Welcome to module 11 of programming fundamentals

using C.

Unit 4 Algorithms for problem solving , module name to

verify whether an integer is prime or not. I miss Azia

D’Silva will guide you today through this module. Let's have

a look at the contents of today's class
definition of a prime number
flow chart to verify whether an integer is prime or not.
Construction of algorithm and a few examples.

At the end of this class, every student will be able to

construct an algorithm for verifying if the entered number

is prime or not.

Let us know, move on to the first outline of today's class.

Definition of a prime number.

A prime number is a positive integer that is not divisible

without any remainder by an integer except by itself and

one. For Example's,a few numbers 2 ,3,5, 7, 11 13, etc.

Let us pick a number 2.

Two has factors, one and two.That is, 2 is divisible by number 1

and number 2, that is by number 1 and it is divisible by itself.

Let us pick another number number 13.

13 is divisible by number 1 and itself that is 13.

And it is not divisible by any other number, and therefore

these numbers are prime numbers.

Let us understand what is a factor?

Factor is a number that divides another number evenly with no remainder.For example, we consider a

number 12. Factors of number 12 is1,2,3 ,4 and 6, 12.

That means numbers 1,2,3,4and six divide number 12 equally. And therefore this number is 1,2 ,3, 4 and 6 factors of number 12.

Let us take another example, a number 9. The factors of number 9 are1, three and nine.

And therefore number 9 has three factors, 1, three and nine.

Let us understand now what is a composite number. A composite number is a positive integer

that has at least one divisorother than one and itself.

For example, 2.4,6,8,9 , 10 etc. Let us pick up a number 4.

Four has. Some factors, that is number 1, 2 and 4. That is,

it is divisible by 1, 2 and 4. It has another extra, factor that is number 2 that equally divides number 4 and therefore;it is a composite number.

Let us pick up another number

number 10. Number 10 is divisible by 125 and 10.

Therefore, we have factors 1, 2,5 and 10 for number 10. Now this number 10 has another two factors extra which it equally divides number 10 and therefore it is a composite number. If numbers 4,6,8,9 10 in our examples wouldn't have any more factors than one and itself, they would have been prime numbers.

Since they have a positive integer that divides each of these numbers rather than one and itself, it is a composite number. Let's have a look at the next outline. That is flowchart for finding whether a number is prime or not.

Let's start by inputting a number. This number is a number which is. Required to find whether it is a prime or not.
Second step is to calculate the square root of a number. that is inputted by the user.

And it is stored in r.Now, in the if condition check if I is equal to or greater than. R where r is the stored square root of the inputted number.
If this condition holds true, I is equal to or greater than R, then go and print the number isprime.
Else there's another condition we need to check. That Is if the number entered by the user. Modulus I is equal equal to 0. if it holds true then the number entered by the user is not a prime number.

If the condition holds false,then we increment the value of I buy one and then the loop again continues with the looping statement. The condition if is checked for I's knew value that is incremented value of I is

checked. Again, I is equal to or greater than R if it satisfies

this condition. The algorithm goes and prints the number is prime, else then numbers.Modulus is calculated using the new incremented value of I if the remainder is 0, then the

number is not prime. This means that the new value of I equally divides the inputted number and

therefore. It becomes a composite number and not a prime number. If still this condition holds false, then I is incremented again and the valueof I is incremented by one and again the if statement is. Checked for the value of I and the number till. Whether the input number is decided to be prime or not. Once we have the answer.

For the inputted number.

Then the flow chart stops. That means the algorithm stops after the result. Let's go ahead and calculate the square root of a number using the algorithm.

In the construction of algorithm
Step one is start
Step 2, input number.
Step 3 R is equal to square root of a number.
Step 4 I= to two that is initialized to two.

Step 5 If I is greater than R,then go and print the number is prime. And stop the algorithm.

If this condition is not satisfied, then go to step 6. If number model is, I is = = to 0 then right number is

not prime an stop the algorithm.If these two conditions are not

satisfied, then at step 7 the value of I is incremented by one

and step 7 is repeated until the decision of the inputted number is taken. That is, whether the inputted number is prime.Or not. At the last, once the inputted number is, decided whether it is a prime number or not, then at step eight we go to Step 5 and keep on incrementing the value of seven. So at step

five, we check the condition I is greater than R, then right

number is prime number and stop.

If this condition fails, then.

We go to step 6 and number modulo. I is calculated if the

remainder is 0 then we write the number is not prime.

And stop the algorithm.
Step five and six are repeated until the decision of the

inputted number is taken, whether the number is prime or not.

Let's take an example input a number 81 sqrt 81 is calculated

as nine. I is initialized to
two. I is greater than the square root , i.e 2 is greater than 9. False,
and therefore the modulus is calculated
number modulus I is equal to 81 modulo two isequal equal to 0. No, this

condition holds false and therefore I is incremented by one which now is equal to 3.

With this, we go to the step three that is comparing I with the square root calculated.

Compared three is greater than nine, it holds false.

Then number modulo three isequal equal to 0 is true and

therefore 81 is not a prime number since three is dividing

81 in equal parts.

Example, two input number 11 square root of number 11 is equal to three. I

is equal to two I is greater than the square root. That is 2 is compared with three. 2 is greater than three holds false and number modulo. I is done. That Is 11 modulo two is equal equal

to 0. Holds false and the value of I is incremented by one which equals 3.

Going to Step 3 again. The valueof I is compared with the square

root Calculator 3 is greater than 11, holds false.

Number modulo three is equal equal to 0 false. I is

incremented by another one and it becomes 4.

Now go to Step 3 again.

I is greater than the square root. 4 is greater than three,

holds true and print 11 is a prime number.
With this, we conclude our class.

I have referred to problem solving and program design in C

by Jerry Hanley and LloydKaufman and

webreferencestutorialspoint.com,geeksforgeeks.org and

mathisfun.com. Thank you.