Lecture 1. Introduction to Computer Science

ICT

ICT is the short form of 3 basic terms:

- **Information** is the representation of data in a meaningful way.

- **Communication** may be inferred as exchanging of information by speaking, writing, or using some other medium.

- **Technology** refers to methods, systems and devices, which are a result of scientific knowledge, being used for practical purposes.

The term ICT includes various forms of technologies that are used to create, display, store, process, transmit, share or exchange information by electronic means.

Components

ICT is generally refers to

+ **all devices**

+ **networking components**

+ **applications**

+ **systems**

allow people and organizations (i.e., businesses, nonprofit agencies, governments and enterprises) to interact in the digital world.

ICT components:

CLOUD COMPUTING

SOFTWARE

INTERNET ACCESS

HARDWARE

DATA

TRANSACTIONS

COMMUNICATIONS TECHNOLOGY

More importantly:

ICT involves the combinations and applications of those components.

What is computer science?

- CS is the science of using computers to solve problems

- Mostly, designing software (computer programs)

- Addressing fundamental scientific questions about the nature of computation

- Also involves aspects of hardware and architecting the large computer systems that form the infrastructure of commercial and government enterprises

What is NOT computer science?

CS is not about using software, such as:

spreadsheets (like Excel)
word processors (like Word)
image tools (like Photoshop)

Many software packages are complicated to master (such as Photoshop or Excel) and it is true that many jobs depend on expertise in using such tools, but computer science is not about using the tools.

It is not about expertise in computer games
it is not about writing content in websites
it is not about not about assembling computers or knowing which computers are best buys

Edsger Dijkstra, a famous computer scientist once said, *"Computer Science is no more about computers than Astronomy is about telescopes"*.

What computer science is about

Computer Science is:

about the principles behind building software packages
about the algorithms used in computer games
about the technology behind the internet
about the architecture of computing devices.

Computer is a simple device that knows:

how to remember things
how to look up those memories

A computer program is a set of instructions for managing memory.

Whatever you want to do with a computer, you're manipulating a set of electrical symbols the computer understands in a particular way.

Why to learn programming?
Programming is Automation

- At the heart of programming and writing code is one central idea: **automation**.

- When someone writes a software program, what they are really doing is taking some manual process and making it automatic.

- Think how can your life may be automated

- The real benefit to learning how to program is being able to automate simple tasks and find new ways of solving problems.

Why to learn programming?
Teaches breaking down problems

Want to be better at solving problems?

Learning to program is all about learning how to take complex problems and break them down into smaller parts.

Most of the work of programming is taking some set of steps, also known as an algorithm, and translating that set of steps into smaller and smaller steps until you get to a single line of code.

Programming trains your mind

Why to learn programming?
Programming jobs are abundant

Today, more than ever, the number of development jobs is increasing to a point where it is impossible to fill the demand.

In US big companies like Google, Microsoft request more visas for foreign employees.

It is pretty reasonable to expect that as more and more of our world runs on computers and more and more computing devices are created and used, we'll need more and more developers to write software for those computers and devices.

Why to learn programming?
People will have to know it in future

It is only theory:

It is inevitable that at some point programming will be as ubiquitous as basic literacy.

I'd consider it pretty wise and prudent to make an investment in learning to code early, rather than trying to catch up later. Much better to be ahead than behind.

What can you do if you learn programming?

Anything

What can you do if you learn programming?

Curing diseases

Self-driving cars

What can you do if you learn programming?

Design robots

Making games

Making websites

https://www.bostondynamics.com/