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CODE:

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/*
*
*@Rajvaibhav Rahane
*/
/*
*       Program to replicate String class
*       implements default and copy constructors
*       implements functions length(),concat(),getReversedString(),indexOf(),isPalindrome()
*       overloads operators >>,<< for standard i/o operations
*/
#include<bits/stdc++.h>
#include<stdio.h>
using namespace std;
class Strings{
        private:
                char *str;
                intstrLength;

                void calculateLength();

        public :
                Strings(){
                        str=NULL;
                        strLength=0;
                }
                Strings(Strings* s){
                        str=new char[s->length()];
                        strLength=s->length();
                        inti;
                        for(i=0;i<s->length();i++){
                                str[i]=s->str[i];
                        }
                        str[i]='\0';
                        cout<<"Copy Constructor called\n";
                }
                //void createString(int length);
                intlength();
                Strings concat(Strings);
                bool isPalindrome();
                Strings copy();
                intcompareTo(Strings);
                friend ostream& operator<<(ostream&,const Strings s);
                friend istream& operator>>(istream&in,Strings&s);
                Strings getReversedString();
                intindexOf(Strings);
};
bool Strings::isPalindrome(){                                   //returns whether string is palindrome or not
        if(str!=NULL){
                for(inti=0,j=strLength-1;i<j;i++,j--){
                        if(str[i]!=str[j])
                                return false;
                }
        }
        return true;
}
void Strings::calculateLength(){
        if(str!=NULL)
                for(strLength=0;str[strLength]!='\0';strLength++);
}

intStrings::length(){
        return strLength;
}

/*void Strings::createString(int length){
        if(length!=0){
                cin>>str;
                        //cout<<"strlen"<<strlen(str)<<"called";
                //str[length]='\0';
                calculateLength();
        }
}*/

istream& operator>>(istream&in,Strings&s){

        s.str=new char[0];
        scanf("%[^\n]%*c",s.str);
        //in>>s.str;
        s.calculateLength();
        s.str[s.length()]='\0';
        return in;
}

ostream& operator<<(ostream&out,Strings s){
        if(s.str!=NULL)
                out<<s.str;
        else
                out<<"NULL String";
        return out;
}
Strings Strings::concat(Strings str){
        Strings resultant;
        inti;
        resultant.str=new char[this->length()+str.length()+1];
        for(i=0;i<this->length();i++){
                resultant.str[i]=this->str[i];
        }
        for(int j=0;i<this->length()+str.length();i++,j++){
                resultant.str[i]=str.str[j];
        }
        resultant.str[i]='\0';
        resultant.calculateLength();
        return resultant;
}
Strings Strings::getReversedString(){
        Strings str(this);
        char temp;
        for(inti=0,j=str.strLength-1;i<j;i++,j--){
                temp=str.str[i];
                str.str[i]=str.str[j];
                str.str[j]=temp;
        }
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    return str;
}
Strings Strings::copy(){
    return Strings(this);
}
intStrings::compareTo(Strings s){
    if(this->str==NULL){
        if(s.str==NULL) return 0;      //both strings equal
        else return -2;                //main string lexographically lower
    }else if(s.str==NULL) return 2;    //s is lower
    else{
        inti;
        for(i=0;i<s.length()&&i<strLength;i++){
            if(s.str[i]!=str[i]){
                return str[i]-s.str[i];
            }
        }
        if(i!=s.length())return -1;
        else if(i!=strLength)          return 1;
        return 0;
    }
}
intStrings::indexOf(Strings substring){
    int index=-1,k,j;
    for(inti=0;i<=this->length()-substring.length();i++){
        if(this->str[i]==substring.str[0]){
            index=i;
            for(j=i+1,k=1;k<substring.length();j++,k++){
                if(this->str[j]!=substring.str[k]){
                    index=-1;
                    break;
                }
            }
            if(index!=-1)
                return index;
        }
    }
    return index;
}
void printMenu(){
    cout<<"1)Print Length\t";
    cout<<"2)Check is string Palindrome\t";
    cout<<"3)Compare 2 Strings\t";
    cout<<"4)Copy a String\t";
    cout<<"5)Reverse a String\t";
    cout<<"6)Find substring in String\n";
    cout<<"7)Exit\t Choice : ";
}
intmain(){
    int choice;
    do{
        printMenu();scanf("%d%*c",&choice);
        switch(choice){
            case 1:{
                Strings s;cout<<"Enter String:";cin>>s;
                cout<<s<<" "<<s.length()<<endl;break;
            }
            case 2:{
                Strings s;cout<<"Enter String:";cin>>s;
```

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					cout<<s<<" is "<<(s.isPalindrome()?"":"not 
")<<"palindrome"<<endl;break;
				}
				case 3:{
					Strings s1;cout<<"Enter String:";cin>>s1;
					Strings s2;cout<<"Enter String:";cin>>s2;
					cout<<s1.compareTo(s2)<<endl;
					break;
				}
				case 4:{
					Strings s;cout<<"Enter String:";cin>>s;
					Strings copy=s.copy();cout<<copy<<endl;break;
				}
				case 5:{
					Strings s;cout<<"Enter String:";cin>>s;
					cout<<"Reversed String : "<<s.getReversedString()<<endl;break;
				}
				case 6:{
					Strings s;cout<<"Enter String:";cin>>s;
					Strings sub;cout<<"Enter Substring:";cin>>sub;
					int index=s.indexOf(sub);
					cout<<"Substring ";
					if(index==-1)	cout<<"absent";
					else	cout<<"present at index(0 Based) "<<index;
					cout<<endl;break;
				}
				case 7:{break;}
			}
		}while(choice!=7);
		/*Strings s,s2;string raj;
		/*int length;
		cout<<"Enter Length";
		cin>>length;
		s.createString(length);
		cin>>s;
		cout<<s;
		cout<<" "<<s.length()<<endl;

		cin>>s2;
		cout<<s2;
		cout<<" "<<s2.length()<<endl;

		Strings concat=s.concat(s2);
		cout<<concat;
		cout<<" "<<concat.length()<<endl;
		cout<<s<<" "<<s2<<endl;

		Strings reversed=s.getReversedString();
		cout<<reversed<<" "<<reversed.length()<<"\t"<<s<<endl;

		cout<<s2.indexOf(s)<<endl;
		cout<<s<<"\t"<<s2<<endl;
		cin>>raj;
		cout<<raj;
		cout<<" "<<raj.length();*/
		return 0;
}
```
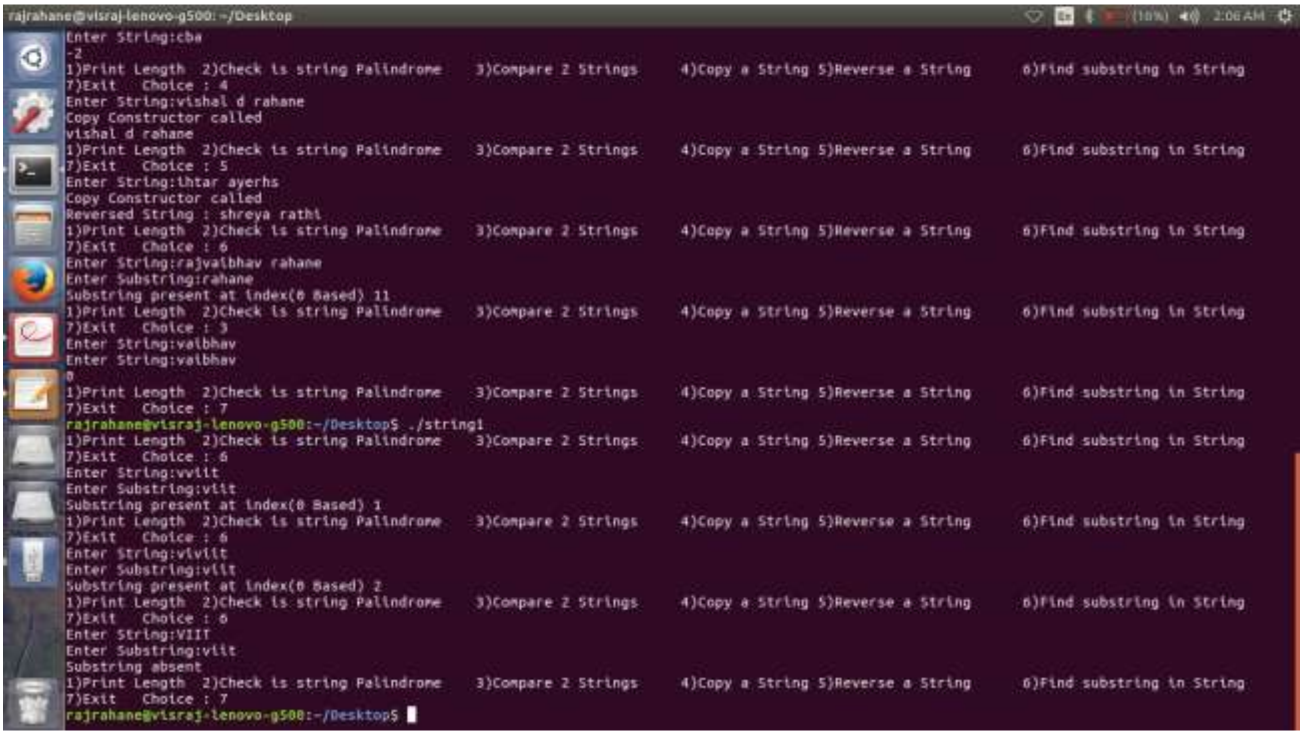
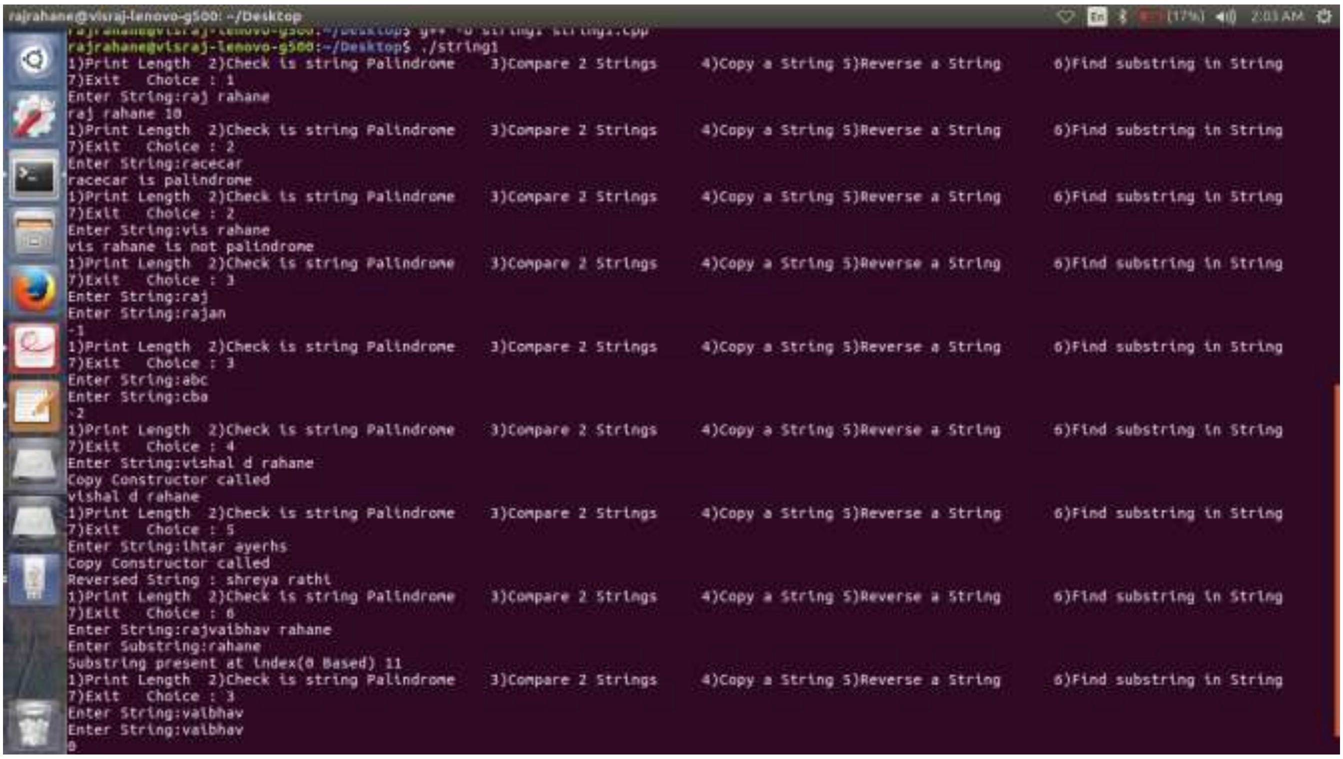

Output:



```
Enter String:cba
-2
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 4
Enter String:vishal d rahane
Copy Constructor called
vishal d rahane
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 5
Enter String:ihtar ayerhs
Copy Constructor called
Reversed String : shreya rathi
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 6
Enter String:rajvaibhav rahane
Enter Substring:rahane
Substring present at index(0 Based) 11
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 3
Enter String:vaibhav
Enter String:vaibhav
0
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 7
rajrahane@visraj-lenovo-g500:~/Desktop$ ./string1
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 6
Enter String:vviit
Enter Substring:viit
Substring present at index(0 Based) 1
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 6
Enter String:viviit
Enter Substring:viit
Substring present at index(0 Based) 2
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 6
Enter String:VIIT
Enter Substring:viit
Substring absent
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 7
rajrahane@visraj-lenovo-g500:~/Desktop$ 
```



```
rajrahane@visraj-lenovo-g500:~/Desktop$ g++ -o string1 string1.cpp
rajrahane@visraj-lenovo-g500:~/Desktop$ ./string1
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 1
Enter String:raj rahane
raj rahane 10
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 2
Enter String:racecar
racecar is palindrome
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 2
Enter String:vis rahane
vis rahane is not palindrome
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 3
Enter String:raj
Enter String:rajan
-1
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 3
Enter String:abc
Enter String:cba
-2
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 4
Enter String:vishal d rahane
Copy Constructor called
vishal d rahane
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 5
Enter String:ihtar ayerhs
Copy Constructor called
Reversed String : shreya rathi
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 6
Enter String:rajvaibhav rahane
Enter Substring:rahane
Substring present at index(0 Based) 11
1)Print Length  2)Check is string Palindrome    3)Compare 2 Strings     4)Copy a String 5)Reverse a String      6)Find substring in String
7)Exit   Choice : 3
Enter String:vaibhav
Enter String:vaibhav
0
```