IST 256
Lab Week 2 – Tuesday, January 21, 2014

Lab Exercise 1. Reviewing Arithmetic

These are "thought" problems. Just write the answers on the paper. There is no need to run a program in NetBeans.

a. Suppose we two variables declared and assigned the value 5, but one of them is an int and one is a double:

    int numunits = 5;
    double price = 5.0;

What is the difference in performing division on these two variables? For example, how are the values different for the following two expressions:

    numunits / 2
    price / 2

b. Suppose that we have two integer variables declared and initialized.

    int evenNumber = 4;
    int oddNumber = 5;

What is the value of the modulus (remainder) operator on these variables with the value 2?

    evenNumber % 2
    oddNumber % 2

Can you write the beginning of an if statement that tests a variable called number to see if its value is even?

    int number = ??;

Test to see if the number is even:

Lab Exercise 2. Writing a GUI program for Compute Salary

1. Login to lab computers

2. Open NetBeans and create a new project
Go to the Program menu and find NetBeans. Start a new project in NetBeans and create a Java GUI Application called ComputeSalary. If you need to look at the details, refer back to the instructions from last week. But remember the three main steps: create the new project, create the new JFrameForm and name it something like ComputeSalaryUI, and set the Properties under Run to have the form as the main class.

3. **The program specification (statement of problem)**

Given the number of hours that an employee works in a week, their salary is computed as follows: If the number of hours is less than or equal to 40, the pay rate is $10 per hour. If the number of hours is greater than 40, the employee is paid $10 per hour on the 40 hours plus $15 per hour overtime rate on the number of hours greater than 40. (Get the number of hours from a TextField on the form and display the salary in a Label.)

4. **Create the Form Design**.
   * **Add a label to the form** by dragging it from the Palette pane (upper right hand side).
       o Scroll down to find the text property and change it to an instruction to the user, something like "Type number of hours worked."
   * **Add a textfield to the form** by dragging it from the Palette pane.
       o Change the text property to be 0 (and hit enter). Then resize the textfield on the form with your mouse.
   * **Add a button to the form** by dragging it from the Palette pane.
       o Change the text property of the button to be an instruction to the user, e.g. Compute Salary.
   * **Add another label** to the form below the button to show the Salary. (We'll use this label to show the result, instead of a TextField.

The resulting form will look something like:

       Type number of hours worked: |__0_____|

                  | Compute Salary | (Button)

                  Result Salary   (Label)

   * **To add a program to be executed** when the user clicks the button, right click on the button on your form and select Event -> Action -> actionPerformed.

5. Add the Program

First add a comment to the button event method to document its actions:

Go to the Source tab and find the actionPerformed method and add a comment before it. My comment (using the multi-line comment notation):

/* Get the number of hours worked from the form and compute the Salary
 *   and display it in a label
 * Programmer: Nancy McCracken
 */

Add the code right after the comment with TODO:

For each step, add a comment and then on the next line(s), add the programming statement(s) that perform the computational step described.

[These steps correspond to the similar program developed in class:

      Step 1:   // declare variables for hours worked and resulting salary
           Add the declarations for two variables, hours and salary
      Step 2:   // get the number of hours that the user typed into the textfield
           Add the statement that assigns the input into the hours variable.
      Step 3:   // pay rate is $10 on hours <= 40 and $15 for hours overtime
           Add the if statement that computes the salary
      Step 4:   // display the salary (as a decimal number) in the second label
           jLabel2.setText("Salary = " + String.valueOf(salary));   ]

- **Run this program** by the little green triangle on the top bar.
  - o When the program executes, it should bring up the user interface form, and you should type in an integer into the text field. Then click on the button to get the salary.

- **Test your program with three integers:**
  - o **Write down what integers you typed in and what the results are here. Make sure that at least one integer is greater than 40. Do the results look plausible?**

Hours	Salary

- Note that NetBeans saves your project as you work.

Lab Exercise 2 – Modifying the ComputeSalary program – work on your own

1. Program Specification
   Change the ComputeSalary program so that it also allows the user to type in whether they work the night shift or day shift. The user will either type the text "night" or "day" (type it without the quotes). Then the salary is computed as follows:
       The salary is computed with the pay rate of $10.0 for hours <= 40
               and pay rate of $15 for hours > 40 as before (no need to change this code).
       In addition, if they work the night shift, add a bonus of $20 to the salary.

2. **Add to the form:**

Add a third label right under the Type hours label to say "Type shift, either night or day" and a second textfield beside it that starts as an empty textfield.

The resulting form will now look something like:

        Type number of hours worked: |__0_____|
        Type shift, either night or day: |_____|

                | Compute Salary | (Button)

                Result Salary   (Label)

3. Add code to your program.

Go to the actionPerformed function that you wrote before.
Add a third variable declaration for a variable of type String that will represent the shift.

Write a statement that will get the value of shift from the second Textfield (jTextField2)
Note that you don't need to convert the String to a number.

After the *if* statement, add another *if* statement to add to the salary if the user should get a bonus.
        the condition of the if statement will compare Strings: (shift.equals ("night")).
        the body of the if statement will add 20.00 into the current value of salary.

4. Run this program by the little green triangle on the top bar.

5. Test your program:

   Perform the following 4 tests, using the input indicated and show the result.

Test Run	Hours	Shift	Salary
1	46	day	
2	32	day	
3	46	night	
4	32	night	

6. Answer the following questions about the program that you wrote:

Write down the **condition** of the first if statement:

Write down the **condition** of the second if statement:

Hand in this lab sheet either at the end of class today or by the beginning of class on Tuesday, January 28.