CECS 282 - Homework 9

Complete these problems on a separate sheet of paper. Due April 14.

1. Reading from *C++ How to Program*:
   (a) Chapter 7.10
   (b) *Skim* Chapter 15.1, 15.2
   (c) Chapter 15.5 sections: Creating a Vector, vector Member Function push_back, vector Growth, Outputting vector Contents With Iterators, Displaying the vector's Contents in Reverse (USEFUL FOR PROJECT 2)
   (d) Chapter 6.19
   (e) *Skim* Chapter 18.1, 18.2

2. Suppose the following code is run:

```
vector<Rational *> v;
v.push_back(new Rational(1, 3));
v.push_back(new Rational(3, 3));
v.push_back(new Rational(3, 3));
v.push_back(new Rational(4, 3));
v.push_back(new Rational(5, 3));
```

   Show with code how to clear the vector `v` so that it contains no elements, **without** leaking any memory for `Rational` objects that were created on the heap.

3. Write a template function `Swap`, which takes two **references** as parameters and swaps their values. Your function must work with **any variable type** that supports `operator=` and cannot use the built-in function `std::swap`.

4. We want to add an `operator=(const std::string& rhs)` assignment operator for the `Rational` class, taking a **string** in the form "*n*`/`*d*" as a parameter and parsing the string to assign a numerator *n* and denominator *d* to the `Rational` object. When implemented correctly, this will allow us to write code like:

```
Rational r;
r = "1/3";
// r is now the rational "1 over 3".
```

   Write code to:
   (a) Declare the operator in the `Rational` class declaration in Rational.h. (Like other assignment operators, this one should be a member operator and not a friend.)
   (b) Implement the operator in Rational.cpp. (Hint: `istringstream`.)