Programming and Data Structure with Python

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Day – 1:

So, far in the introduction with the course coordinators, we are a bit shocked to know

Let’s start programming!!

Python 2 and python 3

We will be using python 3

Version doesn’t matter in this course.

What is programming?

Programming eccentrically comes down to writing some systematic procedures in precise notation. Systematic procedure could be done without using programming. If some steps which are being performed again and again is the precise instruction to do something.

Experienced - Assume certain basic capabilities and describe in terms of these,

Inexperienced – set of instructions are required.

In between, checklist could be implemented.

* Take a task,
* Systematic steps
* Assign the task and provide the instructions who is going to do what..

GCD algorithm:

gcd(m,n)

Largest k that divides both m & n.

gcd(m,n) = 1 when m,n are co-primes.

How to **systematically** compute gcd?

Systematic – always correct, always works

Then worry about the clever way.

But first direct way to solve the problem is necessary.

**Direct approach = “Brute force”**

m has factors or divisors,

n has factors or divisors,

Compare the two sets and choose the common factors.

Smallest and largest factor.

Procedure becomes an algorithm, when the systematic steps compute a result after certain steps.

Factors (14) = [1, 2, 7, 14] (list)

**Difference between list and set: Set is not ordered but list has an order.**

Factors (63) = [1, 3, 7, 9, 21, 63]

Now we have to compare and check if the factors are in the both lists. [1, 7]

It is advantageous to notice that, factors were checked in increasing order.

Common factors are also in ascending order. The biggest is the last one.

Refer program file. Of GCD.

Steps :

* Factors of m
* Factors of n
* Common factor
* Gcd

Range doesn’t include the last point.

Step 1 : “Obviously” Correct Procedure – Broot force.

Can we do better?

We only need to check factors in 1, 2, 3 … , min(m,n)