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EECS 132 Introduction to Java

Project 3 Testing Report

Method: RealNumber (int precision, boolean isNegative, int[ ] data)

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| Test | Type of things that must be tested |
| 0 | Precision of 0,  Data array of length 0  Data array with input at index 0 |
| 1 | Precision of 1  Data array length of 1  Data array with input at index 1 |
| Many | Many digits after decimal (large precision)  Data array with many inputs  Data array with inputs at many indexes |
| First | Data array input at first index |
| Middle | Data array input in middle |
| Last | Data array input at last index |

My first constructor was tested by inputting values and calling get methods. The inputted data was return when I called the get method. I also call the to string method on my RealNumbers and the correct string representation of the data array was returned. An empty array input resulted in zeros in data array and the length corresponded to the precision. An empty array input with 0 precision resulted in an empty data array. All the RealNumber that were initialized in the RealNumberTest worked and also worked in the following methods.

Method: RealNumber (int precision, String value)

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| Test | Explanation |
| 0 | Precision of 0  String length of 0 should result in an error |
| 1 | Precision of 1  String length of 1  1 digit before decimal  1 digit after decimal |
| Many | Many digits after decimal (large precision)  Long length string input  Many digits before decimal  Many digits after decimal |
| First | Non-zero digit at first index |
| Middle | Non-zero digit in middle index |
| Last | Non-zero digit at last index |

The second constructor was tested by creating instances of RealNumber. I used the get methods to get the precision, data, and string values. The returned values were what I expected for the RealNumber instances created in this constructor. A string with length 0 would result in an error because it is not a value number. I tested strings with length 1 and 1 digit before and after decimal. I test string with many char. They all work and the RealNumber instances also work in my methods.

Method: getPrecision()

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| Test | Explanation |
| 0 | Precision 0 |
| 1 | Precision 1 |
| Many | Larger precision |

The precision I set was the precision returned.

Method: getData()

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| Test | Explanation |
| 0 | Data array with 0 length String value of 0 results in array with only 0 as input |
| 1 | Array input with length 1 in 1st constructor  String length of 1 that results in array with length 1 in 2nd constructor |
| Many | Array with many digits  String with many chars result in array with long length  Precision longer than data input length |
| First | String that results in a digit at first index of array  Array with nonzero digit at first index |
| Middle | String that results in a digit in middle index of array  Array with nonzero digit at middle index |
| Last | String that results at last index of array  Array with nonzero digit at last index |

The data array set was the data array returned. The string input resulted in the correct corresponding data array.

Method: isNegative()

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| 1st conductor, negative number |
| 2nd conductor, negative number |
| 1st conductor, positive number |
| 2nd conductor, positive number |

The isNegative assigned is the isNegative returned.

Method: toString()

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| Test | Explanation |
| 0 | String of 0 length should result in error - not a valid number  Precision is 0 |
| 1 | String of length 1  Convert data of length 1 to string  String with 1 digit before decimal  String with 1 digit after decimal  Precision is 1 |
| Many | String of many digits  Convert array of many digit to string  String wither less digits after decimal than precision  String with more digits after decimal than precision |
| First | Convert array with digit at first index to a string  Non-zero digit at first char |
| Middle | Convert array with digit at middle index to a string  Non-zero digit at middle char |
| Last | Convert array with digit at last index of string  Non-zero digit at last char |

RealNumber with precision 0 resulted in a whole number ending in a decimal (e.g. 156.). RealNumbers with strings and array inputs that have values at first, middle, and last had the correct number value string returned. Data arrays were correctly converted to strings.

Method: compare

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| Test | Explanation |
| 0 | Different digits at 0 index of array  0 different digits in array  Two data array that both equal 0 |
| 1 | Arrays with length 1  Different digits at index 1 of array  Data array with just 1 different digit |
| Many | Arrays with many digits  Array with many different digits |
| First | Different digit at first index of array |
| Middle | Different digit at middle index of array |
| Last | Different digit at last index of array |

Tested strings with different digits at first, last, middle index of array and string. Compare RealNumbers with 0 precision, 1, precision, and larger precisions. Tested array with length 1 and longer lengths and strings with length 1 and longer lengths.

Method: compareTo

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| Test | Explanation |
| 0 | Different digits at 0 index of array  0 different digits in array  Two data array that both equal 0 |
| 1 | Arrays with length 1  Different digits at index 1 of array  Data array with just 1 different digit |
| Many | Arrays with many digits  Array with many different digits |
| First | Different digit at first index of array |
| Middle | Different digit at middle index of array |
| Last | Different digit at last index of array |

Called the compare method

Method: equals

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| Test | Explanation |
| 0 | Different digits at 0 index of array  0 different digits in array  Two data array that both equal 0 |
| 1 | Arrays with length 1  Different digits at index 1 of array  Data array with just 1 different digit |
| Many | Arrays with many digits  Array with many different digits |
| First | Different digit at first index of array |
| Middle | Different digit at middle index of array |
| Last | Different digit at last index of array |

Called the compare method. If it returned 0, then equals to is true.

Method: add

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| Test | Explanation |
| 0 | Add 0 to a value  Add values with precision of 0 |
| 1 | Add 1 to a value  Add value of array length 1  Value of string length of 1  Add values with precision of 1 |
| Many | Add arrays with many digits  Add strings with many chars |
| First | Add to first index of array  Add to first char of string |
| Middle | Add to middle index of array  Add to middle char of string |
| Last | Add to last index of array  Add to last char of string |

Method: subtract

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| Test | Explanation |
| 0 | Subtract from 0  Subtract 0 from value  Subtract value with precision 0  Subtract from a value with many 0s |
| 1 | Subtract 1 from value  Subtract string of length 1  Subtract data array with length 1 |
| Many | Subtract strings with many char  Subtract array with many digits |
| First | Subtract from first index of array  Subtract from first char of string |
| Middle | Subtract from middle index of array  Subtract from middle char of string |
| Last | Subtract from last index of array  Subtract from last char of string |

Method: multiply

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| Test | Explanation |
| 0 | Multiply by 0  Values with precision of 0 |
| 1 | Multiply by 1  Array with length 1  Strings with length 1  Precision of 1 |
| Many | Array with many digits |
| First | Changes in digits at first index of array |
| Middle | Changes in digits at middle index of array |
| Last | Changes in digits at last index of array |

Method: divide

Only realnumber with precision of 1 or 0 worked. Precision greater than 1 resulted in out of memory error.

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| Test | Explanation |
| 0 | Values with precision of 0  Divide by 0 results in error |
| 1 | Divide by 1  Array of length 1  String with length 1  Precision of 1 |
| Many | Array with many digits and large precision |
| First | Changes in digits at first index of array |
| Middle | Changes in digits at middle index of array |
| Last | Changes in digits at last index of array |

My squareRoot method does not work because my division method uses too much memory

Method: squareRoot

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| Test | Explanation |
| 0 | Precision of 0  String with char at index 0  Data array with digit at index 0 |
| 1 | String length of 1  Data array with length of 1  Precision 1 |
| Many | Number with many digits, such as a long string or long data array |
| First | Test first index |
| Middle | Test middle index |
| Last | Test last index |