DS PRACTICAL 05

STACK IMPLEMENTATION

AIM :- Write a program to implement a STACK data structure by

[A] Array [B] Linked list

Demonstrate the STACK operation such as push, pop and print using menu driver .

PROGRAM:-

[A] By using ARRAY :-

```
#include <stdio.h>
int stack[100], top, n, num;

void push()
{
   if (top >= n - 1)
   {
      printf("Stack is overflow\n");
   }
   else
   {
      printf("Enter the value : ");
      scanf("%d", &num);
      top++;
      stack[top] = num;
   }
}

void pop()
{
   if (top <= -1)
   {
      printf("\nStack is Underflow\n");
   }
   else
```

```
    {
        printf("\nThe poped element is : %d\n", stack[top]);
        top--;
    }
}

void print()
{
    if (top >= 0)
    {
        printf("Printing the element in stack");
        for (int i = top; i >= 0; i--)
        {
            printf("\n%d", stack[i]);
        }
        printf("\nPress next choice:-\n");
    }
    else
    {
        printf("\nEmpty stack\n");
    }
}

int main()
{
    int choice;
    top = -1;
    printf("\nEnter the size of stack:");
    scanf("%d", &n);
    printf("\nSelect stack operation\n");
    printf("1.Push  2.Pop  3.Print  4.Exit\n");
```

```
    do
    {
        printf("Enter the choice :- ");
        scanf("%d", &choice);

        switch (choice)
        {
        case 1:
            push();
            break;

        case 2:
            pop();
            break;

        case 3:
            print();
            break;

        case 4:
            printf(" Exit succesfully\n");
            break;

        default:
            printf("invalid no. \n");
            break;
        }
    } while (choice != 4);

    return 0;
}
```

OUTPUT

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
PS C:\Users\chuna> ./a.exe

Enter the size of stack:4

Select stack operation
1.Push  2.Pop  3.Print  4.Exit
Enter the choice :- 1
Enter the value : 12
Enter the choice :- 1
Enter the value : 23
Enter the choice :- 1
Enter the value : 34
Enter the choice :- 1
Enter the value : 45
Enter the choice :- 3
Printing the element in stack
45
34
23
12
Press next choice:-
Enter the choice :- 2

The poped element is : 45
Enter the choice :- 3
Printing the element in stack
34
23
12
Press next choice:-
Enter the choice :- 4
 Exit succesfully
PS C:\Users\chuna>
```

[B] By using LINKED LIST :-

```
#include <stdio.h>
#include <stdlib.h>

struct node {
   int data;
   struct node *next;
};
struct node *Top = NULL;

void push(int num) {
   struct node *p;
   p=(struct node *)malloc(sizeof(struct node));

   if (p== NULL) {
      printf("Stack Overflow\n");
      return;
   }
   p->data = num;
   p->next = Top;
   Top =p;
}

void pop() {
   struct node *t;
   if (Top == NULL) {
      printf("Stack Underflow\n");
   } else {
      t = Top;
      Top = Top->next;
      free(t);
```

```
        t = NULL;
    }
}

void print() {
    struct node *temp = Top;
    if (Top == NULL) {
        printf("Stack is empty\n");
        return;
    }
    printf("Elements of stacks are:\n");
    while (temp != NULL) {
        printf("%d\n", temp->data);
        temp = temp->next;
    }
}

int main() {
    int choice;
    int value;

    do {
        printf("Select the the operation:  1) Push 2) Pop 3) print 4) Exit \n");
        scanf("%d", &choice);
        switch (choice) {
        case 1:
            printf("Enter the value: ");
            scanf("%d", &value);
            push(value);
            break;
        case 2:
```

```
            pop();
            break;
        case 3:
            print();
            break;
        case 4:
            printf("Exit successfully\n");
            break;
        default:
            printf("Invalid choice\n");
        }
    } while (choice != 4);

    return 0;
}
```

OUTPUT

```
PS C:\Users\chuna> g++ stack2.c
PS C:\Users\chuna> ./a.exe
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
1
Enter the value: 12
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
1
Enter the value: 23
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
1
Enter the value: 34
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
1
Enter the value: 45
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
3
Elements of stacks are:
45
34
23
12
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
2
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
3
Elements of stacks are:
34
23
12
Select the the operation:  1) Push 2) Pop 3) print 4) Exit
4
Exit successfully
PS C:\Users\chuna>
```