

# **Programming 1**

## **Monitored Assignment 2**

**Group Members:** Rami Bader, Rodion Danilenko, Kamrul Islam Sajib

### **Description of the algorithm:**

The algorithm first validates the new object of type UnlimitedInteger with the String.matches() method.

It stores the signs of both operators in order to determine whether the two numbers need to be added or subtracted, and the signs are removed. After that, leading zeros are appended to the shorter number until both operators have equal length.

If the signs of the operators are the same, an adding operation is performed. The numbers are added digit by digit and a carry bit is assigned if the result of the operation is greater than nine. If both numbers are negative, a "-" sign is appended in front of the result.

If the signs of the operators are different, a subtracting operation is performed. First, the numbers are compared digit by digit from left to right in order to determine the bigger number. After that the smaller number is subtracted from the bigger number digit by digit. A bit is borrowed if the result of the operation is less than zero. If the bigger number in absolute value is negative, a "-" sign is appended in front of the result.

The multiplication is performed by multiplying the first operator to every digit of the second operator. A carry bit is assigned if necessary. The intermediate results are added together using the method for addition. In the end, any leading zeroes are omitted. If the two numbers are of different signs, a "-" sign is appended in front of the final result.

The method plus() accepts the variable of object UnlimitedInteger and converts it to string, applying method toString(). The same happens in method times(). Then, a relevant method from the class(Main or Multi) is called. The last step is a creation of a new object UnlimitedInteger and returning it.

The equation is made from the method plus() and times().