

PRACTICAL NO : 5

AIM : Stack implementation

[A] : Implement a Stack using array and perform the stack operations: Push, Pop and Print using Menu Driver Program such as 1.Push, 2.Pop and 3. Print and 4. Exit.

PROGRAM :

```
#include <stdio.h>

#define MAX 100

int stack[MAX];

int top = -1;

void menu()
{
    printf("1.PUSH\n2.POP\n3.PRINT\n4.EXIT\n");
}

void PUSH()
{
    if(top > MAX)
    {
        printf("Stack Overflow\n");
        return;
    }
    top += 1;
    printf("Enter value to push: ");

    int a;

    scanf("%d", &a);

    stack[top] = a;
}
```

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```
void POP()
{
    if(top < 0)
    {
        printf("Stack Underflow\n");
        return;
    }
    printf("Pop element: %d\n", stack[top]);
    top -= 1;
}

void PRINT()
{
    if(top == -1)
    {
        printf("No Element in Stack\n");
        return;
    }
    printf("Elements in stack are:\n");
    for(int i = top; i >= 0; i--){
        printf("%d \n", stack[i]);
    }
}

int main()
{
    char ch;
    do
    {
```

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```
menu();

int choice;

printf("Enter choice: ");

scanf("%d", &choice);


switch (choice)
{
case 1:
    PUSH();
    break;
case 2:
    POP();
    break;
case 3:
    PRINT();
    break;
case 4:
    return 0;
default:
    printf("Invalid Choice\n");
    break;
}

printf("\nDo you want to continue(Y/N): ");

scanf(" %c", &ch);


} while (ch == 'y' || ch == 'Y');

return 0;

}
```

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OUTPUT

```
PS C:\Users\230212\Desktop\DSA_programs> cd "c:\Users\230212\Desktop\DSA_programs"
PS C:\Users\230212\Desktop\DSA_programs> cd "c:\Users\230212\Desktop\DSA_programs\" ; if ($?) { gcc Practical5A.c -o Practical5A } ; if ($?) { .\Practical5A }
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 1
Enter value to push: 10

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 1
Enter value to push: 20

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 3
Elements in stack are:
20
10

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 2
Pop element: 20

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 3
Elements in stack are:
10
```

[B] : : Implement a Stack using linked list and perform the stack operations: Push, Pop and Print using Menu Driver Program such as 1.Push, 2.Pop and 3. Print and 4. Exit.

PROGRAM :

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

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

```
struct Node {
```

```
    int data;
```

```
    struct Node* next;
```

```
};
```

```
struct Node* top = NULL;
```

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```
void menu() {  
    printf("1.PUSH\n2.POP\n3.PRINT\n4.EXIT\n");  
}  
  
void PUSH() {  
    struct Node* newNode = (struct Node*)malloc(sizeof(struct Node));  
    if (!newNode) {  
        printf("Stack Overflow\n");  
        return;  
    }  
    printf("Enter value to push: ");  
    scanf("%d", &newNode->data);  
    newNode->next = top;  
    top = newNode;  
}  
  
void POP() {  
    if (top == NULL) {  
        printf("Stack Underflow\n");  
        return;  
    }  
    struct Node* temp = top;  
    printf("Pop element: %d\n", top->data);  
    top = top->next;  
    free(temp);  
}  
  
void PRINT() {  
    if (top == NULL) {  
        printf("No Element in Stack\n");  
    }
```

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```
    return;
}
struct Node* temp = top;
printf("Elements in stack are:\n");
while (temp != NULL) {
    printf("%d \n", temp->data);
    temp = temp->next;
}
}
int main() {
    char ch;
    do {
        menu();
        int choice;
        printf("Enter choice: ");
        scanf("%d", &choice);
        switch (choice) {
            case 1:
                PUSH();
                break;
            case 2:
                POP();
                break;
            case 3:
                PRINT();
                break;
            case 4:
                return 0;
        }
    } while (ch != 'q');
```

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```
default:

    printf("Invalid Choice\n");

    break;

}

printf("\nDo you want to continue(Y/N): ");

scanf(" %c", &ch);

} while (ch == 'y' || ch == 'Y');

return 0;

}
```

PROGRAM

```
PS C:\Users\230212\Desktop\DSA_programs> cd "c:\Users\230212\Desktop\DSA_programs"
PS C:\Users\230212\Desktop\DSA_programs> cd "c:\Users\230212\Desktop\DSA_programs\" ; if ($?) { gcc practical5B.c -o practical5B } ; if ($?) { .\practical5B }
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 1
Enter value to push: 50

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 1
Enter value to push: 100

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 3
Elements in stack are:
100
50

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 2
Pop element: 100

Do you want to continue(Y/N): Y
1.PUSH
2.POP
3.PRINT
4.EXIT
Enter choice: 3
Elements in stack are:
50

Do you want to continue(Y/N):
```

GITHUB LINK : <https://github.com/AmolNagargoje04/Data-Structure-practical>

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