University of Massachusetts Dartmouth
Department of Electrical and Computer Engineering

ECE 161 Submit name: stutest4.cpp
Project 2 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:

```
Scaled = Raw * m + b
```

where:

```
m = (100 – 75) / (<Test Set High grade > – <Test Set Average >)
b = 75 – m * <average of test set>
```

graphically: