Working with function templates

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Sorting MathVector with insertion sort

• The book gave us a template version of an insertion sort [16-2].
  – We used it to sort integers, doubles, and characters.
• Function templates are great because it let you reuse algorithms
  – The same sorting algorithm should work for any data type that can be compared
• How about sorting MathVectors?
  – To do this you need to define what “is less than” means for MathVectors
• In order to reuse, you must make sure that your class works with the template!
A definition

• Given the for vectors \((2,2), (1,2,3.3), (1,2,3,4), (1,2,3)\), we will use the following working definition:
  
  \[(1,2,3) < (1,2,3,4) < (1,2,3.3) < (2,2)\]

• So the problem is: Given an array of MathVectors not necessarily of the same dimension, sort them according to the working definition above using the insertion sort function template.
Devise a plan – list the tasks

50. Analyze what we need to do for MathVector in order to get it working with the sorting template
   -- needs ‘=’, default constructor, (needed by swapValues);
   -- ‘<‘ (needed by indexOfSmallest)
   -- and copy constructors (“Class that overload ‘=‘ must also overload copy constructor)

51. Add default constructor to MathVector.
52. Add Copy constructor to MathVector.
53. Add operator < to MathVector.
54. Test the sorting template