A Forum for Computing and Informatics

A Venture by Alumni of NIT Trichy

Foundations of Programming and Problem Solving

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www.therootlearning.com

You will learn

- Programming Fundamentals
- Data Types, Variables and Basic IO
- Controlling Program Flow
- Unit Testing Fundamentals
- Arrays and Strings
- Object Oriented Programming
- Collection Classes
- Exception Handling and Debugging
- Basics of Git and GitHub for Programmers
- Mathematics for Programmers

Pick a language of your choice

Python C# Java

CODE **1500+** problems from scratch

CRACK CODING CONTESTS

HackerRank topcoder hackerearth CODECHEF Sphere online judge CODEFORCES codewars LeetCode AtCoder

FEES: Rs. 10000

- Competitive Programming Fundamentals
- 50+ Problems (Easy) from HackerEarth, CodeForces, LeetCode etc.
- Mentorship for AtCoder or CodeForces (Beginner Level Contests)

Try 7 Days of Classes for Free

Sample Programming Problems

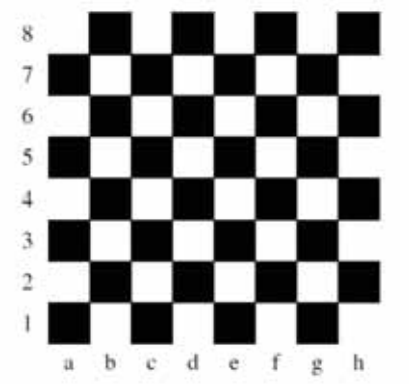
Randomly selected from **1500+** problems of the "**Foundations of Programming and Problem Solving**" Course @ **ROOT IT Learning Centre, Trichy.**

Basic Operations and IO

1. Program to Convert Celsius To Fahrenheit.
2. Program to Swap Two Variables without using temporary variable
3. Program to Swap Two Variables without using temporary variable and without causing overflow
4. Program to Generate a Random Number between 1 and 100.
5. Find the area of a field in acres, whose length and width are given in feet.
6. Given the total amount and the tax percentage, calculate the net amount backwards.

Conditionals

7. Program to Check if a Number is Odd or Even
8. Program to Check Leap Year
9. Program to Find the Largest Among Three Numbers
10. Given three numbers, find the two numbers that are closer to each other.
11. Program to Sort three integers.
12. Program to check whether a triangle can be formed by the given value for the three angles.
13. Program to accept a coordinate point in an XY coordinate system and determine in which quadrant the coordinate point lies
14. What colour is that square, Given the row (1-8) and column (a-h) in a chess board. Given a5 the color is black. D3 the color is white. (Can you solve this with less than 5 lines of code?)



Alternative Solutions

15. Find if a given year is leap year or not without using if/else blocks.
16. Program to Check if a Number is Odd or Even without using % modulo operator
17. Print all positive integers less than N, that are divisible by K, without using % or / or * operators.
18. Find the smallest of two numbers without using comparison operators.

Loops

19. Given N, Write a program that prints Fizz if the number is a multiple of 3, Buzz if the number is a multiple of 5, FizzBuzz if the number is a multiple of 3 and 5, otherwise print the number upto N.
20. Find the Factorial of a given Number
21. Prompt the user for N, the number rounds in a match and obtain the score for each of those rounds, print the running score after each round and the final total at the end.

22. Implement a number guessing game where you prompt the user to guess a number between 1 and X and inform them whether the entered number is larger or smaller than the magic (random) number and the number of attempts they took to guess the magic number correctly.

Number Theory Problems

23. Program to count the number of digits in a given integer
24. Find if the first and last digits of a given integer are the same
25. Given an integer, find the digit with maximum value. (I/P: 1890, O/P: 9)
26. Given an integer find the location (1s, 10s, 100s, 1000s, etc.,) of the digit with maximum value. (I/P: 1890, O/P: 10s)
27. Reverse a given integer number N
28. Find the digital root of a given integer (Digital root means - keep adding and folding till it becomes a single digit)
29. Check if all digits of a given integer N divides N
30. Find the nearest prime number given a number
31. Find the kth prime number from a given number
32. Represent the given number N as a product of prime numbers
33. Given an integer N, check if the given number N is a power of K. Do not use built in functions.
34. Find Armstrong Numbers in the given Interval
35. Check if a given number is a perfect square or not
36. Find the LCM of two given numbers
37. Find the HCF or GCD of two given numbers
38. Program to print the k^{th} Fibonacci number

Arrays

39. Given an unsorted integer array A, print the contents of the array in the given format: {arrayindex:value, arrayindex:value}. Note that there is no comma after the last value.
40. Given an unsorted array A of size N, subtract the element found in location 0 from all other elements in the array.
41. Given an unsorted integer array A and a target value X, find if A contains the value X.
42. Given an unsorted integer array A and a target value X, return the index at which X is located in A or return -1 if it is not found in A.
43. Given an unsorted integer array and a target value X, return the location of the Kth occurrence of the target value in the array and -1 if there is no Kth occurrence of target.
44. Given an unsorted integer array A, find the Maximum Pairwise Product which returns the maximum product that can be obtained by multiplying two integers in the array.
45. Write a function that takes two unsorted integer arrays as input and returns true if the two arrays are the same.
46. Write a function that takes an unsorted integer array as input and returns an array with the duplicates removed.
47. Given an unsorted integer array of length N as input, rotate the contents of the array to the right/left by K positions, where K is always less than N.
48. Given an unsorted integer array A, find the value that will be in index "I" after "R" rotations to the right.
49. Given an unsorted integer array A and a value X, check if there exists a subset of A of size two that adds upto X (Subset sum for a pair).
50. Given an unsorted integer array with equal number of 0s and 1s, rearrange the array such that 0s occupy the even positions and 1s occupy the odd positions. For this case, consider 0 to be an even position.

Students must code solutions for all the 1500 + problems from the scratch. More than one solution is possible for almost all the problems and **exploring alternative solutions** is a very important part of the programming exercise @ **ROOT – IT Learning Centre, Trichy.**