CS 159 – Homework #6
Due: Monday April 11 at 11:00pm (time local to West Lafayette, IN).
10 Points Possible

Problem: Given a seed for the random number generator, create a data set of 75 elements in the range from 1 to 100 (inclusive of both endpoints) and display the mean, standard deviation, values less than one deviation from the mean, and values greater than one deviation from the mean.

Example Execution #1:

```
Enter seed value -> 1000

Data set mean: 49.2
Data set standard deviation: 31.3
Values less than one deviation from mean: 14 5 4 17 1 17 17 15 5 5 1 5 4 17 11 1
Values greater than one deviation from mean: 91 99 84 95 92 98 95 83 86 100 88 100 83 96 92 90 95 96
```

Example Execution #2:

```
Enter seed value -> 2000

Data set mean: 50.3
Data set standard deviation: 26.8
Values less than one deviation from mean: 19 21 15 17 5 18 1 18 13 23 15 10 2 6 23
Values greater than one deviation from mean: 95 83 84 93 78 81 81 96 81 88 83 79 96 89 81
```

Example Execution #3:

```
Enter seed value -> 3000

Data set mean: 54.5
Data set standard deviation: 30.8
Values less than one deviation from mean: 20 19 20 12 10 17 11 23 3 2 22 22 5 9 12 7 17 8 1
Values greater than one deviation from mean: 97 96 96 93 94 89 98 98 94 96 91 100 91
```

Example Execution #4:

```
Enter seed value -> 5000

Data set mean: 56.2
Data set standard deviation: 26.2
Values less than one deviation from mean: 1 19 24 26 24 24 21 29 19 1 23 16 22 10 11 24 29
Values greater than one deviation from mean: 100 89 98 93 92 93 91 88 90 94 94
```

Academic Integrity Reminder: Please review the policies of the course as they relate to academic integrity. The assignment you submit should be your own original work. You are to be consulting only course staff regarding your specific algorithm for assistance. Collaboration is not permitted on individual homework assignments.

Additional Requirements:

1. Add the homework assignment header file to the top of your program. A description of your program will need to be included in the assignment header. This particular header can be added to your file by entering `:hhw` while in command mode in `vi`.

2. **Each of the example executions provided for your reference represents a single execution of the program.** Your program must accept input and produce output **exactly** as demonstrated in the example executions, do not add any "bonus" features not demonstrated in the example executions. Your program will be tested with the data seen in the example executions and an unknown number of additional tests.
   - There are no input validation requirements in this assignment.

3. For this assignment you will be **required** to implement the user-defined functions (from chapter 4). Failing to follow course standards as they relate to good user-defined function use will result in a **zero for this assignment.**

4. Revisit **course standards as it relates what makes for good use of user-defined functions, what is acceptable to retain in the** `main` **function, and when passing parameters by address is appropriate.** In many cases user-defined function use should result in a `main` function that only declares variables and makes function calls.

5. Course standards **prohibit** the use of programming concepts not yet introduced in lecture. For this assignment you may consider all material in the **first eight chapters** of the book, notes, and lectures to be acceptable for use.
   - The use of any dynamic array structures (chapters 9 and 10) would violate this requirement and result in **no credit being awarded for your effort.** See course standards below for array declaration expectations.

6. A program **MUST** compile, be submitted through Vocareum as demonstrated during the lab #0 exercise, and successfully submitted prior to the posted due date to be considered for credit. The C-file you submit must be named exactly: `hw06.c`, no variation is permitted.

Course Programming and Documentation Standards Reminders:

- It is common to make use of a symbolic/defined constant when the size of the array is known prior to the start of a program.
- The course standards expect all arrays to be of a fixed size. Variable-size arrays, even those demonstrated in chapter 8 of the text, would violate course standards.
- Code found inside the body of relevant selection and repetition constructs must be indented two additional spaces.
- Make use of `{` and `}` with all relevant selection and repetition constructs.
- See page 258 of your C programming text regarding the proper indentation for a `switch` construct.
- Use the course function header (`vi` shortcut `:hfx` while in command mode) for every user-defined function..
  - List and comment **all parameters** to a function, one per line, in the course function header.
  - **All function declarations** will appear in the global declaration section of your program.
  - **The user-defined function definitions will appear in your program after the** `main` **function.**
- Indent all code found within the `main` and all user-defined functions **exactly** two spaces.
- Place a **single space** between all operators and operands.
- Comment **all** variables to the right of each declaration. Declare only one variable per line.
- Notice that several programs (see program 2-9 on pages 74-75) in the programming text use a single line comment to indicate the start of the local declaration and executable statement sections of a function.
  - At no point during the semester should these two sections ever overlap.
- Select **meaningful identifiers** (names) for all variables in your program.

When you submit... only the final successful submission is kept for grading. All other submissions are over-written and cannot be recovered. You may make multiple submissions but only the last attempt is retained and graded.

- Verify in the confirmation e-mail sent to you by the course that you have submitted the correct file to the correct assignment.
- Leave time prior to the due date to seek assistance should you experience difficulties completing or submitting this assignment. All attempts to submit via a method other than through the appropriate assignment on Vocareum will be denied consideration.

Assignment deadlines... are firm and the electronic submission will disable promptly as advertised. We can only grade what you are able submit via Vocareum prior to the assignment deadline.