lab11

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1  // EE231002 Lab11. Academic Competition
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3  // Dec. 6, 2019
4
5  #include <stdio.h>
6  #define N 100                                    // 100 students
7
8  struct STU {                                     // structure definition for each
    students
   This line has more than 80 characters
9      char fName[15];                              // first name
10     char lName[15];                              // last name
11     double math, sci, lit;                       // test scores
12     double total;                                // total score
13 };
14 struct STU list[N];
15
16 int main(void)
17 {
18     int i, j, top;                               // index, index, the top one
19     int g = 0;                                   // #people get grandprize
20     int grand[N];                                // who gets the grandprize
21     int s = 0;                                   // #people can get subprize
22     int subject[N], ssubject[N];                 // who can gets subjectprize
23
24     // discard first line
25     while ((i = getchar()) != '\n') ;
26     // input data
27     for (i = 0; i < N; i++) {
28         scanf("%s%s%lf%lf%lf", list[i].fName, list[i].lName,
29                                &list[i].math, &list[i].sci, &list[i].lit);
30     }
31     // define who could win SubjectPrize and who win Grandprize
32     for (i = 0; i < N; i++) {
33         if (list[i].math >= 80 && list[i].sci >= 80 && list[i].lit >= 80) {
34             grand[g++] = i;                      // i have eligibility
35                                                  // for GrandPrize
36             list[i].total = list[i].math + list[i].sci + list[i].lit;
37         }
38         else if (list[i].math >= 60 && list[i].sci >= 60 && list[i].lit >= 60)
39         {
40             subject[s] = ssubject[s] = i;        // i have eligibility
41                                                  // for SubjectPrize
42             s++;
43         }
44     }
45     // output Grandprize
46     printf("Grand Prize:\n");
```

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47      for (i = g - 1; i >= 0; i--) {              // output all in grand list
48          top = i;
49          for (j = 0; j < i; j++)                 // find the top
50              if (list[grand[top]].total < list[grand[j]].total) top = j;
51          printf("%3d: %s %s %.1lf\n", g - i, list[grand[top]].fName,
52                  list[grand[top]].lName, list[grand[top]].total);
53          grand[top] = grand[i];                  // discard the top one
54      }
55      // output Math Prize
56      printf("Math Prize:\n");
57      for (i = s - 1; i >= s - 10; i--) {         // total output 10 people
58          top = i;
59          for (j = 0; j < i; j++)                 // find the top one
60              if (list[subject[top]].math < list[subject[j]].math) top = j;
61          printf("%3d: %s %s %.1lf\n", s - i, list[subject[top]].fName,
62                  list[subject[top]].lName, list[subject[top]].math);
63          subject[top] = subject[i];              // discard the top one
64      }
65      for (i = 0; i < s; i++)
66          subject[i] = ssubject[i];               // recover origin data
67      // output Science Prize
68      printf("Science Prize:\n");
69      for (i = s - 1; i >= s - 10; i--) {         // total output 10 people
70          top = i;
71          for (j = 0; j < i; j++)                 // find the top one
72              if (list[subject[top]].sci < list[subject[j]].sci) top = j;
73          printf("%3d: %s %s %.1lf\n", s - i, list[subject[top]].fName,
74                  list[subject[top]].lName, list[subject[top]].sci);
75          subject[top] = subject[i];              // discard the top one
76      }
77      for (i = 0; i < s; i++)
78          subject[i] = ssubject[i];               // recover origin data
79      // output Literature Prize
80      printf("Literature Prize:\n");
81      for (i = s - 1; i >= s -10; i--) {          // total output 10 people
        for (i = s - 1; i >= s - 10; i--) {          // total output 10 people
82          top = i;
83          for (j = 0; j < i; j++)                 // find the top one
84              if (list[subject[top]].lit < list[subject[j]].lit) top = j;
85          printf("%3d: %s %s %.1lf\n", s - i, list[subject[top]].fName,
86                  list[subject[top]].lName, list[subject[top]].lit);
87          subject[top] = subject[i];              // discard the top one
88      }
89      return 0;
90  }
```

[Format] can be improved.
[Extra] arrays are not needed.
[Program] logic can be simplified.

Score: 88