

# Information and Communication Technologies

## Lecture 1

Introduction to Computer Science

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# Why to study this lesson?

Goal of this lesson is:

- Introduce computer science as a profession
- What are the perspectives of profession
- Introduction to basic principles of different topics in computer science

# 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.

## What is NOT computer science (2)

- It is not about expertise in computer games
- it is not about writing content in websites
- it is 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 is computer science 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.

# What is programming?

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.

# Situation in Kazakhstan

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## Работа по отраслям

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[Административный персонал](#) 770

[Банки, инвестиции, лизинг](#) 554

[Безопасность](#) 127

[Бухгалтерия, управленческий учет, финансы предприятия](#) 798

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# Why to learn programming?

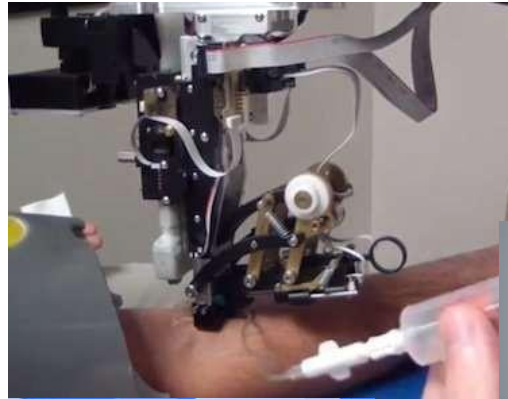
## Programming is fun

There is a certain thrill and feeling of satisfaction that I have felt no other place than when I have written some code to do some complex task and I finally see it work.

Programming isn't always easy and it can be a real headache sometimes, but I can't really think of a more rewarding job.

# What can you do if you learn programming?

- Curing diseases
- Self-driving cars
- Design robots
- Making games
- Making websites
- e.t.c.



# Do programmer need to know math?

Not all programming jobs requires math

Math is essential:

in computer graphics in  
3d technologies

But math helps to think logically

**Thank you**