



Problem Solving through Programming in C

COE 251

WEEK 1: IDEA OF ALGORITHMS



Idea of Algorithms



Idea of Algorithms

What are the problems that can be solved using computers ?



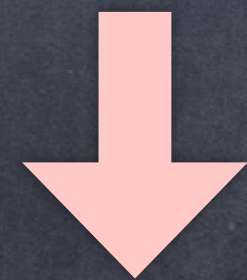
If the steps to execute or perform to arrive at the desired result is known, then it can be solved by programming.



Idea of Algorithms

Programming = Letting the computer know how to solve a problem.

= A set of instructions to be provided to a computer to solve a problem.

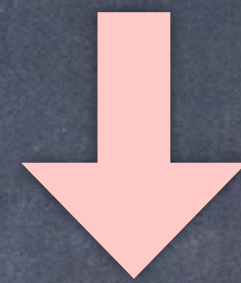


Steps to be followed.



Idea of Algorithms

Steps to be followed to solve a problem.



Algorithm



Idea of Algorithms

Consider the problem of finding the average of "n" numbers.

The steps to solving this problem is known; hence can be programmed.

$$x_1, x_2, x_3, \dots, x_n, \text{ Average} \rightarrow \frac{x_1 + x_2 + x_3 + x_4 + \dots + x_n}{n} = \frac{\sum_{i=1}^n x_i}{n}$$

Assuming there are 3 numbers ($n = 3$), what steps will be taken in determining the average?



Idea of Algorithms

Problem:

Find the average of "n" numbers.

Assuming there are 20 numbers ($n = 20$), what steps will be taken in determining the average?



Idea of Algorithms

Problem:

How many times does the word "Facebook" occur?

The massive outage that took down Facebook, its associated services (Instagram, WhatsApp, Oculus, Messenger), its platform for businesses, and the company's own internal network all started with routine maintenance.

According to infrastructure vice president Santosh Janardhan, a command issued during maintenance inadvertently caused a shutdown of the backbone that connects all of Facebook's data centers, everywhere in the world.

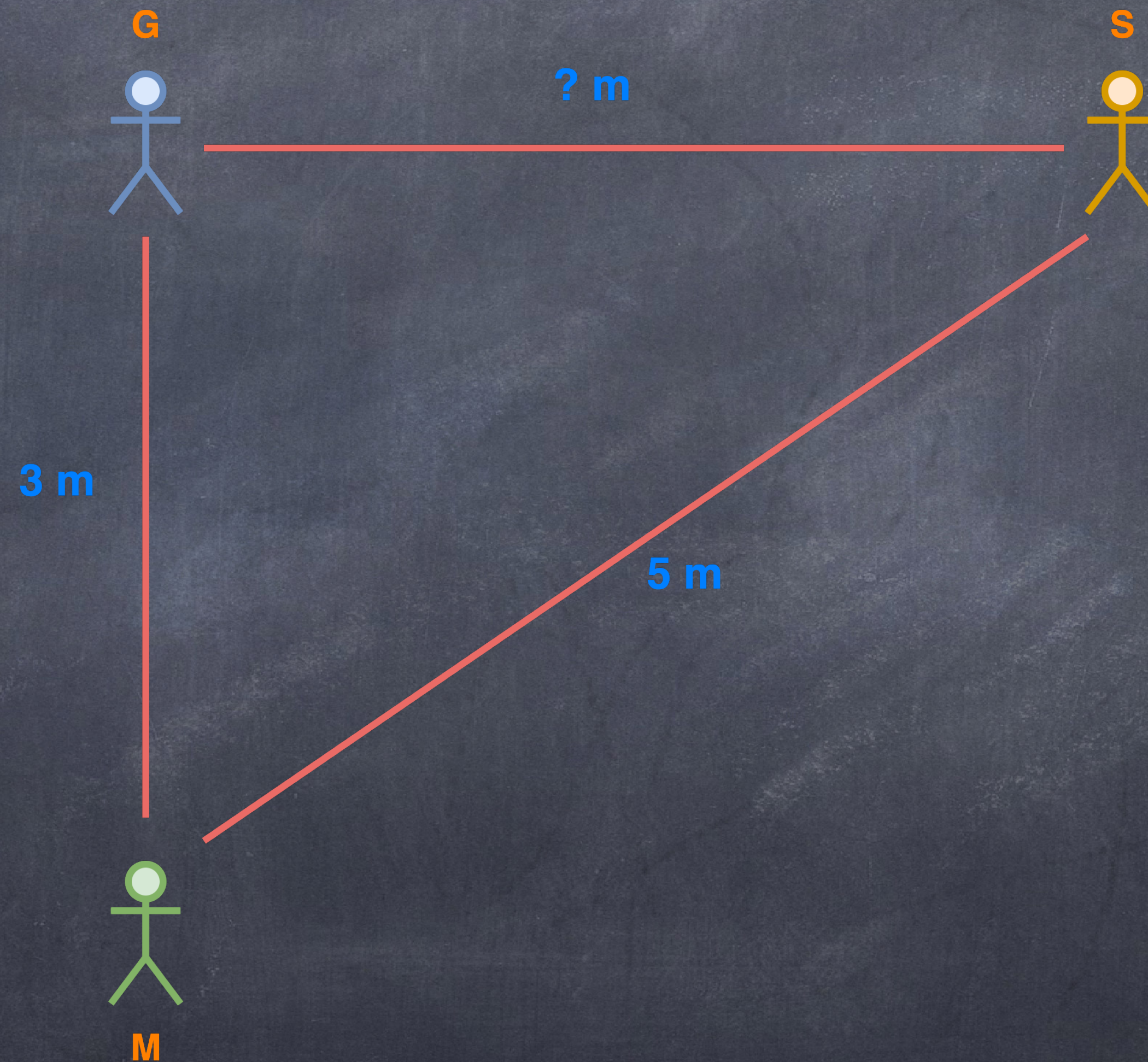
That by itself is bad enough, but as we've already explained, the reason you couldn't use Facebook is that the DNS and BGP routing information pointing to its servers suddenly disappeared. According to Janardhan, that problem was a secondary issue, as Facebook's DNS servers noted the loss of connection to the backbone and stopped advertising the BGP routing information that helps every computer on the internet find its servers. The DNS servers were still working, but they were unreachable.



Idea of Algorithms

Problem:

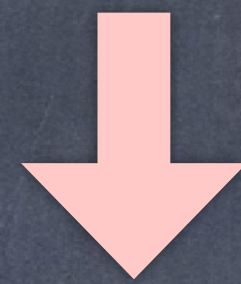
What is the distance between **G** and **S**?



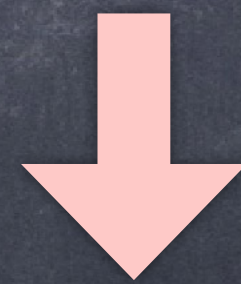


Idea of Algorithms

Steps to be followed to solve a problem.



Algorithm



How can we express algorithms?



Next ...

How to express Algorithms
– Flowchart and Pseudocode