1. Write a program in C++ to print Hello World!

```
#include <iostream>
using namespace std;
int main()
{
   cout<<"\nHello World!"<<endl;
   return 0;
}
```

2. Write a program in C++ to print the sum of two numbers.

```
#include <iostream>
using namespace std;
int main()
{
   int a,b,sum;
   cout << "Enter two numbers: ";
         cin >> a >>b;
   cout << "The sum of "<<a<<" and "<<b<<" is "<<a+b<<endl;
   sum=a+b;
   cout << "The sum of "<<a<<" and "<<b<<" is "<<sum<<endl;
   return 0;
}
```

3. To find the size of fundamental data types.

```
#include <iostream>
using namespace std;
int main()
{
   cout << " The sizeof(char) is: " << sizeof(char) << " bytes \n" ;
   cout << " The sizeof(short) is: " << sizeof(short) << " bytes \n" ;
   cout << " The sizeof(int) is: " << sizeof(int) << " bytes \n" ;
   cout << " The sizeof(long) is: " << sizeof(long) << " bytes \n" ;
   cout << " The sizeof(long long) is: " << sizeof(long long) << " bytes \n";
   cout << " The sizeof(float) is: " << sizeof(float) << " bytes \n" ;
   cout << " The sizeof(double) is: " << sizeof(double) << " bytes \n";
   cout << " The sizeof(long double) is: " << sizeof(long double) << " bytes \n";
   cout << " The sizeof(bool) is: " << sizeof(bool) << " bytes";
   return 0;
}
```

4. To swap two numbers with a third variable.

```
#include <iostream>
using namespace std;
int main()
{
         int n1, n2, t;
         cout << "Enter 1st number: ";
         cin >> n1 ;
         cout << "Enter 2nd number: ";
         cin >> n2;
         t=n2;
         n2=n1;
         n1=t;
   cout << "After swapping the 1st number is : "<< n1 <<endl ;
   cout << "After swapping the 2nd number is : "<< n2;
   return 0;
}
```

5. To swap two numbers without a third variable.

```
n1=n1+n2;
n2=n1-n2;
n1=n1-n2;
```

6. To find the area of any triangle using Heron's formula

```
area = sqrt(s*(s-side1)*(s-side2)*(s-side3));
```

7. To convert fahrenheit to celsius and vice versa.

```
f = (c * 9.0) / 5.0 + 32;
c = ((f * 5.0)-(5.0 * 32))/9;
```

8. To compute the quotient and remainder.

```
#include <iostream>
using namespace std;
int main()
{
   int dividend, divisor, quotient,remainder;
   cout<<"Enter the dividend: ";
   cin>>dividend;
   cout<<"Enter the divisor: ";
   cin>>divisor;
   quotient=dividend / divisor;
   remainder=dividend % divisor;
   cout<<" The quotient of the division is:
"<< quotient << endl;
   cout<<" The remainder of the division is:
"<< remainder << endl;
   return 0;
}
```

9. To check whether a number is positive, negative or zero.

```
#include <iostream>
using namespace std;
int main()
{
   int num1 = 0;
         cout << "Input a number : ";
   cin >> num1;
   if(num1 > 0)
      cout << "The entered number is
positive.";
   else if(num1 < 0)
      cout << "The entered number is
negative.";
   else
      cout << "The number is zero.";
   return 0;
}
```

10. To print the multiplication table of n

```
#include <iostream>
using namespace std;
int main()
{
   int a,i=0;
   char c;
         do
   {
      cout << "Input a number: ";
      cin>> a;
      for (i=1;i<=10;i++)
      cout << a<<" x "<< i << " = "<<a*i<<"\n"
;
      cout <<"\nDo you want to print the
multiplication table for another
number?(Y/N): ";
      cin >> c;
      cout << endl;
   }while(c=='Y');
         return 0;
}
```

11. To show the manipulation of a string

```
#include <iostream>
#include <string>
using namespace std;
int main()
{
   string txt = "Challenge each student.";
   cout << " Input a sentence:: ";
   getline(cin, txt);
   cout <<" The string: "<< txt << endl;
   cout <<" The length of the string:: "<<
txt.length() << endl;
   cout <<" The char at index 1 of the
string:: "<< txt.at(1) << endl;
   cout <<" The char at index 1 of the string
[using array ]:: "<< txt[1] << endl;
   cout <<" Is the string empty:: "<<
txt.empty() << endl;
   cout <<" Retrieve the sub-string from 3rd
position for 4 characters:: "<< txt.substr(3,
4) << endl;
   cout <<" The sub-string replace by
'went':: "<< txt.replace(3, 4, "went") << endl;
```

```
   cout <<" Append a string ' end' at last of
the string:: "<< txt.append(" end") << endl;
   cout <<" Append a string ' end' at last of
the string using operator:: "<< txt + " end"
<< endl;
   cout <<" The string ' insert ' inserting at
3rd position of the string:: "<< txt.insert(3, "
insert ") << endl;
   return 0;
}
```

12. To add 2 binary numbers.

```
#include <iostream>
#include <math.h>
using namespace std;
int main()
{
          long bn1,bn2;
          int i=0, r=0;
          int sum[20];
          cout << "Input the 1st binary
number: ";
          cin>> bn1;
          cout << "Input the 2nd binary
number: ";
          cin>> bn2;
   while (bn1 != 0 || bn2 != 0)
   {
      sum[i++] = (int)((bn1 % 10 + bn2 % 10
+ r) % 2);
      r = (int)((bn1 % 10 + bn2 % 10 + r) / 2);
      bn1 = bn1 / 10;
      bn2 = bn2 / 10;
   }
   if (r != 0)
      sum[i++] = r;
   --i;
   cout<<" The sum of two binary numbers
is: ";
   while (i >= 0)
      cout<<(sum[i--]);
   cout<<endl;
   return 0;
 }
```

13. To swap the first and the last digit of the number.

```
#include <iostream>
#include <cmath>
using namespace std;
int main()
{
   int n, first, last, sum, digits, nn, a, b;
   cout << "Input any number: ";
   cin >> n;
   digits = (int)log10(n);
   first = n / pow(10, digits);
   last = n % 10;
   a = first * (pow(10, digits));
   b = n % a;
   n = b / 10;
   nn = last * (pow(10, digits)) + (n * 10 +
first);
   cout << "The number after swapping the
first and last digits are: " << nn << endl;
}
```

13. To find sum of Natural Numbers

```
#include <iostream>
using namespace std;
int main()
{
   int n, sum = 0;
   cout << "Enter a positive integer: ";
   cin >> n;
   for (int i = 1; i <= n; ++i)
      sum += i;
   cout << "Sum = " << sum;
   return 0;
}
```

14. To find factorial

```
#include <iostream>
using namespace std;
int main()
{
   int n;
   long factorial = 1.0;
```

```
   cout << "Enter an integer: ";
   cin >> n;
   if (n < 0)
      cout << "Error! Factorial of a negative
number doesn't exist.";
   else
   {   for(int i = 1; i <= n; ++i)
         factorial *= i;
      cout << "Factorial of " << n << " = " <<
factorial<<endl;
   }
   return 0;
}
```

15. To check Leap Year

```
#include <iostream>
using namespace std;
int main()
{
   int year;
   cout << "Enter a year: ";
   cin >> year;
   if (year % 400 == 0)
      cout << year << " is a leap year.";
   else if (year % 100 == 0)
      cout << year << " is not a leap year.";
   else if (year % 4 == 0)
      cout << year << " is a leap year.";
   else
      cout << year << " is not a leap year.";
   return 0;
}
```

16. To Display Fibonacci Series

```
#include <iostream>
using namespace std;
int main()
{
   int n, t1 = 0, t2 = 1, nextTerm = 0;
   cout << "Enter the number of terms: ";
   cin >> n;
   cout << "Fibonacci Series: ";
   for (int i = 1; i <= n; ++i) {
      if(i == 1)
      {
         cout << t1 << ", ";
         continue;
      }
      if(i == 2)
      {
         cout << t2 << ", ";
         continue;
      }
      nextTerm = t1 + t2;
      t1 = t2;
      t2 = nextTerm;
      cout << nextTerm << ", ";
   }
   return 0;
}
```

17. Check if the number is a palindrome

```
#include <iostream>
using namespace std;
int main()
{
    int n, num, digit, rev = 0;
    cout << "Enter a positive number: ";
    cin >> num;
    n = num;
    do
    {
       digit = num % 10;
       rev = (rev * 10) + digit;
       num = num / 10;
    } while (num != 0);
    cout << " The reverse of the number is: "
<< rev << endl;
    if (n == rev)
       cout << " The number is a
palindrome.";
    else
       cout << " The number is not a
palindrome.";
   return 0;
}
```

18. Pattern

```
*
* *
* * *
* * * *
* * * * *
```

```
#include <iostream>
using namespace std;
int main() {
    int rows;
    cout << "Enter number of rows: ";
    cin >> rows;

    for(int i = 1; i <= rows; ++i)
    {
        for(int j = 1; j <= i; ++j)
            cout << "* ";
        cout << "\n";
    }
    return 0;
}
```

19. Pattern

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

```
#include <iostream>
using namespace std;
int main()
{
    int rows;
    cout << "Enter number of rows: ";
    cin >> rows;
    for(int i = 1; i <= rows; ++i)
    {
        for(int j = 1; j <= i; ++j)
            cout << j << " ";
        cout << "\n";
    }
    return 0;
}
```

20. Pattern

```
A
B B
C C C
D D D D
E E E E E
```

```
#include <iostream>
using namespace std;
int main()
{
    char alphabet = 'A';
    int rows;
    cout << "Enter number of rows: ";
    cin >> rows;
    for(int i = 1; i <= rows; ++i)
    {
        for(int j = 1; j <= i; ++j)
            cout << alphabet << " ";
        ++alphabet;
        cout << endl;
    }
    return 0;
}
```

21. Pattern

```
* * * * *
* * * *
* * *
* *
*
```

```
#include <iostream>
using namespace std;
int main()
{
    int rows;
    cout << "Enter number of rows: ";
    cin >> rows;
    for(int i = rows; i >= 1; --i)
    {
        for(int j = 1; j <= i; ++j)
            cout << "* ";
        cout << endl;
    }
    return 0;
}
```

22. Pattern

```
      *
     * * *
   * * * * *
 * * * * * * *
* * * * * * * * *
```

```
#include <iostream>
using namespace std;
int main()
{
   int space, rows;
   cout <<"Enter number of rows: ";
   cin >> rows;
   for(int i = 1, k = 0; i <= rows; ++i, k = 0)
   {
      for(space = 1; space <= rows-i;
++space)
         cout <<"  ";
      while(k != 2*i-1)
      {
         cout << "* ";
         ++k;
      }
      cout << endl;
   }
   return 0;
}
```

23. Pattern

```
* * * * * * * * *
 * * * * * * *
   * * * * *
     * * *
       *
```

```
#include <iostream>
using namespace std;
int main()
{
   int rows;
   cout << "Enter number of rows: ";
   cin >> rows;
   for(int i = rows; i >= 1; --i)
   {
      for(int space = 0; space < rows-i;
++space)
         cout << "  ";
      for(int j = i; j <= 2*i-1; ++j)
         cout << "* ";
      for(int j = 0; j < i-1; ++j)
         cout << "* ";
      cout << endl;
   }
   return 0;
}
```

24. Simple Calculator using switch statement

```
# include <iostream>
using namespace std;

int main()
{
   char op, choice;
   float num1, num2;
   do
   {
     cout << "Enter operator: +, -, *, /: ";
      cin >> op;
      cout << "Enter two operands: ";
      cin >> num1 >> num2;
      switch(op)
      {
         case '+': cout << num1 << " + " <<
num2 << " = " << num1 + num2;
            break;
         case '-': cout << num1 << " - " <<
num2 << " = " << num1 - num2;
            break;
         case '*': cout << num1 << " * " <<
num2 << " = " << num1 * num2;
            break;

         case '/': cout << num1 << " / " <<
num2 << " = " << num1 / num2;
            break;
         default: cout << "Error! operator is
not correct";
```

```
            break;
        }
        cout << "\n\nDo you want to perform
another operation?(y/n): ";
        cin >> choice;
        cout << endl;
    }while(choice=='y');
    return 0;
}
```