# CPSC 1045: In Lab Exercise 6 [10 marks]

Complete these exercises individually. Please follow the instructions **carefully** and complete all of the steps. Demonstrate to the instructor that you have completed the exercises prior to leaving the lab today.

1. Create a new HTML file called ex6.html. Add the usual tags to make a complete HTML file. In the same directory, create a new JavaScript file called ex6.js. Inside ex6.js create the following functions:
    a. Write the function `factorial(n)`. The function should accept a positive integer n as a parameter and return n! Your function should do the following steps:
        - Check that n is a positive integer; if it is not, print an error message to the console
        - Calculate the factorial of n. The factorial of n is calculated by multiplying together all of the numbers from 1 to n.
          Ex. 5! = 5*4*3*2*1 = 120
          Ex. 0! = 1
        - **Return** (do not print) the calculated value

        Sample Output
        Typing `factorial(3)` into the console should return `6`
        Typing `factorial(-10)` into the console should return `ERROR: not positive`

    b. Write the function `choose(n,k)`. The function should accept two positive integers, n and k, as parameters. Your function should calculate and return $C_{n,k}$ (pronounced N choose K). Your function should perform the following steps:
        - Check that n and k are positive integers and k is smaller than n. If they are not, print an error message to the console
        - Calculate $C_{n,k}$ using the following formula: $C_{n,k} = \frac{n!}{k!(n-k)!}$
        - **Return** (do not print) $C_{n,k}$.

        NOTE: You **must** call/invoke the factorial function you created in part A three times to complete part B.
        Sample Output
        Typing `choose(10, 5)` into the console should return `252`
        Typing `choose(5, 10)` into the console should return `ERROR: n smaller than k`

2. Test that your JavaScript correctly executes for all of the problems by opening ex6.html in the browser and **invoking the functions in the console using different inputs**.
3. When you have completed the exercises, call over the instructor or the lab assistant and demonstrate your program works. Be prepared to explain how your functions work.

**Grading**

- 4 marks A
    - 0.5 mark error checking, 3 marks calculating, 0.5 mark return
- 6 marks B
    - 2 marks error checking, 3 marks calculating, 1 mark return