

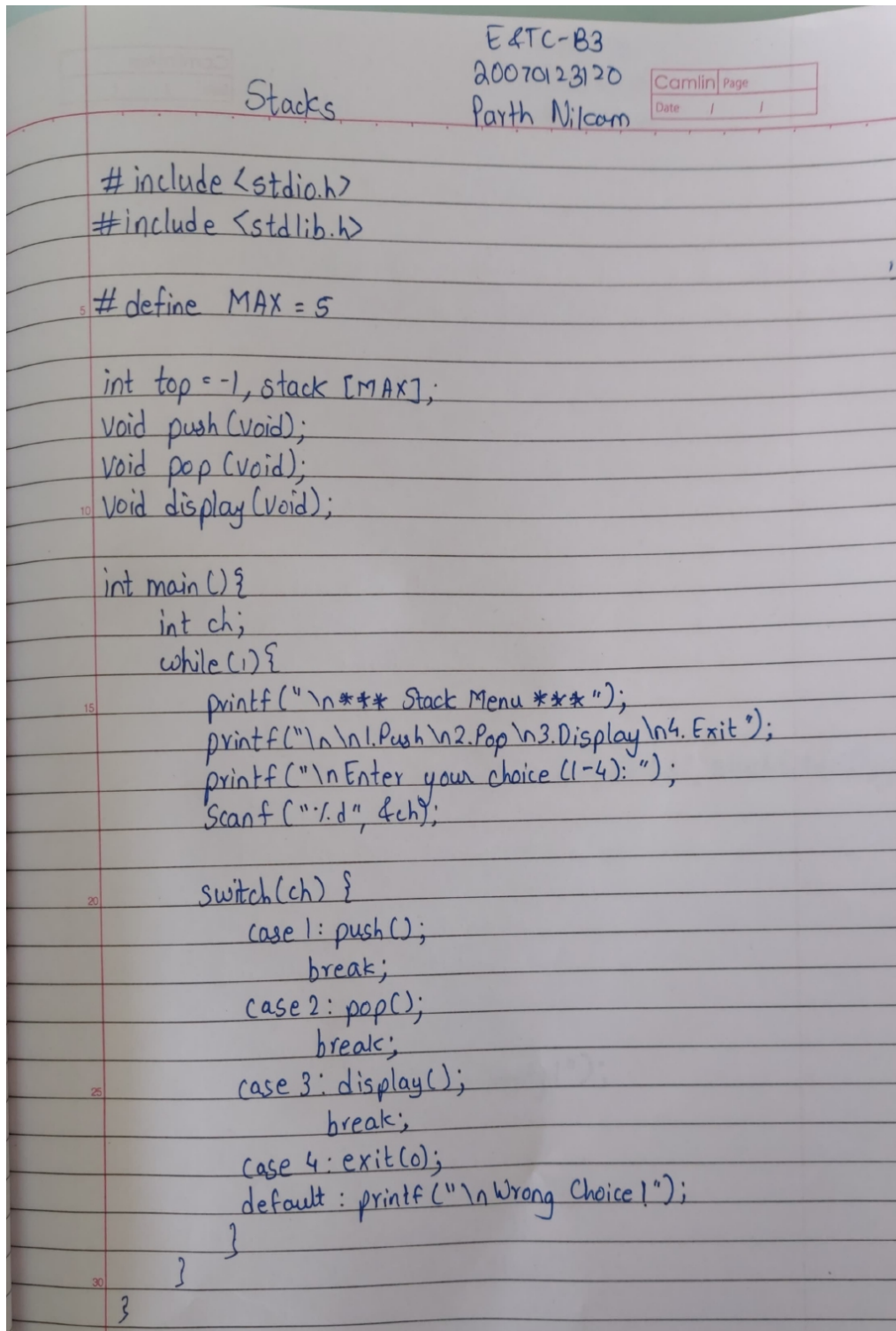
Data Structures using C

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E&TC - B3

Aim: - Studying and coding on stack.

Objective: - To perform push, pop, and peek operations on stack in C language

Code: -



The image shows a handwritten C program for a stack implemented using an array. The code is written on lined paper with red margin lines. At the top right, there is a header with the text 'E&TC-B3', '20070123120', and 'Parth Nikam'. Below this, there is a small table with the header 'Camlin Page' and a row for 'Date' with slashes for day, month, and year. The word 'Stacks' is written in the top left margin. The code itself starts with two include statements: `#include <stdio.h>` and `#include <stdlib.h>`. It then defines a constant `MAX = 5`. The stack is represented as an array `stack[MAX]` with a `top` pointer initialized to `-1`. Three functions are declared: `void push(void);`, `void pop(void);`, and `void display(void);`. The `main` function starts with a `while` loop that displays a menu: `*** Stack Menu ***`, with options `1. Push`, `2. Pop`, `3. Display`, and `4. Exit`. It prompts the user to enter a choice (1-4) and reads it into `ch`. A `switch` statement then handles the choices: `case 1: push(); break;`, `case 2: pop(); break;`, `case 3: display(); break;`, `case 4: exit(0);`, and a `default` case that prints `Wrong Choice!`. The program ends with a closing brace for `main` and another for the `while` loop.

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

#define MAX = 5

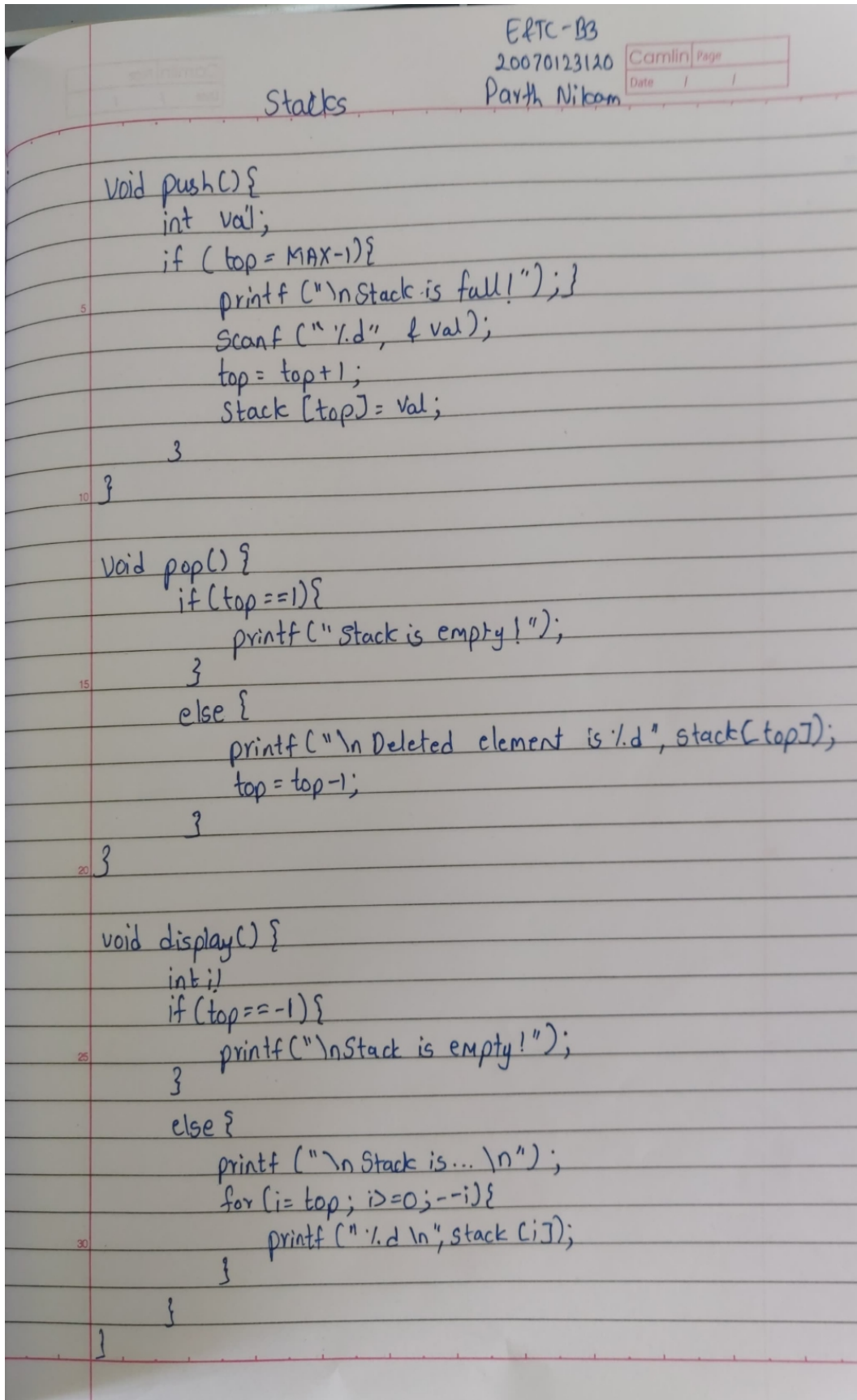
int top = -1, stack[MAX];
void push(void);
void pop(void);
void display(void);

int main() {
    int ch;
    while(1) {
        printf("\n*** Stack Menu ***");
        printf("\n\n1.Push\n2.Pop\n3.Display\n4.Exit");
        printf("\nEnter your choice (1-4): ");
        scanf("%d", &ch);

        switch(ch) {
            case 1: push();
                     break;
            case 2: pop();
                     break;
            case 3: display();
                     break;
            case 4: exit(0);
            default: printf("\nWrong Choice!");
        }
    }
}
```

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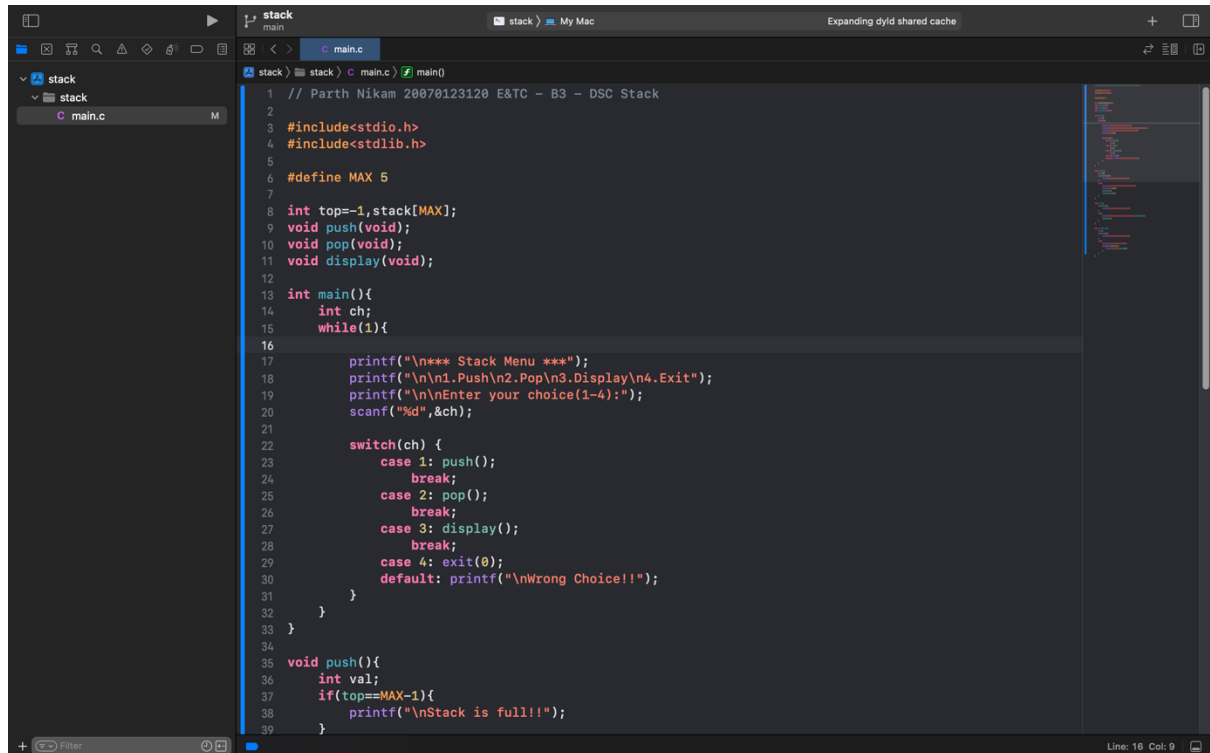
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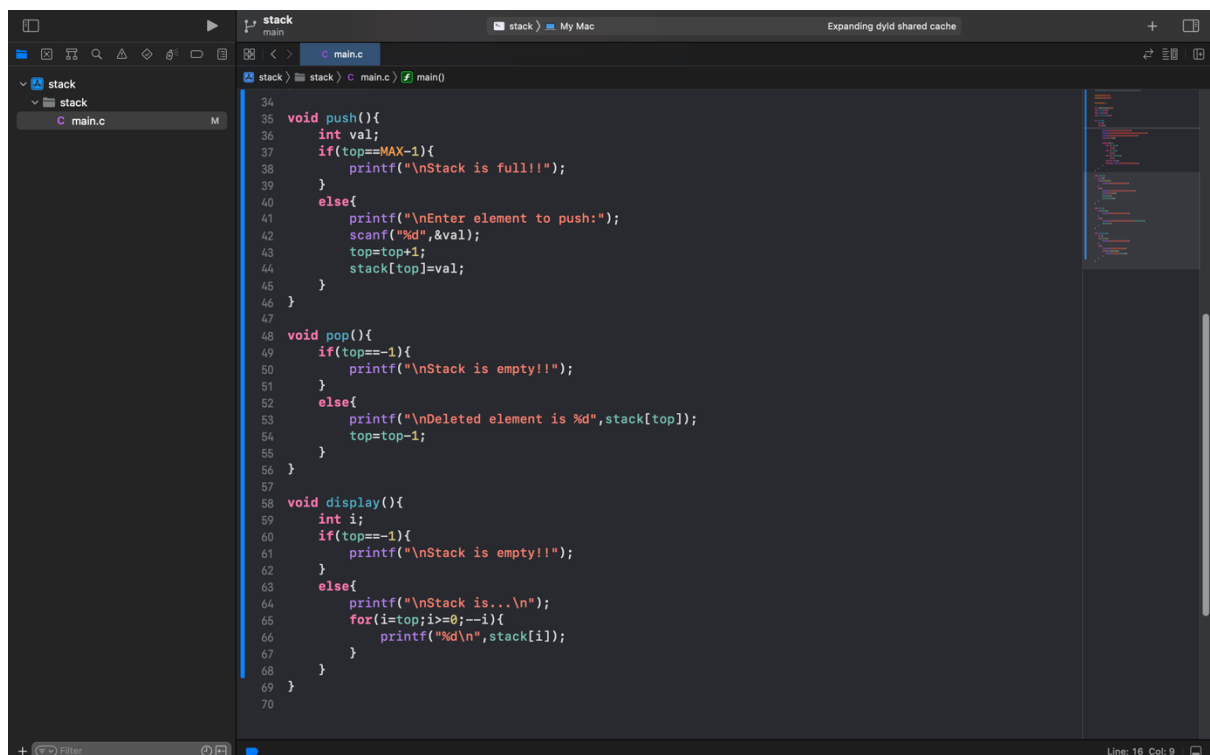
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Screenshot: -



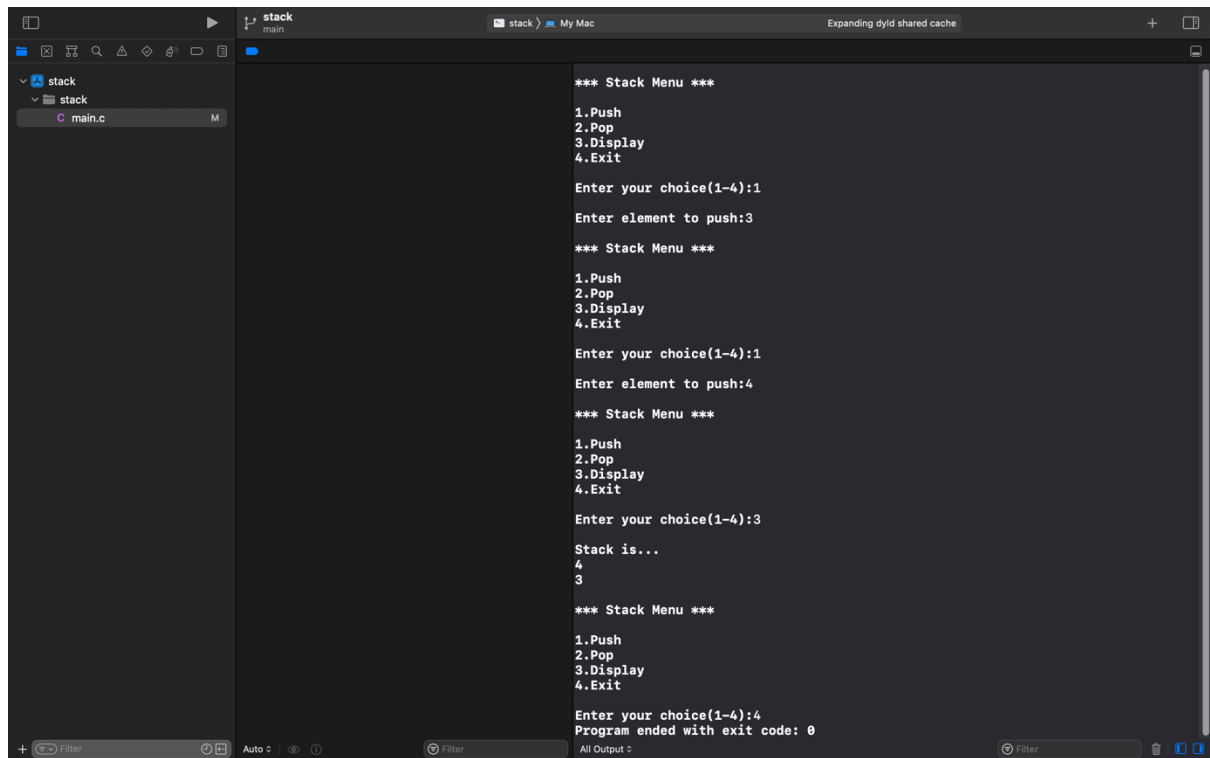
```
1 // Parth Nikam 20070123120 E&TC – B3 – DSC Stack
2
3 #include<stdio.h>
4 #include<stdlib.h>
5
6 #define MAX 5
7
8 int top=-1,stack[MAX];
9 void push(void);
10 void pop(void);
11 void display(void);
12
13 int main(){
14     int ch;
15     while(1){
16
17         printf("\n*** Stack Menu ***");
18         printf("\n1.Push\n2.Pop\n3.Display\n4.Exit");
19         printf("\nEnter your choice(1-4):");
20         scanf("%d",&ch);
21
22         switch(ch) {
23             case 1: push();
24                     break;
25             case 2: pop();
26                     break;
27             case 3: display();
28                     break;
29             case 4: exit(0);
30             default: printf("\nWrong Choice!!");
31         }
32     }
33 }
34
35 void push(){
36     int val;
37     if(top==MAX-1){
38         printf("\nStack is full!!");
39     }
```



```
34
35 void push(){
36     int val;
37     if(top==MAX-1){
38         printf("\nStack is full!!");
39     }
40     else{
41         printf("\nEnter element to push:");
42         scanf("%d",&val);
43         top=top+1;
44         stack[top]=val;
45     }
46 }
47
48 void pop(){
49     if(top==-1){
50         printf("\nStack is empty!!");
51     }
52     else{
53         printf("\nDeleted element is %d",stack[top]);
54         top=top-1;
55     }
56 }
57
58 void display(){
59     int i;
60     if(top==-1){
61         printf("\nStack is empty!!");
62     }
63     else{
64         printf("\nStack is...\n");
65         for(i=top;i>=0;--i){
66             printf("%d\n",stack[i]);
67         }
68     }
69 }
70
```

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```
*** Stack Menu ***
1.Push
2.Pop
3.Display
4.Exit
Enter your choice(1-4):1
Enter element to push:3
*** Stack Menu ***
1.Push
2.Pop
3.Display
4.Exit
Enter your choice(1-4):1
Enter element to push:4
*** Stack Menu ***
1.Push
2.Pop
3.Display
4.Exit
Enter your choice(1-4):3
Stack is...
4
3
*** Stack Menu ***
1.Push
2.Pop
3.Display
4.Exit
Enter your choice(1-4):4
Program ended with exit code: 0
```

Result: - Stack is a linear data structure that follows a particular order in which the operations are performed. The order may be LIFO (Last in First Out) or FILO (First in Last Out). It was studied, analyzed, and understood.