

## HW05 - STL Vectors [50 pts]

Answer the following questions regarding STL and the vector container:

1. What is the STL? What is a vector?
2. Which vector operations change the size of a vector after its construction?
3. What is the STL array container and how does it differ from the built-in array and from a vector?
4. How does the vector member function *resize()* differ from *reserve()*?
5. What should *begin()* and *end()* do for a container?
6. Give an example of using the vector *push\_back()* modifier.

Write the following program using a vector:

A common game is the lottery card. The card has numbered spots of which a certain number are selected at random. Write a *Lotto()* function that takes two arguments. The first should be the number of spots on a lottery card and the second should be the number of spots selected at random. The function should return a `vector<int>` object that contains, in sorted order, the numbers selected at random. Use your function as follows:

```
Vector<int> winners;  
winners = Lotto(51,6);
```

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This would assign to *winners* a vector that contains six numbers selected randomly from the range 1 through 51. Note that simply using `rand()` doesn't quite do the job because it may produce duplicate values. Suggestion: Have the function create a vector that contains all the possible values, use `random_shuffle()`, and then use the beginning of the shuffled vector to obtain the values. Also write a short program that lets you test the function.

### References:

- 1) <http://www.cplusplus.com/reference/vector/vector/>
- 2) [http://www.cplusplus.com/reference/algorithm/random\\_shuffle/](http://www.cplusplus.com/reference/algorithm/random_shuffle/)

Use the command script to capture your interaction compiling and running the program, including all operations, as shown below:

CS1C Spring 2023 TTH HW05 50pts **Due: Th 2/9/2023**

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ script hw05.scr
```

```
Script started, file is hw05.scr
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ date
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ ls -l
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ make all
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ ls -l
```

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...

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ ./hw05
```

... // print out the winners vector along with the formal  
parameter values passed to Lotto

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ exit
```

Script done, file is hw05.scr

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/05 $ make tar
```

...

Submit the tar package file hw05.tar by Thursday February 9,  
2023.