EGR 125 Due date: _____
Introduction to Engineering Methods (C++)
File: N125H10

Homework Assignment #10 – Vector<T> Container Class

Reading Assignment:
Read Chapter 17 in Programming In C++, by D'Orazio

Problem Assignment:

1. (75 points) Write a C++ program that uses vector<T> containers in each part. Turn in a printout of the program and the results in each case.
   A) Prompt the user to enter exactly 20 integers from the keyboard into a vector. After they have been stored in the vector, use vector and algorithm functions to find the min, max, total, and average. Display the results by outputting the vector contents to the screen (10 per line) as well as the min, max, total, and average.
   B) Read an unknown number of real numbers from a file (create the file first with at least 30 numbers) into a vector. Sort the numbers and display the results by outputting the vector contents to the screen (10 per line).
   C) Create a file containing the names of 15 cities. Use some cities with one word (e.g. Norfolk) and some with two or more words (e.g., Virginia Beach)). Write a program to read the cities (as strings) into a vector. From this vector create two more vectors, one with the names of the cities in alphabetical order, and one with the names of the cities in reverse alphabetical order. Display the contents of the three vectors.

2. (25 points) Determine the contents of vectors A, B, C, D, and E after the program below is executed (do not compile the program).

```
// Homework #10 - Vector<T> containers     Project:  HWVectorT
#include <iostream>
#include <vector>      // STL Vector<T> container class
#include <algorithm>   // STL algorithms
using namespace std;
int main()
{   int X[4] = {2,4,6,8};
   vector<int> A(X,X+4),B,C(8,4),D(8,0),E(8,0),F;
   unsigned int N = A.size();
   for (unsigned int i = 0; i < N; i++)
   {    A.push_back(A[i]);
        F.push_back(i+1);
   }
   copy(F.begin(), F.end(),D.begin());
   copy_backward(F.begin(),F.end(),E.end());
   for (unsigned int i=0; i<A.size(); i++)
   {   B.push_back(i*i);
       cout << A.at(i) << "\t" << B.at(i) << "\t" << C.at(i) << "\t";
       cout << D.at(i) << "\t" << E.at(i) << endl;
   }
```

```
    system("pause");
    return(0);  }
```