

University of Massachusetts Dartmouth
Department of Electrical and Computer Engineering

ECE 161
Project 2

Submit name: stutest4.cpp
Due: see <http://ece161.viall.org>

Write a program to read a file containing student names and associated test scores. The data file must be named "stutest4.txt". The first line of the file will contain two integers each one occupying three columns. This first integer (in columns 1-3) will be the number of students. The second integer (in columns 4-6) will be the number of exams for each students.

A sample file is below. Note this is a sample file – the names, scores, number of scores, and number of lines may change; The formatting of the data, however, will remain constant. That is the name will be in columns 1-20; each test score will occupy four columns.

```

...../.....1...../.....2...../.....3...../.....4.. ← Column number
 6 4
Scott, Montgomery      80  80  92  68
Kirk, James T.        100  95 100  98
Spock, Mr.            100  30 100 100
Checkov, Pavel        100  65  90  90
McCoy, Leonard        92  75  85  90
Sulu, Hikiru          80  85  90  95

```

The output should be a nicely formatted table (with headings) showing each students name, their test scores, and their averages, the scaled test scores and averages. The average for each column shown as well. All averages should be displayed to one decimal place. The scaled test scores must be rounded to the nearest integer value. Lastly, your program may print out the slope (m) and y-intercept (b) for each of the test sets. This is mainly a debugging aid for you.

If the data file above was used, the output should look as follows:

Name	Ex1	Ex2	Ex3	Ex4	Avg	Ex1	Ex2	Ex3	Ex4	Avg
	raw	raw	raw	raw	raw	scl	scl	scl	scl	scl
Checkov, Pavel	100	65	90	90	86.3	100	68	65	75	76.9
Kirk, James T.	100	95	100	98	98.3	100	100	100	95	98.7
McCoy, Leonard	92	75	85	90	85.5	75	79	48	75	69.0
Scott, Montgomery	80	80	92	68	80.0	38	84	72	19	53.0
Spock, Mr.	100	30	100	100	82.5	100	30	100	100	82.6
Sulu, Hikiru	80	85	90	95	87.5	38	89	65	87	69.8
Averages	92.0	71.7	92.8	90.2	86.7	75.0	75.0	75.0	75.0	75.0
m		3.1	1.1	3.5	2.5					
b		-212.5	-1.8	-248.8	-154.2					

Press any key to continue

Required structures/variables/defines

```
#define MAXSTU 100
#define MAXTST 40
#define MAXCHR 20

typedef struct stuinfo
{
    char name[MAXCHR]; // student name
    int raw[MAXTST]; // raw test scores for a single student
    float sturawavg; // single students raw average
    float scl[MAXTST]; // scaled test scores for single student
    float stusclavg; // single students scaled average
} STUINFO;

void main(void)
{
    STUINFO stu[MAXSTU];
```

Suggested variables:

```
float m[MAXTST]; // used for slope data of each test
float b[MAXTST]; // used for y-intercept data of each test
float rawavg[MAXTST]; // used for avg of each raw test set
float sclavg[MAXTST]; // used for avg of each scaled test set
```

Scaling grades:

Each students individual test grades are scaled as follows:

$$\text{Scaled} = \text{Raw} * m + b$$

where:

$$m = (100 - 75) / (<\text{Test Set High grade} > - <\text{Test Set Average} >)$$
$$b = 75 - m * <\text{average of test set}>$$

graphically:

