



BIL103E Computer Intro

Contents of the Lecture

- What is a computer?
- Computation & Information.
- Programs.
- Parts of a Computer.
- Operating Systems.

Instructor:

Dr. Damien Jade Duff

djduff@itu.edu.tr

<http://djduff.net/my-schedule/>

Tabulation, World War II



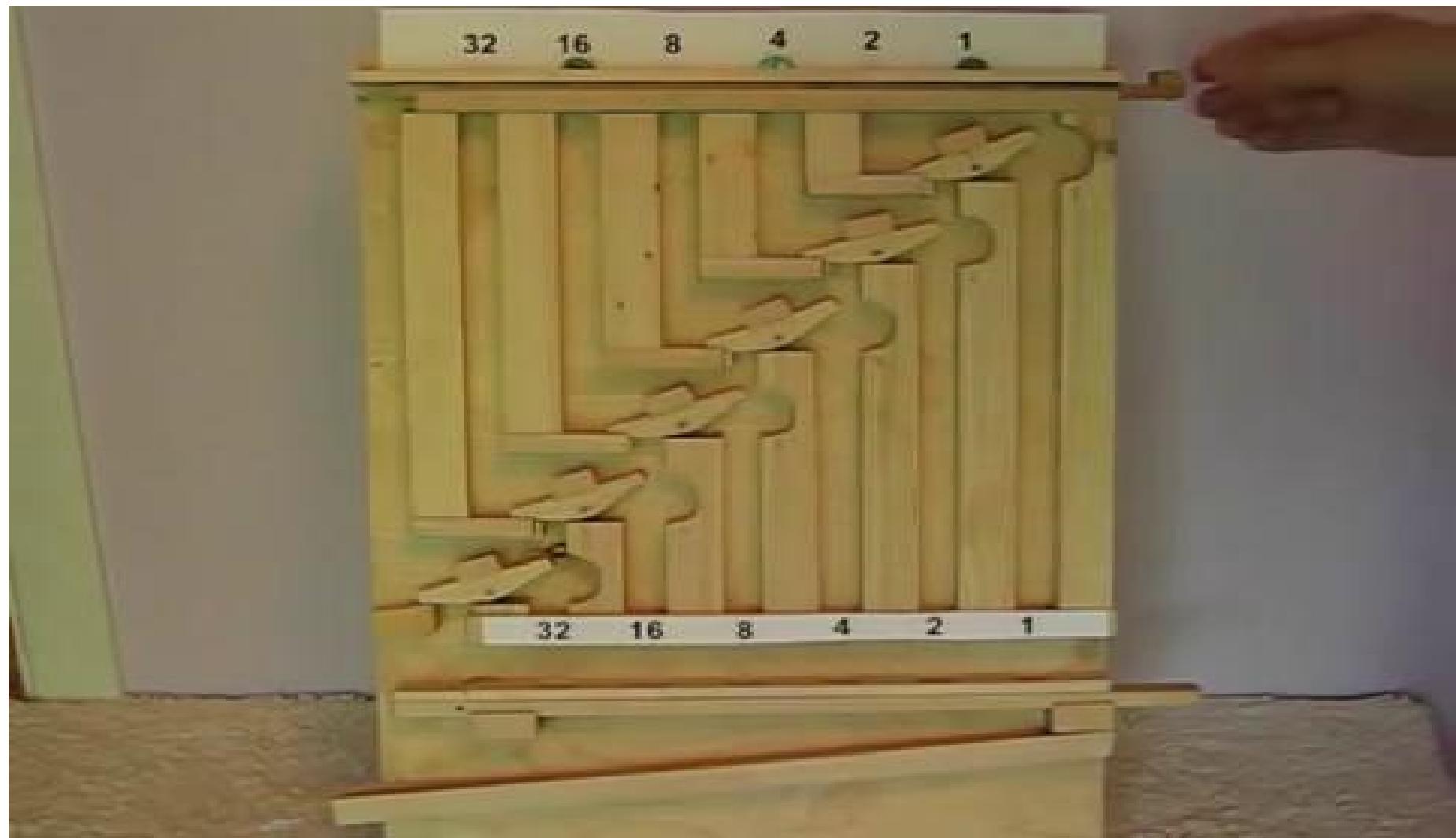
Central Computing Bureau

Peoples Gas Light & Coke Co.

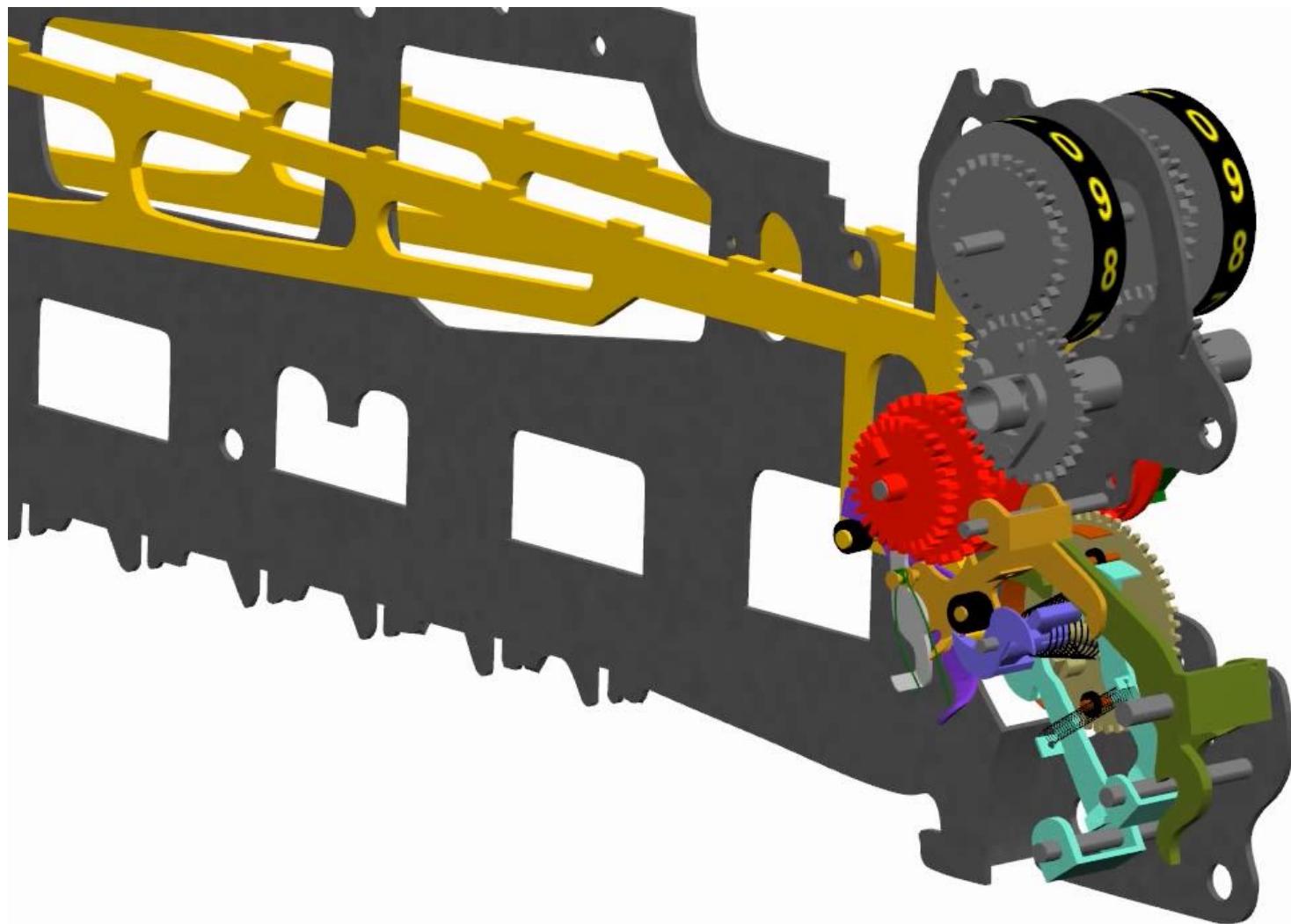
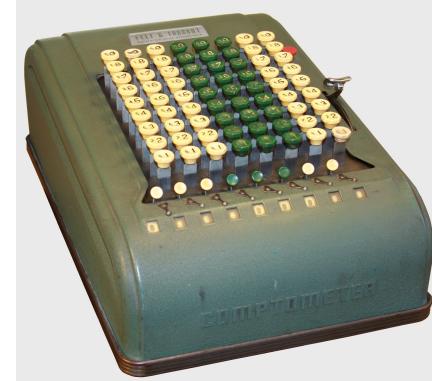
Chicago 1929



Machines can add



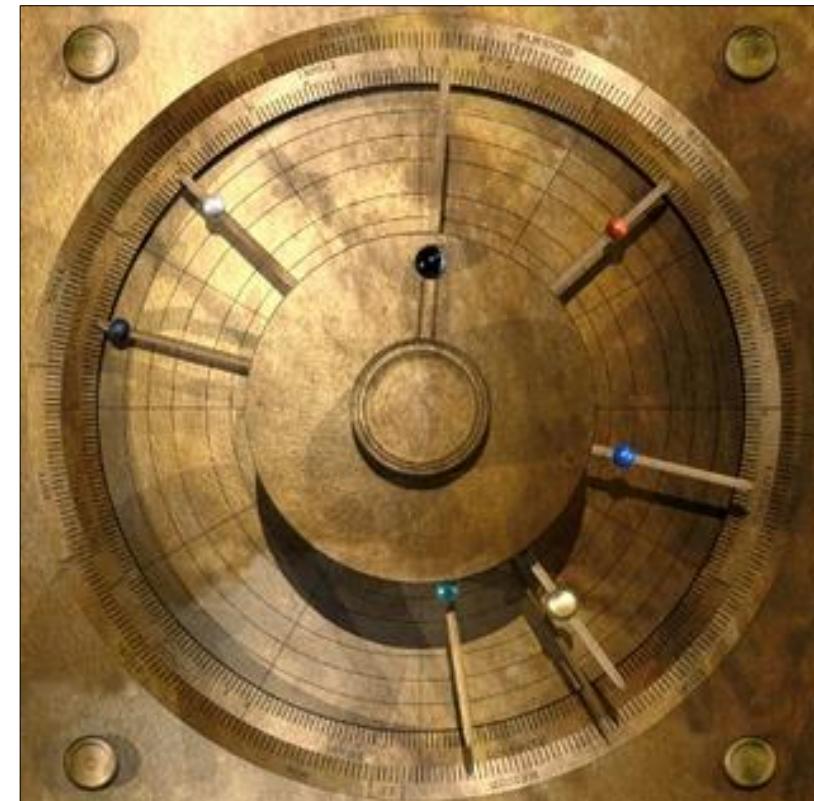
Machines can add



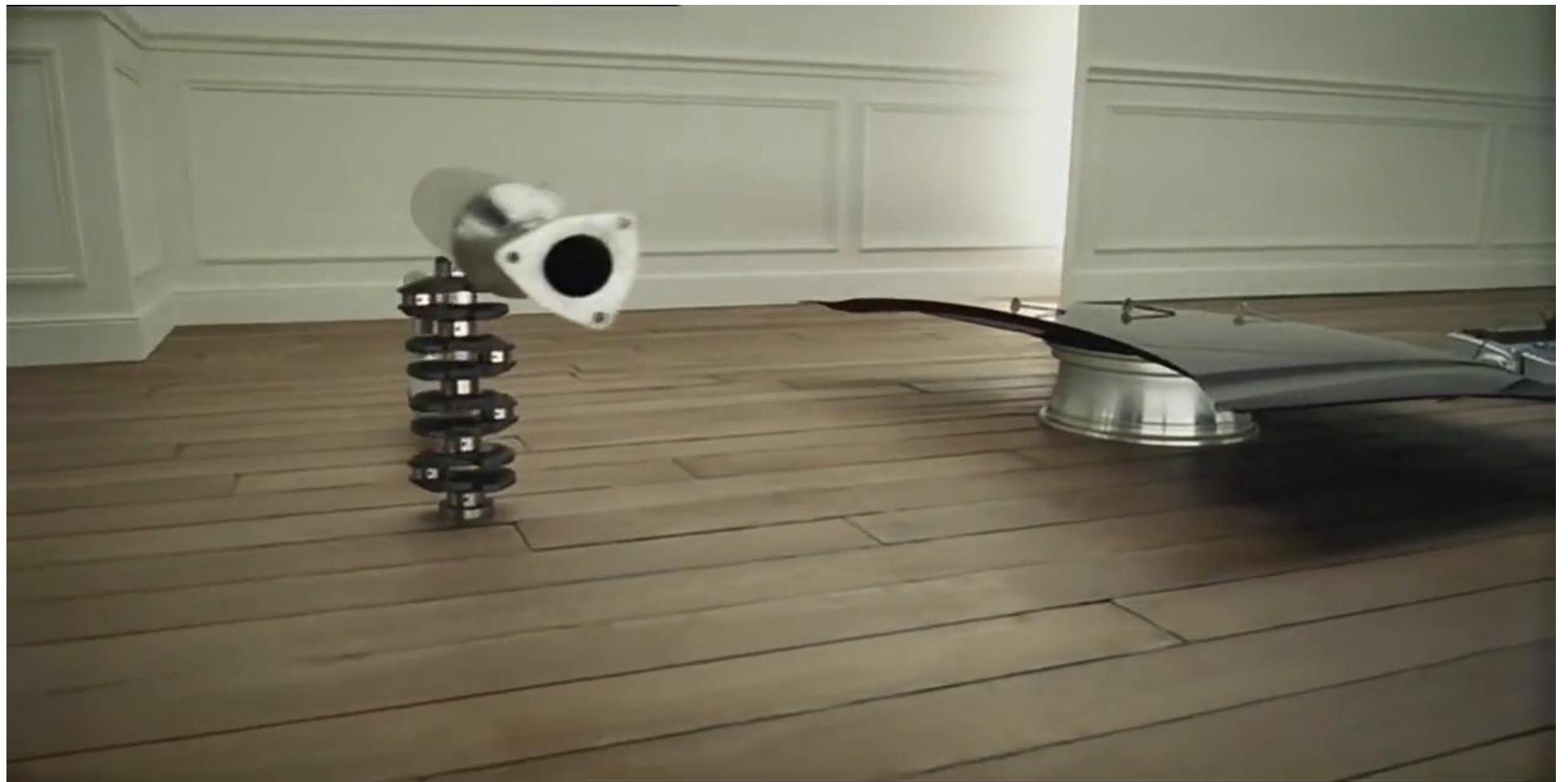
Machines can make decisions



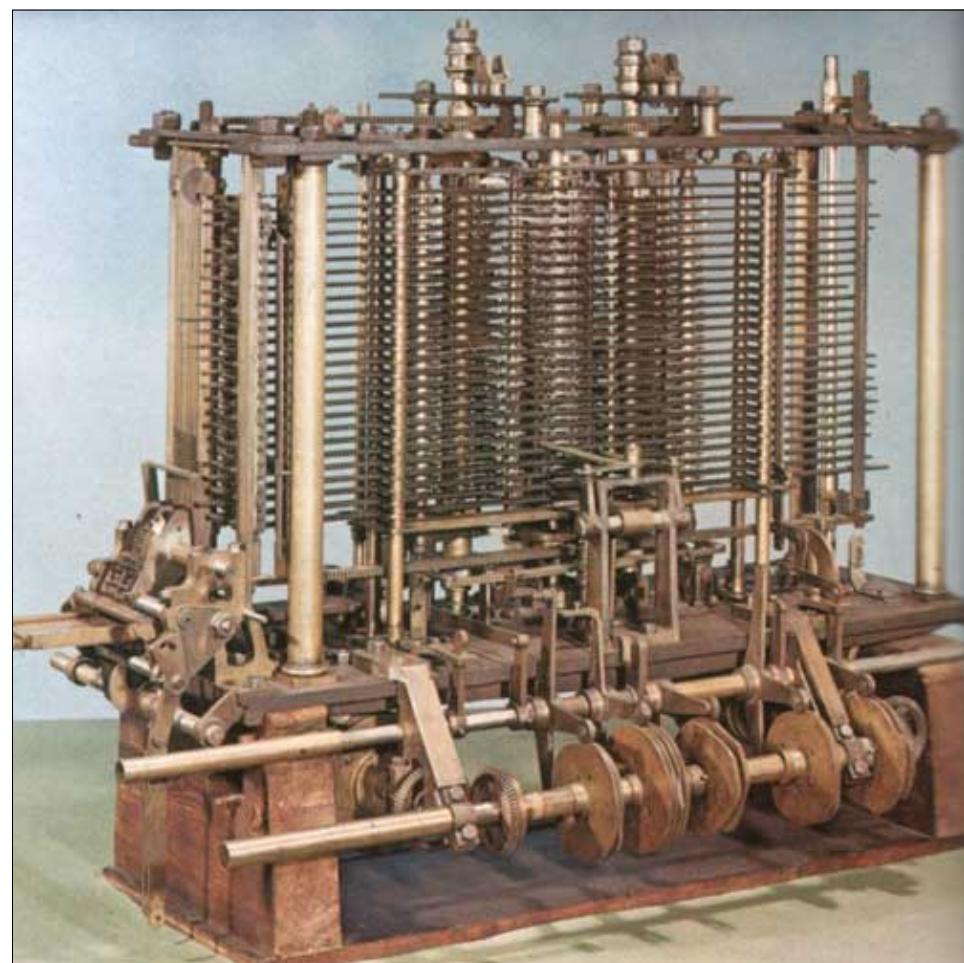
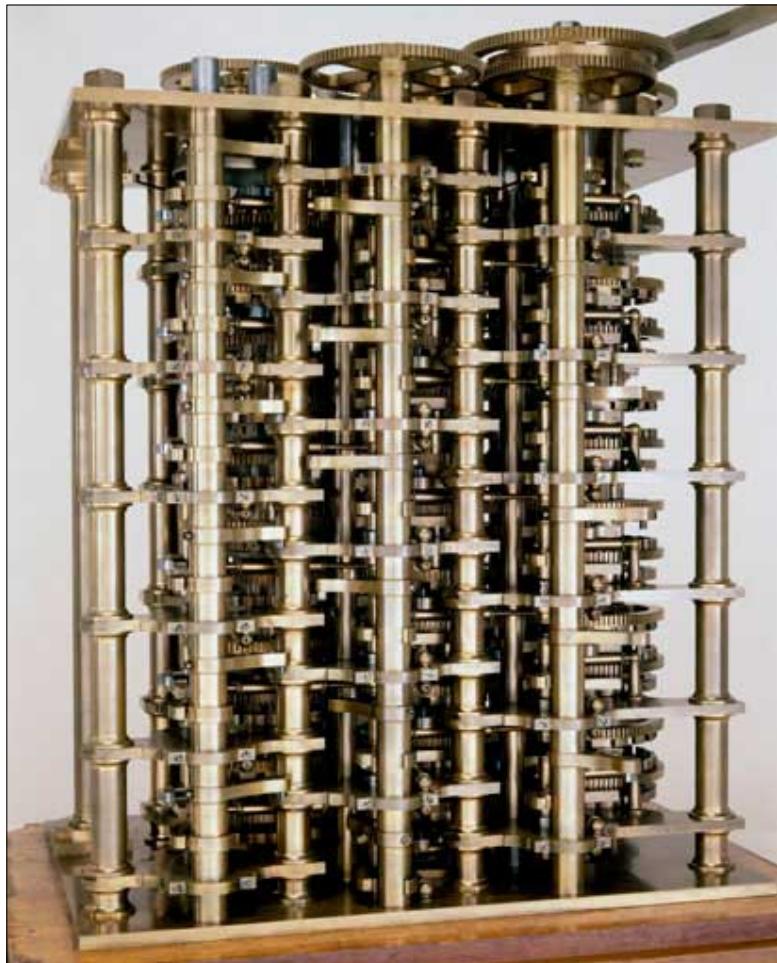
Machines can process information



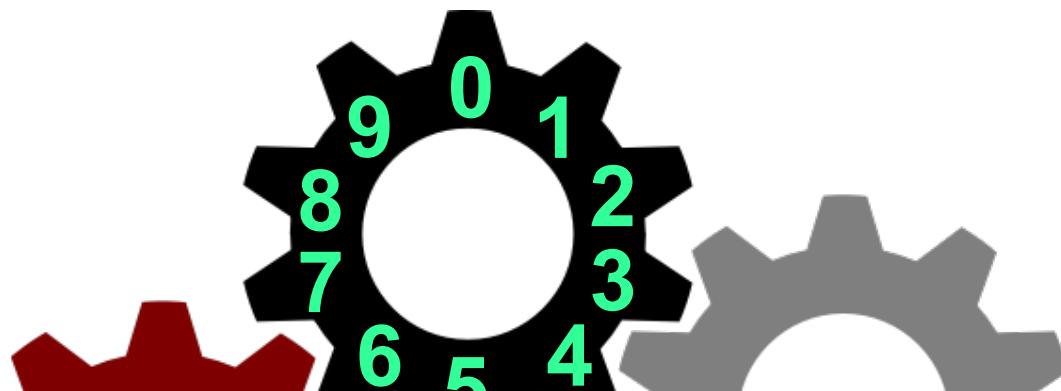
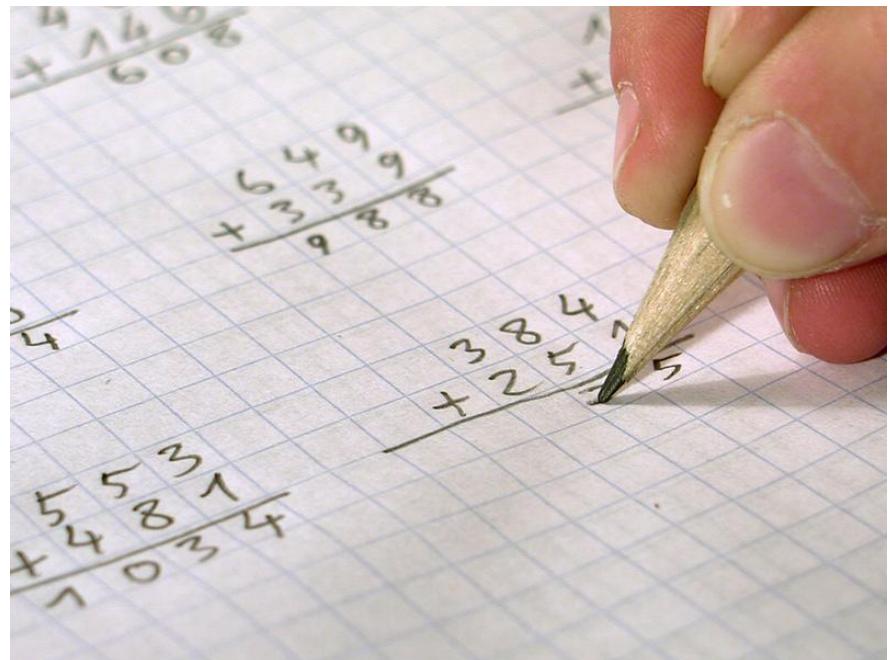
Machines can execute
complex sequences



Machines can execute complex motions (and computations)



Information can have different physical representations



“Computer”

A device which processes information under
the control of a changeable set of instructions.

“Program”

Program

Instructions expressed so as to be
followed by a machine.

Algorithm

Instructions that involve computation for
solving a problem in finite time.

Programs are instructions for machines

Algorithm:

To check if a number A is prime:

For every number B less than A,

Is A / B a whole number?

Then A is not prime.

If no B was found dividing A, A is prime.

Program (Python):

```
def prime(a):  
    for b in range(2,a-1):  
        if a%b==0:  
            return False  
    return True
```

Modern computers

Devices

- Desktops.
- Laptops.
- Tablets.
- Smartphones.
- Music players.
- E-book readers.
- Game consoles.
- Navigation devices.

Tasks

- Surf the Internet.
- Send and receive e-mail.
- Listen to music.
- Read books.
- Prepare documents.
- Play games.
- Navigate.



BIL103E Computer Intro

Contents of the Lecture

- What is a computer?
- Computation & Information.
- Programs.
- Parts of a Computer.
- Operating Systems.

Instructor:

Dr. Damien Jade Duff

djduff@itu.edu.tr

<http://djduff.net/my-schedule/>

Software vs. Hardware

Physical Parts

=

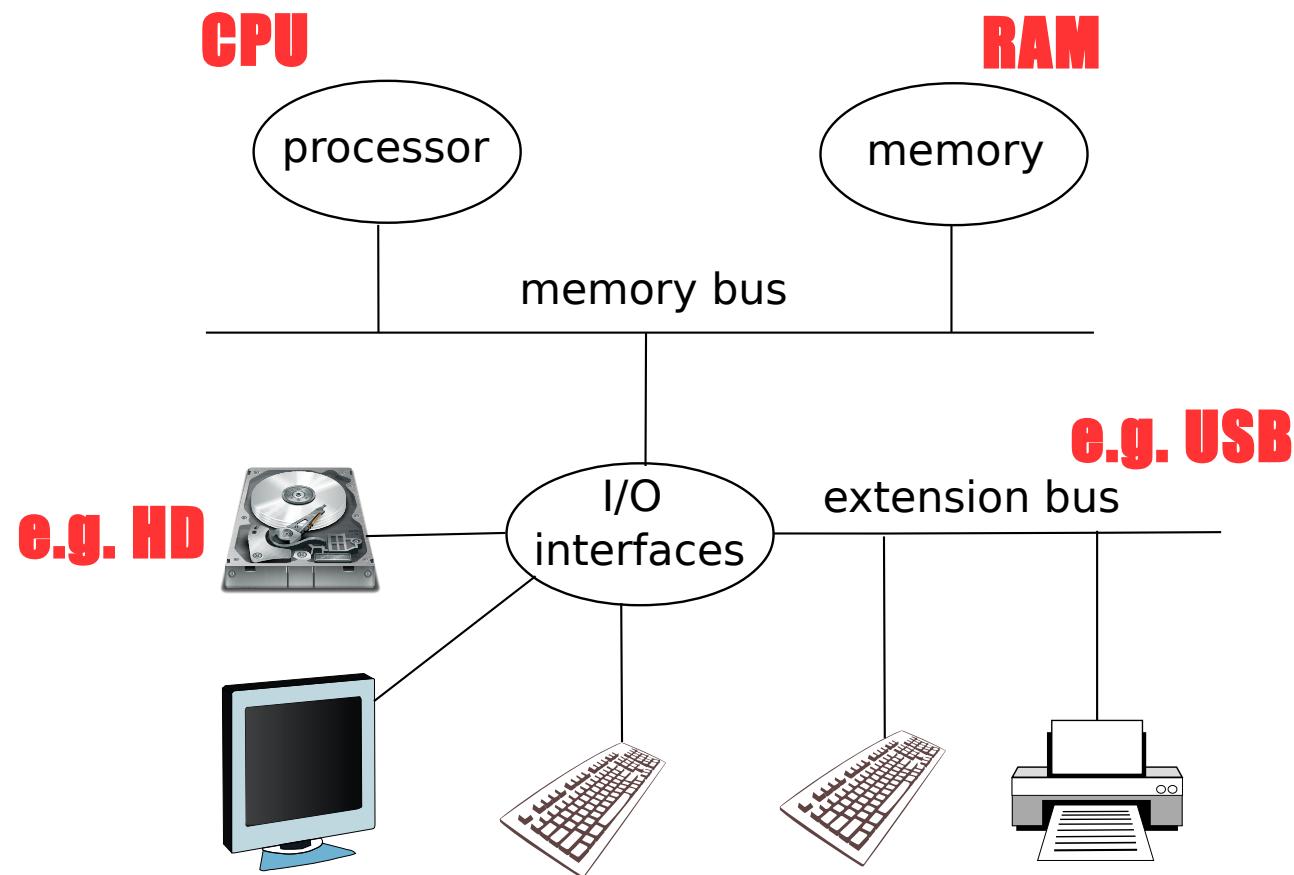
Hardware

Programs

=

Software

Modern PC architecture



Fundamental components

- Processor/CPU.
 - Processes instructions.
- Memory/RAM.
 - Stores running programs & data.
 - Not persistent.
- System bus.

Other components

- Secondary storage:
 - Hard disks.
 - Provide data “persistence”.
- I/O devices:
 - Keyboards, monitors, touch-screens.
- Peripherals:
 - Printers, web cameras.

Loading & Saving Info.

- **Load**: Secondary Storage → Memory.
- **Save**: Memory → Secondary Storage.



BIL103E Computer Intro

Contents of the Lecture

- What is a computer?
- Computation & Information.
- Programs.
- Parts of a Computer.
- Operating Systems.

Instructor:

Dr. Damien Jade Duff

djduff@itu.edu.tr

<http://djduff.net/my-schedule/>

Operating System

- How do programs start?
 - With another program: operating system.
- Software.
- Application/hardware interface.
- Manages resources.

OS: Multitasking

- Running more than one program at a time.
- But only one CPU???
 - Time-sharing: fast switching.

OS: Resource Management

- Programs should
 - Execute instructions at the right time.
 - Processor management.
 - Not interfere with other program memory.
 - Memory management.
 - Not confuse device accesses.
 - I/O management.

OS: Programming Interface

- OS makes it easier to develop applications.
- Hides detail of hardware.
 - 'Abstraction'.

Popular O/Ss

- Unix:
 - Linux.
 - MacOS X.
 - FreeBSD.
 - iOS.
 - Solaris.
 - Android.
- Windows.
 - Desktop.
 - Phone.

Review

- Why do we need an O/S?
- What is multitasking?
- When we “load” information, where does it go?
- What are different ways I can represent the number 2?