Laboratory 5: Writing a Library of Methods

Objective. Develop a collection of commonly used methods.

Discussion. In this lab we will be building up a library of methods that we may find useful at some later time. A little time spent now, carefully considering how these methods ought to be written, can save considerable amounts of time later when code reuse can be employed.

While we will not always know the context in which a method will be used, we can generally make a reasonable guess. Whenever possible, we should try to make the implementation of a method as general as possible. This includes:

- Careful thought about the appropriate information to be passed to each method.
- Consideration of the most general types that can be used parameters and return values.
- Avoidance, if possible, of the use of static instance ("global") variables.
- Appropriate documentation of pre- and postconditions.

Procedure.

For each of the following functions and procedures, write the method, and test it carefully, before going on.

1. A method that picks a random number between low and high, inclusive.
2. A method that picks a random floating point number between low and high, inclusive (Hint: Read up on `Math.random` in Appendix D).
3. A method that draws a triangle in a drawing window.
4. A method that updates the position of three points to reflect three points clicked in the drawing window. A "rubber band" line should be drawn between the mouse and the last point (if any). When the point is placed, the rubber band line becomes solid.
5. A method to compute the distance between two points.
6. A method to compute the midpoint of two points.
7. A method to compute the center of mass (centroid) of three points.
8. A predicate to determine if two circles overlap.
9. A method that returns true if two `Rect`s overlap.
10. A method that draws a `String` centered at point `p`, and returns a `Round-Rect` that was drawn about the `String` to form a button.

11. A method that waits for a both a click and a release within a provided rectangle.

12. A method that pauses for a `double` number of seconds.

Thought questions. Consider the following questions as you complete the lab:

1. How might you write a method that draws all the pixels within the triangular region defined by three points?

2. Is it possible to swap the value of two `int`s without the aid of a third?