

## cout, endl and "\n"

1. Write a program that displays "This statement is false".

2. Write a program that displays the following lines.

*When earth is sundered, and skies choked black,  
And sleepers serve the seven curses,  
To the hearth there comes a stranger,  
Journeyed far 'neath moon and star.*

3. Write a program that displays the value of an integer, a floating point number and a character.

4. Write a program that displays the following:

```
##      ## #####
##      ##      ##
##      ##      ##
#####  #####
      ##  ##
      ##  ##
      ##  #####
```

5. Write a program that displays the following robot.

```
=====
|  o  o  |
=====
|  |
=====
==[ Who ]==
| [ am ] |
^ [ I? ] ^
=====
\ /  \ /
| |  | |
[ ]  [ ]
-----
```

## Arithmetic operators and sqrt(), pow(), abs() functions

6. Write a program that displays the sum, difference, product, quotient (division), and remainder of two integers provided by the user.
7. Write a program that calculates the number of seconds, minutes and hours in a year.
8. Write a program that computes the result using the formula

$$result = a * (b - c) + 1.37$$

where  $a$ ,  $b$ ,  $c$  are provided by the user and 1.37 is a constant defined by the user.

9. Write a program that swaps the values of two variables.
10. Write a program that swaps the values of two variables without using a 3<sup>rd</sup> variable.
11. Write a program that reads the units in meter and convert it to feet. (1 inch = 2.54 cm).
12. Write a program that displays a temperature in Celsius and in Absolute Value (kelvin) after reading the temperature in Fahrenheit from the users. Use the conversion formulae  $5(F - 32) = 9C$  and  $C = A + 273.15$ .
13. Write a program that will take the radius of a circle from the user. Then it will compute and print the area and perimeter of the circle.
14. Write a program that will take the length and width of a rectangle from the user. Then it will compute and print the area and perimeter of the rectangle.
15. Write a program that will take the height and base of triangle from the user. Then it will compute and print the area of the rectangle.
16. Write a program that converts the days in to month and years. Here the user supplies the number of days.
17. Write a program that inputs number of cents (from 0 to 99) and outputs the minimal number of pennies (1 cent), nickels (5 cents), dimes (10 cents) and quarters (25 cents) with the same value. For example, 94 cents is the same as 3 quarters, 1 dime, 1 nickel, and 4 pennies.

18. Write a program that inputs a number of hours and outputs the equivalent number of weeks, days, and hours. For example, an input of 4000 would output 23 weeks, 5 days and 16 hours.
19. Write a program that prompts the user for the current year and the user's current age. It then calculates and prints the user's birth year.
20. Write a program that takes a 6-digit positive integer (i.e., in the range 100,000-999,999) and then constructs an integer whose digits are reverse of the input. For example, if 289405 is the input, then the integer 504982 should be the output.
21. Write a program to compute and print the value of  $y$  in the following equation.

$$y = \frac{-5 + (6 \times 9)}{2 + (5 \div 3)}$$

22. Write a program to compute and print the value of  $x$  in the following equation. (Hint: use `pow()` and `sqrt()` functions and don't forget to include `<cmath>`)

$$x = \frac{-5 + \sqrt{5^2 - 16}}{4}$$

23. Write a program to compute and print the value of  $z$  in the following equation.

$$z = 1 + \frac{1}{1} + \frac{1}{2} + \frac{1}{6} + \frac{1}{24} + \frac{1}{120} + \frac{1}{720}$$

24. Write a program that will take  $b$  and  $c$  from the user and compute the value of  $a$  in the following equation. (Hint: use `abs()` function)

$$a = \sqrt{|b|} + c^2$$

25. Write a program that will take  $a$ ,  $b$  and  $c$  from the user and compute the value of  $x$ .

$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

26. Write a program to compute and print the value of  $s$  in the following equation.

$$s = \frac{1^2}{\sqrt{2}} + \frac{2^3}{\sqrt{3}} + \frac{3^4}{\sqrt{4}} + \frac{4^5}{\sqrt{5}} + \frac{5^6}{\sqrt{6}}$$

## if and switch statements

27. Write a program to find whether a number is odd or even.
28. Write a program that takes an integer and checks if the number is divisible by 2, 3, 5, 7 and 10.
29. Write a program that will print your grade when you enter your exam score. The program should use the following grading system:

Score range	Grade
[85, 100]	A
[80, 85)	A-
[75, 80)	B+
[70, 75)	B
[65, 70)	B-
[60, 65)	C+
[55, 60)	C
[50, 55)	C-
[45, 50)	D+
[40, 45)	D
[0, 40)	F

30. Write a program that takes the user's age as input and then finds out whether the user is younger than a teenager, a teenager or older than a teenager.
31. Write a program that takes integer inputs from 0 to 10 and displays the number in words. Example: if the user enters 5, the program should print Five.
32. Write a program that takes 3 numbers from the user and finds out the largest and the smallest number among the three numbers.
33. Write a program to check if a year is leap year or not. Use the following algorithm:

```
if (year is not divisible by 4) then (it is a not a leap year)
else if (year is not divisible by 100) then (it is a leap year)
else if (year is not divisible by 400) then (it is a not a leap year)
else (it is a leap year)
```

34. Write a program to compute the roots of a quadratic equation i.e.  $ax^2 + bx + c = 0$ .

Where the formula for finding the roots are:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Here the value of a, b and c are given by the user. The program needs to find the determinant by calculating  $d = (b^2 - 4ac)$ .

If  $d$  is zero the equation has a single root and the value of the root is  $(-b/2a)$ .

If the  $d$  is positive then there are two real roots and the roots are  $(-b + \sqrt{d})/2a$  and  $(-b - \sqrt{d})/2a$ .

If the determinant is negative the roots are complex conjugate. The values are  $-b/2a + (\sqrt{|d|}/2a)i$  and  $-b/2a - (\sqrt{|d|}/2a)i$ .

Make sure you use floating point numbers. Check your answers using your calculator.

35. Write a program to find out if a character is lower case letter or upper case letter or digit or symbol. (Hint: Learn about ASCII table)

36. Imagine you are writing a program for children. If a child enters the letter 'a', your program should display "A is for Apple". If a child enters 'z', it should print "Z is for Zebra".

# Loops

## Level I

37. Write a program that will keep taking input (integers) until the user enters -1. (Use while or do-while loop)
38. Write a program that will keep taking input (character) until the user enters a dot '.'. (Use while or do-while loop)
39. Write a program that will keep taking input (floats) until the user enters 3.1416. (Use while or do-while loop)
40. Write a program that will print the following series of integers.  
0, 1, 2, 3, ... 99
41. Write a program that will print the following series of integers.  
42, 41, 40, 39, ... 17
42. Write a program that will print the following series of floating point numbers.  
2.25, 2.50, 2.75, 3.00, ... 4.00
43. Write a program that will print the following series of characters.  
*a, b, c, ..., z*
44. Write a program that will print the following series of integers.  
1, 3, 5, 7, ... 73
45. Write a program that will print the following series of integers.  
-42, -40, -38, ... - 8
46. Take two integers from the user and print all the integers between them.
47. Take two integers from the user and print all the odd numbers between them. You cannot use the % operator.
48. Take two integers from the user and print all the numbers between them that are divisible by 7. You cannot use the % operator.

## Level II

49. Take 10 floating point numbers from the user and then print the largest and smallest numbers among the 10 numbers.
50. Take an integer from the user and check if the number is prime or not.
51. Write a program that will count the number of digits in a given integer.
52. Compute the sum,  $S = 1 + 2 + 3 + \dots + 100$
53. Compute the sum,  $S = 1 + 3 + 5 + \dots + 99$
54. Compute the sum,  $S = 5 + 10 + 15 + \dots + 100$
55. Compute the sum,  $S = 1 - 2 + 3 - 4 \dots + 99 - 100$
56. Compute the sum,  $S = 1 + 2 + 4 + 8 + \dots + 1024$
57. Compute the sum,  $S = 1 + 2 + 4 + 7 + 11 + \dots + 56$
58. Write a program that will take 10 numbers from the user and compute the average value.
59. Write a program that will take a floating point number  $x$  and an integer  $y$ . Then compute the value of  $x^y$  without using the **pow**( $x, y$ ) function.
60. Write a program that will take an integer and compute its factorial.
61. Write a program that will print the digits of an integer backwards. Example: if the user enters 452643, the program should print 346254.
62. Write a program that will check if a number is palindrome (symmetric). For example, 12521 is a palindrome because if you reverse the number, it remains the same number.
- 63.