과목: 자료구조

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자료구조 <과제 4>

- String 클래스의 작성 -

홍지훈

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0. 과제

- 강의내용과 교재를 참고하여 String 클래스를 작성하고 예제코드를 작성하여 제출

1. 소스코드

1-1. String.h

```
#pragma once
#include <iostream>

using namespace std;

class String
{
private:
    char *buffer;
    int length;
    int size;

    String(int m);

public:
    String();
    String(String& s); //복사생성자
    String(char* init, int m); //길이 m string init 초기화
    ~String();
    String Concat(String t);
    String& operator=(const String&); // 대입
    bool operator==(String t); // 동일한지 비교
    bool operator!(); // 공백이면 true 아니면 false
    int Length(); // 문자수 반환
    String Substr(int i, int j); // i~j 사이의 string 반환
    int Find(String pat); //string 에서 pat 스트링을 찾아서 위치를 반환 없으면 -1
    void print();
};
```

1-2. String.cpp

```
#include "String.h"

String::String() : String(10) {}
String::String(int m)
{
    size = m;
    buffer = new char[m];
    length = 0;
}
String::~String()
{
    delete[] buffer;
}
```

```
String::String(String& s) : String(s.length + 1)
{
    for (int i = 0; i < s.length; i++)
        buffer[i] = s.buffer[i];
    buffer[s.length] = '\0';
    length = s.length;

}
String::String(char* init, int m) : String(m + 1)
{
    for (int i = 0; i < m; i++)
        buffer[i] = init[i];
    buffer[m] = '\0';
    length = m;
}
String String::Concat(String t)
{
    String result(length + t.length + 1);

    for (int i = 0; i < length; i++)
        result.buffer[i] = buffer[i];
    for (int i = 0; i < t.length; i++)
        result.buffer[length + i] = t.buffer[i];

    result.buffer[length + t.length] = '\0';
    result.length = length + t.length;

    return result;
}
String& String::operator=(const String& s)
{
    delete[] buffer;
    buffer = new char[s.length + 1];
    for (int i = 0; i < s.length; i++)
        buffer[i] = s.buffer[i];
    buffer[s.length] = '\0';
    length = s.length;

    return *this;
}
bool String::operator==(String t)
{
    if (length != t.length) return false;
    for (int i = 0; i < length; i++)
        if (buffer[i] != t.buffer[i])
            return false;
    return true;
}
```

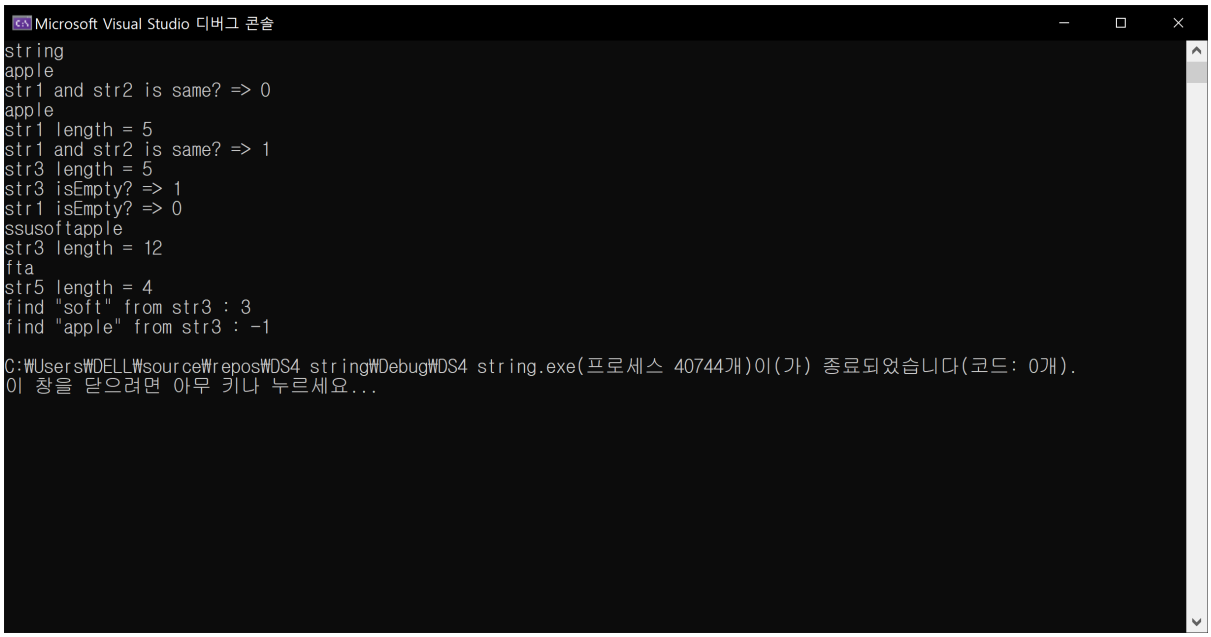
```cpp
bool String::operator!()
{
    if (length == 0)
        return true;
    return false;
}
int String::Length()
{
    return length;
}
String String::Substr(int i, int j)
{
    String result(j - i + 2);
    result.length = j - i + 2;
    for (int k = 0; k < j-i+1; k++)
        result.buffer[k] = buffer[k+i];
    result.buffer[j-i+1] = '\0';
    return result;
}

int String::Find(String pat)
{
    for (int i = 0; i + pat.length+1 < length; i++) {
        bool suc = true;
        for (int j = 0; j < pat.length; j++) {
            if (i + j >= length || buffer[i + j] != pat.buffer[j]) {
                suc = false;
                break;
            }
        }
        if (suc) return i;
    }
    return -1;
}

void String::print()
{
    for (int i = 0; i < length; i++)
        cout << buffer[i];
    cout << endl;
}
```

1-3. main.cpp

```cpp
#include "String.h"

using namespace std;
```

```
int main(void) {
    String str1((char*)"string", 6);
    str1.print();

    String str2((char*)"apple", 5);
    str2.print();

    cout << "str1 and str2 is same? => " << (str1 == str2) << endl;
    str1 = str2;
    str1.print();
    cout << "str1 length = " << str1.Length() << endl;
    cout << "str1 and str2 is same? => " << (str1 == str2) << endl;

    String str3;
    cout << "str3 length = " << str1.Length() << endl;
    cout << "str3 isEmpty? => " << (!str3) << endl;
    cout << "str1 isEmpty? => " << (!str1) << endl;

    String str4((char*)"ssusoft", 7);
    str3 = str4.Concat(str2);
    str3.print();
    cout << "str3 length = " << str3.Length() << endl;

    String str5;
    str5 = str3.Substr(5, 7);
    str5.print();
    cout << "str5 length = " << str5.Length() << endl;

    String str6((char*)"soft", 4);

    cout << "find \"soft\" from str3 : " << str3.Find(str6) << endl;
    cout << "find \"apple\" from str3 : " << str3.Find(str1) << endl;
    return 0;
}
```

2. 실행 화면


Microsoft Visual Studio 디버그 콘솔
string
apple
str1 and str2 is same? => 0
apple
str1 length = 5
str1 and str2 is same? => 1
str3 length = 5
str3 isEmpty? => 1
str1 isEmpty? => 0
ssusoftapple
str3 length = 12
fta
str5 length = 4
find "soft" from str3 : 3
find "apple" from str3 : -1
C:₩Users₩DELL₩source₩repos₩DS4 string₩Debug₩DS4 string.exe(프로세스 40744개)이(가) 종료되었습니다(코드: 0개).
이 창을 닫으려면 아무 키나 누르세요...