习题 5

填空题：如下设计了一个字符串类 String，请根据运行结果，完成程序。

```cpp
#include <iostream>
#include <cstring>
#include <string>
using namespace ①_____;

class String
{
public:
    String(const char *str="")
    {
        size = strlen(②_____);
        x = size>0 ? new char[size] : NULL;
        if(x==NULL) size = 0;
        for(int i=0; i<size; i++)
            x[i] = str[i];
    }
    String(const String &s) : x(③_____)
    {
        *this = s;                        // 直接利用深赋值运算符函数
    }
virtual ~String()
    {
        if(x!=NULL) delete ④_____ x;
        size = 0;
    }
    String & operator=(const String &s)
    {
        if(this == ⑤_____) return *this;
        if(x!=NULL) delete [] x;
        size = s.size;
        x = new char[size];
        if(x==NULL) size = 0;
        for(int i=0; i<size; i++)
            x[i] = s.x[i];
        return ⑥_____;
    }
    ⑦_____operator[](int index) {    return x[index]; }
    friend ostream & operator<<(ostream &out, const String &s)
    {
        for(int i=0; i<s.size; i++)
            out << s.x[i];
        return ⑧_____;
```

```cpp
    }
⑨_____istream & operator>>(istream &in, String &s)
    {
        string str;
        in >> str;                                    // 利用 C++字符串
        s = String(str.c_str());    // 利用深赋值运算符
        return in;
    }
    friend ⑩_____Compare(const String &s1, const String &s2)
    {
        int i;
        for(i=0; i<s1.size && i<s2.size && s1.x[i]==s2.x[i]; i++)
            ;
        if(i<s1.size && i<s2.size)
            return s1.x[i] > s2.x[i] ? 1 : -1;
        else if(i<s1.size && i==s2.size)
            return 1;
        else if(i==s1.size && i<s2.size)
            return -1;
        else
            return 0;
    }
friend bool operator<(const String &s1, const String &s2)
    {    return Compare(s1, s2) < 0; }
friend bool operator<=(const String &s1, const String &s2)
    {    return Compare(s1, s2) <= 0;}

friend bool operator>(const String &s1, const String &s2)
    {    return Compare(s1, s2) > 0; }
    friend bool operator>=(const String &s1, const String &s2)
    {    return Compare(s1, s2) >= 0;}
    friend bool operator==(const String &s1, const String &s2)
    {    return Compare(s1, s2) == 0;}
    friend bool operator!=(const String &s1, const String &s2)
    {    return Compare(s1, s2) != 0;}
protected:
    char *x;
    int size;
};
void display(const String &s1, const String &s2)
{
    char *str[] = {"小于", "等于", "大于"};
    cout << "\"" << s1 << "\" " << str[1+Compare(s1, s2)]
            << " \"" << s2 << "\"\t" << endl;
```

```
}
int main()
{    String s1("Hello world!"), s2(s1);
     display(s1, s2);
     s2[0] = 'h';
     display(s1, s2);
     s2 = "Hello world ";
     display(s1, s2);
     s2 = "Hello world";
     display(s1, s2);
     s1 = "";   s2 = "";
     display(s1, s2);
     return 0;
}
```

运行结果
"Hello world!" 等于 "Hello world!"
"Hello world!" 小于 "hello world!"
"Hello world!" 大于 "Hello world "
"Hello world!" 大于 "Hello world"
"" 等于 ""