1. Lab Program Data Structures

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

```
#include <stdio.h>
#include <stdlib.h>
#include <conio.h>
#define max 5
void push();
void pop();
void display();
int menu();
int stack[max], top=0;
int
void main()
{ int ch;
do {
 ch = menu();
 switch(ch)
 { case 1: push();
           break;
   case 2: pop();
           break;
   case 3: display();
           break;
   case 4: exit(0);
   default: printf("\n Enter valid choice\n"); }
  } while(1);
 return 0; }
int menu()
{ int ch;
  printf("\n stack\n 1. Push \n 2. Pop \n 3. display\n 4. exit \n");
  printf("\n Enter your choice");
  scanf("%d", &ch);
  return ch; }
void push()
{ if(top == max)
  printf("\n Overflow");
  else {
  int element;
```

```
printf("\n Enter element:");
scanf("%d", &element);
printf("\n Element (%d) has been pushed at %d", element, top);
stack[top++]=element; } }

void pop()
{ if (top == 0)
  printf ("\n Underflow");
  else
  { top--;
    printf (" Element has been popped out"); } }
void display()
{ if (top == -1)
  printf("\n stack is empty");
  else
  { int i;
    for(i=0; i < top ; i++)
      printf ("%d\n", stack[i]); } }
```

Output:

```
Stack
1. Push
2. Pop
3. Display
4. Exit
Enter your choice: 1
Enter element : 1
Element (1) has been pushed at 0
1. Push
2. Pop
3. Display
4. Exit
Enter your choice : 1
Enter element : 2.
Element (2) has been pushed at 1
1. Push
2. Pop
3. Display
4. Exit
Enter your choice : 3
1
2
```

1. Push
2. Pop
3. Display
4. exit
Enter your choice : 2.
Element popped out
1. Push
2. Pop
3. Display
4. exit
Enter your choice : 2
Element popped out
1. Push
2. Pop
3. Display
4. exit
Enter your choice : 2
Underflow
Enter your choice : 3
Stack is empty.