

## Exercise – Containers and Dynamic Arrays

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### Exercises:

1. You will be implementing your own templated dynamic array class. Your class will need the following functions:
  - a. A constructor, destructor, assignment operator and copy constructor
  - b. Functions for adding and removing from the end of the array
  - c. Functions for adding 1 or more elements from the middle of the array
  - d. Functions for removing from the middle of the array. Both ordered and unordered removal
  - e. Functions for changing how much space is allocated for the array. If less space is allocated than is used, the extra used data is discarded.
  - f. A function for clearing the array.

### Challenge:

CHALLENGE: Add the following functions:

- a. A function for sorting the array
- b. A function that searches the array for a given element
- c. A function for concatenating two dynamic arrays together
- d. A function for randomly shuffling the array
- e. A function for rotating the array by a given amount
  - i. Rotating an array means to shift elements in a direction. Any elements that would fall off the end wrap back around to the start
  - ii. EG: rotating the array {1,2,3,4,5,6,7,8,9} by 2 would give {8,9,1,2,3,4,5,6,7} and rotating the array by -4 would give {5,6,7,8,9,1,2,3,4}