CSC108H lab – week 3

This document contains the instructions for the week 3 CSC108H lab. To earn your lab mark, you must actively participate in the lab. *You don't need to finish in the time alloted, you just need to try hard.*

In this lab, you will write several subclasses of class `JFrame`.

1 Driver and navigator

driver: The person typing at the keyboard.

navigator: The person watching for mistakes, and thinking ahead.

Throughout the lab, you'll be switching back and forth between the driver and navigator roles. The most important rule for this lab:

> **The navigator must not touch the keyboard.** If the navigator does type when they are not supposed to, the navigator will get a zero for this lab.

2 Screen size

Sit down with your partner. The rest of these instructions call you two `s1` and `s2`. Pick which one is which.

`s1` should log in and start up DrJava, and be the first driver.

- Type the following into the Interactions pane. This gets the screen height and width and saves them in `int` variables `screenWidth` and `screenHeight`.

  ```
  import java.awt.*;
  Dimension d= Toolkit.getDefaultToolkit().getScreenSize();
  int screenWidth= (int) d.getWidth();
  int screenHeight= (int) d.getHeight();
  d
  screenWidth
  screenHeight
  ```

  Whenever you need to know how big the screen is, you can use those statements. (`d.getWidth()` and `d.getHeight()` return `double`s, but `JFrame`'s `setSize` method needs `int`s. `(int)` is a typecast: it converts a `double` value to an `int` value. As an exercise, see what happens if you leave out the typecast.)

3 Working with the screen size

Write a subclass of `JFrame` called `MaxWindow` that has the following methods. Test each method from the Interactions pane after you write it. You should use the `Toolkit` code to get the screen dimensions. Save the class in a file called `MaxWindow.java`.

- **Switch roles: `s2` drives and `s1` navigates.** Write a `void` method called `maximizeHeight`, which moves the window to the top of the screen and makes it as tall as the screen.
- Write a `void` method called `maximizeWidth`, which moves the window to the left of the screen and makes it as wide as the screen.
- **Switch roles: `s1` drives and `s2` navigates.** Write a `void` method called maximize, which moves the window to the top left of the screen and makes it as big as the screen. You must do this by calling `this.maximizeHeight` and `this.maximizeWidth`.

Visit the course website. Under "Assignments", click "St. George submission instructions". Log in using your `c2xxxxxx` account information. Submit `MaxWindow.java` for assignment `A1` (you won't be graded on the content of `MaxWindow.java`).

4 Parameters and return values

Write a subclass of `JFrame` called `TilingWindow` that has the following methods. Test each method from the Interactions pane after you write it. You should use the `Toolkit` code to get the screen dimensions. Save the class in a file called `TilingWindow.java`.

- **Switch roles: `s2` drives and `s1` navigates.** Write an `int` method called `widthRatio` that has one parameter, a `JFrame j`, and returns the width of this window divided by `j`'s width.
- **Switch roles: `s1` drives and `s2` navigates.** Write a `boolean` method called `canTileSideways` that has two parameters, an `int i` and a `JFrame j`, and returns `true` if `i` copies of `j` will fit side by side inside this window. For example, if `i` is 8, `j` is 50 pixels wide, and this window is 430 pixels wide, then the result is `true` because 8 copies of `j` can fit side by side. However, if `i` is 10, then the result is `false` because 10 copies of `j` won't fit: $10 \times 50 > 430$.

  Can you do this without declaring a boolean variable?
- **Switch roles: `s2` drives and `s1` navigates.** Write a `boolean` method called `canTile` that has two parameters, an `int i` and a `JFrame j`, and returns `true` if `i` copies of `j` will fit inside this window in a grid pattern. Hint: figure out how many times `j` fits horizontally and how many times `j` fits vertically, and go from there.

  Can you do this without declaring any variables?

Submit `TilingWindow.java` through the course website for assignment `A1` (the content of this file won't be graded).