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Subject : FDS IE-1

Set : 1

Question 1:

Write a C program to Reverse String Without Using Library Function

Code :

```cpp
#include <bits/stdc++.h>
using namespace std;
int main()
{
    string word ;
    cout<<"Enter string to be reversed : ";
    cin >> word;
    // Two pointer approach
    int start = 0 , end = word.size() - 1;
    while(start <= end)
    {
        swap(word[start], word[end]);
        start++;
        end--;
    }
    cout<<"Reversed string : " << word;
    return 0;
}
/*
    Time Complexity = O(n)  where n is the size of
string
*/
```

Output :

```
Enter string to be reversed : complexity
Reversed string : ytixelpmoc
```

```
Enter string to be reversed : madam
Reversed string : madam
```

Question 2:

Pointer Variable Name	Consider Address of Pointer Variable	Value
Pune	1024	10
Mumbai	2000	35
Nagpur	1042	22
Bhopal	2052	5
Indore	2024	3

In the above scenario every pointer variable is storing the number of covid-19 patients. Write a C/C++ program to sort the covid patient and cities in increasing order.

Ex output:

Indore 3

Bhopal 5

Code :

```c
#include<stdio.h>
#include<string.h>
#include<stdlib.h>
struct node
{
    char city[20];
    int value;
    struct node *next;
```

```c
};
void display(struct node *head)
{
    struct node *temp ;
    temp = head;
    while(temp != NULL)
    {
        printf("%s : %d\n", temp->city , temp->value);
        temp = temp->next;
    }
}
void create(struct node *head , int n)
{
    struct node *new , *temp;
    temp = head;
    for(int i = 2 ; i <= n ; i++)
    {
        new = (struct node *)malloc (sizeof(struct
node));
        printf("Enter name of city %d : ",i);
        scanf(" %s",new->city);
        printf("Enter number of covid 19 patients in
%s : ",new->city);
        scanf("%d",&new->value);
        new->next = NULL;
        temp->next = new;
        temp = temp->next;
    }
}
void sort(struct node *head)
{
    //Bubble sort
    int swapTemp , swapped;
    char swapCityTemp[20];
```

```c
    struct node *i ,*j;
    i = head;
    while(i->next != NULL)
    {
        swapped = 0 ;
        j = i->next;
        while(j != NULL)
        {
            if(i->value > j->value)
            {
                //swapping integers
                swapTemp = i->value;
                i->value = j->value ;
                j->value = swapTemp;
                //swapping the city name
                strcpy(swapCityTemp , i->city) ;
                strcpy(i->city , j->city) ;
                strcpy(j->city , swapCityTemp) ;
                swapped = 1 ;
            }
            j = j->next;
        }
        i = i->next;
    }
}
int main()
{
    int n  , swapped;
    struct node *head = (struct node *)malloc
(sizeof(struct node)) ;
    // head node input
    printf("Enter number of cities : ");
    scanf("%d",&n);
    printf("\nEnter name of city 1 : ");
```

```c
    scanf(" %s",head->city);
    printf("Enter number of covid 19 patients in %s :
",head->city);
    scanf("%d",&head->value);
    head->next = NULL;
    //creating remaining nodes
    create(head,n);
    printf("-----------------------------");

    printf("\nEntered Data : \n");
    display(head);

    sort(head);
    printf("-----------------------------");

    printf("\nSorted list of patients and respective
cities : \n");
    display(head);
    printf("-----------------------------");
    return 0;
}

/*
    Time complexity = O(n^2)      bubble sort
*/
```

Output :

```
Enter number of cities : 5

Enter name of city 1 : Pune
Enter number of covid 19 patients in Pune : 10
Enter name of city 2 : Mumbai
Enter number of covid 19 patients in Mumbai : 35
Enter name of city 3 : Nagpur
Enter number of covid 19 patients in Nagpur : 22
Enter name of city 4 : Bhopal
Enter number of covid 19 patients in Bhopal : 5
Enter name of city 5 : Indore
Enter number of covid 19 patients in Indore : 3
------------------------------
Entered Data :
Pune : 10
Mumbai : 35
Nagpur : 22
Bhopal : 5
Indore : 3
------------------------------
Sorted list of patients and respective cities :
Indore : 3
Bhopal : 5
Pune : 10
Nagpur : 22
Mumbai : 35
------------------------------
```

```
Enter number of cities : 8

Enter name of city 1 : Pune
Enter number of covid 19 patients in Pune : 23
Enter name of city 2 : Mumbai
Enter number of covid 19 patients in Mumbai : 43
Enter name of city 3 : Solapur
Enter number of covid 19 patients in Solapur : 23
Enter name of city 4 : Jaipur
Enter number of covid 19 patients in Jaipur : 13
Enter name of city 5 : Delhi
Enter number of covid 19 patients in Delhi : 57
Enter name of city 6 : Prayagraj
Enter number of covid 19 patients in Prayagraj : 35
Enter name of city 7 : Goa
Enter number of covid 19 patients in Goa : 24
Enter name of city 8 : Patna
Enter number of covid 19 patients in Patna : 44
-----------------------------
Entered Data :
Pune : 23
Mumbai : 43
Solapur : 23
Jaipur : 13
Delhi : 57
Prayagraj : 35
Goa : 24
Patna : 44
-----------------------------
Sorted list of patients and respective cities :
Jaipur : 13
Solapur : 23
Pune : 23
Goa : 24
Prayagraj : 35
Mumbai : 43
Patna : 44
Delhi : 57
-----------------------------
```