and easy to understand. These are part of the grading criteria.
6. The following structure and enumeration are recommended for this lab. You should use them in your program.

```
typedef enum sDEPT {                // define 4 departments
    mathD, physD, chemD, geosD, none,
} DEPT;

typedef struct sStu {
    int  appNum;                    // application number
    char fName[20];                 // first name
    char lName[20];                 // last name
    int  math, phys, chem;           // test scores
}
```

```
    int total;                // total score
    DEPT pris[4];             // student's priority
    DEPT dept;                // admitted dept
} Stu;
```