DS LAB-PRACTICE PROGRAMS (4 qns)

Programs and Output

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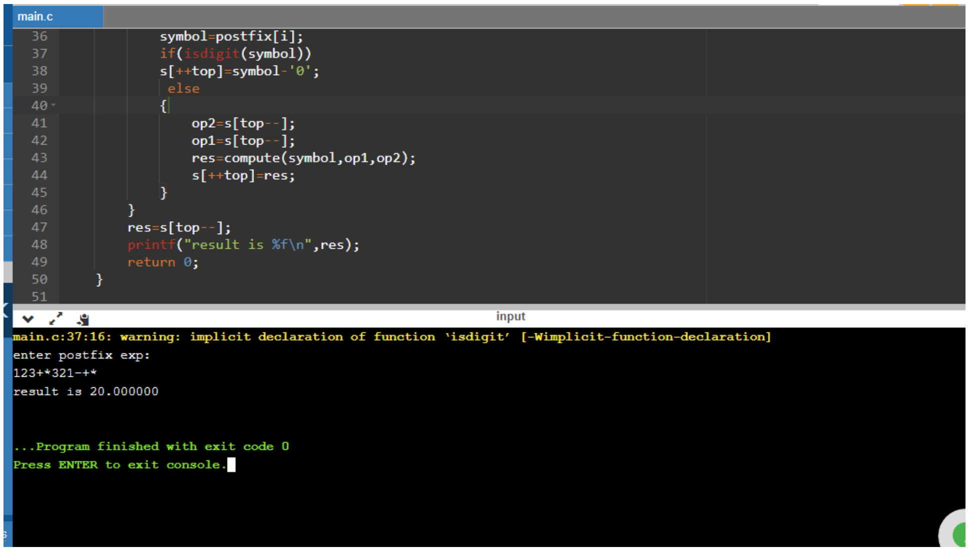
Program 2-

```
#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);
  }
  }
  int main()
  {
    double s[20];
    double res;
    double op1, op2;
    int top, i;

    char postfix[20], symbol;

    printf("enter postfix exp:\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 is %f\n",res);

    return 0;

}
```

Output-



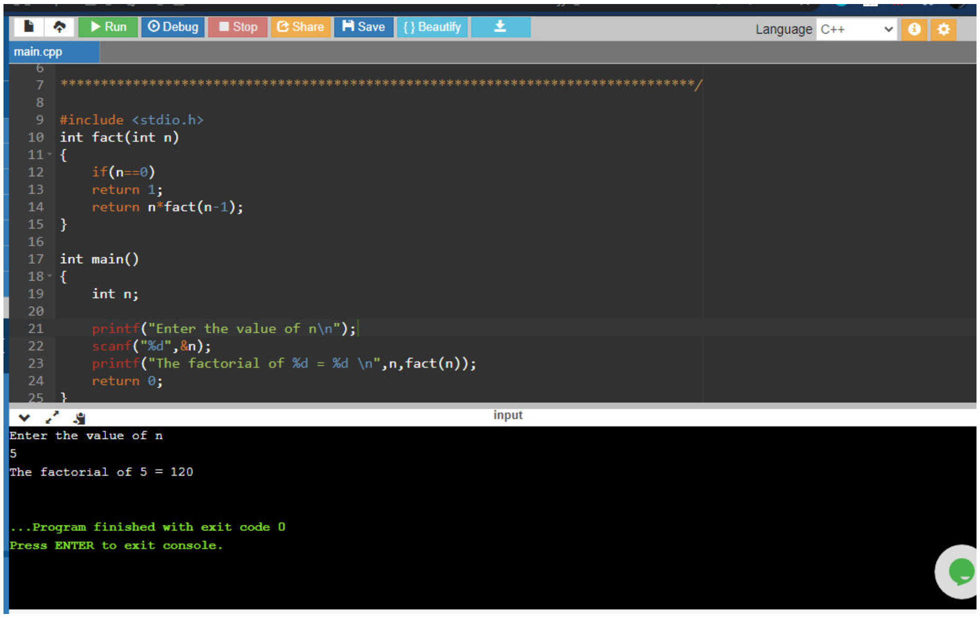
```
                symbol=postfix[i];
                if(isdigit(symbol))
                s[++top]=symbol-'0';
                 else
                {
                    op2=s[top--];
                    op1=s[top--];
                    res=compute(symbol,op1,op2);
                    s[++top]=res;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

```
main.c:37:16: warning: implicit declaration of function ‘isdigit’ [-Wimplicit-function-declaration]
enter postfix exp:
123+*321-+*
result is 20.000000


...Program finished with exit code 0
Press ENTER to exit console.
```

Program 3-

```
#include <stdio.h>
int fact(int n)
{
        if(n==0)
        return 1;
        return n*fact(n-1);
}

int main()
{
        int n;

        printf("Enter the value of n\n");
        scanf("%d",&n);
        printf("The factorial of %d = %d \n",n,fact(n));
        return 0;
}
```

Output-



```
*************************************************************************/

#include <stdio.h>
int fact(int n)
{
    if(n==0)
    return 1;
    return n*fact(n-1);
}

int main()
{
    int n;

    printf("Enter the value of n\n");
    scanf("%d",&n);
    printf("The factorial of %d = %d \n",n,fact(n));
    return 0;
}
```

```
Enter the value of n
5
The factorial of 5 = 120


...Program finished with exit code 0
Press ENTER to exit console.
```

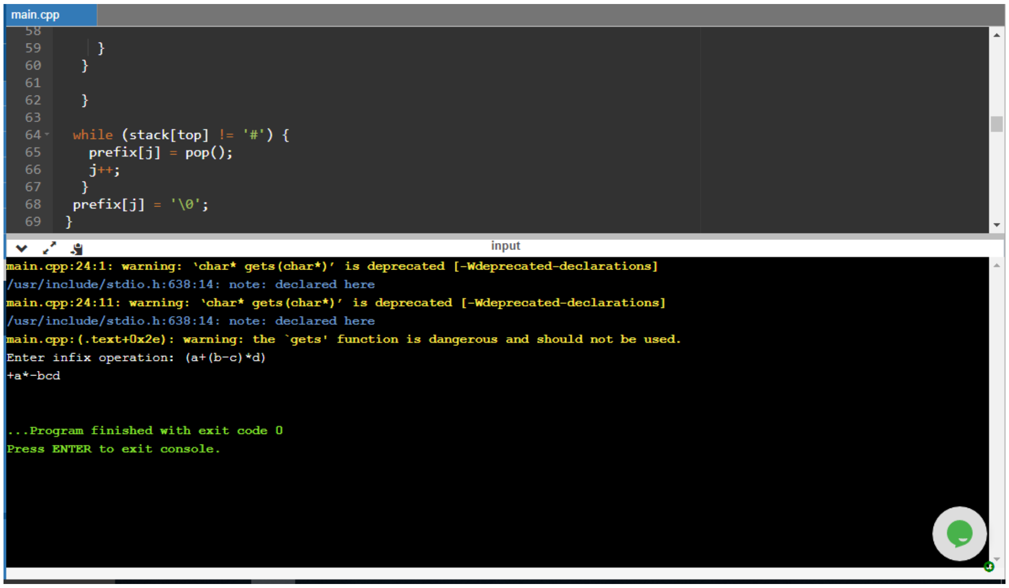
Program 1-

```
# include <stdio.h>

# include <string.h>

# define MAX 20

void infixtoprefix(char infix[20], char prefix[20]);

void reverse(char array[30]);

char pop();

void push(char symbol);

int isOperator(char symbol);

int prcd(char symbol);

int top = -1;

char stack[MAX];


main() {

char infix[20], prefix[20], temp;
```

```
printf("Enter infix operation: ");
gets(infix);
infixtoprefix(infix, prefix);
reverse(prefix);
puts((prefix));
}
void infixtoprefix(char infix[20], char prefix[20]) {
int i, j = 0;
char symbol;
stack[++top] = '#';
reverse(infix);
for (i = 0; i < strlen(infix); i++) {
symbol = infix[i];
if (isOperator(symbol) == 0) {
  prefix[j] = symbol;
  j++;
} else {
  if (symbol == ')') {
    push(symbol);
  } else if (symbol == '(') {
    while (stack[top] != ')') {
      prefix[j] = pop();
      j++;
    }
    pop();
  } else {
    if (prcd(stack[top]) <= prcd(symbol)) {
      push(symbol);
    } else {
      while (prcd(stack[top]) >= prcd(symbol)) {
        prefix[j] = pop();
        j++;
      }
      push(symbol);
    }

     }
   }

   }

  while (stack[top] != '#') {
    prefix[j] = pop();
    j++;
   }
  prefix[j] = '\0';
 }

 void reverse(char array[30]) {

 int i, j;
 char temp[100];
 for (i = strlen(array) - 1, j = 0; i + 1 != 0; --i, ++j) {
  temp[j] = array[i];
 }
 temp[j] = '\0';
 strcpy(array, temp);
```

```
}

 char pop() {
 char a;
 a = stack[top];
 top--;
 return a;
 }

void push(char symbol) {
top++;
stack[top] = symbol;
}

int prcd(char symbol) {

switch (symbol) {
 case '+':
  case '-':
   return 2;
   break;
 case '*':
  case '/':
   return 4;
   break;
  case '$':
  case '^':
   return 6;
   break;
  case '#':
  case '(':
  case ')':
   return 1;
   break;
 }
}

int isOperator(char symbol) {
switch (symbol) {
case '+':
case '-':
case '*':
case '/':
case '^':
case '$':
case '&':
case '(':
case ')':
  return 1;
  break;
default:
  return 0;
   }
 }
```

Output-



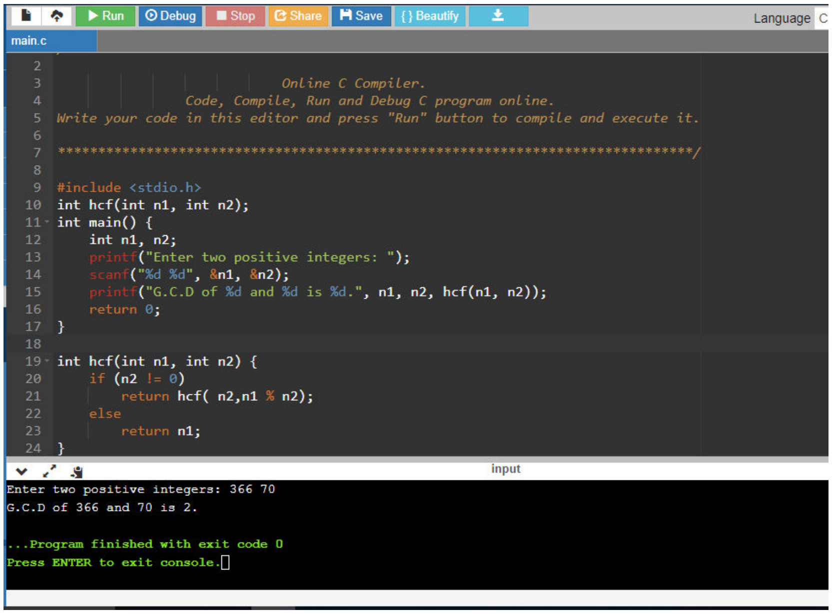
```
        }
      }

      }

    while (stack[top] != '#') {
      prefix[j] = pop();
      j++;
    }
    prefix[j] = '\0';
  }
```

```
main.cpp:24:1: warning: ‘char* gets(char*)’ is deprecated [-Wdeprecated-declarations]
/usr/include/stdio.h:638:14: note: declared here
main.cpp:24:11: warning: ‘char* gets(char*)’ is deprecated [-Wdeprecated-declarations]
/usr/include/stdio.h:638:14: note: declared here
main.cpp:(.text+0x2e): warning: the `gets' function is dangerous and should not be used.
Enter infix operation: (a+(b-c)*d)
+a*-bcd


...Program finished with exit code 0
Press ENTER to exit console.
```

Program 4-

```
#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;

}
```

Output-



```c

                                    Online C Compiler.
                Code, Compile, Run and Debug C program online.
Write your code in this editor and press "Run" button to compile and execute it.

*******************************************************************************/

#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;
}
```

```
Enter two positive integers: 366 70
G.C.D of 366 and 70 is 2.

...Program finished with exit code 0
Press ENTER to exit console.
```