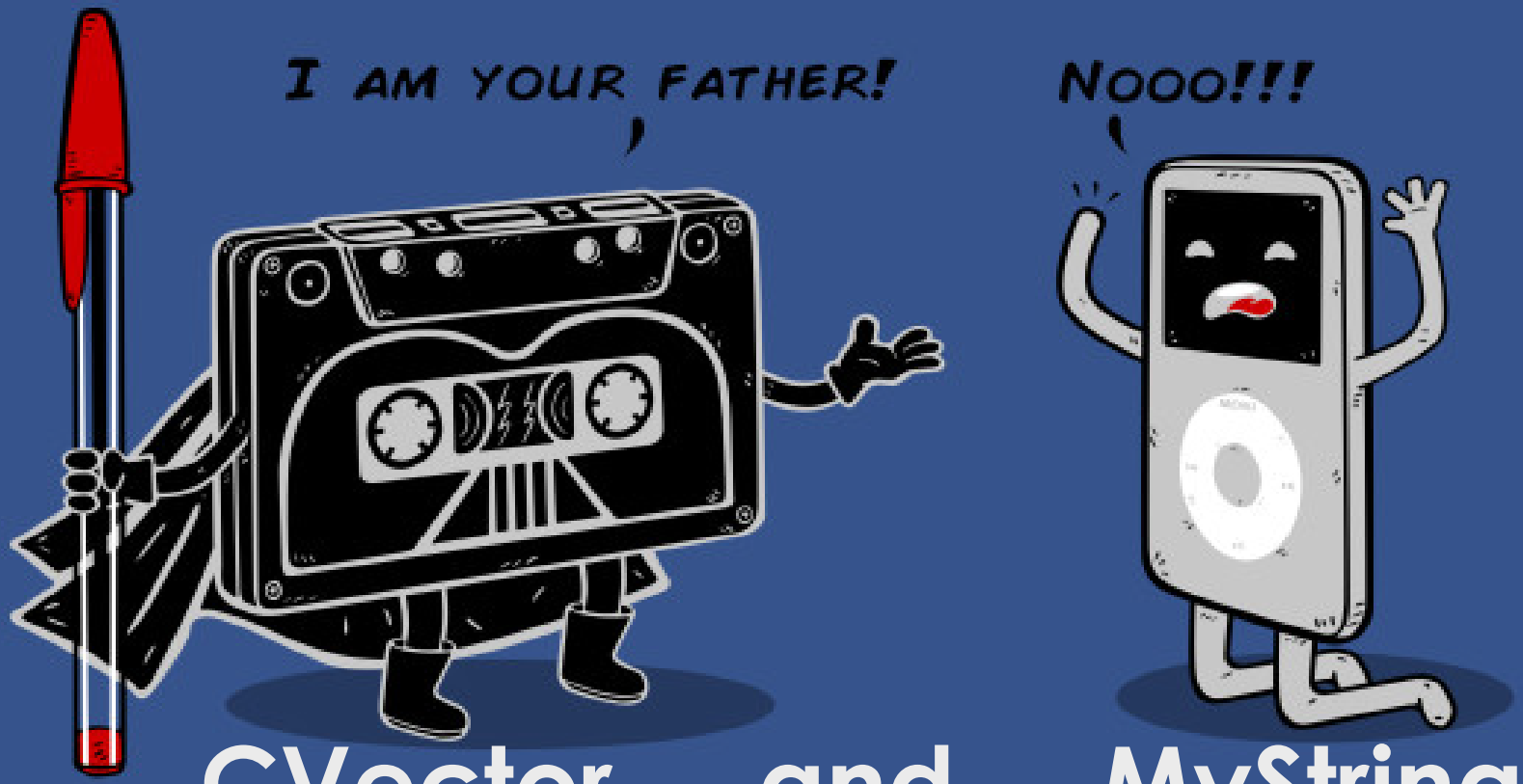
Homework 005

CVector and MyString

DEADLINE: 5/20 SUN. 23:59

A long time ago in a galaxy far, far away....



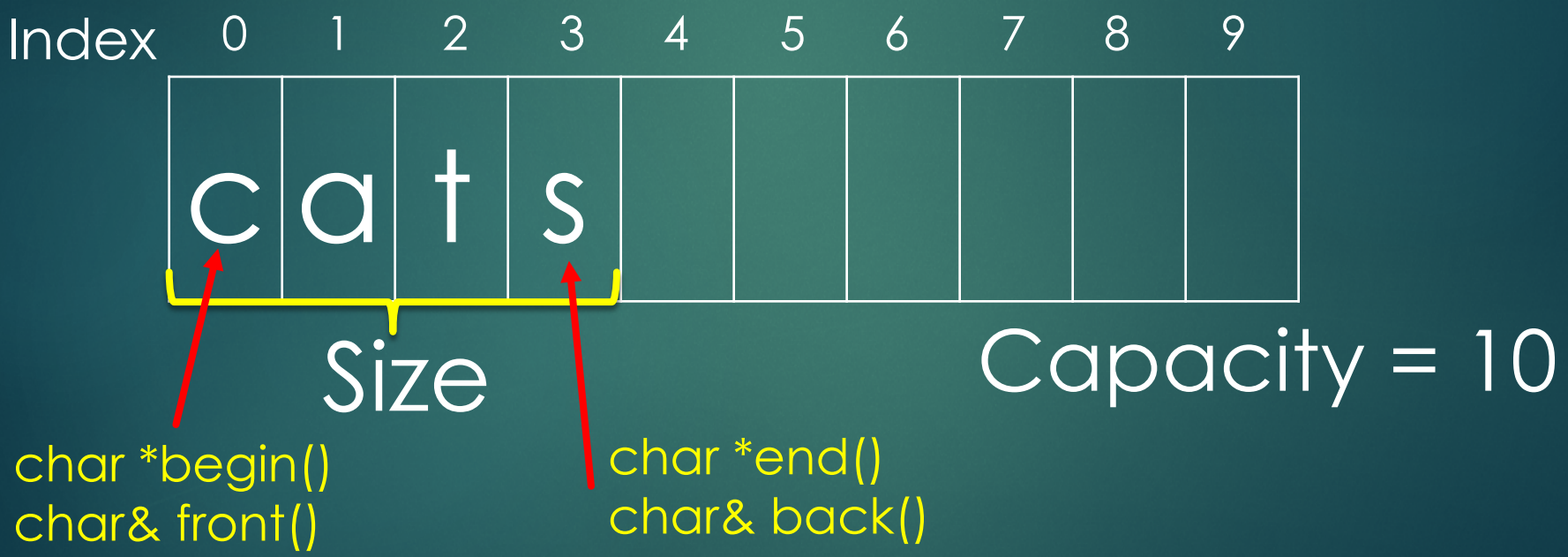
CVector and MyString

What is the CVector?

- Similar to std::vector, the CVector provide a flexible container of characters. The necessary functions includes…
  - Constructors
  - front(), back(), (begin(), end() is optional)
  - getSize(), resize(), getCapacity(), reserve(), shrink_to_fit(), clear()
  - push_back(), pop_back()
  - operator[] for const and non-const object
  - operator==, !=

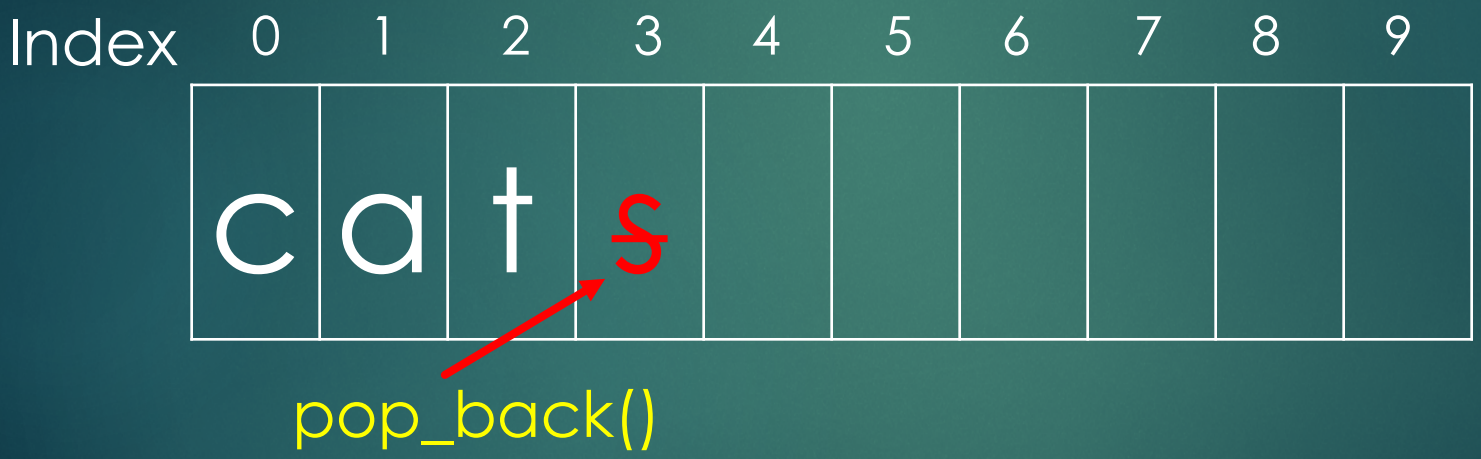
getSize() = 4

- Returns the number of elements in the vector.



getCapacity() = 10

- Returns the capacity of the storage space currently allocated for the vector



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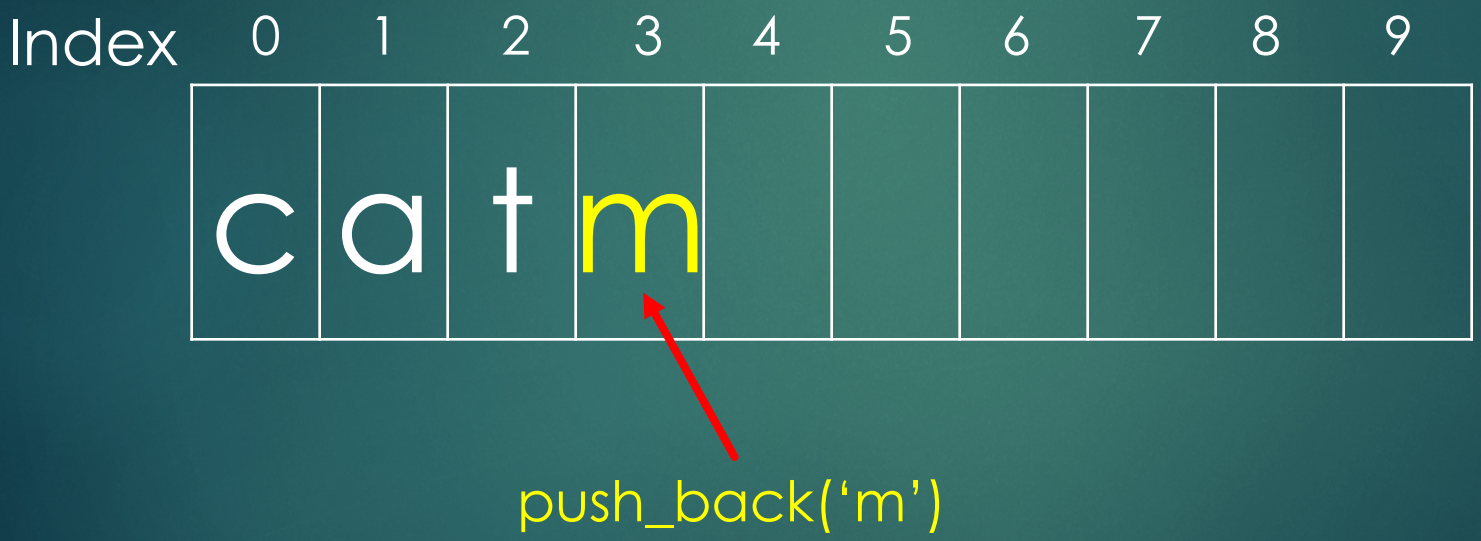


size_t

- std::size_t is the unsigned integer type of the result of the sizeof operator as well as the sizeof... operator

```
#include <cstddef>
#include <iostream>

int main()
{
    const std::size_t N = 10;
    int* a = new int[N];

    for (std::size_t n = 0; n < N; ++n)
        a[n] = n;
    for (std::size_t n = N; n-- > 0;) // Reverse cycles are tricky for unsigned types.
        std::cout << a[n] << " ";

    delete[] a;
}
```

void resize(size_t n, char c = '\0')

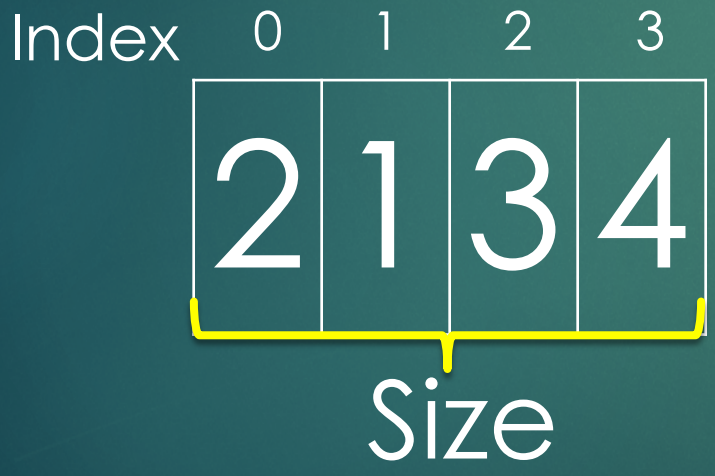
- Resizes the container so that it contains n elements.
  - If n is smaller than the current container size, the content is reduced to its first n elements, removing those beyond.
  - If n is greater than the current container size, the content is expanded by inserting at the end as many elements as needed to reach a size of n.
- The new elements are initialized as **'\0'**
- If n is also greater than the current container capacity, an automatic reallocation of the allocated storage space takes place.

void reserve(size_t n = 0)

- Requests that the capacity to be enough to contain n characters.
  - If n is greater than the current string capacity, the function causes the container to reallocate its storage increasing its capacity to n.
  - Otherwise, the function call does NOT cause a reallocation. (the string capacity is not affected)

void shrink_to_fit()

- Requests the container to reduce its "capacity" to fit its "size".



Capacity = 4 = size

What is the MyString?

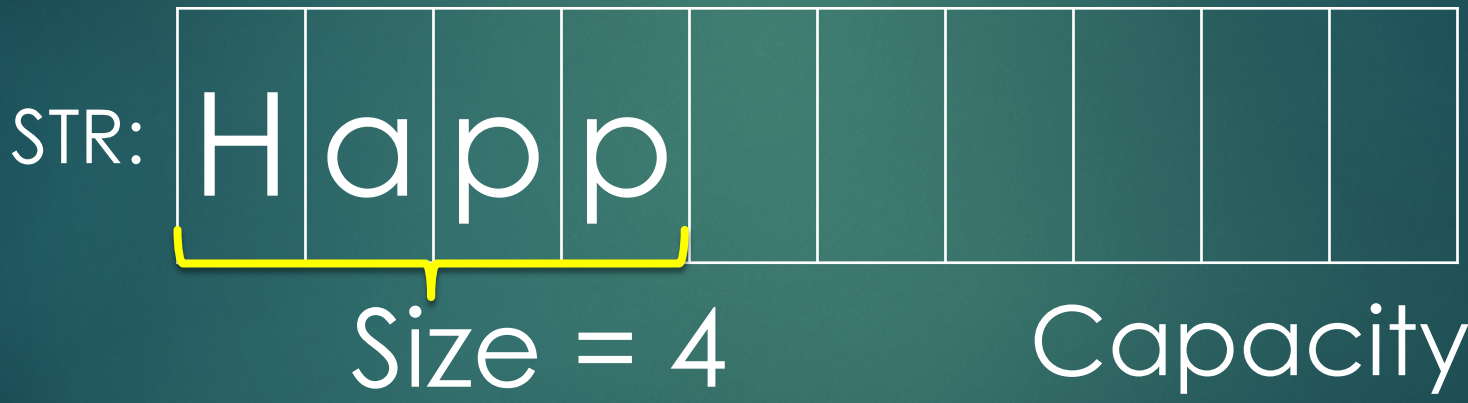
- Similar to std::string, it based on Cvector and provide several string operations.
  - Constructors
  - append(), substr(), insert(), erase()
  - find(), find_first_of()
  - operator+

Size & Capacity?

- A example of input char* “Happ”:

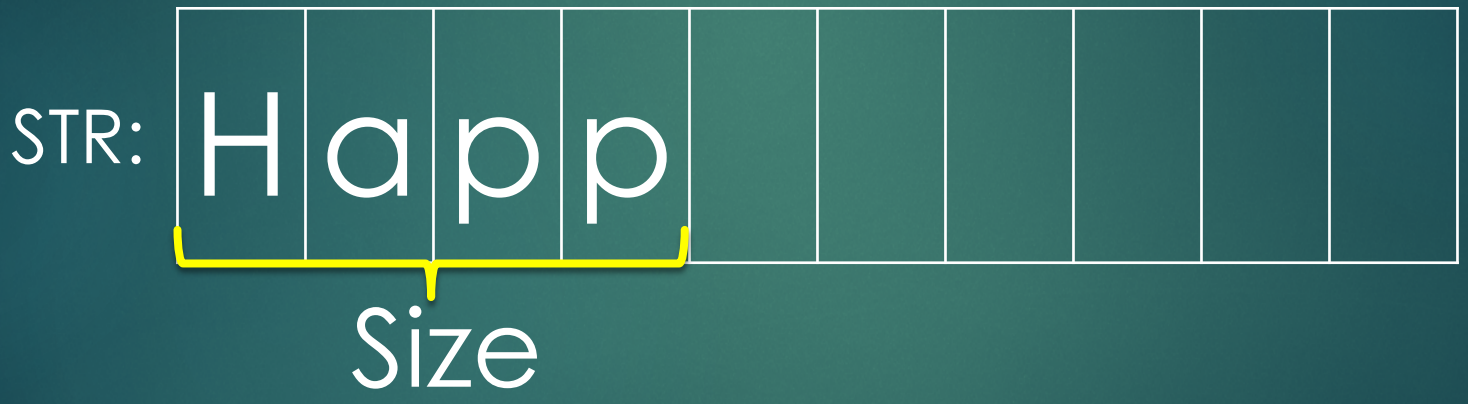
Size & Capacity?

- A example of our string "Happ":



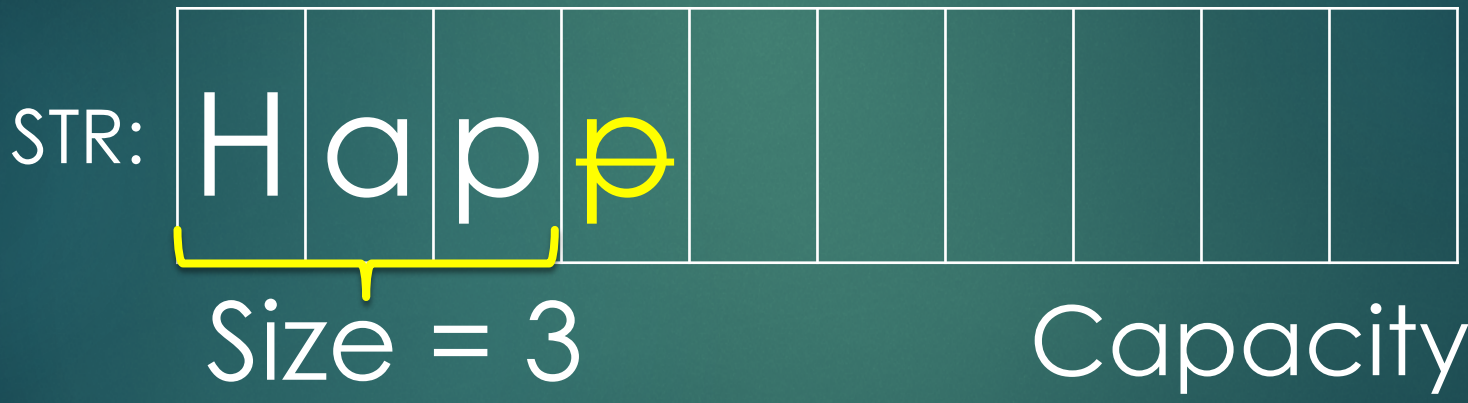
Size & Capacity?

- A example of our string "Happ":



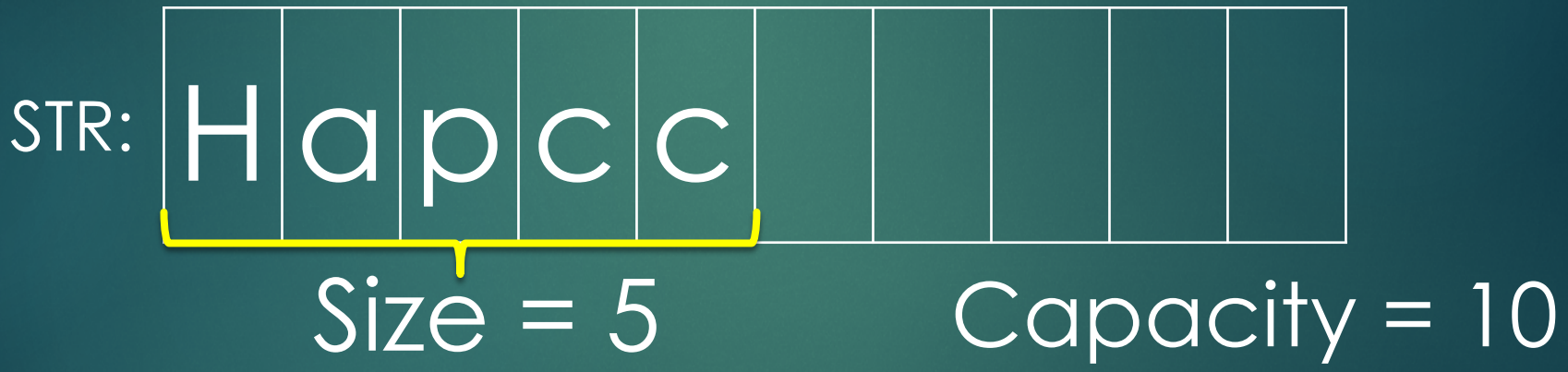
Size & Capacity?

- STR.resize(3)



Size & Capacity?

- STR.resize(5,'c')



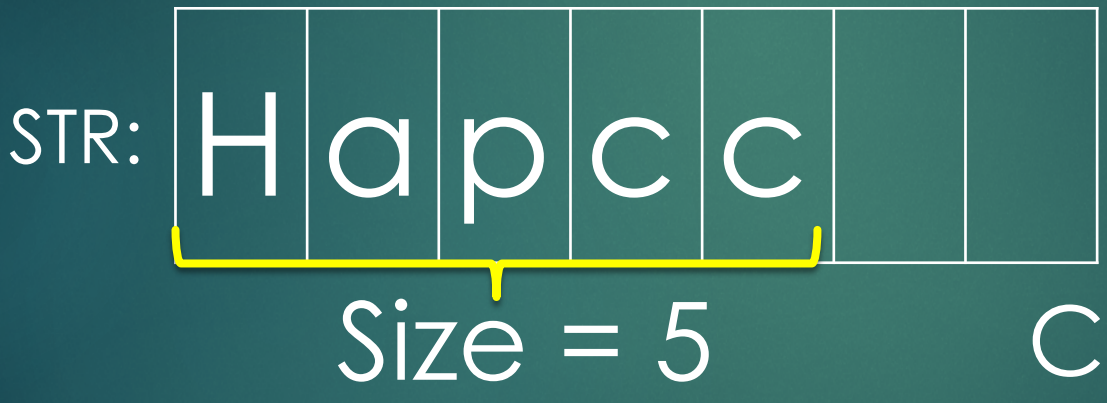
Size & Capacity?

- STR.shrink_to_fit()

Capacity = 5

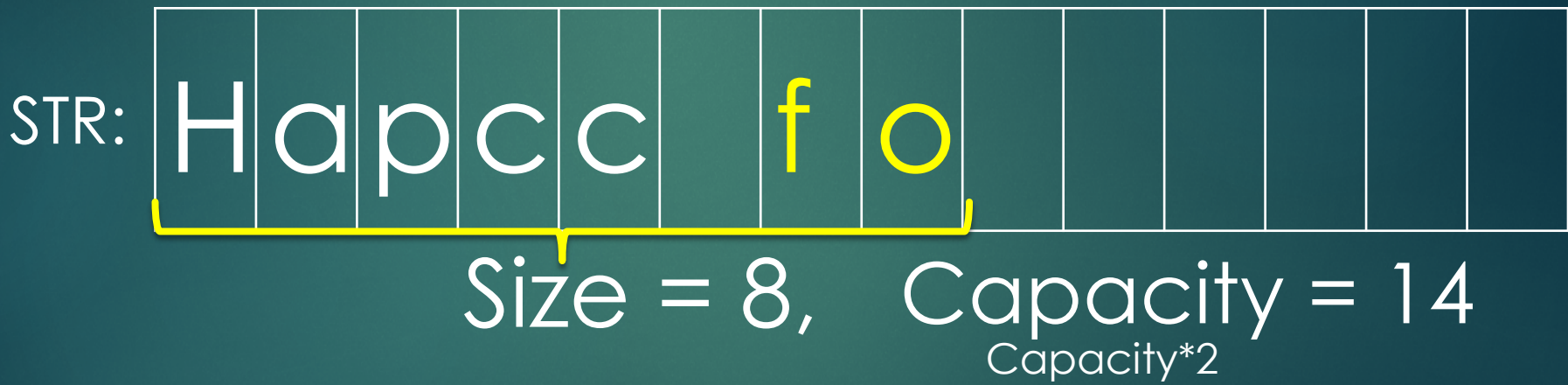
Size & Capacity?

- STR.reserve(7)



Append a string str2 = " fo"

- STR.append(str2);

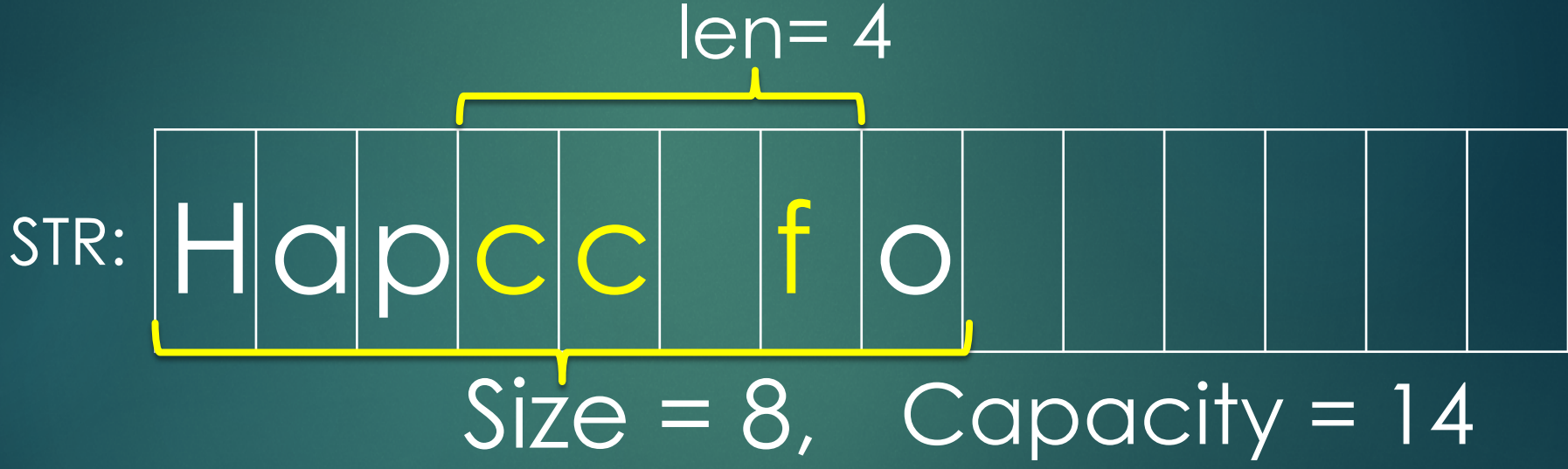


補充說明，因為新追加的字串使得容量(Capacity)不足，
所以Capacity擴增為原來的兩倍

Substr (size_t pos = 0, size_t len = nmax)

STEP 1

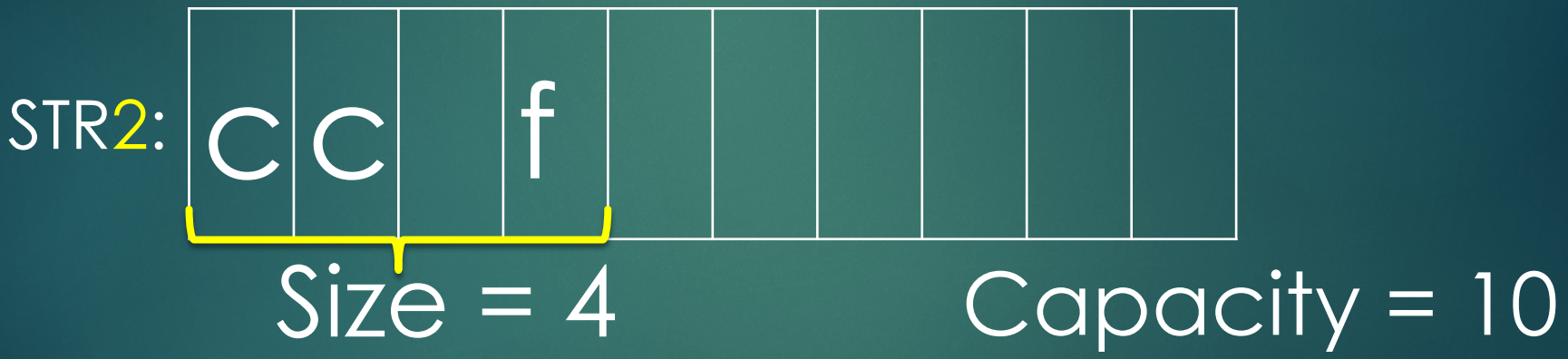
- STR2 = STR.substr(3,4);



STEP 2

Substr (size_t pos = 0, size_t len = nmax)

- STR2 = STR.substr(3,4);

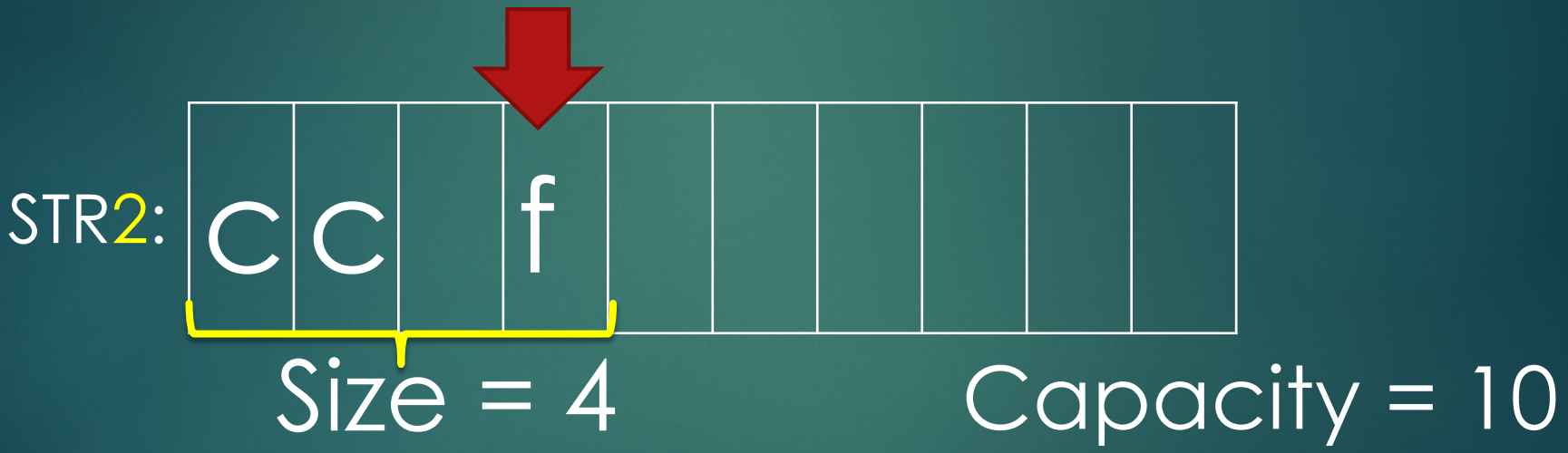


補充說明，因為substr產生新的字串STR2，
因此容量恢復為新產生字串的預設容量（10）

Insert (size_t pos, const String &str, size_t subpos, size_t sublen), insert str3 = "abcd"

STEP 1

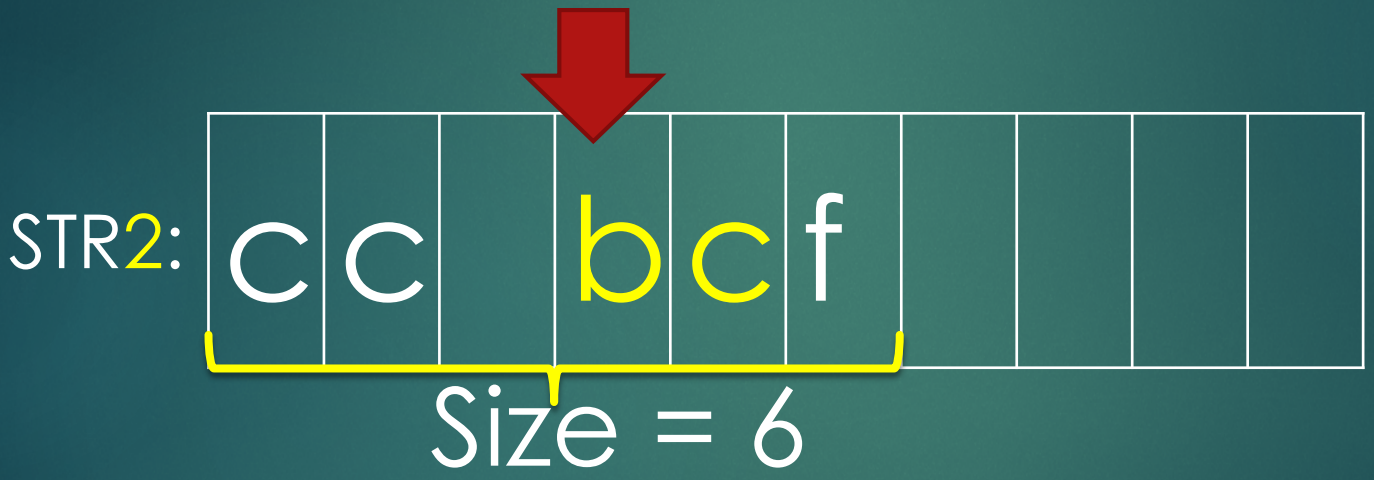
- STR2.Insert (3, str3, 1, 2);



Insert (size_t pos, const String &str, size_t subpos, size_t sublen), insert str3 = "abcd"

STEP 2

- STR2.Insert (3, str3, 1, 2);



find() and find_first_of()

- STR= “to be or not to be, that is cool question”
  0 10 28
- find "cool" in the STR: 28
- find "cXXl" in the STR: 999 //not found
- find_first_of "cXXL" in the STR: 28
- 在STR中找第一個符合 'c', 'X', 'L' 的字元

This time…

R

- We will provide two header files and a driver program.
- Please complete the implementation of these two classes.

Submit your codes to TA

S

- Please complete the implantation of the class **CVector and MyString** to fulfill all challenge in the driver program (106hw5_main.cpp).
- Make sure the code could be compile with TA's driver program.
  - If we can't compile your code, you get **0** point too. (**you may modify part of main function to make your code compilable**)
  - If you have modified your driver program please upload it, too.

Submit your codes to Portal

S

- Please use s1234567_CVector.h & .cpp, s1234567_MyString.h & .cpp , s1234567_main_106hw5.cpp as your file names.
  - Replace s1234567 by your own student ID.
  - And upload **ONLY** these codes.
    - Please ZIP them with your student ID, s1234567_106hw5.zip
    - If you try to upload another files (for example *.sln or others), you get **0** point.
  - Then, submit your zip file to Portal.