

Write a program to test whether a number n , entered through keyboard is prime or not by using different algorithms you know for at least 10 inputs and note down the time complexity by step/frequency count method for each algorithm & for each input. Finally make a comparison of time complexities found for different inputs, plot an appropriate graph & decide which algorithm is faster.

Write a program to find out GCD (greatest common divisor) using the following three algorithms.

- a) Euclid's algorithm
 - b) Consecutive integer checking algorithm.
 - c) Middle school procedure which makes use of common prime factors.
- For finding list of primes implement sieve of Eratosthenes algorithm.

Write a menu driven program as given below, to sort an array of n integers in ascending order by insertion sort algorithm and determine the time required (in terms of step/frequency count) to sort the elements. Repeat the experiment for different values of n and different nature of data (i.e. apply insertion sort algorithm on the data of array that are already sorted, reversely sorted and random data). Finally plot a graph of the time taken versus n for each type of data. The elements can be read from a file or can be generated using the random number generator.

INSERTION SORT MENU

1. n Random numbers=>Array
2. Display the Array
3. Sort the Array in Ascending Order by using Insertion Sort Algorithm
4. Sort the Array in Descending Order by using any sorting algorithm
5. Time Complexity to sort ascending of random data
6. TC to sort ascending of data already sorted in ascending order
7. TC to sort ascending of data already sorted in descending order
8. Time Complexity to sort ascending of data for all Cases in Tabular form for values $n=5000$ to 50000 , step= 5000

Write a program to find out the second smallest and second largest element stored in an array of n integers. n is the user input. The array takes input through random number generation within a given range. How many ways you can solve this problem? Write your approaches & strategy for solving this problem

Write a program to swap pair of elements of an array of n integers from starting. If n is odd, then last number will remain unchanged.

Write a program to display an array of n integers ($n > 1$), where at every index of the array should contain the product of all elements in the array except the element at the given index. Solve this problem by taking single loop and without an additional array.