Lab-4 Practice programs

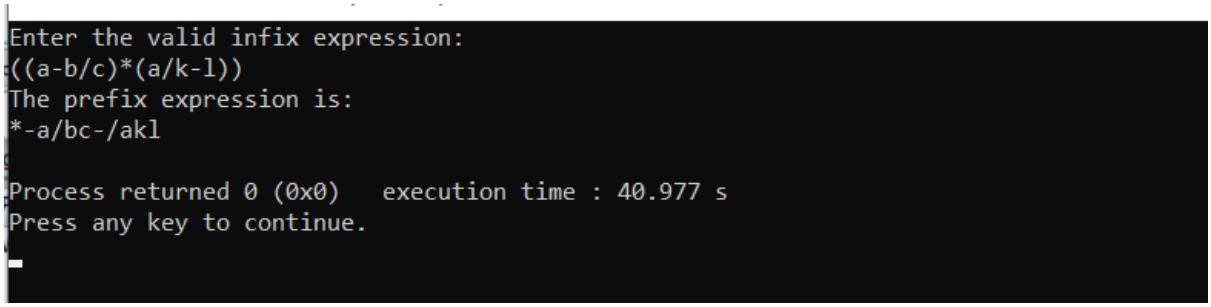
1)WAP to convert a given valid parenthesized infix arithmetic expression to prefix expression. The expression consists of single character operands and the binary operators + (plus), - (minus), * (multiply) and / (divide).

```
#include <stdio.h>
#include <string.h>
#include <process.h>
int F(char symbol)
{
   switch (symbol)
   {
   case '+':
   case '-':
      return 1;
   case '*':
   case '/':
      return 3;
   case '^':
   case '$':
      return 6;
   case ')':
      return 0;
   case '#':
      return -1;
   default:
```

```
        return 8;
    }
}
int G(char symbol)
{
    switch (symbol)
    {
    case '+':
    case '-':
        return 2;
    case '*':
    case '/':
        return 4;
    case '^':
    case '$':
        return 5;
    case '(':
        return 0;
    case ')':
        return 9;
    default:
        return 7;
    }
}
void infix_prefix(char infix[], char prefix[])
{
```

```
int top, j, i;
char s[30], symbol;
top = -1;
s[++top] = '#';
j = 0;
strrev(infix);
for (i = 0; i < strlen(infix); i++)
{
   symbol = infix[i];
   while (F(s[top]) > G(symbol))
   {
      prefix[j] = s[top--];
      j++;
   }
   if (F(s[top]) != G(symbol))
   {
      s[++top] = symbol;
   }
   else
   {
      top--;
   }
}
while (s[top] != '#')
{
   prefix[j++] = s[top--];
```

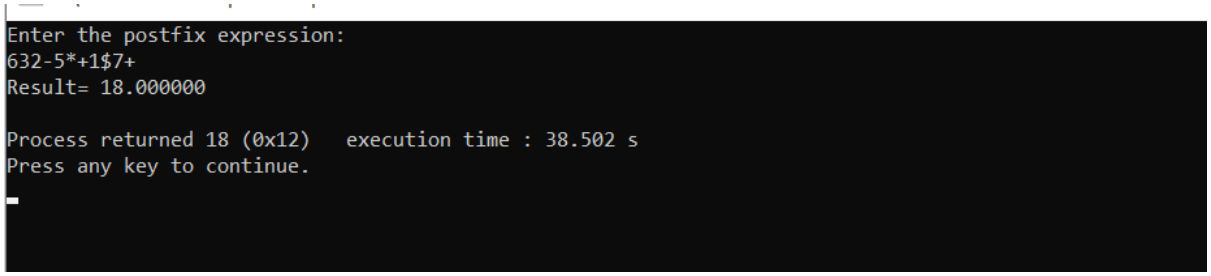
```
    }
    prefix[j] = '\0';
    strrev(prefix);
}

void main()
{
    char infix[30], prefix[30];
    printf("Enter the valid infix expression:\n");
    scanf("%s", infix);
    infix_prefix(infix, prefix);
    printf("The prefix expression is:\n");
    printf("%s\n", prefix);

}
```



2) WAP to demonstrate the Evaluation of postfix expression.

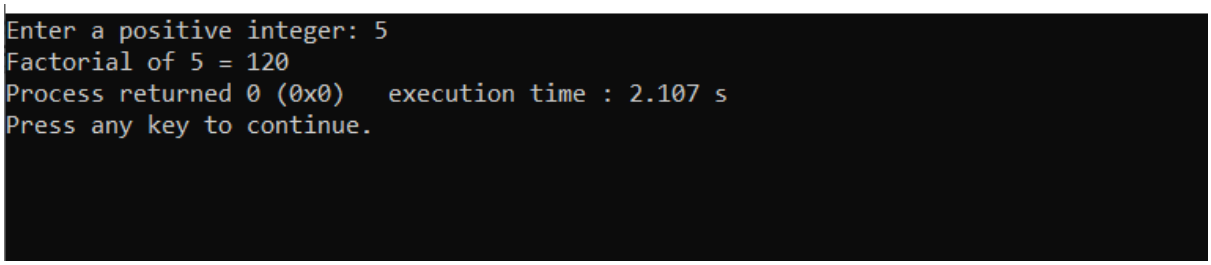
```
#include<stdio.h>
#include<math.h>
#include<string.h>
double compute(char symbol,double op1,double op2)
{
   switch(symbol)
   {
      case '+':return op1+op2;
      case '-':return op1-op2;
      case '*':return op1*op2;
      case '/':return op1/op2;
      case '$':
      case '^':return pow(op1,op2);
   }
}
void main()
{
   double s[20];
   double res;
   double op1,op2;
   int top,i;
   char postfix[20],symbol;
   printf("Enter the postfix expression:\n");
   scanf("%s",postfix);
```

```
    top=-1;
    for(i=0;i<strlen(postfix);i++)
    {
       symbol=postfix[i];
       if(isdigit(symbol))
          s[++top]=symbol-'0';
       else{
          op2=s[top--];
          op1=s[top--];
          res=compute(symbol,op1,op2);
          s[++top]=res;
       }
    }
    res=s[top--];
    printf("Result= %f\n",res);
}
```



3) WAP to perform factorial of a number using Recursion.

```
#include<stdio.h>
long int factorial(int n);
int main() {
   int n;
   printf("Enter a positive integer: ");
   scanf("%d",&n);
   printf("Factorial of %d = %ld", n, factorial(n));
   return 0;
}

long int factorial(int n) {
   if (n>=1)
      return n*factorial(n-1);
   else
      return 1;
}
```



4) WAP to perform GCD of two numbers using Recursion.

```
#include <stdio.h>
int hcf(int n1, int n2);
int main() {
   int n1, n2;
   printf("Enter two positive integers: ");
   scanf("%d %d", &n1, &n2);
   printf("G.C.D of %d and %d is %d.", n1, n2, hcf(n1, n2));
   return 0;
}

int hcf(int n1, int n2) {
   if (n2 != 0)
      return hcf(n2, n1 % n2);
   else
      return n1;
}
```