CS 112 - Intro to Computer Science II - Java

Homework Exercises (10 points each)

Chapter 11 - Programming Projects Handout #3

Project 1:

1. One of the most common examples of recursion is an algorithm to calculate the **factorial** of an integer. The notation *n*! is used for the factorial of the integer *n* and is defined as follows:

   0! is equal to 1
   1! is equal to 1
   2! is equal to 2*1 = 2
   3! is equal to 3*2*1 = 6
   4! is equal to 4*3*2*1 = 24
   .
   .
   n! is equal to n*(n-1)*(n-2)*…*3*2*1

   An alternative way to describe the calculation of n! is the recursive formula *n**(*n*-1)!, plus a stopping case of 0! being defined as 1. Write a static method that implements this recursive formula for factorials. Place the method in a test program that allows the user to compute *n*! (with an invocation of your static method), where the user inputs the value of *n*. Your program should allow the user to enter another value for *n* and repeat the calculation until they want to end the program.

Project 2:

1. Write a static recursive method definition for a method that takes one parameter of type *String* and returns a *boolean* value. The method return **true** if the argument is a palindrome and **false** otherwise. A **palindrome** is a string that reads the same forward and backward, such as "radar". Disregard spaces and punctuation marks, and consider upper- and lowercase versions of the same letter to be equal. For example, the following would be considered a palindrome by your method.

   "Straw? No, too stupid a fad, I put soot on warts."

   Your method need not check that the string is correct English phrase or word. The string "xyzczyx" will be considered a palindrome by your method. Embed the method in a program and test it.