



**Object Oriented Programming Course (CS213)**  
**Under Supervision Eng. Rana Abdelkader**

**Group: S21**

**Assignment 2 – Part 1**

**Done By:**

Name	ID	Methods
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Jana Mohamed Ramadan	20220470	Constructors , (<, >, ==) Operators Overload

### **(+) Operator algorithm:**

- First uses pad() function to pad the smaller number(if any) with zeros to make them equal in size.
- Initializes a carry variable to zero to use it for any carry over.
- Checks over the sign of each variable and enters the correct condition accordingly:
  - o If both numbers are the same sign add them normally and set the sign of the result to that same sign.
  - o If they are different signs convert addition to subtraction and set sign according to the larger number.
- Iterates over each char in the fraction part from end to start and adds it to the corresponding in the fraction part of the other BigReal with the carry.
- Calculates the result , if it is more than 9 , it increments the carry variable , then takes only the last digit.
- Same algorithm is used in the integer part.
- Then result is combined with the sign and returns in a BigReal called value.

### **(-) Operator algorithm:**

- First uses pad() function to pad the smaller number(if any) with zeros to make them equal in size.
- Initializes a borrow variable to zero to use it for any borrow propagation.
- Checks over the sign of each variable and enters the correct condition accordingly:
  - o If both numbers are positive and left is bigger it subtracts normally
  - o If both are positive but right is bigger it swap them and negate the result.
  - o If both are negative just swap them and subtract
  - o If they are different signs convert subtraction to addition and change sign accordingly.

- Iterates over each char in the fraction part from end to start and subtracts it from the corresponding in the fraction part of the other BigReal while subtracting also the borrow.
- Same algorithm is used in integer part.
- Then result is combines and returns in a BigReal called value.

### **(>) Operator algorithm:**

- First checks the sign of both variables , if left is +ve and right is negative it returns true.
- If vice versa it returns false .
- If both of them have the same sign but both are negative it swaps them then continues the algorithm.
- First we check the size of the two variables without any leading zeroes , if left is bigger it return true.
- If both are equal in size it iterates over each digit and compares it if it finds a digit in left larger than right it returns true , if not it returns false.

### **(<) Operator algorithm:**

- Returns true if (>) and equality operator are false.

### **isValidReal algorithm:**

- Using regex we check over the string inputted by the user.
- It first checks if there is a + or – in the beginning of the string.
- It returns true if the string only has one sign and one dot.
- If false it exits the program with an invalid input error message.