

Interactive Broker

Question 1

Your task is to implement `Reduce` function using template. `Reduce` applies a function of two arguments cumulatively to the items of a STL container, from `begin()` to `end()`, so as to reduce the sequence to a single value. For example, `Reduce (<list containing 1,2,3,4,5>, std::plus<int>())` should calculate $((((1+2)+3)+4)+5)$.

```
class NotEnoughElements {};  
  
template <typename Container, typename Function>  
typename Container::value_type Reduce(const Container& c, Function fn) throw (NotEnoughElements)  
{  
    FILL OUT  
}
```

Write a C++ program that would find and print the first longest strictly ascending or strictly descending contiguous (not necessarily consecutive) subsequence for a vector of integers. For example, given a vector with 4, 2, 1, 2, 3, 4, 3, 5, 1, 2, 4, 6, 5, the program would find the underlined subsequence and print it.

Answer

Similar to tree's path length in Fidessa interview. We need to update the struct through single scan of the vector.

```
struct result  
{  
    int max_length;  
    int inc_length;  
    int dec_length;  
};
```

Question 2

You have a class that many libraries depend on. Now, you need to modify the class for one of the applications. Which of the following changes require recompiling all libraries before it is safe to build the application?

- add a constructor
- add a data member
- change destructor into virtual
- add an argument with default value to an existing member function

Answer

This is about binary compatibility (BC). Changes that break BC require recompilation. Here are some rules :

- adding the first user-defined constructor breaks BC, adding other constructor *will not break BC*
- adding virtual function *breaks BC* (vtable changes) adding non-virtual function *will not break BC*
- adding data members *breaks BC* (object size changes)
- changing function (inline and non-inline) definition *breaks BC*
- changing function's default parameters *will not break BC*
- changing compiler *breaks BC*

Other questions

- How many cars are in China?
- Give a simple suggestion for the improvement of traffic in Hong Kong.
- From gov HK, mid-2009 the number of HK residents was 7008000. Estimate population of HK right now.
- What are the benefits of the port of a single-threaded 32-bit application to 64-bit? A multi-threaded application?
- Express this in XML: the continent Asia contains city offices in Tokyo and Bangkok and the head office is in Tokyo.
- A server provides objects of type `MyPacket` to many clients. Some clients run on Solaris and others on Linux. You need to add a new member to `MyPacket`. Do you release server first, client first, or both simultaneously?