1. Write a C program to print your name, date of birth. and mobile number.

Expected Output:

```
Name   : Alexandra Abramov
DOB    : July 14, 1975
Mobile : 99-9999999999
```

2. Write a C program to print a block F using hash (#), where the F has a height of six characters and width of five and four characters.

Expected Output:

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

3. Write a C program to print a big 'C'.

Expected Output:

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

4. Write a C program to print the following characters in a reverse way.

Test Characters: 'X', 'M', 'L'

Expected Output:

The reverse of XML is LMX

5. Write a C program to compute the perimeter and area of a rectangle with a height of 7 inches. and width of 5 inches.

Expected Output:

Perimeter of the rectangle = 24 inches

Area of the rectangle = 35 square inches

6. Write a C program to compute the perimeter and area of a circle with a radius of 6 inches.

Expected Output:

Perimeter of the Circle = 37.680000 inches

Area of the Circle = 113.040001 square inches

7. Write a C program to display multiple variables.
Sample *Variable*s :
a+ c, x + c,dx + x, ((int) dx) + ax, a + x, s + b, ax + b, s + c, ax + c, ax + ux
Declaration :
int a = 125, b = 12345;
long ax = 1234567890;
short s = 4043;
float x = 2.13459;
double dx = 1.1415927;
char c = 'W';
unsigned long ux = 2541567890;

8. Write a C program to convert specified days into years, weeks and days.
Note: Ignore leap year.

Test Data :
Number of days : 1329
Expected Output :
Years: 3
Weeks: 33
Days: 3

9. Write a C program that accepts two integers from the user and calculate the sum of the two integers.
Test Data :
Input the first integer: 25
Input the second integer: 38
Expected Output:
Sum of the above two integers = 63

10. Write a C program that accepts two integers from the user and calculate the product of the two integers.
Test Data :
Input the first integer: 25
Input the second integer: 15
Expected Output:
Product of the above two integers = 375

11. Write a C program that accepts two item’s weight (floating points' values) and number of purchase (floating points' values) and calculate the average value of the items.
Test Data :
Weight - Item1: 15
No. of item1: 5
Weight - Item2: 25
No. of item2: 4
Expected Output:
Average Value = 19.444444

12. Write a C program that accepts an employee's ID, total worked hours of a month and the amount he received per hour. Print the employee's ID and salary (with two decimal places) of a particular month.
Test Data :
Input the Employees ID(Max. 10 chars): 0342
Input the working hrs: 8
Salary amount/hr: 15000
Expected Output:
Employees ID = 0342
Salary = U$ 120000.00

13. Write a C program that accepts three integers and find the maximum of three.
Test Data :
Input the first integer: 25
Input the second integer: 35
Input the third integer: 15
Expected Output:
Maximum value of three integers: 35

14. Write a C program to calculate a bike’s average consumption from the given total distance (integer value) traveled (in km) and spent fuel (in liters, float number – 2 decimal point).
Test Data :
Input total distance in km: 350
Input total fuel spent in liters: 5
Expected Output:
Average consumption (km/lt) 70.000

15. Write a C program to calculate the distance between the two points.
Test Data :
Input x1: 25

Input y1: 15
Input x2: 35
Input y2: 10
Expected Output:
Distance between the said points: 11.1803

16. Write a C program to read an amount (integer value) and break the amount into smallest possible number of bank notes.
Test Data :
Input the amount: 375
Expected Output:
There are:
3 Note(s) of 100.00
1 Note(s) of 50.00
1 Note(s) of 20.00
0 Note(s) of 10.00
1 Note(s) of 5.00
0 Note(s) of 2.00
0 Note(s) of 1.00

17. Write a C program to convert a given integer (in seconds) to hours, minutes and seconds.
Test Data :
Input seconds: 25300
Expected Output:
There are:
H:M:S - 7:1:40

18. Write a C program to convert a given integer (in days) to years, months and days, assumes that all months have 30 days and all years have 365 days.
Test Data :
Input no. of days: 2535
Expected Output:
6 Year(s)
11 Month(s)
15 Day(s)

19. Write a C program that accepts 4 integers p, q, r, s from the user where r and s are positive and p is even. If q is greater than r and s is greater than p and if the sum of r and s is greater than the sum of p and q print "Correct values", otherwise print "Wrong values".
Test Data :

Input the second integer: 35
Input the third integer: 15
Input the fourth integer: 46
Expected Output:
Wrong values

20. Write a C program to print the roots of Bhaskara's formula from the given three floating numbers. Display a message if it is not possible to find the roots.
Test Data :
Input the first number(a): 25
Input the second number(b): 35
Input the third number(c): 12
Expected Output:
Root1 = -0.60000
Root2 = -0.80000

21. Write a C program that reads an integer and check the specified range where it belongs. Print an error message if the number is negative and greater than 80.
Test Data :
Input an intger: 15
Expected Output:
Range [0, 20]

22. Write a C program that read 5 numbers and sum of all odd values between them.
Test Data :
Input the first number: 11
Input the second number: 17
Input the third number: 13
Input the fourth number: 12
Input the fifth number: 5
Expected Output:
Sum of all odd values: 46

22. Write a C program that reads three floating values and check if it is possible to make a triangle with them. Also calculate the perimeter of the triangle if the said values are valid.
Test Data :
Input the first integer: 5
Input the second integer: 15
Input the third integer: 10

Expected Output:
Numbers in sorted order: 5 10 15

23. Write a C program that reads three floating values and check if it is possible to make a triangle with them. Also calculate the perimeter of the triangle if the said values are valid.
Test Data :
Input the first number: 25
Input the second number: 15
Input the third number: 35
Expected Output:
Perimeter = 75.0

24. Write a C program that reads two integers and checks if they are multiplied or not.
Test Data :
Input the first number: 5
Input the second number: 15
Expected Output:
Multiplied!

25. Write a C program that reads an integer between 1 and 12 and print the month of the year in English.
Test Data :
Input a number between 1 to 12 to get the month name: 8
Expected Output:
August

26. Write a C program that prints all even numbers between 1 and 50 (inclusive).
Test Data :
Even numbers between 1 to 50 (inclusive):
Expected Output:
2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50

27. Write a C program that read 5 numbers and counts the number of positive numbers and negative numbers.
Test Data :
Input the first number: 5
Input the second number: -4
Input the third number: 10
Input the fourth number: 15
Input the fifth number: -1

Expected Output:
Number of positive numbers: 3
Number of negative numbers: 2

28. Write a C program that read 5 numbers and counts the number of positive numbers and print the average of all positive values.
Test Data :
Input the first number: 5
Input the second number: 8
Input the third number: 10
Input the fourth number: -5
Input the fifth number: 25
Expected Output:
Number of positive numbers: 4
Average value of the said positive numbers: 12.00

29. Write a C program that read 5 numbers and sum of all odd values between them.
Test Data :
Input the first number: 5
Input the second number: 7
Input the third number: 9
Input the fourth number: 10
Input the fifth number: 13
Expected Output:
Sum of all odd values: 34

30. Write a C program to find and print the square of each one of the even values from 1 to a specified value.
Test Data :
List of square of each one of the even values from 1 to a 4 :
Expected Output:
2^2 = 4
4^2 = 16

31. Write a C program to check a given integer is positive even, negative even, positive odd or negative odd. Print even if the number is 0.
Test Data :
Input an integer: 13
Expected Output:

Positive Odd

32. Write a C program to print all numbers between 1 to 100 which divided by a specified number and the remainder will be 3.
Test Data :
Input an integer: 25
Expected Output:
3
28
53
78
103
128
153
178
203
228
253
278
303
328
353
378
403
428
453
478

33. Write a C program that accepts some integers from the user and find the highest value and the input position.
Test Data :
Input 5 integers:
5
7
15
23
45
Expected Output:
Highest value: 45

Position: 5

34. Write a C program to print the numbers from the lowest to the highest (inclusive) and the sum of consecutive integers from a given pair of numbers.
Test Data :
Input a pair of numbers (for example 10,2):
Input first number of the pair: 10
Input second number of the pair: 2
Expected Output:
List of odd numbers: 3
5
7
9
Sum=24

35. Write a C program to check if two numbers in a pair is in ascending order or descending order.
Test Data :
Input a pair of numbers (for example 10,2 : 2,10):
Input first number of the pair: 10
Expected Output:
Input second number of the pair: 2
The pair is in descending order!

36. Write a C program to read a password until it is correct. For wrong password print "Incorrect password" and for correct password print "Correct password" and quit the program. The correct password is 1234.
Test Data :
Input the password: 1234
Expected Output:
Correct password

37. Write a C program to read the coordinates(x, y) (in Cartesian system) and find the quadrant to which it belongs (Quadrant -I, Quadrant -II, Quadrant -III, Quadrant -IV).
Note: A Cartesian coordinate system is a coordinate system that specifies each point uniquely in a plane by a pair of numerical coordinates.
These are often numbered from 1st to 4th and denoted by Roman numerals: I (where the signs of the (x,y) coordinates are I(+,+), II (−,+), III (−,−), and IV (+,−).
Test Data :
Input the Coordinate(x,y):

x: 25
y: 15
Expected Output:
Quadrant-I(+,+)

38. Write a program that reads two numbers and divide the first number by second number. If the division not possible print "Division not possible".
Test Data :
Input two numbers:
x: 25
y: 5
Expected Output: 5.0

39. Write a C program to calculate the sum of all number not divisible by 17 between two given integer numbers.
Test Data :
Input the first integer: 50 Input the second integer: 99
Expected Output:
Sum: 3521

40. Write a C program to find all numbers which dividing it by 7 and the remainder is equal to 2 or 3 between two given integer numbers.
Test Data :
Input the first integer: 25
Input the second integer: 45
Expected Output:
30
31
37
38
44

41. Write a C program to print 3 numbers in a line, starting from 1 and print n lines. Accept number of lines (n, integer) from the user.
Test Data :
Input number of lines: 5
Expected Output:
1 2 3
4 5 6
7 8 9

10 11 12
13 14 15

42. Write a C program to print a number, it's square and cube in a line, starting from 1 and print n lines. Accept number of lines (n, integer) from the user.
Test Data :
Input number of lines: 5
Expected Output:
1 1 1
2 4 8
3 9 27
4 16 64
5 25 125

43. Write a C program that reads two integers p and q, print p number of lines in a sequence of 1 to b in a line.
Test Data :
Input number of lines: 5
Number of characters in a line: 6
Expected Output:
1 2 3 4 5 6
7 8 9 10 11 12
13 14 15 16 17 18
19 20 21 22 23 24
25 26 27 28 29 30

44. Write a C program to calculate the average marks of mathematics of some students. Input 0 (excluding to calculate the average) or negative value to terminate the input process.
Test Data :
Input Mathematics marks (0 to terminate): 10
15
20
25
0
Expected Output:
Average marks in Mathematics: 17.50

45. Write a C program to calculate the value of S where S = 1 + 1/2 + 1/3 + … + 1/50.
Expected Output:

Value of S: 4.50

46. Write a C program to calculate the value of S where S = 1 + 3/2 + 5/4 + 7/8.
Expected Output:
Value of series: 4.62

47. Write a C program that reads an integer and find all its divisor.
Test Data:
Input an integer: 45
Expected Output:
All the divisor of 45 are:
1
3
5
9
15
45

48. Write a C program to read and print the elements of an array of length 7, before print replace every negative number, zero with 100.
Test Data:
Input the 5 members of the array:
25
45
35
65
15

Expected Output:
Array values are:
n[0] = 25
n[1] = 45
n[2] = 35
n[3] = 65
n[4] = 15

49. Write a C program to read and print the elements of an array of length 7, before print, put the triple of the previous position starting from the second position of the array.
For example, if the first number is 2, the array numbers must be 2, 6, 18, 54 and 162
Test Data:

Input the first number of the array: 5
Expected Output:
n[0] = 5
n[1] = 15
n[2] = 45
n[3] = 135
n[4] = 405

50. Write a C program to read an array of length 5 and print the position and value of the array elements of value less than 5.
Test Data:
Input the 5 members of the array:
15
25
4
35
40
Expected Output:
A[2] = 4.0

51. Write a C program to read an array of length 6, change the first element by the last, the second element by the fifth and the third element by the fourth. Print the elements of the modified array.
Test Data:
Input the 5 members of the array:
15
20
25
30
35

Expected Output:
array_n[0] = 35
array_n[1] = 30
array_n[2] = 25
array_n[3] = 20
array_n[4] = 15

52. Write a C program to read an array of length 6 and find the smallest element and its position.

Test Data:
Input the length of the array: 5 Input the array elements:
25
35
20
14
45
Expected Output:
Smallest Value: 14
Position of the element: 3

53. Write a C program that accepts principle, rate of interest, time and compute the simple interest.
Test Data:
Input Data: p = 10000, r = 10% , t = 12 year
Expected Output:
Input principle, Rate of interest & time to find simple interest:
Simple intrest = 12000

54. Write a C program that accepts a distance in centimeters and prints the corresponding value in inches.
Test Data:
Input Data: 500cms
Input the distance in cm:
Distance of 500.00 cms is = 196.85 inches

55. Write a C program that swaps two numbers without using third variable.
Input value for x & y:
Before swapping the value of x & y: 5 7
After swapping the value of x & y: 7 5

56. Write a C program to shift given data by two bits to the left.
Input value : 2
Read the integer from keyboard-
Integer value = 2
The left shifted data is = 16

57. Write a C program to reverse and print a given number.
Input a number:
The original number = 234

The reverse of the said number = 432

58. Write a C program that accepts 4 real numbers from the keyboard and print out the difference of the maximum and minimum values of these four numbers.
Input four numbers: 1.54 1.236 1.3625 1.002
Difference is 0.5380

59. Write a C program to display sum of series 1 + 1/2 + 1/3 + ……. + 1/n.
Input any number: 1 + 1/0
Sum = 1/0

60. Write a C program to create enumerated data type for 7 days and display their values in integer constants.
Sun = 0
Mon = 1
Tue = 2
Wed = 3
Thu = 4
Fri = 5
Sat = 6

61. Write a C program that accepts a real number x and prints out the corresponding value of sin(1/x) using 4-decimal places.
Input value of x: .6235
Value of sin(1/x) is 0.9995

62. Write a C program that accepts a positive integer less than 500 and prints out the sum of the digits of this number.
Input a positive number less than 500:
Sum of the digits of 347 is 14

63. Write a C program that accepts a positive integer n less than 100 from the user and prints out the sum $1^4 + 2^4 + 4^4 + 7^4 + 11^4 + \bullet\bullet\bullet + m^4$, where m is less than or equal to n. Print appropriate message.
Input a positive number less than 100: 68
Sum of the series is 37361622

64. Write a C program that accepts integers from the user until a zero or a negative number, display the number of positive values, the minimum value, the maximum value and the average of all numbers.

Input a positive integer:
Input next positive integer: 15
Input next positive integer: 25
Input next positive integer: 37
Input next positive integer: 43
Number of positive values entered is 4
Maximum value entered is 43
Minimum value entered is 15
Average value is 30.0000

65. Write a C program that prints out the prime numbers between 1 and 200. The output should be such that each row contains a maximum of 20 prime numbers.
Expected output:
The prime numbers between 1 and 199 are:
2 3 5 7 11 13 17 19 23 29
31 37 41 43 47 53 59 61 67 71
73 79 83 89 97 101 103 107 109 113
127 131 137 139 149 151 157 163 167 173
179 181 191 193 197

66. Write a C program that generates 50 random numbers between -0.5 and 0.5 and writes them in a file rand.dat. The first line of ran.dat contains the number of data and the next 50 lines contains the 50 random numbers.
50
-0.4215
0.2620
0.3065
-0.0485
.... 0.3980
0.1750
0.4780
-0.2915
0.0715
0.3565

67. Write a C program to evaluate the equation y=xn when n is a non-negative integer.
Input the values of x and n: 256
x=256.000000; n=0;
x to power n=1.000000

68. Write a C program to print the powers of 2 table for the power 0 to 10, both positive and negative.

```
=====================================
n 2 to power n 2 to power -n
=====================================
0 1 1.000000000000
1 2 0.500000000000
2 4 0.250000000000
3 8 0.125000000000
4 16 0.062500000000
5 32 0.031250000000
6 64 0.015625000000
7 128 0.007812500000
8 256 0.003906250000
9 512 0.001953125000
10 1024 0.000976562500
=====================================
```

69. Write a C program to print a binomial coefficient table.

```
Mx 0 1 2 3 4 5 6 7 8 9 10
-----------------------------------------------------------
0 1
1 1 1
2 1 2 1
3 1 3 3 1
4 1 4 6 4 1
5 1 5 10 10 5 1
6 1 6 15 20 15 6 1
7 1 7 21 35 35 21 7 1
8 1 8 28 56 70 56 28 8 1
9 1 9 36 84 126 126 84 36 9 1
10 1 10 45 120 210 252 210 120 45 10 1
-----------------------------------------------------------
```

70. Write a C program to print the alphabet set in decimal and character form.

```
[65-A] [66-B] [67-C] [68-D] [69-E] [70-F] [71-G] [72-H] [73-I] [74-J] [75-K] [76-L] [77-M] [78-N]
[79-O] [80-P] [81-Q] [82-R] [83-S] [84-T] [85-U] [86-V] [87-W] [88-X] [89-Y]
[90-Z] [97-a] [98-b] [99-c] [100-d] [101-e] [102-f] [103-g] [104-h] [105-i] [106-j] [107-k] [108-l]
[109-m] [110-n] [111-o] [112-p] [113-q] [114-r] [115-s] [116-t] [117-u] [118-v]
```

[119-w] [120-x] [121-y] [122-z]

71. Write a C program to copy a given string into another and count the number of characters copied.
Input a string
Original string: w3resource
Number of characters = 10

72. Write a C program to remove any negative sign in front of a number.
Input a value (negative):
Original value = -253
Absolute value = 253

-
-
- Basic Algorithm

1. Write a C program to compute the sum of the two given integer values. If the two values are the same, then return triple their sum.
Expected Output:
```
3
12
```

2. Write a C program to get the absolute difference between n and 51. If n is greater than 51 return triple the absolute difference.
Expected Output:
```
6
21
0
```

3. Write a C program to check two given integers, and return true if one of them is 30 or if their sum is 30.
Expected Output:
```
1
1
0
```

4. Write a C program to print your name, date of birth. and mobile number.
Expected Output:
```
1
```

```
1
0
```

5. Write a C program to check if a given positive number is a multiple of 3 or a multiple of 7.
Expected Output:
```
1
1
1
0
```

6. Write a C program to check if one given temperatures is less than 0 and the other is greater than 100.
Expected Output:
```
1
1
0
```

7. Write a C program to check two given integers whether either of them is in the range 100..200 inclusive.
Expected Output:
```
1
0
1
```

8. Write a C program to check whether three given integer values are in the range 20..50 inclusive. Return true if 1 or more of them are in the said range otherwise return false.
Expected Output:
```
1
1
1
0
```

9. Write a C program to check whether two given integer values are in the range 20..50 inclusive. Return true if 1 or other is in the said range otherwise false.
Expected Output:
```
1
1
1
0
```

10. Write a C program to check which number nearest to the value 100 among two given integers. Return 0 if the two numbers are equal.
Expected Output:
```
95
0
```

```
99
```

11. Write a C program to check whether two given integers are in the range 40..50 inclusive, or they are both in the range 50..60 inclusive.
Expected Output:
```
0
0
1
1
```

12. Write a C program to find the larger value from two positive integer values that is in the range 20..30 inclusive, or return 0 if neither is in that range.
Expected Output:
```
0
30
25
28
```

13. Write a C program to check if two given non-negative integers have the same last digit.
Expected Output:
```
0
1
1
0
```

14. Write a C program to check whether the sequence of numbers 1, 2, 3 appears in a given array of integers somewhere.
Expected Output:
```
1
0
1
```

15. Write a C program to count the number of two 5's are next to each other in an array of integers. Also count the situation where the second 5 is actually a 6.
Expected Output:
```
1
2
1
```

16. Write a C program to check if a triple is presents in an array of integers or not. If a value appears three times in a row in an array it is called a triple.
Expected Output:
```
1
1
0
```

17. Write a C program to compute the sum of the two given integers. If the sum is in the range 10..20 inclusive return 30.

Expected Output:

```
29
30
39
30
```

18. Write a C program that accept two integers and return true if either one is 5 or their sum or difference is 5.

Expected Output:

```
1
0
1
```

19. Write a C program to to test if a given non-negative number is a multiple of 13 or it is one more than a multiple of 13.

Expected Output:

```
1
1
1
0
```

20. Write a C program to check if a given non-negative given number is a multiple of 3 or 7, but not both.

Expected Output:

```
1
1
0
```

21. Write a C program to check if a given number is within 2 of a multiple of 10.

Expected Output:

```
0
0
1
1
```

22. Write a C program to compute the sum of the two given integers. If one of the given integer value is in the range 10..20 inclusive return 18.

Expected Output:

```
10
18
18
241
```

23. Write a C program to check if it is possible to add two integers to get the third integer from three given integers.
Expected Output:
```
1
0
1
```

24. Write a C program to check if y is greater than x, and z is greater than y from three given integers x,y,z.
Expected Output:
```
1
1
0
```

25. Write a C program to check if two or more non-negative given integers have the same rightmost digit.
Expected Output:
```
1
1
0
```

26. Write a C program to check three given integers and return true if one of them is 20 or more less than one of the others.
Expected Output:
```
1
1
0
```

27. Write a C program to find the larger from two given integers. However if the two integers have the same remainder when divided by 7, then the return the smaller integer. If the two integers are the same, return 0.
Expected Output:
```
11
20
0
```

28. Write a C program to check two given integers, each in the range 10..99. Return true if a digit appears in both numbers, such as the 3 in 13 and 33.
Expected Output:
```
1
0
1
```

29. Write a C program to compute the sum of three given integers. If the two values are same return the third value.

Expected Output:

```
16
23
12
18
```

30. Write a C program to compute the sum of the three integers. If one of the values is 13 then do not count it and its right towards the sum.

Expected Output:

```
16
23
10
0
```

31. Write a C program to compute the sum of the three given integers. However, if any of the values is in the range 10..20 inclusive then that value counts as 0, except 13 and 17.

Expected Output:

```
16
11
13
13
```

32. Write a C program to check two given integers and return the value whichever value is nearest to 13 without going over. Return 0 if both numbers go over.

Expected Output:

```
5
12
13
0
```

33. Write a C program to check three given integers (small, medium and large) and return true if the difference between small and medium and the difference between medium and large is same.

Expected Output:

```
1
0
1
```

34. Write a C program to check a given array of integers of length 1 or more and return true if the first element and the last element are equal in the given array.

Expected Output:

```
1
0
```

```
0
```

35. Write a C program to check two given arrays of integers of length 1 or more and return true if they have the same first element or they have the same last element.

Expected Output:

```
1
0
```

36. Write a C program to compute the sum of the elements of an given array of integers.

Expected Output:

```
150
10
```

37. Write a C program to rotate the elements of a given array of integers (length 4) in left direction and return the new array.

Expected Output:

```
Elements in original array are: 10, 20, 30, 40
Elements in new array are: 20, 30, 40, 10
```

38. Write a C program to reverse a given array of integers and length 5.

Expected Output:

```
Elements in original array are: 10, 20, 30, 40, 50
Elements in reverse array are: 50, 40, 30, 20, 10
```

39. Write a C program to create a new array containing the middle elements from the two given arrays of integers, each length 5.

Expected Output:

```
Elements in original array are:
10, 20, -30, -40, 30
10, 20, 30, 40, 30
Elements in new array are: -30, 30
```

40. Write a C program to create a new array taking the first and last elements of a given array of integers and length one or more.

Expected Output:

```
Elements in original array are: 10, 20, 30, 40, 50
Elements in new array are: 10, 50
```

41. Write a C program to check if a given array of integers and length 2, contains 15 or 20.

Expected Output:

```
1
1
0
```

42. Write a C program to check if a given array of integers and length 2, does not contain 15 or 20.

Expected Output:

```
0
0
1
```

43. Write a C program to check a given array of integers and return true if the array contains 10 or 20 twice. The length of the array will be 0, 1, or 2.

Expected Output:

```
0
1
0
```

44. Write a C program to check a given array of integers, length 3 and create a new array. If there is a 5 in the given array immediately followed by a 7 then set 7 to 1.

Expected Output:

```
Elements in original array are: 1, 5, 7
Elements in new array are: 1, 5, 1
```

45. Write a C program to compute the sum of the two given arrays of integers, length 3 and find the array which has the largest sum.

Expected Output:

```
Elements in original array are: 10, 20, -30
Elements in original array are: 10, 20, 30
The array which has the largest sum.: 10, 20, 30
```

46. Write a C program to create an array taking two middle elements from a given array of integers of length even.

Expected Output:

```
Elements in original array are: 1, 5, 7, 9, 11, 13
New array: 7, 9
```

47. Write a C program to create a new array from two give array of integers, each length 3.

Expected Output:

```
Elements in original array1 are: 10, 20, 30
Elements in original array2 are: 40, 50, 60
New array: 10, 20, 30, 40, 50, 60
```

48. Write a C program to create a new array swapping the first and last elements of a given array of integers and length will be least 1.

Expected Output:

```
Elements in original array1 are: 1, 5, 7, 9, 11, 13
New array, after swapping first and last elements: 13, 5, 7, 9, 11, 1
```

49. Write a C program to create a new array of length 3 from a given array (length atleast 3) containing the elements from the middle of the array.

Expected Output:

```
Elements in original array1 are: 1, 5, 7, 9, 11, 13
New array: 7, 9, 11
```

50. Write a C program to find the largest value from first, last, and middle elements of a given array of integers of odd length (atleast 1).

Expected Output:

```
1
9
9
```

51. Write a C program to count even number of elements in a given array of integers.

Expected Output:

```
3
```

52. Write a C program to compute the sum of values in a given array of integers except the number 17. Return 0 if the given array has no integer.

Expected Output:

```
Sum of values in the array of integers except the number 17: 46
```

53. Write a C program to compute the sum of the numbers in a given array except those numbers starting with 5 followed by atleast one 6. Return 0 if the given array has no integer.

Expected Output:

```
Sum of values in the array of integers except the number 17: 37
```

54. Write a C program to check if a given array of integers contains 5 next to a 5 somewhere.

Expected Output:

```
0
1
1
```

55. Write a C program to check whether a given array of integers contains 5's and 7's.

Expected Output:

```
1
0
1
```

56. Write a C program to check if the sum of all 5' in the array exactly 15 in a given array of integers.

Expected Output:

```
0
1
0
```

57. Write a C program to check if the number of 3's is greater than the number of 5's.
Expected Output:
```
1
0
0
```

58. Write a C program to check if a given array of integers contains a 3 or a 5.
Expected Output:
```
1
0
1
```

59. Write a C program to check if a given array of integers contains no 3 or a 5.
Expected Output:
```
1
1
0
1
```

60. Write a C program to check if an array of integers contains a 3 next to a 3 or a 5 next to a 5 or both.
Expected Output:
```
1
0
0
```

61. Write a C program to check a given array of integers and return true if the given array contains two 5's next to each other, or two 5 separated by one element.
Expected Output:
```
1
0
1
```

62. Write a C program to check a given array of integers and return true if there is a 3 with a 5 somewhere later in the given array.
Expected Output:
```
0
1
0
```

63. Write a C program to check a given array of integers and return true if the given array contains either 2 even or 2 odd values all next to each other.

Expected Output:

```
0
1
1
```

64. Write a C program to check a given array of integers and return true if the value 5 appears 5 times and there are no 5 next to each other.

Expected Output:

```
1
0
1
0
```

65. Write a C program to check a given array of integers and return true if every 5 that appears in the given array is next to another 5.

Expected Output:

```
1
0
1
1
```

66. Write a C program to check a given array of integers and return true if the specified number of same elements appears at the start and end of the given array.

Expected Output:

```
1
0
1
```

67. Write a C program to check a given array of integers and return true if the array contains three increasing adjacent numbers.

Expected Output:

```
1
0
1
```

68. Write a C program to shift an element in left direction and return a new array.

Expected Output:

```
Elements in original array are: 10, 20, 30, 40
Elements in new array are: 20, 30, 40, 10
```

69. Write a C program to create a new array taking the elements before the element value 5 from a given array of integers.

Expected Output:

```
Elements in original array are: 1, 2, 3, 5, 7
Elements in new array are: 1, 2, 3
```

70. Write a C program to create a new array taking the elements after the element value 5 from a given array of integers.

Expected Output:

```
Elements in original array are: 1, 2, 3, 5, 7, 9, 11
Elements in new array are: 7, 9, 11
```

71. Write a C program to create a new array from a given array of integers shifting all zeros to left direction.

Expected Output:

```
Elements in original array are: 1, 2, 0, 3, 5, 7, 0, 9, 11
Elements in new array are: 0, 0, 1, 3, 5, 7, 2, 9, 11
```

72. Write a C program to create a new array after replacing all the values 5 with 0 shifting all zeros to right direction.

Expected Output:

```
Elements in original array are: 1, 2, 0, 3, 5, 7, 0, 9, 11, 5
Elements in new array are: 1, 2, 0, 3, 7, 0, 9, 11, 0, 0
```

73. Write a C program to create new array from a given array of integers shifting all even numbers before all odd numbers.

Expected Output:

```
Elements in original array are: 1, 2, 5, 3, 5, 4, 6, 9, 11

Elements in new array are: 2, 4, 6, 3, 5, 1, 5, 9, 11
```

74. Write a C program to check if the value of each element is equal or greater than the value of previous element of a given array of integers.

Expected Output:

```
0
1
1
```

75. Write a C program to check a given array (length will be atleast 2) of integers and return true if there are two values 15, 15 next to each other.

Expected Output:

```
1
0
1
```

- Variable Type
  - 1. Write a C program which will invoke the command processor to execute a command.
  - *Expected Output* :
  - `Is command processor available?`
  - `Command processor available!`
  - `Executing command DIR`
  - `00c40280-5e27-11e6-bd4f-71e8825f8ea3`
  - `01691610-41e1-11e6-901d-35b72ececc72`
  - `...........`
  - `ff827330-443a-11e6-9820-23e2f60d924e`
  - `file.txt`
  - `logging_example.out`
  - `test.txt`
  - `Returned value is: 0.`
  -
  - 2. Write a C program to convert a string to an unsigned long integer.
  - *Test Data and Expected Output* :
  - `Input an unsigned number: 25`
  - `Output: 25`
  -
  - 3. Write a C program to convert a string to a long integer.
  - *Expected Output* :
  - `In decimals: 2016, 4235440, -3624422, 5947391.`
  -
  - 4. Write a C program to convert a string to a double.
  - *Expected Output* :
  - `Output= 4.00`
  -
  - 5. Write a C program to generate a random number.
  - *Test Data and Expected Output* :
  - `Guess the number (1 to 10): 6`
  - `The number is higher`
  -
  - `Guess the number (1 to 10): 7`
  - `That is correct!`
  -
  - 6. Write a C program to sort the elements of an array.
  - *Test Data and Expected Output* :
  - `Input the number of elements to be stored in the array :5`
  - `Input 6 elements in the array :`
  - `element - 0 : 15`
  - `element - 1 : 26`
  - `element - 2 : 42`
  - `element - 3 : 82`
  - `element - 4 : 35`

```
After sorting the array are :
15
26
35
42
82
```

7. Write a C program to integral quotient and remainder of a division.

Test Data and Expected Output :

```
Input numerator : 2500
 Input denominator : 235
 quotient =  10, remainder = 150
```

8. Write a C program to return the absolute value of a long integer.

Test Data and Expected Output :

```
Input 1st number (positive or negative) : 25
 Input 2nd number (positive or negative) : -125
 The absolute value of 1st number is : 25
 The absolute value of 2nd number is : 125
```

9. Write a C program to get the environment string.

Expected Output :

```
The set path is:
/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin
:/bin:/usr/games:/usr/local/games
```

10. Write a C program to return the quotient and remainder of a division.

Test Data and Expected Output :

```
Input numerator : 2000
 Input denominator : 235
 quotient =  8, remainder = 120.
```

11. Write a C program to allocate a block of memory for an array.

Test Data and Expected Output :

```
Input the number of elements to be stored in the array :5
Input 5 elements in the array :
 element 1 : 25
 element 2 : 30
 element 3 : 35
 element 4 : 20
 element 5 : 40
 Values entered in the array are :
 25  30  35  20  40
```

12. Write a C program to perform a binary search in an array.

Test Data and Expected Output :

- Input the number of elements to be stored in the array :5
- Input 5 elements in the array :
- element - 1 : 25
- element - 2 : 20
- element - 3 : 18
- element - 4 : 13
- element - 5 : 15
- Input a value to search : 18
- 18 is found in the array.
-
- 13. Write a C program to convert a string to an integer.
- *Test Data and Expected Output* :
- Input a number : 1972
- The value Input is 1972.
-
- 14. Write a C program to convert a string to a double.
- *Test Data and Expected Output* :
- Input a number : 25
- The original number is : 25.000000
- After division by 2 the number is : 12.500000
-
- 15. Write a C program to set a function that will be executed on termination of a program.
- *Expected Output* :
- This is the message from main function.
- Here is the message returning from newFunctionTwo.
- Here is the message returning from newFunctionOne.
-
- 16. Write a C program to return the absolute value of an integer.
- *Test Data and Expected Output* :
- Input a positive or negative number :-25
- The absolute value of the given number is : 25
-
- 17. Write a C program to abort the current process.
- *Expected Output* :
- File does not exist or error, in opening the file.
- timeout: the monitored command dumped core
- Aborted
-
- 18. Write a C program to demonstrate the working of keyword long.
- *Expected Output* :
- The size of int = 4 bytes
- The size of long = 8 bytes
- The size of long long = 8 bytes
- The size of double = 8 bytes
- The size of long double = 16 byte

- Input - Output
- 1. Write a program that converts Centigrade to Fahrenheit.
  Expected Output :
  Input a temperature (in Centigrade): 45
  113.000000 degrees Fahrenheit.

- 2. Write a C program that calculates the volume of a sphere.
  Expected Output :
  Input the radius of the sphere : 2.56
  The volume of sphere is 70.276237.

- 3. Write a C program that prints the perimeter of a rectangle to take its height and width as input.
  Expected Output :
  Input the height of the Rectangle : 5
  Input the width of the Rectangle : 7
  Perimeter of the Rectangle is : 24.000000

- 4. Write a C program that converts kilometers per hour to miles per hour.
  Expected Output :
  Input kilometers per hour: 15
  9.320568 miles per hour

- 5. Write a C program that takes hours and minutes as input, and calculates the total number of minutes.
  Expected Output :
  Input hours: 5
  Input minutes: 37
  Total: 337 minutes.

- 6. Write a program in C that takes minutes as input, and display the total number of hours and minutes.
  Expected Output :
  Input minutes: 546
  9 Hours, 6 Minutes

- 7. Write a program in C that reads a forename, surname and year of birth and display the names and the year one after another sequentially.
  Expected Output :
  Input your firstname: Tom

Input your lastname: Davis
Input your year of birth: 1982
Tom Davis 1982

- 8. Write a program in C to calculate the sum of three numbers with getting input in one line separated by a comma.
  Expected Output :
  Input three numbers separated by comma : 5,10,15
  The sum of three numbers : 30

- 9. Write a C program to perform addition, subtraction, multiplication and division of two numbers.
  Expected Output :
  Input any two numbers separated by comma : 10,5
  The sum of the given numbers : 15
  The difference of the given numbers : 5
  The product of the given numbers : 50
  The quotient of the given numbers : 2.000000

- 10. Write a C program to find the third angle of a triangle if two angles are given.
  Expected Output :
  Input two angles of triangle separated by comma : 50,70
  Third angle of the triangle : 60

- Conditional Statements
- **1.** Write a C program to accept two integers and check whether they are equal or not.
  Test Data : 15 15
  Expected Output :
  Number1 and Number2 are equal

- **2.** Write a C program to check whether a given number is even or odd.
  Test Data : 15
  Expected Output :
  15 is an odd integer

- **3.** Write a C program to check whether a given number is positive or negative.
  Test Data : 15
  Expected Output :
  15 is a positive number

- **4.** Write a C program to find whether a given year is a leap year or not.
  Test Data : 2016
  Expected Output :
  2016 is a leap year.

- **5.** Write a C program to read the age of a candidate and determine whether it is eligible for casting his/her own vote.
  Test Data : 21
  Expected Output :
  Congratulation! You are eligible for casting your vote.

- **6.** Write a C program to read the value of an integer m and display the value of n is 1 when m is larger than 0, 0 when m is 0 and -1 when m is less than 0.
  Test Data : -5
  Expected Output :
  The value of n = -1

- **7.** Write a C program to accept the height of a person in centimeter and categorize the person according to their height.
  Test Data : 135
  Expected Output :
  The person is Dwarf.

- **8.** Write a C program to find the largest of three numbers.
  Test Data : 12 25 52
  Expected Output :
  1st Number = 12, 2nd Number = 25, 3rd Number = 52
  The 3rd Number is the greatest among three

- **9.** Write a C program to accept a coordinate point in a XY coordinate system and determine in which quadrant the coordinate point lies.
  Test Data : 7 9
  Expected Output :
  The coordinate point (7,9) lies in the First quadrant.

- **10.** Write a C program to find the eligibility of admission for a professional course based on the following criteria:
  Marks in Maths >=65
  Marks in Phy >=55
  Marks in Chem>=50

Total in all three subject >=180
or
Total in Math and Subjects >=140

- Test Data :
  Input the marks obtained in Physics :65
  Input the marks obtained in Chemistry :51
  Input the marks obtained in Mathematics :72
  Expected Output :
  The candidate is eligible for admission.

- **11.** Write a C program to calculate the root of a Quadratic Equation.
  Test Data : 1 5 7
  Expected Output :
  Root are imaginary;
  No solution.

- **12.** Write a C program to read roll no, name and marks of three subjects and calculate the total, percentage and division.
  Test Data :
  Input the Roll Number of the student :784
  Input the Name of the Student :James
  Input the marks of Physics, Chemistry and Computer Application : 70 80 90
  Expected Output :
  Roll No : 784
  Name of Student : James
  Marks in Physics : 70
  Marks in Chemistry : 80
  Marks in Computer Application : 90
  Total Marks = 240
  Percentage = 80.00
  Division = First

- **13.** Write a C program to read temperature in centigrade and display a suitable message according to temperature state below :
  Temp < 0 then Freezing weather
  Temp 0-10 then Very Cold weather
  Temp 10-20 then Cold weather
  Temp 20-30 then Normal in Temp
  Temp 30-40 then Its Hot
  Temp >=40 then Its Very Hot

Test Data :
42
Expected Output :
Its very hot.

- **14.** Write a C program to check whether a triangle is Equilateral, Isosceles or Scalene.
  Test Data :
  50 50 60
  Expected Output :
  This is an isosceles triangle.

- **15.** Write a C program to check whether a triangle can be formed by the given value for the angles.
  Test Data :
  40 55 65
  Expected Output :
  The triangle is not valid.

- **16.** Write a C program to check whether a character is an alphabet, digit or special character.
  Test Data :
  @
  Expected Output :
  This is a special character.

- **17.** Write a C program to check whether an alphabet is a vowel or consonant.
  Test Data :
  k
  Expected Output :
  The alphabet is a consonant.

- **18.** Write a C program to calculate profit and loss on a transaction.
  Test Data :
  500 700
  Expected Output :
  You can booked your profit amount : 200

- **19.** Write a program in C to calculate and print the Electricity bill of a given customer. The customer id., name and unit consumed by the user should be taken from the

keyboard and display the total amount to pay to the customer. The charge are as follow :

Unit	Charge/unit
upto 199	@1.20
200 and above but less than 400	@1.50
400 and above but less than 600	@1.80
600 and above	@2.00

- If bill exceeds Rs. 400 then a surcharge of 15% will be charged and the minimum bill should be of Rs. 100/-
- Test Data :
  1001
  James
  800
  Expected Output :
  Customer IDNO :1001
  Customer Name :James
  unit Consumed :800
  Amount Charges @Rs. 2.00 per unit : 1600.00
  Surchage Amount : 240.00
  Net Amount Paid By the Customer : 1840.00
-
- **20.** Write a program in C to accept a grade and declare the equivalent description :

Grade	Description
E	Excellent
V	Very Good
G	Good
A	Average
F	Fail

- Test Data :
  Input the grade :A
  Expected Output :

You have chosen : Average

- **21.** Write a program in C to read any day number in integer and display day name in the word.
  Test Data :
  4
  Expected Output :
  Thursday

- **22.** Write a program in C to read any digit, display in the word.
  Test Data :
  4
  Expected Output :
  Four

- **23.** Write a program in C to read any Month Number in integer and display Month name in the word.
  Test Data :
  4
  Expected Output :
  April

- **24.** Write a program in C to read any Month Number in integer and display the number of days for this month.
  Test Data :
  7
  Expected Output :
  Month have 31 days

- **25.** Write a program in C which is a Menu-Driven Program to compute the area of the various geometrical shape.
  Test Data :
  1
  5
  Expected Output :
  The area is : 78.500000

- **26.** Write a program in C which is a Menu-Driven Program to perform a simple calculation.
  Test Data :

10
2
3
Expected Output :
The Multiplication of 10 and 2 is: 20

C For Loop [59 exercises with solution]

- **1.** Write a program in C to display the first 10 natural numbers.
  Expected Output :
  1 2 3 4 5 6 7 8 9 10

- **2.** Write a C program to find the sum of first 10 natural numbers.
  Expected Output :
  The first 10 natural number is :
  1 2 3 4 5 6 7 8 9 10
  The Sum is : 55

- **3.** Write a program in C to display n terms of natural number and their sum.
  Test Data : 7
  Expected Output :
  The first 7 natural number is :
  1 2 3 4 5 6 7
  The Sum of Natural Number upto 7 terms : 28

- **4.** Write a program in C to read 10 numbers from keyboard and find their sum and average.
  Test Data :
  Input the 10 numbers :
  Number-1 :2
  ...
  Number-10 :2
  Expected Output :
  The sum of 10 no is : 55
  The Average is : 5.500000

- **5.** Write a program in C to display the cube of the number upto given an integer.
  Test Data :
  Input number of terms : 5

Expected Output :
Number is : 1 and cube of the 1 is :1
Number is : 2 and cube of the 2 is :8
Number is : 3 and cube of the 3 is :27
Number is : 4 and cube of the 4 is :64
Number is : 5 and cube of the 5 is :125

- **6.** Write a program in C to display the multiplication table of a given integer.
  Test Data :
  Input the number (Table to be calculated) : 15
  Expected Output :
  15 X 1 = 15
  ...
  ...
  15 X 10 = 150

- **7.** Write a program in C to display the multipliaction table vertically from 1 to n.
  Test Data :
  Input upto the table number starting from 1 : 8
  Expected Output :
  Multiplication table from 1 to 8
  1x1 = 1, 2x1 = 2, 3x1 = 3, 4x1 = 4, 5x1 = 5, 6x1 = 6, 7x1 = 7, 8x1 = 8
  ...
  1x10 = 10, 2x10 = 20, 3x10 = 30, 4x10 = 40, 5x10 = 50, 6x10 = 60, 7x10 = 70, 8x10 = 80

- **8.** Write a program in C to display the n terms of odd natural number and their sum .
  Test Data
  Input number of terms : 10
  Expected Output :
  The odd numbers are :1 3 5 7 9 11 13 15 17 19
  The Sum of odd Natural Number upto 10 terms : 100

- **9.** Write a program in C to display the pattern like right angle triangle using an asterisk.
- The pattern like :
- *
- **
- ***
- ****
-

- **10.** Write a program in C to display the pattern like right angle triangle with a number.
- The pattern like :
- 1
- 12
- 123
- 1234
-
- **11.** Write a program in C to make such a pattern like right angle triangle with a number which will repeat a number in a row.
- The pattern like :
- 1
- 22
- 333
- 4444
-
- **12.** Write a program in C to make such a pattern like right angle triangle with number increased by 1.
- The pattern like :
- 1
- 2 3
- 4 5 6
- 7 8 9 10
-
- **13.** Write a program in C to make such a pattern like a pyramid with numbers increased by 1.
- 1
- 2 3
- 4 5 6
- 7 8 9 10
-
- **14.** Write a program in C to make such a pattern like a pyramid with an asterisk.
- *
- * *
- * * *
- * * * *
-
- **15.** Write a C program to calculate the factorial of a given number.
  Test Data :
  Input the number : 5
  Expected Output :
  The Factorial of 5 is: 120

- **16.** Write a program in C to display the n terms of even natural number and their sum.
  Test Data :
  Input number of terms : 5

Expected Output :
The even numbers are :2 4 6 8 10
The Sum of even Natural Number upto 5 terms : 30

- **17.** Write a program in C to make such a pattern like a pyramid with a number which will repeat the number in the same row.
-
```
    1
  2 2
 3 3 3
4 4 4 4
```
-
- **18.** Write a program in C to find the sum of the series [1-X^2/2!+X^4/4!- .....].
Test Data :
Input the Value of x :2
Input the number of terms : 5
Expected Output :
the sum = -0.415873
Number of terms = 5
value of x = 2.000000

- **19.** Write a program in C to display the n terms of harmonic series and their sum.
1 + 1/2 + 1/3 + 1/4 + 1/5 ... 1/n terms
Test Data :
Input the number of terms : 5
Expected Output :
1/1 + 1/2 + 1/3 + 1/4 + 1/5 +
Sum of Series upto 5 terms : 2.283334

- **20.** Write a program in C to display the pattern like a pyramid using asterisk and each row contain an odd number of asterisks.
-
```
    *
  * * *
* * * * *
```
-
- **21.** Write a program in C to display the sum of the series [9 + 99 + 999 + 9999 ...].
Test Data :
Input the number or terms :5
Expected Output :
9 99 999 9999 99999
The sum of the saries = 111105

- **22.** Write a program in C to print the Floyd's Triangle.
- 1
- 01
- 101
- 0101
- 10101
-
- **23.** Write a program in C to display the sum of the series [1+x+x^2/2!+x^3/3!+....].
  Test Data :
  Input the value of x :3
  Input number of terms : 5
  Expected Output :
  The sum is : 16.375000

- **24.** Write a program in C to find the sum of the series [x - x^3 + x^5 + ...].
  Test Data :
  Input the value of x :2
  Input number of terms : 5
  Expected Output :
  The values of the series:
  2
  -8
  32
  -128
  512
  The sum = 410

- **25.** Write a program in C to display the n terms of square natural number and their sum.
  1 4 9 16 ... n Terms
  Test Data :
  Input the number of terms : 5
  Expected Output :
  The square natural upto 5 terms are :1 4 9 16 25
  The Sum of Square Natural Number upto 5 terms = 55

- **26.** Write a program in C to find the sum of the series 1 +11 + 111 + 1111 + .. n terms.
  Test Data :
  Input the number of terms : 5
  Expected Output :
  1 + 11 + 111 + 1111 + 11111

The Sum is : 12345

- **27.** Write a c program to check whether a given number is a perfect number or not.
  Test Data :
  Input the number : 56
  Expected Output :
  The positive divisor : 1 2 4 7 8 14 28
  The sum of the divisor is : 64
  So, the number is not perfect.

- **28.** Write a c program to find the perfect numbers within a given number of range.
  Test Data :
  Input the starting range or number : 1
  Input the ending range of number : 50
  Expected Output :
  The Perfect numbers within the given range : 6 28

- **29.** Write a C program to check whether a given number is an armstrong number or not.
  Test Data :
  Input a number: 153
  Expected Output :
  153 is an Armstrong number.

- **30.** Write a C program to find the Armstrong number for a given range of number.
  Test Data :
  Input starting number of range: 1
  Input ending number of range : 1000
  Expected Output :
  Armstrong numbers in given range are: 1 153 370 371 407

- **31.** Write a program in C to display the pattern like a diamond.

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

- **32.** Write a C program to determine whether a given number is prime or not.
  Test Data :
  Input a number: 13
  Expected Output :
  13 is a prime number.

- **33.** Write a C program to display Pascal's triangle.
  Test Data :
  Input number of rows: 5
  Expected Output :

```
        1
      1   1
    1   2   1
  1   3   3   1
1   4   6   4   1
```

- **34.** Write a program in C to find the prime numbers within a range of numbers.
  Test Data :
  Input starting number of range: 1
  Input ending number of range : 50
  Expected Output :
  The prime number between 1 and 50 are :
  2 3 5 7 11 13 17 19 23 29 31 37 41 43 47

- **35.** Write a program in C to display the first n terms of Fibonacci series.
  Fibonacci series 0 1 2 3 5 8 13 .....
  Test Data :
  Input number of terms to display : 10
  Expected Output :
  Here is the Fibonacci series upto to 10 terms :
  0 1 1 2 3 5 8 13 21 34

- **36.** Write a program in C to display the such a pattern for n number of rows using a number which will start with the number 1 and the first and a last number of each row will be 1.

```
   1
  121
12321
```

- **37.** Write a program in C to display the number in reverse order.
  Test Data :
  Input a number: 12345

Expected Output :
The number in reverse order is : 54321

- **38.** Write a program in C to check whether a number is a palindrome or not.
  Test Data :
  Input a number: 121
  Expected Output :
  121 is a palindrome number.

- **39.** Write a program in C to find the number and sum of all integer between 100 and 200 which are divisible by 9.
  Expected Output :
  Numbers between 100 and 200, divisible by 9 :
  108 117 126 135 144 153 162 171 180 189 198
  The sum : 1683

- **40.** Write a C Program to display the pattern like pyramid using the alphabet.
- A
- A B A
- A B C B A
- A B C D C B A
-

- **41.** Write a program in C to convert a decimal number into binary without using an array.
  Test Data :
  Enter a number to convert : 25
  Expected Output :
  The Binary of 25 is 11001.

- **42.** Write a program in C to convert a binary number into a decimal number without using array, function and while loop.
  Test Data :
  Input a binary number :1010101
  Expected Output :
  The Binary Number : 1010101
  The equivalent Decimal Number : 85

- **43.** Write a C program to find HCF (Highest Common Factor) of two numbers.
  Test Data :
  Input 1st number for HCF: 24

Input 2nd number for HCF: 28
Expected Output :
HCF of 24 and 28 is : 4

- **44.** Write a program in C to find LCM of any two numbers using HCF.
  Test Data :
  Input 1st number for LCM: 15
  Input 2nd number for LCM: 20
  Expected Output :
  The LCM of 15 and 20 is : 60

- **45.** Write a program in C to find LCM of any two numbers.
  Test Data :
  Input 1st number for LCM: 15
  Input 2nd number for LCM: 20
  Expected Output :
  The LCM of 15 and 20 is : 60

- **46.** Write a program in C to convert a binary number into a decimal number using math function.
  Test Data :
  Input the binary number :1010100
  Expected Output :
  The Binary Number : 1010100
  The equivalent Decimal Number is : 84

- **47.** Write a C program to check whether a number is a Strong Number or not.
  Test Data :
  Input a number to check whether it is Strong number: 15
  Expected Output :
  15 is not a Strong number.

- **48.** Write a C program to find Strong Numbers within a range of numbers.
  Test Data :
  Input starting range of number : 1
  Input ending range of number: 200
  Expected Output :
  The Strong numbers are :
  1 2 145

- **49.** Write a c program to find out the sum of an A.P. series.
  Test Data :
  Input the starting number of the A.P. series: 1
  Input the number of items for the A.P. series: 10
  Input the common difference of A.P. series: 4
  Expected Output :
  The Sum of the A.P. series are :
  1 + 5 + 9 + 13 + 17 + 21 + 25 + 29 + 33 + 37 = 190

- **50.** Write a program in C to convert a decimal number into octal without using an array.
  Test Data :
  Enter a number to convert : 79
  Expected Output :
  The Octal of 79 is 117.

- **51.** Write a program in C to convert an octal number to a decimal without using an array.
  Test Data :
  Input an octal number (using digit 0 - 7) :745
  Expected Output :
  The Octal Number : 745
  The equivalent Decimal Number : 485

- **52.** Write a program in c to find the Sum of GP series.
  Test Data :
  Input the first number of the G.P. series: 3
  Input the number or terms in the G.P. series: 5
  Input the common ratio of G.P. series: 2
  Expected Output :
  The numbers for the G.P. series:
  3.000000 6.000000 12.000000 24.000000 48.000000
  The Sum of the G.P. series : 93.000000

- **53.** Write a program in C to convert a binary number to octal.
  Test Data :
  Input a binary number :1001
  Expected Output :
  The Binary Number : 1001
  The equivalent Octal Number : 11

- **54.** Write a program in C to convert an octal number into binary.
  Test Data :
  Input an octal number (using digit 0 - 7) :57
  Expected Output :
  The Octal Number : 57
  The equivalent Binary Number : 101111
-
- **55.** Write a program in C to convert a decimal number to hexadecimal.
  Test Data :
  Input any Decimal number: 79
  Expected Output :
  The equivalent Hexadecimal Number : 4F

- **56.** Write a program in C to Check Whether a Number can be Express as Sum of Two Prime Numbers.
  Test Data :
  Input a positive integer: 16
  Expected Output :
  16 = 3 + 13
  16 = 5 + 11

- **57.** Write a program in C to print a string in reverse order.
  Test Data :
  Input a string to reverse : Welcome
  Expected Output :
  Reversed string is: emocleW

- **58.** Write a C program to find the length of a string without using the library function.
  Test Data :
  Input a string : welcome
  Expected Output :
  The string contains 7 number of characters.
  So, the length of the string welcome is : 7

- **59.** Write a program in C to check Armstrong number of n digits.
  Test Data :
  Input an integer : 1634
  Expected Output :
  1634 is an Armstrong number

- # C Array [100 exercises with solution]

- *[An editor is available at the bottom of the page to write and execute the scripts.]*
- **1.** Write a program in C to store elements in an array and print it.
  Test Data :
  Input 10 elements in the array :
  element - 0 : 1
  element - 1 : 1
  element - 2 : 2
  .....
  Expected Output :
  Elements in array are: 1 1 2 3 4 5 6 7 8 9

- **2.** Write a program in C to read n number of values in an array and display it in reverse order.
  Test Data :
  Input the number of elements to store in the array :3
  Input 3 number of elements in the array :
  element - 0 : 2
  element - 1 : 5
  element - 2 : 7
  Expected Output :
  The values store into the array are :
  2 5 7
  The values store into the array in reverse are :
  7 5 2

- **3.** Write a program in C to find the sum of all elements of the array.
  Test Data :
  Input the number of elements to be stored in the array :3
  Input 3 elements in the array :
  element - 0 : 2
  element - 1 : 5
  element - 2 : 8
  Expected Output :
  Sum of all elements stored in the array is : 15

- **4.** Write a program in C to copy the elements of one array into another array.
  Test Data :

Input the number of elements to be stored in the array :3
Input 3 elements in the array :
element - 0 : 15
element - 1 : 10
element - 2 : 12
Expected Output :
The elements stored in the first array are :
15 10 12
The elements copied into the second array are :
15 10 12

- **5.** Write a program in C to count a total number of duplicate elements in an array.
  Test Data :
  Input the number of elements to be stored in the array :3
  Input 3 elements in the array :
  element - 0 : 5
  element - 1 : 1
  element - 2 : 1
  Expected Output :
  Total number of duplicate elements found in the array is : 1

- **6.** Write a program in C to print all unique elements in an array.
  Test Data :
  Input the number of elements to be stored in the array :3
  Input 3 elements in the array :
  element - 0 : 1
  element - 1 : 5
  element - 2 : 1
  Expected Output :
  The unique elements found in the array are :
  5

- **7.** Write a program in C to merge two arrays of same size sorted in decending order.
  Test Data :
  Input the number of elements to be stored in the first array :3
  Input 3 elements in the array :
  element - 0 : 1
  element - 1 : 2
  element - 2 : 3
  Input the number of elements to be stored in the second array :3

Input 3 elements in the array :
element - 0 : 1
element - 1 : 2
element - 2 : 3
Expected Output :
The merged array in decending order is :
3 3 2 2 1 1

- **8.** Write a program in C to count the frequency of each element of an array.
  Test Data :
  Input the number of elements to be stored in the array :3
  Input 3 elements in the array :
  element - 0 : 25
  element - 1 : 12
  element - 2 : 43
  Expected Output :
  The frequency of all elements of an array :
  25 occurs 1 times
  12 occurs 1 times
  43 occurs 1 times

- **9.** Write a program in C to find the maximum and minimum element in an array.
  Test Data :
  Input the number of elements to be stored in the array :3
  Input 3 elements in the array :
  element - 0 : 45
  element - 1 : 25
  element - 2 : 21
  Expected Output :
  Maximum element is : 45
  Minimum element is : 21

- **10.** Write a program in C to separate odd and even integers in separate arrays.
  Test Data :
  Input the number of elements to be stored in the array :5
  Input 5 elements in the array :
  element - 0 : 25
  element - 1 : 47
  element - 2 : 42
  element - 3 : 56

element - 4 : 32
Expected Output :
The Even elements are :
42 56 32
The Odd elements are :
25 47

- **11.** Write a program in C to sort elements of array in ascending order.
  Test Data :
  Input the size of array : 5
  Input 5 elements in the array :
  element - 0 : 2
  element - 1 : 7
  element - 2 : 4
  element - 3 : 5
  element - 4 : 9
  Expected Output :
  Elements of array in sorted ascending order:
  2 4 5 7 9

- **12.** Write a program in C to sort elements of the array in descending order.
  Test Data :
  Input the size of array : 3
  Input 3 elements in the array :
  element - 0 : 5
  element - 1 : 9
  element - 2 : 1
  Expected Output :
  Elements of the array in sorted descending order:
  9 5 1

- **13.** Write a program in C to insert New value in the array (sorted list)..
  Test Data :
  Input the size of array : 3
  Input 3 elements in the array in ascending order:
  element - 0 : 5
  element - 1 : 7
  element - 2 : 9
  Input the value to be inserted : 8
  Expected Output :

The exist array list is :
5 7 9
After Insert the list is :
5 7 8 9

- **14.** Write a program in C to insert New value in the array (unsorted list).
  Test Data :
  Input the size of array : 4
  Input 4 elements in the array in ascending order:
  element - 0 : 1
  element - 1 : 8
  element - 2 : 7
  element - 3 : 10
  Input the value to be inserted : 5
  Input the Position, where the value to be inserted :2
  Expected Output :
  The current list of the array :
  1 8 7 10
  After Insert the element the new list is :
  1 5 8 7 10

- **15.** Write a program in C to delete an element at desired position from an array.
  Test Data :
  Input the size of array : 5
  Input 5 elements in the array in ascending order:
  element - 0 : 1
  element - 1 : 2
  element - 2 : 3
  element - 3 : 4
  element - 4 : 5
  Input the position where to delete: 3
  Expected Output :
  The new list is : 1 2 4 5

- **16.** Write a program in C to find the second largest element in an array.
  Test Data :
  Input the size of array : 5
  Input 5 elements in the array :
  element - 0 : 2
  element - 1 : 9

element - 2 : 1
element - 3 : 4
element - 4 : 6
Expected Output :
The Second largest element in the array is : 6

- **17.** Write a program in C to find the second smallest element in an array.
  Test Data :
  Input the size of array : 5
  Input 5 elements in the array (value must be <9999) :
  element - 0 : 0
  element - 1 : 9
  element - 2 : 4
  element - 3 : 6
  element - 4 : 5
  Expected Output :
  The Second smallest element in the array is : 4

- **18.** Write a program in C for a 2D array of size 3x3 and print the matrix.
  Test Data :
  Input elements in the matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [0],[2] : 3
  element - [1],[0] : 4
  element - [1],[1] : 5
  element - [1],[2] : 6
  element - [2],[0] : 7
  element - [2],[1] : 8
  element - [2],[2] : 9
  Expected Output :
  The matrix is :

  1 2 3
  4 5 6
  7 8 9

- **19.** Write a program in C for addition of two Matrices of same size.
  Test Data :
  Input the size of the square matrix (less than 5): 2

Input elements in the first matrix :
element - [0],[0] : 1
element - [0],[1] : 2
element - [1],[0] : 3
element - [1],[1] : 4
Input elements in the second matrix :
element - [0],[0] : 5
element - [0],[1] : 6
element - [1],[0] : 7
element - [1],[1] : 8
Expected Output :
The First matrix is :

1 2
3 4
The Second matrix is :

5 6
7 8
The Addition of two matrix is :

6 8
10 12

- **20.** Write a program in C for subtraction of two Matrices.
  Test Data :
  Input the size of the square matrix (less than 5): 2
  Input elements in the first matrix :
  element - [0],[0] : 5
  element - [0],[1] : 6
  element - [1],[0] : 7
  element - [1],[1] : 8
  Input elements in the second matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [1],[0] : 3
  element - [1],[1] : 4
  Expected Output :
  The First matrix is :

5 6
7 8
The Second matrix is :

1 2
3 4
The Subtraction of two matrix is :

4 4
4 4

- **21.** Write a program in C for multiplication of two square Matrices.
  Test Data :
  Input the rows and columns of first matrix : 2 2
  Input the rows and columns of second matrix : 2 2
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [1],[0] : 3
  element - [1],[1] : 4
  Input elements in the second matrix :
  element - [0],[0] : 5
  element - [0],[1] : 6
  element - [1],[0] : 7
  element - [1],[1] : 8
  Expected Output :
  The First matrix is :

  1 2
  3 4
  The Second matrix is :

  5 6
  7 8
  The multiplication of two matrix is :

  19 22
  43 50

- **22.** Write a program in C to find transpose of a given matrix.
  Test Data :
  Input the rows and columns of the matrix : 2 2
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [1],[0] : 3
  element - [1],[1] : 4
  Expected Output :
  The matrix is :

  1 2
  3 4

  The transpose of a matrix is :
  1 3
  2 4

- **23.** Write a program in C to find sum of right diagonals of a matrix.
  Test Data :
  Input the size of the square matrix : 2
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [1],[0] : 3
  element - [1],[1] : 4
  Expected Output :
  The matrix is :
  1 2
  3 4
  Addition of the right Diagonal elements is :5
  Elements in array are:

- **24.** Write a program in C to find the sum of left diagonals of a matrix.
  Test Data :
  Input the size of the square matrix : 2
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [1],[0] : 3

element - [1],[1] : 4
Expected Output :
The matrix is :
1 2
3 4
Addition of the left Diagonal elements is :5

- **25.** Write a program in C to find sum of rows an columns of a Matrix.
  Test Data :
  Input the size of the square matrix : 2
  Input elements in the first matrix :
  element - [0],[0] : 5
  element - [0],[1] : 6
  element - [1],[0] : 7
  element - [1],[1] : 8
  Expected Output :
  The First matrix is :
  The matrix is :
  5 6
  7 8
  The sum or rows and columns of the matrix is :
  5 6 11
  7 8 15

  12 14

- **26.** Write a program in C to print or display the lower triangular of a given matrix.
  Test Data :
  Input the size of the square matrix : 3
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [0],[2] : 3
  element - [1],[0] : 4
  element - [1],[1] : 5
  element - [1],[2] : 6
  element - [2],[0] : 7
  element - [2],[1] : 8
  element - [2],[2] : 9
  Expected Output :

The matrix is :
1 2 3
4 5 6
7 8 9

Setting zero in lower triangular matrix

1 2 3
0 5 6
0 0 9

- **27.** Write a program in C to print or display upper triangular matrix.
  Test Data :
  Input the size of the square matrix : 3
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [0],[2] : 3
  element - [1],[0] : 4
  element - [1],[1] : 5
  element - [1],[2] : 6
  element - [2],[0] : 7
  element - [2],[1] : 8
  element - [2],[2] : 9
  Expected Output :
  The matrix is :
  1 2 3
  4 5 6
  7 8 9

  Setting zero in upper triangular matrix

  1 0 0
  4 5 0
  7 8 9

- **28.** Write a program in C to calculate determinant of a 3 x 3 matrix.
  Test Data :
  Input elements in the first matrix :
  element - [0],[0] : 1

element - [0],[1] : 0
element - [0],[2] : -1
element - [1],[0] : 0
element - [1],[1] : 0
element - [1],[2] : 1
element - [2],[0] : -1
element - [2],[1] : -1
element - [2],[2] : 0
Expected Output :
The matrix is :
1 0 -1
0 0 1
-1 -1 0

The Determinant of the matrix is: 1

- **29.** Write a program in C to accept a matrix and determine whether it is a sparse matrix.
  Test Data :
  Input the number of rows of the matrix : 2
  Input the number of columns of the matrix : 2
  Input elements in the first matrix :
  element - [0],[0] : 0
  element - [0],[1] : 0
  element - [1],[0] : 1
  element - [1],[1] : 0
  Expected Output :
  The given matrix is sparse matrix.
  There are 3 number of zeros in the matrix

- **30.** Write a program in C to accept two matrices and check whether they are equal.
  Test Data :
  Input Rows and Columns of the 1st matrix :2 2
  Input Rows and Columns of the 2nd matrix :2 2
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 2
  element - [1],[0] : 3
  element - [1],[1] : 4
  Input elements in the second matrix :

element - [0],[0] : 1
element - [0],[1] : 2
element - [1],[0] : 3
element - [1],[1] : 4
Expected Output :
The first matrix is :
1 2
3 4
The second matrix is :
1 2
3 4
The Matrices can be compared :
Two matrices are equal.

- **31.** Write a program in C to check whether a given matrix is an identity matrix.
  Test Data :
  Input number of Rows for the matrix :3
  Input number of Columns for the matrix :3
  Input elements in the first matrix :
  element - [0],[0] : 1
  element - [0],[1] : 0
  element - [0],[2] : 0
  element - [1],[0] : 0
  element - [1],[1] : 1
  element - [1],[2] : 0
  element - [2],[0] : 0
  element - [2],[1] : 0
  element - [2],[2] : 1
  Expected Output :
  The matrix is :
  1 0 0
  0 1 0
  0 0 1
  The matrix is an identity matrix.

- **32.** Write a program in C to find a pair with given sum in the array.
  Expected Output :
  The given array : 6 8 4 -5 7 9
  The given sum : 15

Pair of elements can make the given sum by the value of index 0 and 5

- **33.** Write a program in C to find the majority element of an array.
  A majority element in an array A[] of size n is an element that appears more than n/2 times (and hence there is at most one such element).
  Expected Output :
  The given array is : 4 8 4 6 7 4 4 8
  There are no Majority Elements in the given array.

- **34.** Write a program in C to find the number occurring odd number of times in an array.
  All numbers occur even number of times except one number which occurs odd number of times.
  Expected Output :
  The given array is : 8 3 8 5 4 3 4 3 5
  The element odd number of times is : 3

- **35.** Write a program in C to find the largest sum of contiguous subarray of an array.
  Expected Output :
  The given array is : 8 3 8 -5 4 3 -4 3 5
  The largest sum of contiguous subarray is : 21

- **36.** Write a program in C to find the missing number from a given array. There are no duplicates in list.
  Expected Output :
  The given array is : 1 3 4 2 5 6 9 8
  The missing number is : 7

- **37.** Write a program in C to find the pivot element of a sorted and rotated array using binary search.
  Pivot element is the only element in input array which is smaller than it's previous element.
  A pivot element divided a sorted rotated array into two monotonically increasing array.
  Expected Output :
  The given array is : 14 23 7 9 3 6 18 22 16 36
  The Pivot Element in the array is : 3

- **38.** Write a program in C to merge one sorted array into another sorted array.
  Pivot element is the only element in input array which is smaller than it's previous element.
  A pivot element divided a sorted rotated array into two monotonically increasing array.

Expected Output :
The given Large Array is : 10 12 14 16 18 20 22
The given Small Array is : 11 13 15 17 19 21
After merged the new Array is :
10 11 12 13 14 15 16 17 18 19 20 21 22

- **39.** Write a program in C to rotate an array by N positions.
  Expected Output :
  The given array is : 0 3 6 9 12 14 18 20 22 25 27
  From 4th position the values of the array are : 12 14 18 20 22 25 27
  Before 4th position the values of the array are : 0 3 6 9
  After rotating from 4th position the array is:
  12 14 18 20 22 25 27 0 3 6 9

- **40.** Write a program in C to find the ceiling in a sroted array.
  N.B.: Given a sorted array in ascending order and a value x, the ceiling of x is the smallest element in array greater than or equal to x, and the floor is the greatest element smaller than or equal to x.
  Expected Output :
  The given array is : 1 3 4 7 8 9 9 10
  The ceiling of 5 is: 7

- **41.** Write a program in C to find the Floor and Ceil of the number 0 to 10 from a sroted array.
  Expected Output :
  The given array is : 1 3 5 7 8 9
  Number: 0 ceiling is: 1 floor is: -1
  Number: 1 ceiling is: 1 floor is: 1
  Number: 2 ceiling is: 3 floor is: 1
  Number: 3 ceiling is: 3 floor is: 3
  Number: 4 ceiling is: 5 floor is: 3
  Number: 5 ceiling is: 5 floor is: 5
  Number: 6 ceiling is: 7 floor is: 5
  Number: 7 ceiling is: 7 floor is: 7
  Number: 8 ceiling is: 8 floor is: 8
  Number: 9 ceiling is: 9 floor is: 9
  Number: 10 ceiling is: -1 floor is: 9

- **42.** Write a program in C to find the smallest missing element from a sorted array.
  Expected Output :

The given array is : 0 1 3 4 5 6 7 9
The missing smallest element is: 2

- **43.** Write a program in C to to print next greater elements in a given unsorted array. Elements for which no greater element exist, consider next greater element as -1.
  Expected Output :
  The given array is : 5 3 10 9 6 13
  Next Bigger Elements are:
  Next bigger element of 5 in the array is: 10
  Next bigger element of 3 in the array is: 10
  Next bigger element of 10 in the array is: 13
  Next bigger element of 9 in the array is: 13
  Next bigger element of 6 in the array is: 13
  Next bigger element of 13 in the array is: -1
  Next Bigger Elements Array:
  10 10 13 13 13 -1

- **44.** Write a program in C to find the two repeating elements in a given array.
  Expected Output :
  The given array is : 2 7 4 7 8 3 4
  The repeating elements are: 7 4

- **45.** Write a program in C to find two elements whose sum is closest to zero.
  Expected Output :
  The given array is : 38 44 63 -51 -35 19 84 -69 4 -46
  The Pair of elements whose sum is minimum are:
  [44, -46]

- **46.** Write a program in C to find the smallest positive number missing from an unsorted array.
  Expected Output :
  The given array is : 3 1 4 10 -5 15 2 -10 -20
  The smallest positive number missed is: 5

- **47.** Write a program in C to find a subarray with given sum from the given array.
  Expected Output :
  The given array is : 3 4 -7 1 3 3 1 -4
  [0..1] -- { 3 4 }
  [0..5] -- { 3 4 -7 1 3 3 }
  [3..5] -- { 1 3 3 }

[4..6] -- { 3 3 1 }

- **48.** Write a program in C to find if a given integer x appears more than n/2 times in a sorted array of n integers.
  Expected Output :
  The given array is : 1 3 3 5 4 3 2 3 3
  The given value is : 3
  3 appears more than 4 times in the given array[]

- **49.** Write a program in C to find majority element of an array.
  Expected Output :
  The given array is : 1 3 3 7 4 3 2 3 3
  The majority of the Element : 3

- **50.** Write a program in C to print a matrix in spiral form.
  Expected Output :
  The given array in matrix form is :
  1 2 3 4 5
  6 7 8 9 10
  11 12 13 14 15
  16 17 18 19 20
  The spiral form of above matrix is:
  1 2 3 4 5 10 15 20 19 18 17 16 11 6 7 8 9 14 13 12

- **51.** Write a program in C to find the maximum circular subarray sum of a given array.
  Expected Output :
  The given array is : 10 8 -20 5 -3 -5 10 -13 11
  The maximum circular sum in the above array is: 29

- **52.** Write a program in C to count the number of triangles can be fromed from a given array.
  Expected Output :
  The given array is : 6 18 9 7 10
  Number of possible triangles can be formed from the array is: 5

- **53.** Write a program in C to find the number of times (frequency) occurs a given number in an array.
  Expected Output :
  The given array is : 2 3 4 4 4 4 5 5 5 6 7 7

The number of times the number 4 occurs in the given array is: 4

- **54.** Write a program in C to sort an array of 0s, 1s and 2s.
  Expected Output :
  The given array is : 0 1 2 2 1 0 0 2 0 1 1 0
  After sortig the elements in the array are:
  0 0 0 0 0 1 1 1 1 2 2 2

- **55.** Write a program in C to sort an array of 0s, 1s and 2s.
  Expected Output :
  The given first array is : 4 8 7 11 6 9 5 0 2
  The given second array is : 5 4 2 0 6
  The second array is the subset of first array.

- **56.** Write a program in C to return the minimum number of jumps to reach the end of the array.
  Expected Output :
  The given array is : 1 3 5 8 9 2 6 7 6 8 9 1 1 1
  The minimum of number of jumps is required to reach the end is: 3

- **57.** Write a program in C to find minimum element in a sorted and rotated array.
  Expected Output :
  The given array is : 3 4 5 6 7 9 2
  The minimum element in the above array is: 2

- **58.** Write a program in C to move all zeroes to the end of a given array.
  Expected Output :
  The given array is : 2 5 7 0 4 0 7 -5 8 0
  The new array is:
  2 5 7 8 4 -5 7 0 0 0

- **59.** Write a program in C to return the counting sort on an array.
  Expected Output :
  The given array is : 4 14 8 0 2 5 2 1 0 17 9 0 5
  After sorting the elements in the array are: 0 0 0 1 2 2 4 5 5 8 9 14 17

- **60.** Write a program in C to find the row with maximum number of 1s.
  Expected Output :
  The given 2D array is :
  0 1 0 1 1

1 1 1 1 1
1 0 0 1 0
0 0 0 0 0
1 0 0 0 1
The index of row with maximum 1s is: 1

- **61.** Write a program in C to find maximum product subarray in a given array.
  Expected Output :
  The given array is : -4 9 -7 0 -15 6 2 -3
  The maximum product of a sub-array in the given array is: 540

- **62.** Write a program in C to find the largest subarray with equal number of 0s and 1s.
  Expected Output :
  The given array is : 0 1 0 0 1 1 0 1 1 1
  Subarray found from the index 0 to 7

- **63.** Write a program in C to replace every element with the greatest element on its right side.
  Expected Output :
  The given array is : 7 5 8 9 6 8 5 7 4 6
  After replace the modified array is: 9 9 9 8 8 7 7 6 6 0

- **64.**Write a program in C to find the median of two sorted arrays of same size.
  Expected Output :
  The given array - 1 is : 1 5 13 24 35
  The given array - 2 is : 3 8 15 17 32
  The Median of the 2 sorted arrays is: 14

- **65.** Write a program in C to find the product of an array such that product is equal to the product of all the elements of arr[] except arr[i].
  Expected Output :
  The given array is : 1 2 3 4 5 6
  The product array is: 720 360 240 180 144 120

- **66.** Write a program in C to count the number of inversion in a given array.
  Expected Output :
  The given array is : 1 9 6 4 5
  The inversions are: (9, 6) (9, 4) (9, 5) (6, 4) (6, 5)
  The number of inversion can be formed from the array is: 5

- **67.** Write a program in C to search an element in a row wise and column wise sorted matrix.
  Expected Output :
  The given array in matrix form is :
  15 23 31 39
  18 26 36 43
  25 28 37 48
  30 34 39 50
  The given value for searching is: 37
  The element Found at the position in the matrix is: 2, 2

- **68.** Write a program in C to return maximum sum such that no two elements are adjacent.
  Expected Output :
  The given array is : 1 3 5 9 7 10 1 10 100
  The maximum sum from the array such that no two elements are adjacent is: 122

- **69.** Write a program in C to find out the maximum difference between any two elements such that larger element appears after the smaller number.
  Expected Output :
  The given array is : 7 9 5 6 13 2
  The elements which provide maximum difference is: 5, 13
  The Maximum difference between two elements in the array is: 8

- **70.** Write a program in C to find two numbers that occur odd number of times in an array.
  Expected Output:
  The given array is: 6 7 3 6 8 7 6 8 3 3
  The two numbers occuring odd number of times are: 3 & 6

- **71.** Write a program in C to find the median of two sorted arrays of different size.
  Expected Output:
  The given first array is : 90 240 300
  The given second array is : 10 13 14 20 25
  The median of two different size arrays are : 22.500000

- **72.** Write a program in C to return only the unique rows from a given binary matrix.
  Expected Output:
  The given array is :
  0 1 0 0 1

1 0 1 1 0
0 1 0 0 1
1 0 1 0 0
The unique rows of the given array are :
0 1 0 0 1
1 0 1 1 0
1 0 1 0 0

- **73.** Write a program in C to print all unique elements of an unsorted array.
  Expected Output:
  The given array is : 1 5 8 5 7 3 2 4 1 6 2
  Unique Elements in the given array are:
  1 5 8 7 3 2 4 6

- **74.** Write a program in C to find the sum of upper triangular elements of a matrix.
  Expected Output:
  The given array is :
  1 2 3
  4 5 6
  7 8 9
  The elements being summed of the upper triangular matrix are: 2 3 6
  The Sum of the upper triangular Matrix Elements are: 11

- **75.** Write a program in C to find the sum of lower triangular elements of a matrix.
  Expected Output:
  The given array is :
  1 2 3
  4 5 6
  7 8 9
  The elements being summed of the lower triangular matrix are: 4 7 8
  The Sum of the lower triangular Matrix Elements are: 19

- **76.** Write a program in C to find largest number possible from the set of given numbers.
  Expected Output:
  The given numbers are :
  15 628 971 9 2143 12
  The largest possible number by the given numbers are: 997162821431512

- **77.** Write a program in C to generate a random permutation of array elements.
  Expected Output:
  The given array is:
  1 2 3 4 5 6 7 8
  The shuffled elements in the array are:
  2 8 7 3 4 5 1 6

- **78.** Write a program in C to find four array elements whose sum is equal to given number.
  Expected Output:
  The given array is:
  3 7 1 9 15 14 6 2 5 7
  The elements are:
  3, 15, 14, 5

- **79.** Write a program in C to sort n numbers in range from 0 to n^2.
  Expected Output:
  The given array is: 37 62 52 7 48 3 15 61
  Sorted array is: 3 7 15 37 48 52 61 62

- **80.** Write a program in C to count all distinct pairs for a specific difference.
  Expected Output:
  The given array is:
  5 2 3 7 6 4 9 8
  The distinct pairs for difference 5 are: [7, 2] [8, 3] [9, 4]
  Number of distinct pairs for difference 5 are: 3

- **81.** Write a program in C to find the maximum repeating number in a given array.
  The array range is [0..n-1] and the elements are in the range [0..k-1] and k<=n..
  Expected Output:
  The given array is:
  2 3 3 5 3 4 1 7 7 7 7
  The maximum repeating number is: 7

- **82.** Write a program in C to print all possible combinations of r elements in a given array.
  Expected Output:
  The given array is:
  1 5 4 6 8 The combination from by the number of elements are: 3
  The combinations are:

1 5 4 6
1 5 4 8
1 5 6 8
1 4 6 8
5 4 6 8

- **83.** Write a program in C to find a pair with the given difference.
  Expected Output:
  The given array is:
  1 15 39 75 92
  The given difference is: 53
  The pair are: (39, 92)

- **84.** Write a program in C to find the minimum distance between two numbers in a given array.
  Expected Output:
  The given array is:
  7 9 5 11 7 4 12 6 2 11
  The minimum distance between 7 and 11 is: 1

- **85.** Write a program in C to Count all possible paths from top left to bottom right of a m X n matrix.
  Expected Output:
  The size of matrix is : 4 x 4
  The all possible paths from top left to bottom right is: 20

- **86.** Write a program in C find the equilibrium index of an array.
  Expected Output:
  The given array is:
  0 -4 7 -4 -2 6 -3 0
  The equilibrium index found at : 7 5 0

- **87.** Write a program in C to find the maximum element in an array which is first increasing and then decreasing.
  Expected Output:
  The given array is:
  2 7 12 25 4 57 27 44
  The maximum element which is increasing then decreasing is: 57

- **88.** Write a program in C to find the maximum n – m such that array[n] > array[m] from a given array[].
  Given an array arr[], find the maximum j – i such that arr[j] > arr[i]
  Expected Output:
  The given array is:
  7 5 8 2 3 2 4 2 1 0
  m = 0, n = 2, arr1[m] = 7 arr1[n] = 8 difference = 2
  m = 3, n = 6, arr1[m] = 2 arr1[n] = 4 difference = 3
  The maximum differcences between two position of array index is: 3

- **89.** Write a program in C to find maximum size square sub-matrix with all 1s.
  Expected Output:
  The given array in matrix form is :
  0 1 0 1 1
  1 1 1 1 0
  1 1 1 1 0
  1 1 1 1 0
  1 1 1 1 1
  0 1 0 1 0
  The maximum size sub-matrix is:
  1 1 1 1
  1 1 1 1
  1 1 1 1
  1 1 1 1

- **90.** Given an array of size n such that every element is in the range from 0 to n-1. Write a program in C to rearrange the given array so that arr[i] becomes arr[arr[i]].
  Expected Output:
  The Original array is
  2 1 4 3 0 The modified array is:
  4 1 0 3 2

- **91.**Given an unsorted array of specific size. Write a program in C to find the minimum length of subarray such that,
  sorting this subarray makes the whole array sorted.
  Expected Output:
  The given array is:
  10 12 15 17 28 32 42 18 56 59 67
  The minimum length of unsorted subarray which makes the given array sorted

lies between the indeces 4 and 7

- **92.** Write a program in C that checks whether the elements in an unsorted array appears consecutively or not.
  Expected Output:
  The given array is:
  7 4 3 5 6 2
  The appearence of elements in the array are consecutive.
  The given array is:
  7 4 4 5 6 2
  The appearence of elements in the array are not consecutive.
  The given array is:
  7 4 9 5 6 3
  The appearence of elements in the array are not consecutive.

- **93.** Write a program in C to rearrange positive and negative numbers alternatively in a given array.
  N.B.: If positive numbers are more they appear at the end and for also negative numbers, they too appear in the end of the array.
  Expected Output:
  The given array is:
  -4 8 -5 -6 5 -9 7 1 -21 -11 19
  The rearranged array is:
  -4 7 -5 1 -21 5 -11 8 -9 19 -6

- **94.** Write a program in C to find the maximum for each and every contigious subarray of size k from a given array.
  Expected Output:
  The given array is:
  1 3 6 21 4 9 12 3 16 10
  The length of each subarray is: 4
  The contigious subarray of length 4 and their maximum value are:
  1 3 6 21 ----> 21
  3 6 21 4 ----> 21
  6 21 4 9 ----> 21
  21 4 9 12 ----> 21
  4 9 12 3 ----> 12
  9 12 3 16 ----> 16
  12 3 16 10 ----> 16

- **95.** Write a program in C to segregate 0s and 1s in an array.
  Expected Output:
  The given array is:
  1 0 1 0 0 1 0 1 1
  The array after segregation is: 0 0 0 0 1 1 1 1 1

- **96.** Write a program in C to segregate even and odd elements on an array.
  Expected Output:
  The given array is:
  17 42 19 7 27 24 30 54 73
  The array after segregation is: 54 42 30 24 27 7 19 17 73

- **97.** Write a program in C to find the index of first peak element in a given array.
  Expected Output:
  The given array is:
  5 12 13 20 16 19 11 7 25
  The index of first peak element in the array is: 3

- **98.** Write a program in C to return the largest span found in the leftmost and rightmost appearances of same value(values are inclusive) in a given array.
  Expected Output:
  The given array is:
  17 42 19 7 27 24 17 54 73
  The span between the same values in the array is: 7

- **99.** Write a program in C to return true if an array can be splitted in such a position that, the sum of left side of the splitting is equal to the sum of the right side.
  Expected Output:
  The given array is : 1 3 3 8 4 3 2 3 3
  The array can be split in a position where the sum of both side are equal.

- **100.** Write a program in C to return the number of clumps(a series of 2 or more adjacent elements of the same value) in a given array.
  Expected Output:
  The given array is:
  17 42 42 7 24 24 17 54 17
  The number of clumps in the array is: 2

C Pointer [22 exercises with solution]

1. Write a program in C to show the basic declaration of pointer.

Expected Output :

```
 Pointer : Show the basic declaration of pointer :
-----------------------------------------------------
 Here is m=10, n and o are two integer variable and *z is an integer

 z stores the address of m  = 0x7ffd40630d44

 *z stores the value of m = 10

 &m is the address of m = 0x7ffd40630d44

 &n stores the address of n = 0x7ffd40630d48

 &o  stores the address of o = 0x7ffd40630d4c

 &z stores the address of z = 0x7ffd40630d50
```

2. Write a program in C to demonstrate how to handle the pointers in the program.

Expected Output :

```
Address of m : 0x7ffcc3ad291c
 Value of m : 29

 Now ab is assigned with the address of m.
 Address of pointer ab : 0x7ffcc3ad291c
 Content of pointer ab : 29

 The value of m assigned to 34 now.
 Address of pointer ab : 0x7ffcc3ad291c
 Content of pointer ab : 34

 The pointer variable ab is assigned with the value 7 now.
 Address of m : 0x7ffcc3ad291c
 Value of m : 7
```

3. Write a program in C to demonstrate the use of &(address of) and *(value at address) operator.

Expected Output :

```
Pointer : Demonstrate the use of & and * operator :
-----------------------------------------------------
 m = 300
 fx = 300.600006
 cht = z

 Using & operator :
----------------------
```

```
 address of m = 0x7ffda2eeeec8
 address of fx = 0x7ffda2eeeecc
 address of cht = 0x7ffda2eeeec7

 Using & and * operator :
----------------------------
 value at address of m = 300
 value at address of fx = 300.600006
 value at address of cht = z

Using only pointer variable :
--------------------------------
 address of m = 0x7ffda2eeeec8
 address of fx = 0x7ffda2eeeecc
 address of cht = 0x7ffda2eeeec7

 Using only pointer operator :
--------------------------------
 value at address of m = 300
 value at address of fx= 300.600006
 value at address of cht= z
```

4. Write a program in C to add two numbers using pointers.

Test Data :

Input the first number : 5

Input the second number : 6

Expected Output :

```
The sum of the entered numbers is : 11
```

5. Write a program in C to add numbers using call by reference.

Test Data :

Input the first number : 5

Input the second number : 6

Expected Output :

```
 The sum of 5 and 6  is 11
```

6. Write a program in C to find the maximum number between two numbers using a pointer.

Test Data :

Input the first number : 5

Input the second number : 6

Expected Output :

```
6 is the maximum number.
```

- **7.** Write a program in C to store n elements in an array and print the elements using pointer.

  Test Data :

  Input the number of elements to store in the array :5

  Input 5 number of elements in the array :

  element - 0 : 5

  element - 1 : 7

  element - 2 : 2

  element - 3 : 9

  element - 4 : 8

  Expected Output :

```
 The elements you entered are :
 element - 0 : 5
 element - 1 : 7
 element - 2 : 2
 element - 3 : 9
 element - 4 : 8
```

- **8.** Write a program in C to print all permutations of a given string using pointers.

  Expected Output :

```
The permutations of the string are :
abcd  abdc  acbd  acdb  adcb  adbc  bacd  badc  bcad  bcda  bdca
bdac  cbad  cbda  cabd  cadb  cdab  cdba  db
ca  dbac  dcba  dcab  dacb  dabc
```

- **9.** Write a program in C to find the largest element using Dynamic Memory Allocation.

  Test Data :

  Input total number of elements(1 to 100): 5

  Number 1: 5

  Number 2: 7

  Number 3: 2

  Number 4: 9

  Number 5: 8

  Expected Output :

```
The Largest element is :  9.00
```

- **10.** Write a program in C to Calculate the length of the string using a pointer.

  Test Data :

  Input a string : w3resource

  Expected Output :

```
The length of the given string w3resource
is : 10
```

- **11.** Write a program in C to swap elements using call by reference.
  Test Data :
  Input the value of 1st element : 5
  Input the value of 2nd element : 6
  Input the value of 3rd element : 7
  Expected Output :
- `The value before swapping are :`
- `element 1 = 5`
- `element 2 = 6`
- `element 3 = 7`
-
- `The value after swapping are :`
- `element 1 = 7`
- `element 2 = 5`
- `element 3 = 6`
-
- **12.** Write a program in C to find the factorial of a given number using pointers.
  Test Data :
  Input a number : 5
  Expected Output :
- `The Factorial of 5 is : 120`
-
- **13.** Write a program in C to count the number of vowels and consonants in a string using a pointer.
  Test Data :
  Input a string: string
  Expected Output :
- `Number of vowels : 1`
- `Number of constant : 5`
-
- **14.** Write a program in C to sort an array using Pointer.
  Test Data :
  testdata
  Expected Output :
- Test Data :
  Input the number of elements to store in the array : 5
  Input 5 number of elements in the array :
  element - 1 : 25
  element - 2 : 45
  element - 3 : 89
  element - 4 : 15
  element - 5 : 82
  Expected Output :
-

```
 The elements in the array after sorting :
 element - 1 : 15
 element - 2 : 25
 element - 3 : 45
 element - 4 : 82
 element - 5 : 89
```

15. Write a program in C to show how a function returning pointer.

Test Data :

Input the first number : 5

Input the second number : 6

Expected Output :

```
 The number 6 is larger.
```

16. Write a program in C to compute the sum of all elements in an array using pointers.

Test Data :

Input the number of elements to store in the array (max 10) : 5

Input 5 number of elements in the array :

element - 1 : 2

element - 2 : 3

element - 3 : 4

element - 4 : 5

element - 5 : 6

Expected Output :

```
 The sum of array is : 20
```

17. Write a program in C to print the elements of an array in reverse order.

Test Data :

Input the number of elements to store in the array (max 15) : 5

Input 5 number of elements in the array :

element - 1 : 2

element - 2 : 3

element - 3 : 4

element - 4 : 5

element - 5 : 6

Expected Output :

```
 The elements of array in reverse order are :
 element - 5 : 6
 element - 4 : 5
 element - 3 : 4
 element - 2 : 3
 element - 1 : 2
```

- **18.** Write a program in C to show the usage of pointer to structure.
  Expected Output :
- ```
  John Alter from Court Street
  ```
- **19.** Write a program in C to show a pointer to union.
  Expected Output :
- ```
  Jhon Mc Jhon Mc
  ```
- **20.** Write a program in C to show a pointer to an array which contents are pointer to structure.
  Expected Output :
- ```
  Exmployee Name : Alex
  Employee ID :  1002
  ```
- **21.** Write a program in C to print all the alphabets using a pointer.
  Expected Output :
- ```
  The Alphabets are :
  A  B  C  D  E  F  G  H  I  J  K  L  M  N  O  P  Q  R  S  T  U  V  W  X  Y  Z
  ```
- **22.** Write a program in C to print a string in reverse using a pointer.
  Test Data :
  Input a string : w3resource
  Expected Output :
- ```
  Pointer : Print a string in reverse order :
  ------------------------------------------------
  Input a string : w3resource
  Reverse of the string is : ecruoser3w
  ```

C Searching and Sorting Algorithm [9 exercises with solution]

- 1. Write a C program for binary search.
  Binary Search : In computer science, a binary search or half-interval search algorithm finds the position of a target value within a sorted array. The binary search algorithm can be classified as a dichotomies divide-and-conquer search algorithm and executes in logarithmic time.

- 2. Write a C program to sort a list of elements using the selection sort algorithm.
  According to Wikipedia "In computer science, selection sort is a sorting algorithm, specifically an in-place comparison sort. It has O(n2) time complexity, making it inefficient on large lists, and generally performs worse than the similar insertion sort".
  Note :
  a) To find maximum of elements
  ```

b) To swap two elements

- 3. Write a C program to sort a list of elements using the bubble sort algorithm.
  Bubble Sort works by repeatedly swapping the adjacent elements if they are in wrong order.

- 4. Write a C program to sort a list of elements using the insertion sort algorithm.
  Insertion sort is a simple sorting algorithm that builds the final sorted array (or list) one item at a time. It is much less efficient on large lists than other algorithms such as quicksort, heapsort, or merge sort.

- 5. Write a C program to sort a list of elements using the merge sort algorithm.
  Merge sort is an O(n log n) comparison-based sorting algorithm. Most implementations produce a stable sort, which means that the implementation preserves the input order of equal elements in the sorted output.

- 6. Write a C program to sort numbers using heap algorithm(MAX heap).
  A sorting algorithm that works by first organizing the data to be sorted into a special type of binary tree called a heap.

- 7. Write a C program to sort a list of elements using the quick sort algorithm.
  Quick sort is a comparison sort, meaning that it can sort items of any type for which a "less-than" relation (formally, a total order) is defined.
  Note: Read n values into array and Sort using Quick Sort

- 8. Write a C program to sort a list of elements using the radix sort algorithm.
  Radix sort is a non-comparative integer sorting algorithm that sorts data with integer keys by grouping keys by the individual digits which share the same significant position and value.

- 9. Write a C Program for counting sort.
  According to Wikipedia “In computer science, counting sort is an algorithm for sorting a collection of objects according to keys that are small integers; that is, it is an integer sorting algorithm. It operates by counting the number of objects that have each distinct key value, and using arithmetic on those counts to determine the positions of each key value in the output sequence. Its running time is linear in the number of items and the difference between the maximum and minimum key values, so it is only suitable for direct use in situations where the variation in keys is not significantly greater than the number of items. However, it is often used as a subroutine in another sorting algorithm,

radix sort, that can handle larger keys more efficiently".

C Function [11 exercises with solution]

- **1.** Write a program in C to show the simple structure of a function.
  Expected Output :
- `The total is :  11`
-
- **2.** Write a program in C to find the square of any number using the function.
  Test Data :
  Input any number for square : 20
  Expected Output :
- `The square of 20 is : 400.00`
-
- **3.** Write a program in C to swap two numbers using function.
  Test Data :
  Input 1st number : 2
  Input 2nd number : 4
  Expected Output :
- `Before swapping: n1 = 2, n2 = 4`
- `After swapping: n1 = 4, n2 = 2`
-
- **4.** Write a program in C to check a given number is even or odd using the function.
  Test Data :
  Input any number : 5
  Expected Output :
- `The entered number is odd.`
-
- **5.** Write a program in C to find the sum of the series 1!/1+2!/2+3!/3+4!/4+5!/5 using the function.
  Expected Output :
- `The sum of the series is : 34`
-
- **6.** Write a program in C to convert decimal number to binary number using the function.
  Test Data :
  Input any decimal number : 65
  Expected Output :
- `The Binary value is : 1000001`
-
-

- **7.** Write a program in C to check whether a number is a prime number or not using the function.
  Test Data :
  Input a positive number : 5
  Expected Output :
- `The number 5 is a prime number.`
-
- **8.** Write a program in C to get the largest element of an array using the function.
  Test Data :
  Input the number of elements to be stored in the array :5
  Input 5 elements in the array :
  element - 0 : 1
  element - 1 : 2
  element - 2 : 3
  element - 3 : 4
  element - 4 : 5
  Expected Output :
- `The largest element in the array is : 5`
-
- **9.** Write a program in C to check armstrong and perfect numbers using the function.
  Test Data :
  Input any number: 371
  Expected Output :
- `The 371 is an Armstrong number.`
- `The 371 is not a Perfect number.`
-
- **10.** Write a program in C to print all perfect numbers in given range using the function.
  Test Data :
  Input lowest search limit of perfect numbers : 1
  Input lowest search limit of perfect numbers : 100
  Expected Output :
- `The perfect numbers between 1 to 100 are :`
- `6   28`
-
-
- **11.** Write a program in C to check whether two given strings are an anagram.
  Test Data :
  Input the first String : spare
  Input the second String : pears
  Expected Output :
- `spare and pears are Anagram.`

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