SOMAIYA VIDYAVIHAR

K J Somaiya Institute of Technology

An Autonomous Institute Permanently Affiliated to the University of Mumbai

DEPARTMENT OF INFORMATION TECHNOLOGY

Course: DS Lab (ITL302) B.Tech. (Information Technology) – Semester III
Academic Year: 2024-25 (Odd Semester)

Experiment No: 1

Aim: Implementation of Stack using Array for real-world application.

Objectives:

1. To introduce the concepts of data structures and analysis procedure.
2. To conceptualize linear data structures and its implementation for various real-world applications.

Theory: A stack is a linear data structure where the insertion of a new element and the removal of an existing element both take place at the same end, represented as the top of the stack. This follows the Last In First Out (LIFO) principle, meaning that the last element added to the stack will be the first one to be removed. The operations commonly associated with a stack include push, which inserts elements into the stack, pop, which removes elements from the stack, peek, which retrieves the topmost element without deleting it, and isFull, which checks whether the stack is full. Stacks are used in various applications, such as function calls, expression evaluation, and undo mechanisms, and are implemented using standard data structures like arrays or linked lists. The efficiency of stack operations is crucial, and a well-implemented stack should ensure that these operations are performed in constant time, denoted as O (1).

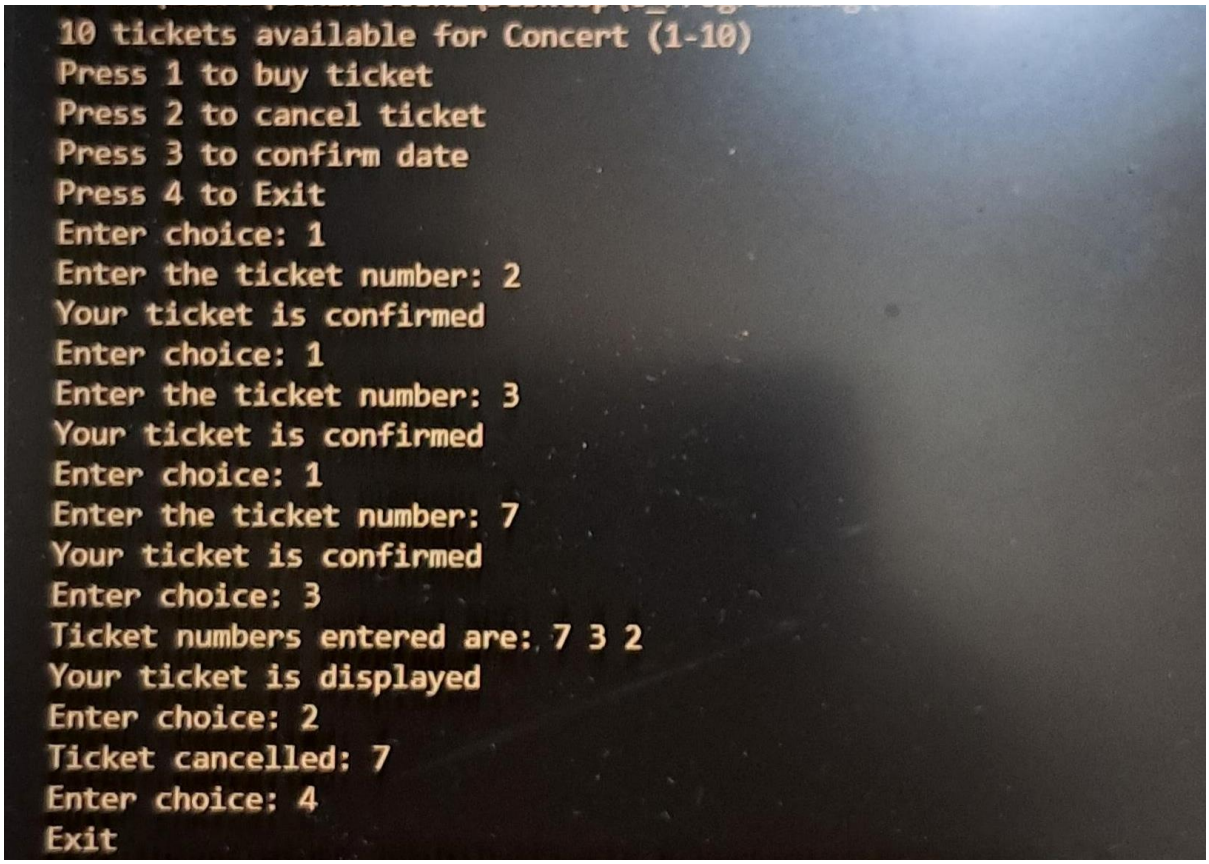
Program:

```
#include <stdio.h>
#define MAX 100 int

stack[MAX], top = -1;

void push(int val) {
if (top >= MAX - 1) {
printf("No more tickets available\n");
} else {
 top++;
stack[top=val];
}}

void pop() {
if (top <= -1) {
printf("All tickets booked\n");
} else {
printf("Ticket cancelled: %d\n", stack[top]);
top--;
} }

void display() {
if (top >= 0) {
printf("Ticket numbers entered are: ");
for (int i = top; i >= 0; i--) {
```

```
printf("%d ", stack[i]);
}
printf("\n");
} else {
printf("Tickets Unavailable\n");
} }

int main() {
int a, val;
 printf("10 tickets available for Concert (1-10)\n");
printf("Press 1 to buy ticket\n");
printf("Press 2 to cancel ticket\n");
printf("Press 3 to confirm date\n");
printf("Press 4 to Exit\n");
do {
printf("Enter choice: ");
scanf("%d", &a);
switch (a) {
case 1: {
printf("Enter the ticket number: ");
scanf("%d", &val);
push(val);
printf("Your ticket is confirmed\n");
break;
 }
case 2: {
```

```
pop();
break;
 }
case 3:
{
display();
printf("Your ticket is displayed\n"); break; } case 4: {
printf("Exit\n");
break;
}
default:
{
printf("Invalid Choice\n");
}
}
} while (a != 4);
return 0;
}
```

Output:


10 tickets available for Concert (1-10)
Press 1 to buy ticket
Press 2 to cancel ticket
Press 3 to confirm date
Press 4 to Exit
Enter choice: 1
Enter the ticket number: 2
Your ticket is confirmed
Enter choice: 1
Enter the ticket number: 3
Your ticket is confirmed
Enter choice: 1
Enter the ticket number: 7
Your ticket is confirmed
Enter choice: 3
Ticket numbers entered are: 7 3 2
Your ticket is displayed
Enter choice: 2
Ticket cancelled: 7
Enter choice: 4
Exit

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Conclusion: The Stacks Program has provided insights into Data Structures and Algorithm Concepts. Through the program a better understanding of stack operations such as push pop and peep is gained. The menu driven program has helped in understanding practical applications in real world scenarios

Submitted Details -

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