## 6(a). Evaluating Arithmetic expression(Postfix) using Array

**Program :**

```c
#include <stdio.h>

#include <string.h>

#define MAX 20
int Stack[MAX], top = -1;
char expr[MAX];
void Push(int ele);
int Pop();
int main() {
  int i, a, b, c, e;
  printf("Enter the postfix expression : ");
  gets(expr);
  for (i = 0; i < strlen(expr); i++) {
    if (expr[i] == '+' || expr[i] == '-' || expr[i] == '*' || expr[i] == '/') {
      b = Pop();
      a = Pop();
      switch (expr[i]) {
      case '+':
        c = a + b;
        Push(c);
        break;
      case '-':
        c = a - b;
        Push(c);
        break;
      case '*':
        c = a * b;
        Push(c);
        break;
      case '/':
        c = a / b;
        Push(c);
        break;
      }
    } else {
      printf("Enter the value of %c : ", expr[i]);
      scanf("%d", & e);
      Push(e);
    }
  }
  printf("The result is %d", Pop());
  return 0;
}
void Push(int ele) {
  top = top + 1;
  Stack[top] = ele;
}
int Pop() {
  int e;
  e = Stack[top];
  top = top - 1;
```

```
  return e;
}
```

**Output :**

```
Enter the postfix expression : abc+*d*
Enter the value of a : 2
Enter the value of b : 3
Enter the value of c : 4
Enter the value of d : 5
The result is 70
```

## 6(b). Evaluating Arithmetic expression(Postfix) using Linked List

**Program :**

```
#include <stdio.h>

#include <string.h>

#include <stdlib.h>

#define MAX 20
struct node {
  int Element;
  struct node * Next;
}* List = NULL;
typedef struct node Stack;
void Push(int e);
int Pop();
int main() {
  int i, a, b, c, e;
  char expr[MAX];
  printf("Enter the postfix expression : ");
  gets(expr);
  for (i = 0; i < strlen(expr); i++) {
    if (expr[i] == '+' || expr[i] == '-' || expr[i] == '*' || expr[i] == '/') {
      b = Pop();
      a = Pop();
      switch (expr[i]) {
      case '+':
        c = a + b;
        Push(c);
        break;
      case '-':
        c = a - b;
        Push(c);
        break;
      case '*':
        c = a * b;
        Push(c);
        break;
      case '/':
        c = a / b;
        Push(c);
        break;
      }
    } else {
      printf("Enter the value of %c : ", expr[i]);
      scanf("%d", & e);
      Push(e);
    }
  }
  printf("The result is %d", Pop());
  return 0;
}
void Push(int e) {
  Stack * NewNode = malloc(sizeof(Stack));
```

```
  NewNode -> Element = e;
  if (List == NULL)
    NewNode -> Next = NULL;
  else
    NewNode -> Next = List;
  List = NewNode;
}
int Pop() {
  int e;
  Stack * TempNode;
  TempNode = List;
  List = List -> Next;
  e = TempNode -> Element;
  free(TempNode);
  return e;
}
```

**Output :**

```
Enter the postfix expression : abc+*d*
Enter the value of a : 2
Enter the value of b : 3
Enter the value of c : 4
Enter the value of d : 5
The result is 70
```