

## ITEC 324

### Homework (Programming Assignment) 2

#### **Problem Specification**

1. Enhance the ShapeIcon class so that it can display multiple moving shapes. Hint: in the class, include an array list of shapes and methods to add and remove shapes to the set of objects that are displayed. (This is based on problem 4.20 in your text.)
2. Main Window with 4 buttons (Show, Exit, Add, Remove) and a checkbox group (Airplane, Boat, and Clock)
  - Show button - When clicked, a new subwindow should be displayed. If the window does not already exist, it should be created.
  - Add button - When clicked, a new airplane, boat, or clock shape (depending on which checkbox is selected) is added to the subwindow, at a random location. When added, the airplane, boat, or clock is automatically in motion across the screen. If the subwindow is not currently showing, it is displayed (first being created, if necessary).  
Note: If multiple shapes are clicked, all of the selected shapes must be added.
  - Remove button - When clicked, the most recently added shape is removed. If the subwindow is not currently showing, the button has no effect.
  - Exit button – When clicked, all the windows should close and the application should terminate.
  - Checkbox group - Checkboxes for Airplane, Boat, and Clock that specify whether an airplane, a boat, or a clock is added when the Add button is pressed. The initial state of the checkbox group should have the Airplane box checked. Multiple checkbox can be checked.
  - Note: Airplane, Boat, and Clock must have more than two colors.
3. Subwindow which has one JLabel and two buttons (Hide and Exit)
  - JLabel – Displays the airplanes, boats, and clocks that are added to
  - Hide button – When clicked, the subwindow disappears but continues to exist. The animation should halt when the subwindow is hidden.
  - Exit button in the subwindow – When clicked, the subwindow should be closed and destroyed. The main window should NOT be closed.
4. UML Documentation:
  - Class diagram of your system
  - Sequence diagram showing the scenario of displaying the subwindow, adding an airplane, a boat, and a clock to it, hiding the subwindow, showing the subwindow again, and then exiting the system.

**Notes:**

- All the icons should wrap. That is, once an icon disappears at the edge of the window, it should appear at the opposite side of the window.
- You are to include java documentation for all of your non-private classes and methods. Since I will run the javadoc command on your program, you do **NOT** need to submit the output from the javadoc command.
- Your program should be in the default package - it should *not* be in a named package.
- Your UML documentation should not be hand written.
- *Hand in a hard copy (NOT an electronic copy) of your UML diagrams at the beginning of the class on the due date*
- Your program must include a class called MultiShapeTest that contains the main routine that runs your user interface.
- Please check the grading criteria in the class syllabus.