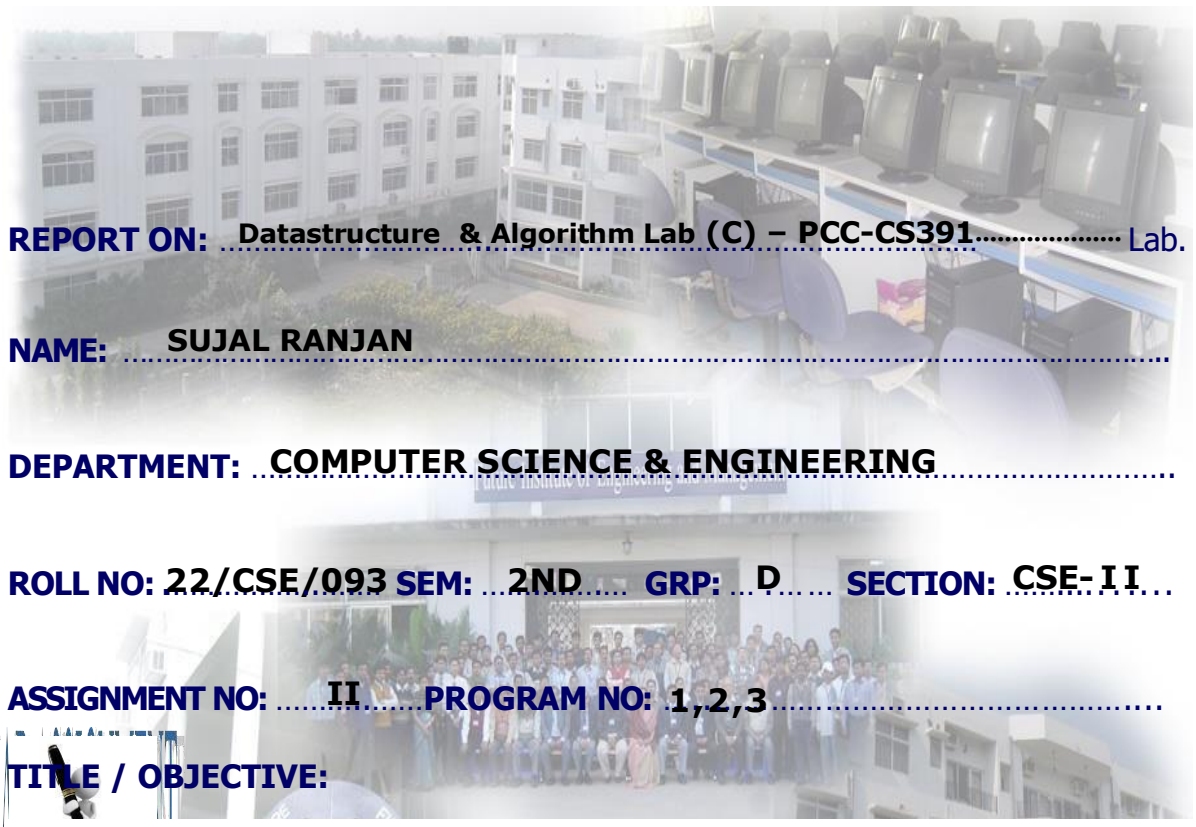

REPORT ON: Datastructure & Algorithm Lab (C) – PCC-CS391 Lab.

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ROLL NO: 22/CSE/093 **SEM:** 2ND **GRP:** D **SECTION:** CSE-II

ASSIGNMENT NO: II **PROGRAM NO:** 1,2,3

TITLE / OBJECTIVE:

1.Write a menu-driven program to perform all the stack operations using structure pointer(user defined data type).

2.Write a menu-driven program to perform all the stack operations using user defined functions.

3.write a menu-driven program to perform all the stack operations using structure(user defined data type).

PERFORMANCE DATE: 15/09/2023 **SUBMISSION DATE:** 22/09/2023

EXAMINER'S SIGNATURE:

1. WRITE A MENU DRIVEN PROGRAM TO PERFORM ALL THE STACK OPERATIONS USING STRUCTURE POINTER(USER DEFINED DATA TYPE).

PROGRAM: Stack1.c

```
#include<stdio.h>
#include<stdlib.h>
#define MAX 4
void push();
void pop();
void peek();
void display();
struct stack
{
        int top;
        int st[MAX];
}*stk;
int main()
{
  int choice;
  stk = (struct stack *) malloc(sizeof(struct stack *));
  stk->top=-1;
  system("cls");
  while(1)
        {
    printf("\n\n\tYou can perform the following Stack Operations.\n");
    printf("\n\t1.Push\n\t2.Pop\n\t3.peek\n\t4.Display n\t5.Exit\n ");
    printf("\n\tEnter your choice: ");
    scanf("%d",&choice);
    switch(choice)
    {
                        case 1:  push();
                                 display();
                                 break;
                        case 2:  pop();
                                 display();
                                 break;
                        case 3:  peek();
                                 display();
                                 break;
                        case 4: display();
                                 break;
                        case 0: exit(0);
                                 break;

                        default:printf("\n\t\tSORRY!!! WRONG CHOICE!!!\n");
                                 break;
                }
  }
}
void push()
{
 if(stk->top==MAX-1)
 {
  printf("\n\t\tSORRY!!! STACK IS FULL.\n");
```

```
                }
  else
  {
   printf("\n\tEnter the element do you want to insert: ");
   scanf("%d",&stk->st[++stk->top]);
  }
}
void pop()
{
  if(stk->top==-1)
  {
   return;
  }
  else
  {
   printf("\n\t\tThe Element %d is Poped.\n",stk->st[stk->top--]);
  }
}
void peek()
{
  if(stk->top<0)
  {
   printf("\n\t\tSORRY!!! STACK IS EMPTY.\n");

  }
  else
  {
   printf("\n\tEnter the element is=%d",stk->st[stk->top]);
  }
}
void display()
{
  int i;
  if(stk->top<0)
  {
   printf("\n\t\tSORRY!!! THE STACK IS EMPTY\n");
  }
  else
  {

            printf("\n\tThe Stack is..... \n");
            for(i=stk->top;i>=0;i--)
            {
            printf("\n\t\t|%.2d|",stk->st[i]);

            if(i==stk->top)
            {
                        printf("<--- Top(%d)",stk->top);
            }
            }
  }
}
```

OUTPUT:

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 10

The Stack is .....

|10|<---Top(0)

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 20

The Stack is .....

|20|<---Top(1)
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 30

The Stack is .....

|30|<---Top(2)
|20|
|10|

You can perform the following Stack Operations.

1. Push

2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 40

The Stack is .....

|40|<---Top(3)
|30|
|20|
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 2

The Element 40 is Poped.

The Stack is .....

|30|<---Top(2)
|20|
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 2

The Element 30 is Poped.

The Stack is .....

|20|<---Top(1)
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 2

The Element 20 is Poped.

The Stack is .....

|10|<---Top(0)

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 2

The Element 10 is Poped.

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 3

SORRY!!! STACK IS EMPTY.

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display
5. Exit

Enter your choice: 4

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. peek
4. Display

```
5. Exit

    Enter your choice: 5

------------------------------------
Process exited after 41.18 seconds with return value 0
Press any key to continue . . .
```

2. WRITE A MENU-DRIVEN PROGRAM TO PERFORM ALL THE STACK OPERATIONS USING USER DEFINED FUNCTIONS.

PROGRAM: Stack2.c

```
#include<stdio.h>
#include<stdlib.h>
#define MAX 4
void push();
void pop();
void peek();
void display();
int stack[MAX],top=-1;
int main()
{
  int choice;
  system("cls");
  while(1)
   {
     printf("\n\n\tYou can perform the following Stack Operations.\n");
     printf("\n\t1.Push\n\t2.Pop\n\t3.Peek\n\t4.Display\n\t5.Exit\n");
     printf("\n\tEnter your choice: ");
     scanf("%d",&choice);
     switch(choice)
     {
                        case 1:  push();
                                 display();
                                 break;
                        case 2:  pop();
                                 display();
                                 break;
                        case 3:  peek();
                                 display();
                                 break;
                        case 4: display();
                                 break;
                        case 5:   exit(0);
                                 break;
                        default:printf("\n\t\tSORRY!!! WRONG CHOICE!!!\n");
                                 break;
                    }
   }
}
void push()
{
 int item;
 if(top==MAX-1)
  {
```

```
                printf("\n\t\tSORRY!!! STACK IS FULL.\n");
  }
  else
  {
    printf("\n\tEnter the element do you want to insert: ");
    scanf("%d",&stack[++top]);
  }
}
void pop()
{
  int item;
  if(top<0)
  {
          return;
          }
   else
  {
    printf("\n\t\tThe Element %d is Poped.\n",stack[top--]);
  }
}
void peek()
{
 if(top<0)
  {
   printf("\n\t\tSORRY!!! STACK IS EMPTY.\n");

  }
  else
  {
   printf("\n\tEnter the element is=%d",stack[top]);
  }
}
void display()
{
int i;
if(top<0)
{
  printf("\n\t\tSORRY!!! THE STACK IS EMPTY\n");
}
else
{

 printf("\n\tThe Stack is..... \n");
 for(i=top;i>=0;i--)
 {
  printf("\n\t\t|%d|",stack[i]);

   if(i==top)
   {
    printf("<----Top(%d)",top);
   }
 }
}
getchar();
}
```

Output:

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 10

The Stack is .....

|10|<---Top(0)

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 20

The Stack is .....

|20|<---Top(1)
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 30

The Stack is .....

|30|<---Top(2)
|20|
|10|

You can perform the following Stack Operations.

1. Push
2. Pop

3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 40

The Stack is .....

|40|<---Top(3)
|30|
|20|
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 40 is Poped.

The Stack is .....

|30|<---Top(2)
|20|
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 30 is Poped.

The Stack is .....

|20|<---Top(1)
|10|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 20 is Poped.

The Stack is .....

|10|<---Top(0)

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 10 is Poped.

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 3

SORRY!!! STACK IS EMPTY.

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 4

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

```
Enter your choice: 5

--------------------------------
Process exited after 22.14 seconds with return value 0
Press any key to continue . . .
```

3. WRITE A MENU-DRIVEN PROGRAM TO PERFORM ALL THE STACK OPERATIONS USING STRUCTURE(USER DEFINED DATA TYPE).

PROGRAM:Stack3.c

```
#include<stdio.h>
#include<stdlib.h>
#define MAX 4
void push();
void pop();
void peek();
void display();
struct stack
{
        int top;
        int st[MAX];
}stk;
int main()
{
  int choice;
  stk.top=-1;
  system("cls");
  while(1)
   {
     printf("\n\n\tYou can perform the following Stack Operations.\n");
     printf("\n\t1.Push\n\t2.Pop\n\t3.Peek\n\t4.Display\n\t5.Exit\n");
     printf("\n\tEnter your choice: ");
     scanf("%d",&choice);
     switch(choice)
     {
                        case 1:  push();
                                 display();
                                 break;
                        case 2: pop();
                                 display();
                                 break;
                        case 3:  peek();
                                 display();
                                 break;
                        case 4: display();
                                 break;
                        case 5:   exit(0);
                                 break;
                        default:printf("\n\t\tSORRY!!! WRONG CHOICE!!!\n");
                                 break;
                }
   }
}
void push()
{
 if(stk.top==MAX-1)
```

```
                {
   printf("\n\t\tSORRY!!! STACK IS FULL OR STACK OVERFLOW.\n");

  }
  else
  {
   printf("\n\tEnter the element do you want to insert: ");
   scanf("%d",&stk.st[++stk.top]);
  }
}
void pop(void)
{
 if(stk.top<0)
  {
   return;
  }
 else
  {
   printf("\n\t\tThe Element %d is Poped.\n",stk.st[stk.top--]);
  }
}
void peek()
{
 if(stk.top<0)
  {
   printf("\n\t\tSORRY!!! STACK IS EMPTY.\n");

  }
 else
  {
   printf("\n\tEnter the element is=%d",stk.st[stk.top]);
  }
}
void display()
{
 int i;
 if(stk.top<0)
  {
  printf("\n\t\tSORRY!!! THE STACK IS EMPTY\n");
  }
 else
  {

            printf("\n\tThe Stack is..... \n");
            for(i=stk.top;i>=0;i--)
            {
            printf("\n\t\t|%0.2d|",stk.st[i]);

            if(i==stk.top)
            {
                        printf("<--- Top(%d)",stk.top);
            }
            }
  }
 getchar();
}
```

Output: You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 11

The Stack is .....

|11|<---Top(0)

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 12

The Stack is .....

|12|<---Top(1)
|11|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 1

Enter the element do you want to insert: 13

The Stack is .....

|13|<---Top(2)
|12|
|11|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display

5. Exit

Enter your choice: 1

Enter the element do you want to insert: 14

The Stack is .....

|14|<---Top(3)
|13|
|12|
|11|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 14 is Poped.

The Stack is .....

|13|<---Top(2)
|12|
|11|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 13 is Poped.

The Stack is .....

|12|<---Top(1)
|11|

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 12 is Poped.

The Stack is .....

|11|<---Top(0)

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 2

The Element 11 is Poped.

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 3

SORRY!!! STACK IS EMPTY.

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 4

SORRY!!! THE STACK IS EMPTY

You can perform the following Stack Operations.

1. Push
2. Pop
3. Peek
4. Display
5. Exit

Enter your choice: 5

Process exited after 15.43 seconds with return value 0
Press any key to continue . . .