Goal:
Exercise the use of control structures and data input error checking in a C++ program.

Assignment:
Replace the three separate programs (rectangle, square, and circle) from Project #1 with a single program that can calculate the area of a geometric shape (rectangle, square or circle). Your new program will display a menu that allows the user to select a geometric shape for which the area is to be calculated. After the user selects a shape, you will prompt the user to enter the appropriate parameters for that shape and calculate the area. After the area is calculated, you will print out the results and redisplay the selection menu until the user decides to terminate the program.

As an example consider; the following invocation of the simpleShape C++ program (data entered by the user is shown in bold font):

```
$ ./simpleShape
Shape Menu:
(r) rectangle
(s) square
(c) circle
(0) exit
Type the letter for the desired shape: s
You selected a square.

Please enter the length of the square: 4.0
The area of the square with length (4) = 16.0 units squared

Shape Menu:
(r) rectangle
(s) square
(c) circle
(0) exit
Type the letter for the desired shape:
```
The skill set required for this assignment includes:

- Selection statements
- Looping constructs
- Algorithm design
- Input data error control

This graded assignment is worth 100 points and will be counted as part of your programming grade for the course. The points for this project are further divided as follows:

- The core components of your program including the user menu and prompts, the looping structures, the selection logic, the area computations, etc. are worth 70% of the total (or 70 points).
- Additionally, your program must include error checking as described in the special instructions below. This part of the project is worth 30% of the total (or 30 points).

Special Instructions

- The menu in your program does not need to look exactly like the example above (it may, but it does not have to). However, your menu does need to request the same user input as shown above; specifically r for rectangle, s for square, c for circle, and 0 (the number zero) to exit.
- Part of error control for this project is to recognize when the user enters invalid data at the menu prompt. Your program should recognize when an invalid value has been entered, it should provide the user with an appropriate notification, and offer the user the option to continue (in which case the menu will be redisplayed), or to exit the program.
- Additionally, your program should recognize if the user enters invalid data for any of the shape dimensions. In that case the program should exit "gracefully" and inform the user that the program has terminated. Further, the program should inform the user of why the program abnormally terminated and what action to take if they wish to run the program again. For example the following would be an acceptable message to the user stating why program terminated. “Invalid input data. Expected a floating point value, but a character was entered”

The product that you submit must be your own work. Collaboration is allowed as specified within the syllabus for this course. For this assignment, you are not required to submit an acknowledgement statement.

Your programs must be posted to Blackboard no later than 6:00pm, Tuesday, September 27th.