Exp.1- APPLICATIONS OF STACK

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Use stack ADT for the following problems.

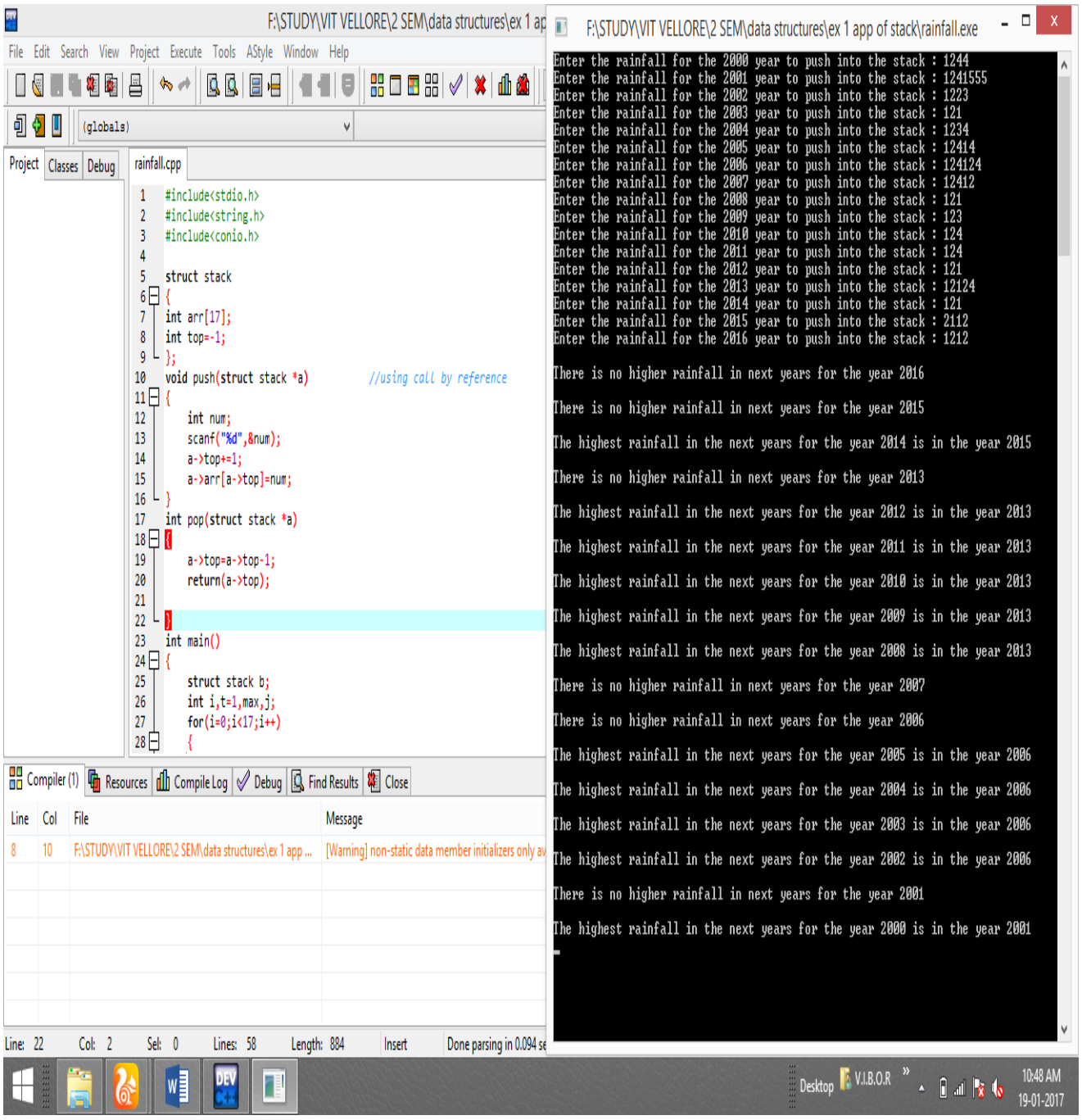
1. **Assume yearly average rainfall data is availbale for the years 2000 to 2016. For each year rainfall value, find the year with next highest rainfall value.**

Ans-

```
#include<stdio.h>
#include<string.h>
#include<conio.h>
struct stack
{
int arr[17];
int top=-1;
};
void push(struct stack *a)          //using call by reference
{
int num;
scanf("%d",&num);
a->top+=1;
a->arr[a->top]=num;
}
int pop(struct stack *a)
{
a->top=a->top-1;
return(a->top);
}
```

```
int main()
{
struct stack b;
int i,t=1,max,j;
for(i=0;i<17;i++)
{
printf("Enter the rainfall for the %d year to push into the stack : ",2000+i);
push(&b);
}
t=b.top;
while(t!=-1)
{
max=t;
for(i=t+1;i<17;i++)
{
if(b.arr[i]>b.arr[max])
{
max=i;
}
}
if(max==t)
{
printf("\nThere is no higher rainfall in next years for the year %d\n",2000+t);
}
else
{
printf ("\nThe highest rainfall in the next years for the year %d is in the year
%d\n",2000+t,2000+max);
}
t=pop(&b);
}
getch();
return(0); }
```

OUTPUT SCREENSHOT-



2. **Given the arithmetic expression, find the lengths of all the valid sub expressions enclosed by paranthesis.**

```
#include<stdio.h>
#include<string.h>
#include<conio.h>
int ctr,i,j,t1,t2,x,m;
char arr[1000];
void push()
{
    int num;
    scanf("%d",&num);
    top+=1;
    arr[top]=num;
}
int pop()
{
    top=top-1;
    return(top);

}
int close(int t1)
{
ctr=0;
for(x=t1+1;x<m;x++)
{
    if(arr[x]==')')
    {
            if(ctr==0) return(x);
            else {
            ctr=ctr-1;}
    }
    else if (arr[x]=='(')
    {
    ctr=ctr+1;}
}
}
int main()
{

    printf("\n\nEnter the expression ");
    gets(arr);
    m=strlen(arr);
    for(i=0;i<m;i++)
    {
            if(arr[i]=='(')
            {
            t2=close(i);
            for(j=i+1;j<t2;j++)
            {
```

```
                printf("%c",arr[j]);

            }
            printf("\t%d\n",t2-i-1);
            }
    }


getch();
return(0);
}
```

OUTPUT SCREENSHOT –