- **References**

Chapter 7.12 – STL vector

Starting Out With C++. From Control Structures through Objects (Eighth Edition)

A Comparison between array and vector

	array	vector
They look different	int scores[30];	**vector<int> scores(30);**
What is it?	Data type	Object in Standard Template Library (STL) which has member functions
Has member functions	No	**Yes**
#include		<vector>

A Comparison between array and vector

	array	vector
Size	Its size is determined at compile time.	Elements are added or deleted at run time.
Speed	faster	?

- Note: STL is a collection of data types and which you may use in your program. STL is not part of original C++ language, but were created in addition to the build-in data types.

Vectors – Section 7.12

- **Vector**: A sequence of identical type values
  - like an array, but can grow and shrink over time
  - Use special "<...>" syntax
  - Can hold values of any type:
  - ```
    vector<int> scores;
    // read as "vector OF ints"
    ```
- Automatically adds space as more is needed – no need to determine a set size ahead of time.
- Can use [] to access elements
    ```

Vectors – Declaring

- First, need to **#include<vector>**
- Declare a vector to hold int elements:

  vector<int> scores;
- Declare a vector with initial size 30:

  vector<int> scores(30);
- Declare a vector with initial size 30, and initialize all elements to 42:

  vector<int> scores(30, 42)

Vectors – Adding Elements

- Use **push_back** member function to add element to a full array or to an array that had no defined size:

  scores.push_back(75);

- Use the **size** function to determine how many elements are in a vector:

  int howbig = scores.size();

Vectors – Removing Elements

- Use **pop_back** member function to remove last element from vector:

  scores.pop_back();

- To remove all contents of vector, use the **clear** member function:

  scores.clear();

- To determine if vector is empty, use the **empty** member function:

  while (!scores.empty()) ...

Vector Exercise

- Convert Program 7-29 to an array system and compare the differences.

Vectors in Functions

- Vectors can be parameters or return values in functions.
- Just list the full type in the standard syntax for vectors.

```
void Count(vector<int> items);

vector<string> GeneratePasswordList();
```

Should I use array or vector?

- What is your opinions?
- Some said array while others said vector. Let us wait until we finish the vector programming assignment to answer this question.
- It depends on ...