Chapter -1 : Introduction to Programming

Algorithm

A sequential solution of any program that written in human language, called algorithm.

Algorithm is first step of the solution process, after the analysis of problem, programmer writes the algorithm of that problem.

3. Write an algorithm to find all roots of a quadratic equation $ax^2+bx+c=0$.

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Step 1: Start

Step 2: Declare variables a, b, c, D, r1, r2, rp and ip;

Step 3: Calculate discriminant
        D ← b^2-4ac

Step 4: If D ≥ 0
        r1 ← (-b+\sqrt{D})/2a
        r2 ← (-b-\sqrt{D})/2a
        Display r1 and r2 as roots.

Else
        Calculate real part and imaginary part
        rp ← b/2a
        ip ← \sqrt{(-D)/2a}
        Display rp+j(ip) and rp-j(ip) as roots

Step 5: Stop
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4. Write an algorithm to find the factorial of a number entered by the user.

Step 1: Start
Step 2: Declare variables n, factorial and i.
Step 3: Initialize variables
   factorial ← 1
   i ← 1
Step 4: Read value of n
Step 5: Repeat the steps until i = n
   5.1: factorial ← factorial*i
   5.2: i ← i+1
Step 6: Display factorial
Step 7: Stop

Factorial of Number

5 = 1 X 2 X 3 X 4 X 5 = 120

7 = 1 X 2 X 3 X 4 X 5 X 6 X 7
5. Write an algorithm to check whether a number entered by the user is prime or not.

Step 1: Start

Step 2: Declare variables n, i, flag.

Step 3: Initialize variables

   flag ← 1

   i ← 2

Step 4: Read n from user.

Step 5: Repeat the steps until i<(n/2)

   5.1 If remainder of n÷i equals 0

      flag ← 0

      Go to step 6

   5.2 i ← i+1

Step 6: If flag = 0

      Display n is not prime

      else

      Display n is prime

Step 7: Stop
6. Write an algorithm to find the Fibonacci series till term ≤ 1000.

Step 1: Start

Step 2: Declare variables first_term, second_term and temp.

Step 3: Initialize variables first_term ← 0 second_term ← 1

Step 4: Display first_term and second_term

Step 5: Repeat the steps until second_term ≤ 1000
   5.1: temp ← second_term
   5.2: second_term ← second_term + first_term
   5.3: first_term ← temp
   5.4: Display second_term

Step 6: Stop

Assignment

Q.1 Write an algorithm for printing first 10 natural number.

Q.2 Write an algorithm for printing first 10 odd number.

Q.3 Write an algorithm for printing first 10 even number.

Q.4 Write an algorithm for printing first 10 natural number in reverse order.