

Student Information

- Name:- Aditya Kumar
- Sap Id :- 590015145
- Branch :- M.C.A
- Batch :- B1
- Instructor :-Dr. Sourbh Kumar

Lab Assignment 1: Stack Implementation Using Arrays

```
#include <stdio.h>
#include <stdlib.h>
#define MAX_SIZE 100

int stack[MAX_SIZE];
int top = -1;
int is_empty()
{
    return top == -1;
}

int is_full()
{
    return top == MAX_SIZE - 1;
}
void push(int item)
{
    if (is_full())
    {
        printf("Stack Overflow\n");
        return;
    }
    top++;
    stack[top] = item;
    printf("%d pushed to stack\n", item);
}
int pop()
{
    if (is_empty())
    {
        printf("Stack Underflow\n");
        return -1;
    }
    int item = stack[top];
    top--;
    return item;
}
int peek()
```

```

{
    if (is_empty())
    {
        printf("Stack is empty\n");
        return -1;
    }
    return stack[top];
}
int main()
{
    push(10);
    push(20);
    push(30);

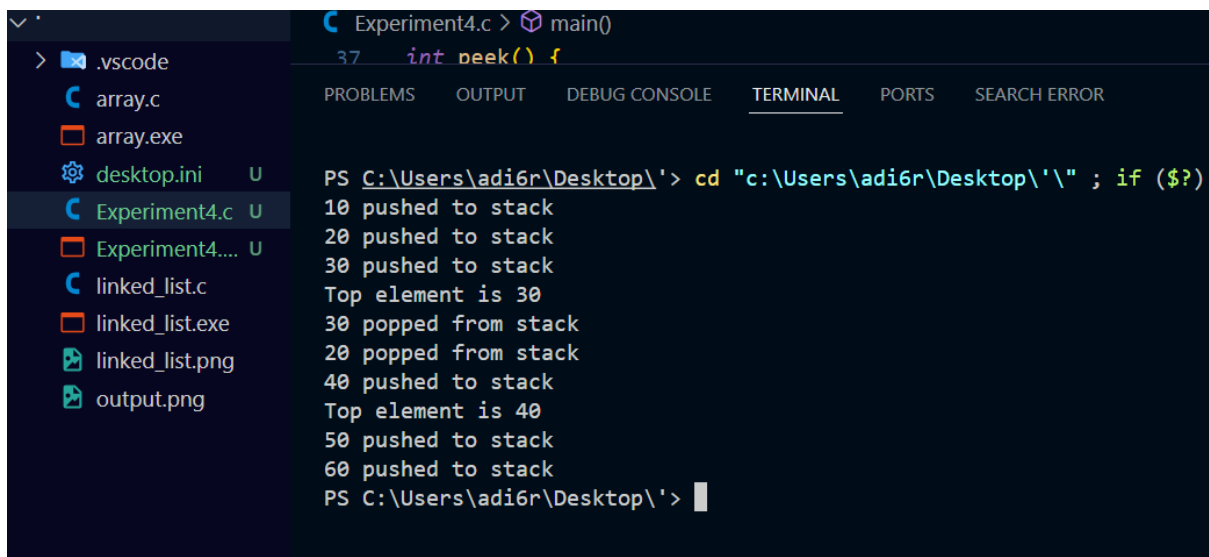
    printf("Top element is %d\n", peek());
    printf("%d popped from stack\n", pop());
    printf("%d popped from stack\n", pop());

    push(40);
    printf("Top element is %d\n", peek());

    // Trying to push more elements than the stack capacity
    push(50);
    push(60);

    return 0;
}

```



The screenshot shows a VS Code editor with a file explorer on the left and a terminal window on the right. The file explorer shows a project named 'Experiment4.c' with files like 'array.c', 'array.exe', 'desktop.ini', 'Experiment4.c', 'Experiment4....', 'linked_list.c', 'linked_list.exe', 'linked_list.png', and 'output.png'. The terminal window shows the execution of the program, with the following output:

```

PS C:\Users\adi6r\Desktop\> cd "c:\Users\adi6r\Desktop\" ; if ($?)
10 pushed to stack
20 pushed to stack
30 pushed to stack
Top element is 30
30 popped from stack
20 popped from stack
40 pushed to stack
Top element is 40
50 pushed to stack
60 pushed to stack
PS C:\Users\adi6r\Desktop\>

```

Lab Assignment 2: Stack Implementation Using Linked Lists

```
#include <stdio.h>
#include <stdlib.h>
// Node structure
struct Node
{
    int data;
    struct Node* next;
};
// Stack structure
struct Stack
{
    struct Node* top;
};
// Function to create a new node
struct Node* newNode(int data)
{
    struct Node* node = (struct Node*)malloc(sizeof(struct Node));
    node->data = data;
    node->next = NULL;
    return node;
}
// Function to check if the stack is empty
int isEmpty(struct Stack* stack)
{
    return stack->top == NULL;
}

// Function to push an item onto the stack
void push(struct Stack* stack, int data)
{
    struct Node* node = newNode(data);
    node->next = stack->top;
    stack->top = node;
    printf("%d pushed to stack\n", data);
}

// Function to pop an item from the stack
int pop(struct Stack* stack)
{
    if (isEmpty(stack)) {
        printf("Stack Underflow\n");
        return -1;
    }
    struct Node* temp = stack->top;
    int popped = temp->data;
```

```

    stack->top = temp->next;
    free(temp);
    return popped;
}

// Function to peek the top element of the stack
int peek(struct Stack* stack)
{
    if (isEmpty(stack))
    {
        printf("Stack is Empty\n");
        return -1;
    }
    return stack->top->data;
}

int main()
{
    struct Stack* stack = (struct Stack*)malloc(sizeof(struct Stack));
    stack->top = NULL;

    push(stack, 10);
    push(stack, 20);
    push(stack, 30);

    printf("Top element is %d\n", peek(stack));

    printf("%d popped from stack\n", pop(stack));
    printf("%d popped from stack\n", pop(stack));

    push(stack, 40);
    printf("Top element is %d\n", peek(stack));

    return 0;
}

```

```

> .vscode
  array.c
  array.exe
  desktop.ini
  experiment1...
  experiment1...
  Experiment4.c
  Experiment4....
  linked_list.c
  linked_list.exe
  linked_list.png
  output.png

PROBLEMS  OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  SEARCH ERROR

PS C:\Users\adi6r\Desktop\> cd "c:\Users\adi6r\Desktop\" ; if ($?) { g
1_lab2 }
10 pushed to stack
20 pushed to stack
30 pushed to stack
Top element is 30
30 popped from stack
20 popped from stack
40 pushed to stack
Top element is 40
PS C:\Users\adi6r\Desktop\>

```

