1. Write a program to simulate working of stack using an array with the following a) Push b) Pop c) Display. The program should print appropriate message for stack overflow and stack underflow.

→
```
#include <stdio.h>
#include <stdlib.h>
#define STACK_SIZE 5

int top = -1;
int s[10], item;

void push();
void pop();
void display();

int main()
{
  int choice;
  while(1)
  {
    printf("\n Enter your choice \n");
    printf("1: Push 2: Pop 3: Display 4: Exit \n");

    scanf("%d", &choice);
```

```
switch (choice)
{
 case 1 : printf ("Enter the number to be
   inserted : ");
        scanf ("%d", &item);
        push();
        break ;
 case 2 :  pop();
        break;
 case 3 : display();
        break ;
 case 4 : exit (0);
        break ;
 default : printf ("INVALID CHOICE\n");
   }
  }
}
void push()
{
   if (top == STACK_SIZE -1)
   {
     printf ("Stack overflow, insertion is
          not possible \n");
     return ;
   }
```

```
    top=top+1;
    s[top] = item;
    printf("%d inserted successfully\n", item);
}
void pop()
{
    if (top==-1)
    {
        printf("Stack underflow, deletion not
        possible");
        return;
    }
    int item_deleted = s[top];
    printf("Item deleted : %d\n", item_deleted);
    top = top-1;
}
void display()
{   int i;
    if (top==-1)
    {
        printf("stack is empty\n");
        return;
    }
```

```
printf ("Contents of the stack are: ");
for ( i=top; i>=0; i--)
{
    printf ("%d ", s[i]);
}
printf ("\n");
}
```

Output:

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
1
Enter the number to be inserted: 10
10 inserted sucessfully

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
1
Enter the number to be inserted: 20
20 inserted sucessfully

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
1
Enter the number to be inserted: 30
30 inserted sucessfully.

Enter your choice
1: Push 2: Pop 3: Display 4: Exit.
1
Enter the number to be inserted : 40
Stack overflow, insertion was not possible.

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
3
Contents of the stack are : 30 20 10

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
2
Item deleted : 30.

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
2
Item deleted : 20

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
2
Item deleted : 10.

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
2
Stack underflow, deletion not possible

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
3
Stack is empty.

Enter your choice
1: Push 2: Pop 3: Display 4: Exit
4.