Practical 6

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Subject: DAA Lab

Problem Statement:

DNA sequences can be viewed as a string of A, C, G, and T characters, which represent nucleotides. Finding the similarities between two DNA sequences is an important computation performed in bioinformatics. Find the similarity between the given X and Y sequence.

X=AGCCCTAAGGGCTACCTAGCTT

Y= GACAGCCTACAAGCGTTAGCTTG

Code:

```
#include <stdio.h>

#include <stdlib.h>

struct node{

   int val;

   char dir;

};

void print_lcs(int n, char a[], struct node C[][n], int i, int j){

   if(i==0 || j==0){

      return ;

   }

   if(C[i][j].dir=='D'){

      print_lcs(n,a,C,i-1,j-1);
```

```
        printf("%c",a[i]);
       }
    else {
        if(C[i][j].dir=='U'){
            print_lcs(n,a,C,i-1,j);
         }
        else {
            print_lcs(n,a,C,i,j-1);
        }
    }
}
int main(){
    char a[]="AGCCCTAAGGGCTACCTAGCTT";
    char b[]="GACAGCCTACAAGCGTTAGCTTG";
    printf("First string: %s\n",a);
    printf("Second string: %s\n",b);
    struct node C[22][23];
    for(int i=0;i<22;i++){
        for(int j=0;j<23;j++){
            if(a[i]==0 || b[j]==0){
                C[i][j].val=0;
                C[i][j].dir='H';
```

```
        }
        if(a[i]!=b[j]){
            C[i][j].val= C[i-1][j].val > C[i][j-1].val ? C[i-1][j].val : C[i][j-1].val;
            if(C[i-1][j].val >= C[i][j-1].val){
                C[i][j].dir='U';
            }else{
                C[i][j].dir='S';
             }
        }
   if(a[i]==b[j]){
   C[i][j].val=C[i-1][j-1].val+1;
   C[i][j].dir='D';
}
}
}
   print_lcs(23,a,C,21,22);
}
```

Output:

main.c

```
    for(int i=0;i<22;i++){
        for(int j=0;j<23;j++){
            if(a[i]==0 || b[j]==0){
                C[i][j].val=0;
                C[i][j].dir='H';
            }
            if(a[i]!=b[j]){
                C[i][j].val= C[i-1][j].val > C[i][j-1].val ? C[i-1][j].val : C[i][j-1].val;
                if(C[i-1][j].val >= C[i][j-1].val){
                      C[i][j].dir='U';
                }else{
                      C[i][j].dir='S';
                 }
            }
    if(a[i]==b[j]){
    C[i][j].val=C[i-1][j-1].val+1;
    C[i][j].dir='D';
}
}
}
    print_lcs(23,a,C,21,22);
}
```

input

```
First string: AGCCCTAAGGGCTACCTAGCTT
Second string: GACAGCCTACAAGCGTTAGCTTG
CAGCTACCTAGCTT

...Program finished with exit code 0
Press ENTER to exit console.
```