5.4: Recursion

IT1406 - Introduction to Programming

Level I - Semester 1

5.4. Recursion

- Java supports *recursion*. Recursion is the process of defining something in terms of itself. As it relates to Java programming, recursion is the attribute that allows a method to call itself.
- A method that calls itself is said to be *recursive*.
- The classic example of recursion is the computation of the factorial of a number.
- The factorial of a number *N* is the product of all the whole numbers between 1 and *N*. For example, 3 factorial is 1 × 2 × 3 ×, or 6. Here is how a factorial can be computed by use of a recursive method:

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```
// A simple example of recursion.
        class Factorial {
        // this is a recursive method
        int fact(int n) {
                int result;
                if(n==1) return 1;
                result = fact(n-1) * n;
                return result;
        }
}
class Recursion {
        public static void main(String args[]) {
                Factorial f = new Factorial();
                System.out.println("Factorial of 3 is " + f.fact(3));
                System.out.println("Factorial of 4 is " + f.fact(4));
                System.out.println("Factorial of 5 is " + f.fact(5));
        }
}
```

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- The output from this program is shown here:

  Factorial of 3 is 6
  Factorial of 4 is 24
  Factorial of 5 is 120

- When **fact( )** is called with an argument of 1, the function returns 1; otherwise, it returns the product of **fact(n–1)*n**. To evaluate this expression, **fact( )** is called with **n–1**. This process repeats until **n** equals 1 and the calls to the method begin returning.