

# Assignment 2 - Factorials

Ryan Brinson

August 2023

## 1 Psuedocode

---

**Algorithm 1** Main

---

**Require:**  $n$

**Ensure:**  $n \in \mathbb{N}$

- 1: FACTORIAL( $n$ )
  - 2: **output** The factorial of  $n$  is  $n!$
- 

---

**Algorithm 2** Factorial

---

- 1: **function** FACTORIAL( $n$ )
  - 2:     **if**  $n = 0$  **then**
  - 3:         **return** 1
  - 4:     **else**
  - 5:         **return**  $n * \text{FACTORIAL}(n - 1)$
- 

## 2 Output

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\rbrin\OneDrive\School\CS 3305\Assignments\A2\Factorial> & 'C:\Program Files\Eclipse Adop
tium\jdk-17.0.8.7-hotspot\bin\java.exe' '-XX:+ShowCodeDetailsInExceptionMessages' '-cp' 'C:\Users\r
brin\AppData\Roaming\Code\User\workspaceStorage\8de8c13acd66a2093b4ff05a92a8dea\redhat.java\jdt_ws\
Factorial_18c48ee1\bin' 'Factorial'
Enter a non-negative integer: 5

The Factorial of 5 is 120

PS C:\Users\rbrin\OneDrive\School\CS 3305\Assignments\A2\Factorial> |
```

### 3 Code

```
// Name:          Ryan Brinson
// Class:         CS 3305/ W04
// Term:          Fall 2023
// Instructor:    Carla McManus
// Assignment: 2   Part 1 Factorial

import java.util.Scanner;

public class Factorial {

    public static void main(String[] args) {
        // Initialize the input scanner
        Scanner input = new Scanner(System.in);

        // Prompt the user to to enter a value
        System.out.print("Enter a non-negative integer: ");
        int n = input.nextInt();

        // Check to make sure the value is greater or equal to 0
        while (n < 0) {
            System.out.println("\nThe number you entered is invalid");
            System.out.print("Enter a non-negative integer: ");
            n = input.nextInt();
        }

        // Print and run the factorial simultaneously
        System.out.println("\nThe Factorial of "
            + n + " is " + factorial(n) + "\n");

        input.close();
    }

    //———— Factorial Subroutine————//
    public static long factorial(int n){
        // If the passed value is 0 return 1
        if (n == 0) return 1;

        // If the passed value is not 0 pass a decremented value to another
        // instance of factorial and multiply that by the initial value
        else return n * factorial(n - 1);
    }
}
```