Sorting Competition: Group 3

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Score and times

Small(er) data set (final1.txt) results:

Test #	Runtime (ms)
1	265
2	188
3	302
Average	251

Placement: 1st

Large data set (final2.txt) results:

Test #	Runtime (ms)
1	1933
2	1855
3	1464
Average	1750

Placement: 1st

Description - General outline

- Divides input into three arrays, one for each of the set of positive decimals, negative decimals, and rationals. These values are stored in either DecimalPair or RationalPair objects
- Sorts negative/positive decimals using a helper method, recombines the resulting arrays into one decimal array
- Sorts rationals using a helper method
- Merges the two sorted arrays

Description - Primary helper functions

`void sort_rationals(RationalPair[])`

- Determines bucket size based on the number of rationals
- Distributes rationals into buckets
- Sorts each bucket using timsort with RationalPairCompare() as the comparator
- Reassembles original array in sorted order

`void sort_decimals(DecimalPair[])`

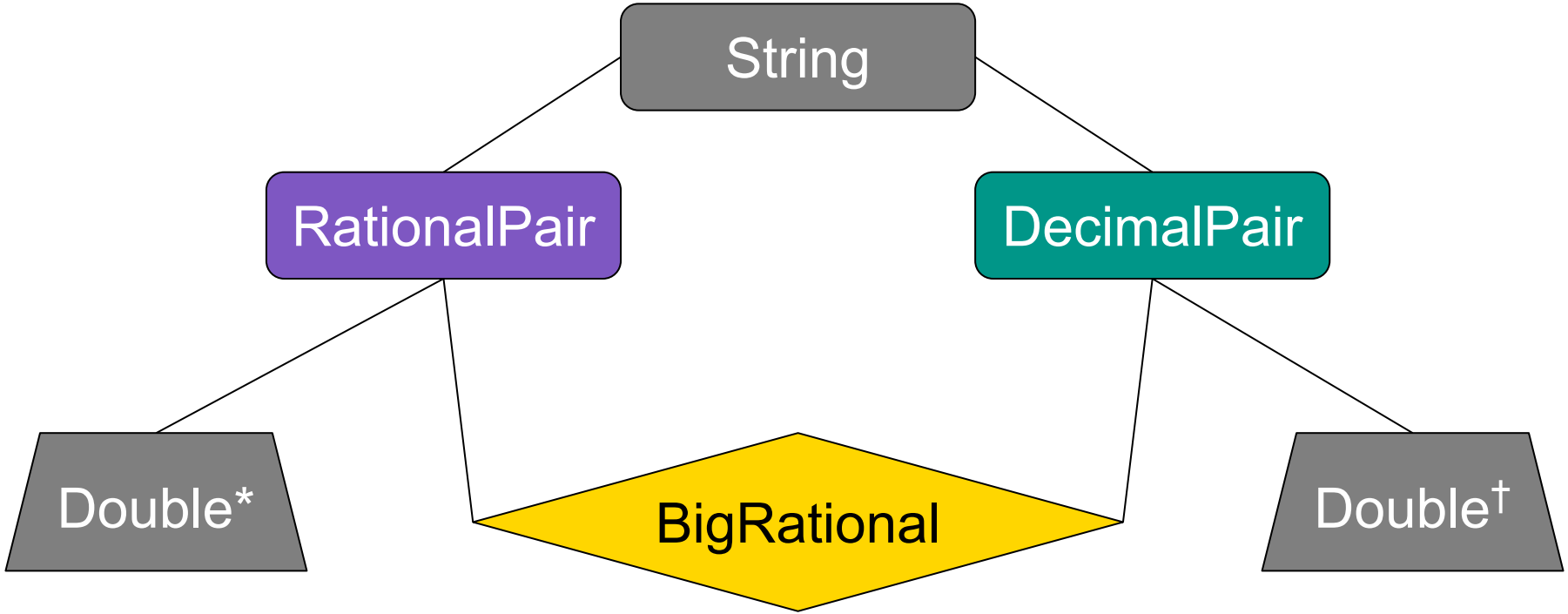
- Determines bucket size based on the number of decimals
- Distributes decimals into buckets
- Sorts each bucket using radix sort which uses counting sort as it's stable sort
- Reassembles original array in sorted order

Description - Primary helper classes

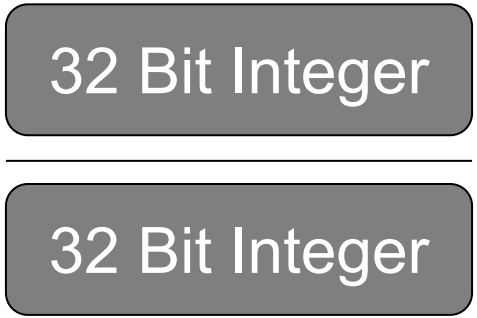
- BigRational
  - represents a fraction or decimal
  - constructor takes a string
  - contains important comparator
- RationalPair
  - represents a fraction
  - stores a numerator/denominator, decimal value, and BigRational
  - compare method allows us to compare fractions to decimals
- DecimalPair
  - represents a decimal
  - stores its decimal value, a BigRational, and other values useful for bucket sort

Data Storage

Data Storage



Rational Number:



Rational Number:

Rational Number:

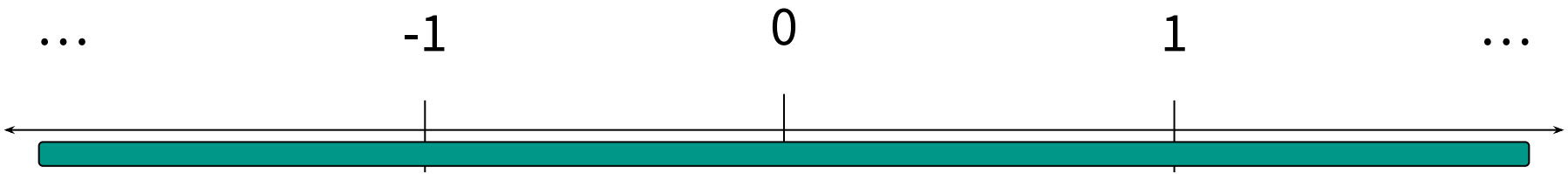
Double Precision Float:

Floating Point Magic

Floating Point Numbers Aren't Numbers

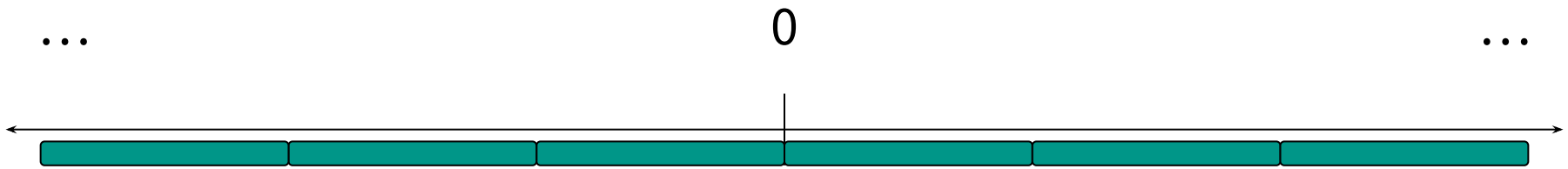
Floating Point Numbers Aren't Numbers*

Real Numbers



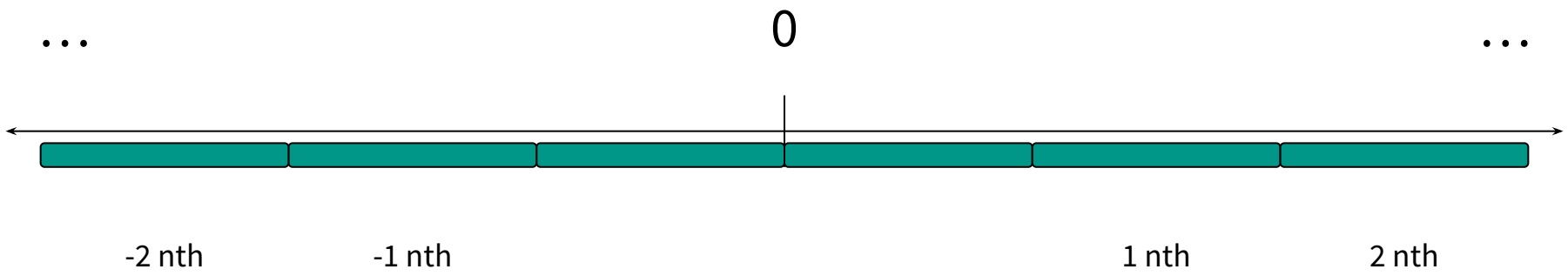
Floating Point Numbers

Real Numbers



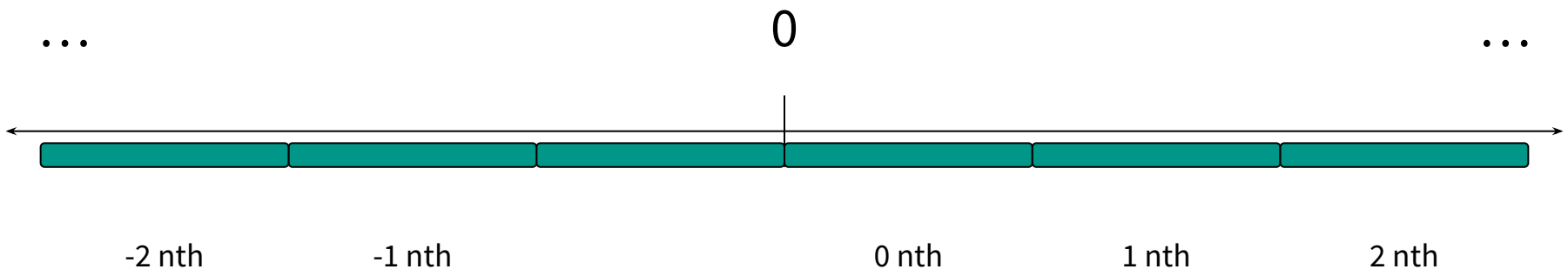
Floating Point Numbers

Real Numbers



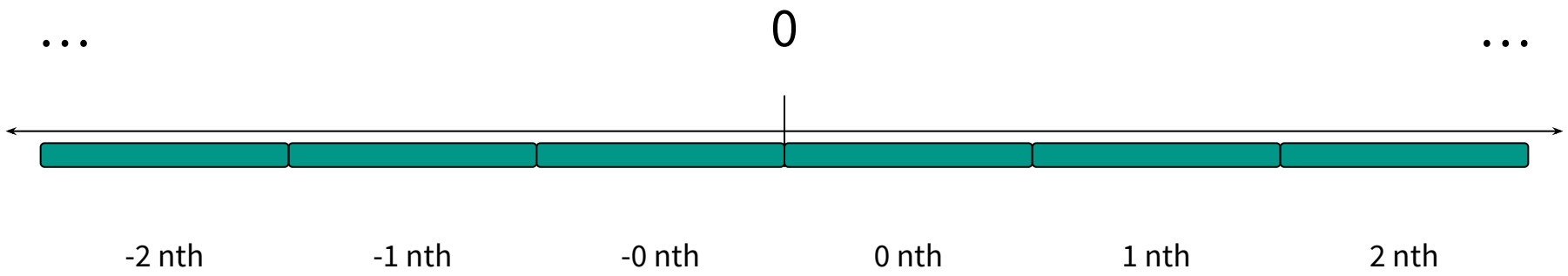
Floating Point Numbers

Real Numbers



Floating Point Numbers

Real Numbers



Floating Point Numbers

Comparing Rationals and Decimals

Decimal-ish

Rational-ish

Comparing Rationals and Decimals

Decimal-ish

Rational-ish

Comparing Rationals and Decimals