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COURSE CODE: CT-159

ASSIGNMENT: DSA LAB#04

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Q1.

SOURCE CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

bool ispalindrome(string m){
    stack<char>s;
    for(char ch:m){
        s.push(ch);
    }
    string reversed="";
    while(!s.empty()){
        reversed+=s.top();
        s.pop();
    }
    return m==reversed;
}

int main(void){
    string input;
    cout<<"ENTER STRING:"<<endl;
    cin>>input;
    if(ispalindrome(input))
      cout<<"IT IS A PALINDROME!"<<endl;
    else
      cout<<"IT IS NOT A PALINDROME!"<<endl;
    return 0;
}
```

OUTPUT:

```
ENTER STRING:
MADAM
IT IS A PALINDROME!

--------------------------------
Process exited after 4.743 seconds with return value 0
Press any key to continue . . .
```

Q2.

SOURCE CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

string f(string m){
    stack<char>s;
    for(char ch:m){
        if(ch=='#')
          if(!s.empty())s.pop();
        else
          s.push(ch);
    }

    string result="";
    while(!s.empty()){
       result=s.top()+result;
       s.pop();
   }
   return result;
}

bool compare(string s,string t){
    return f(s)==f(t);
}
```

```cpp
int main(void){
      string s1="ab#c";
      string t1="ad#c";

      string s2="a#c";
      string t2="b";

      cout<<boolalpha;
      cout<<"EXAMPLE 1:"<<compare(s1,t1)<<endl;
      cout<<"EXAMPLE 2:"<<compare(s2,t2)<<endl;
      return 0;
}
```

OUTPUT:

```
EXAMPLE 1:true
EXAMPLE 2:false

--------------------------------
Process exited after 0.3236 seconds with return value 0
Press any key to continue . . .
```

Q3.

SOURCE CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

class Solution{
public:
    void backtrack(vector<vector<int>>&ans,vector<int>&nums,int index){
        if(index==nums.size()){
            ans.push_back(nums);
            return;
        }
        for(int i=index;i<nums.size();i++){
            swap(nums[i],nums[index]);
            backtrack(ans,nums,index+1);
            swap(nums[i],nums[index]);
        }
    }

    vector<vector<int>>permute(vector<int>&nums){
        vector<vector<int>>ans;
        backtrack(ans,nums,0);
        return ans;
    }
};
```

```cpp
int main(void){
    Solution s;
    vector<int>nums1={1,2,3};
    vector<int>nums2={0,1};

    vector<vector<int>>res1=s.permute(nums1);
    vector<vector<int>>res2=s.permute(nums2);

    for(auto v:res1){
        for(int i=0;i<v.size();i++)
            cout<<v[i]<<" ";
        cout<<endl;
    }
    cout<<endl;

    for(auto v:res2){
        for(int i=0;i<v.size();i++)
            cout<<v[i]<<" ";
        cout<<endl;
    }
    return 0;
}
```

OUTPUT:

```
1 2 3
1 3 2
2 1 3
2 3 1
3 2 1
3 1 2

0 1
1 0

--------------------------------
Process exited after 0.4581 seconds with return value 0
Press any key to continue . . .
```

Q4.

SOURCE CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

class Solution{
public:
    bool exist(vector<vector<char>>&board,string word){
        int m=board.size();
        int n=board[0].size();
        for(int i=0;i<m;i++){
            for(int j=0;j<n;j++){
                if(dfs(board,word,i,j,0))
                    return true;
            }
        }
        return false;
    }
```

```cpp
    bool dfs(vector<vector<char>>&board,string&word,int i,int j,int index){
        if(index==word.size())
            return true;
        if(i<0||i>=board.size()||j<0||j>=board[0].size())
            return false;
        if(board[i][j]!=word[index])
            return false;
        char temp=board[i][j];
        board[i][j]='#';
        bool found=dfs(board,word,i+1,j,index+1)||
                   dfs(board,word,i-1,j,index+1)||
                   dfs(board,word,i,j+1,index+1)||
                   dfs(board,word,i,j-1,index+1);
        board[i][j]=temp;
        return found;
    }
};
```

```
int main(void){
    vector<vector<char>>board={{'A','B','C','E'},{'S','F','C','S'},{'A','D','E','E'}};
    string word1="ABCCED";
    string word2="ABCB";
    Solution s;
    if(s.exist(board,word1))
        cout<<"TRUE"<<endl;
    else
        cout<<"FALSE"<<endl;

    if(s.exist(board,word2))
        cout<<"TRUE"<<endl;
    else
        cout<<"FALSE"<<endl;
    return 0;
}
```

OUTPUT:

```
TRUE
FALSE

--------------------------------
Process exited after 0.3295 seconds with return value 0
Press any key to continue . . .
```