Lab Arrays & Vectors

## Activity

Provide your C++ source code and screenshots of your program outputs.

1. The Fibonacci numbers are defined by the following sequence:

f1 = 1

f2 = 1

fn = fn-1 + fn-2

Write a program that computes the first 100 Fibonacci numbers and stores them in an array. The program then allows the user to enter an integer n (which is a strictly positive number, i.e. greater than 0) and displays the nth Fibonacci number, fn, that is stored in the array.

1. The following program maintains a list of country names, and another list indicating average minutes of TV watched per day in each corresponding country.

#include <iostream>

#include <vector>

#include <string>

**using** **namespace** std;

**int** main() {

// Source: www.statista.com, 2010

**const** **int** NUM\_CTRY = 5; // Num countries supported

vector<string> ctryNames(NUM\_CTRY); // Country names

vector<**int**> ctryMins(NUM\_CTRY); // Mins TV watched daily

string userCountry; // User defined country

**bool** foundCountry = **false**; // Match to country supported

**int** i = 0; // Loop index

// Define vector contents

ctryNames.at(0) = "China";

ctryMins.at(0) = 158;

ctryNames.at(1) = "India";

ctryMins.at(1) = 119;

ctryNames.at(2) = "Russia";

ctryMins.at(2) = 226;

ctryNames.at(3) = "UK";

ctryMins.at(3) = 242;

ctryNames.at(4) = "USA";

ctryMins.at(4) = 283;

// Prompt user for country name

cout << "Enter country name: ";

cin >> userCountry;

// Find country's index and avgerage TV time

foundCountry = **false**;

**for** (i = 0; i < NUM\_CTRY; ++i) {

**if** (ctryNames.at(i) == userCountry) {

foundCountry = **true**;

cout << "People in " << userCountry << " watch ";

cout << ctryMins.at(i) << " mins of TV daily." << endl;

**break**;

}

}

**if** (!foundCountry) {

cout << "Country not found; try again." << endl;

}

**return** 0;

}

Modify the program as follows:

* print the time in hours and minutes, e.g., print "4 hours and 43 minutes" rather than 283 minutes
* If a user types “PRINT”, print the list of known countries along with the TV watch time for each country.
* If the user types "MAX", don't search the country list, but instead find the maximum minutes in the list and print that number along with the corresponding country.
* If the user types “ADD”, don’t search the country list, but instead allows the user to add a country and its corresponding TV watching time to the vectors.
* If the user types “MOD”, asks the user to enter the country for which data is modified and the new TV watching time, and then modifies the vectors accordingly.
* If the user types “DEL”, asks the user to enter the country for which data is modified, and then modifies the vectors accordingly.
  + You can delete an element at a specific index in a vector using the erase function: myVector.erase(myVector.begin() + index);
* If a user types a country name that isn't found, the program behavior should be the same as if the user enters “PRINT”.

Be sure to test all the modifications and provide screenshots that demonstrate the correct behaviors of your program.