

Q1: Write a program to print the following text on the console screen.

```
Welcome to C++
```

Q2: Using escape sequences to print the text in following fashion.

```
Welcome  
to  
C++
```

Q3: Write a program that takes two integer numbers from the user and print their sum on console screen.

Q4: What are Arithmetic operators? Write the rule of precedence for the Arithmetic operators.

Q5: How C++ program is compiled into an executable?

Q6: Write a program that take two numbers and operation to perform on those numbers as input from the user and print the result of operation on console screen.

(Hint: Use *if*-statements to identify the required operation)

Q7: Write a program that asks user to enter two integers, obtains the numbers from the user, and then prints the larger number followed by the words "is larger." If the numbers are equal, print the message "These numbers are equal."

Q8: Write a program that inputs three integers from the keyboard and prints the sum, average, product, smallest and largest of these numbers. The screen dialog should appear as follows:

```
Input three different integers: 13 27 14  
Sum is 54  
Average is 18  
Product is 4914  
Smallest is 13  
Largest is 27
```

Q9: Write a program that reads an integer and determines and prints whether its odd or even.

Q10: Write a program that inputs a five digit integer, separates the integer into its digit and prints them separated by three spaces each. For example, if the user types in 42339, the program should print:

```
4      2      3      3      9
```

Q11: Develop a C++ program that uses a *while* statement to determine the gross pay for each of several employees. The company pays "straight time" for the first 40 hours worked by each employee and pays "time-and-a-half" for all hours worked in excess of 40 hours. You are given a list of the employees of the company, the number of hours each employee worked last week and the hourly rate of each employee. Your program should input this information for each employee and should determine and display the employee's gross pay.

Sample Output:

```
Enter hours worked (-1 to end): 39
Enter hourly rate of the employee: 10.00
Salary is 390.00 Rs.

Enter hours worked (-1 to end): 40
Enter hourly rate of the employee: 10.00
Salary is 400.00 Rs.

Enter hours worked (-1 to end): 41
Enter hourly rate of the employee: 10.00
Salary is 415.00 Rs.

Enter hours worked (-1 to end): -1
```

Q12: Write a program that ask user to enter an integer number and evaluates its factorial. Your program should print the output as below,

```
Enter an integer : 5
5 x 4 x 3 x 2 x 1 = 120
```

Q13: Write a program that ask user to input the number of elements in a Fibonacci sequence and then generates a Fibonacci sequence up-to the given number of elements.
(Hint: In Fibonacci sequence, the next element is the sum of two previous values)

Sample Output:

```
Enter number of elements: 10
0 1 1 2 3 5 8 13 21 34
```

Q14: Write a program that reads three non-zero double values and determines and prints whether they could represents sides of triangle.

[Hint: a, b and c represents sides of triangle if following criteria is met,

$$a + b > c$$

$$a + c > b$$

$$b + c > a]$$

Sample Output:

```
Enter length of three sides: 3 4 5
They are sides of triangle.

Enter length of three sides: 2 2 5
They are not sides of triangle.

Enter length of three sides: 2.4 3.8 5.5
They are sides of triangle.
```

Q15: Write a program that reads three non-zero double values and determines and prints whether they are sides of right triangle. The program should verify the results up to 4 decimal places.
[Hint: Use Pythagoras theorem to determine whether the three sides form right triangle.]

Sample Output:

```
Enter length of three sides: 3 4 5
The sides represents right triangle.

Enter length of three sides: 4 5 6.403
The sides don't represents right triangle.

Enter length of three sides: 4 5 6.4031
The sides represents right triangle.
```

Q16: Write a program that ask user to input a floating point number and computes exponential of that number using Taylor series as below,

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

Also, prompt the user for desired accuracy of e (i.e., the number of terms in summation).

Sample Output:

```
Enter a value whose exponential needs to be evaluated: 1
Enter number of terms for evaluation: 20
Result is: 2.71828
```

Q17: Write a program that ask user to input angle in radians and computes its sine using Taylor series as below,

$$\sin(x) = \sum_{n=0}^{\infty} \frac{(-1)^n}{(2n+1)!} x^{2n+1}$$

Also, prompt the user for desired accuracy of *sine*. (i.e., the number of terms in summation).

Sample Output:

```
Enter a value for sin evaluation: 2
Enter number of terms in the summation: 10
Result is: 0.909297
```

Q18: Write a program that prints the following pattern as shown below,

```

*           *****           *****           *
**          *****          *****          **
***         *****         *****         ***
****        *****        *****        ****
*****       *****       *****       *****
*****      *****      *****      *****
*****     *****     *****     *****
*****    *****    *****    *****
*****   *****   *****   *****
*****  *****  *****  *****
***** ***** ***** *****
***** ***** ***** *****
***** ***** ***** *****
***** ***** ***** *****

```

You can make separate programs for all these four patterns. *Extra Credit:* If all the four patterns are printed in a single program.

[Hint: Use nested `for` loop].

Q19: Write a program that prints the following diamond shape.

[Hint: Use nested `for` loop].

```

*
***
*****
*****
*****
*****
*****
*****
***
*

```

Q20: Modify the program in Q19 to read an odd number in the range of 1 to 19 to specify the number of rows in the diamond, then display a diamond of appropriate size.

Q21: A right triangle can have sides that are all integers. A set of three integer values for the sides of a right triangle is called a Pythagorean triple. These three sides must satisfy the relationship that the sum of the squares of two of the sides is equal to the square of the hypotenuse. Find all Pythagorean triples for `side1`, `side2` and `hypotenuse` all no larger than 500. Use a triple-nested for loop that tries all possibilities.