Learn Coding

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Table of contents

0.1 Welcome

- Introduction
- Materials

0.2 Plan

1. What is Coding? Why should I learn it?
2. A tour of computers
3. A tour of [online] learning resources
4. A peek at topics

1 What is Coding?

1 2 3 4 5 6

1.1 What is Coding?

1 2 3 4 5 6

A creative activity where computers are instructed directly to perform useful, step-by-step operations.

1.2 Yes, but how?

1 2 3 4 5 6

In music we go from *imagined* sounds to music score to execution (press piano keys, blow air in trumpet, harp on strings) to actual, perceived sounds.

Humans communicate on three levels: natural language, the music score and the execution.

1.3 Methaphorically

1 2 3 4 5 6

- the music score represents the code.
- execution on a specific instrument represents executable code, e.g., file chrome.exe on your computer
- the hearing *experience* represents the changes that take place on your data.

. . .

Coding in some ways is like music composition

1.4 Un-metaphorically...

- an informal language will describe algorithms on paper, on whiteboard etc.
- a formal language, Python or SQL or Markdown, will describe code.
- special interpretation/compilation software will take code and execute it.
- we need to supply *data* and store results.

1.5 Algorithms, by example

the Farenheit temperature in Naples can be obtained by

1. taking the current temperature in Celsius degrees
2. rescale it by $\frac{9}{5}$
3. re-center it by adding 32

1.6 Code

```
my_celsius = int(input('Please enter the current temperature in Naples:'))

my_farenheit = (my_celsius * 9/5) + 32

print(f'Today we have {my_farenheit} Farenheit degrees in Naples')
```

Reading this syntax requires training.

1.7 Implementation: compilation

```
>python -m py_compile my_converter.py -o converter.exe
>converter.exe
>Please enter the temperature in Naples now:
```

file converter.exe is for computers, not humans.

1.8 Implementation: interpretation

```
>python my_converter.py
>Please enter the current temperature in Milan:
```

2 Computers

1 2 3 4 5 6

2.1 Computers

1 2 3 4 5 6

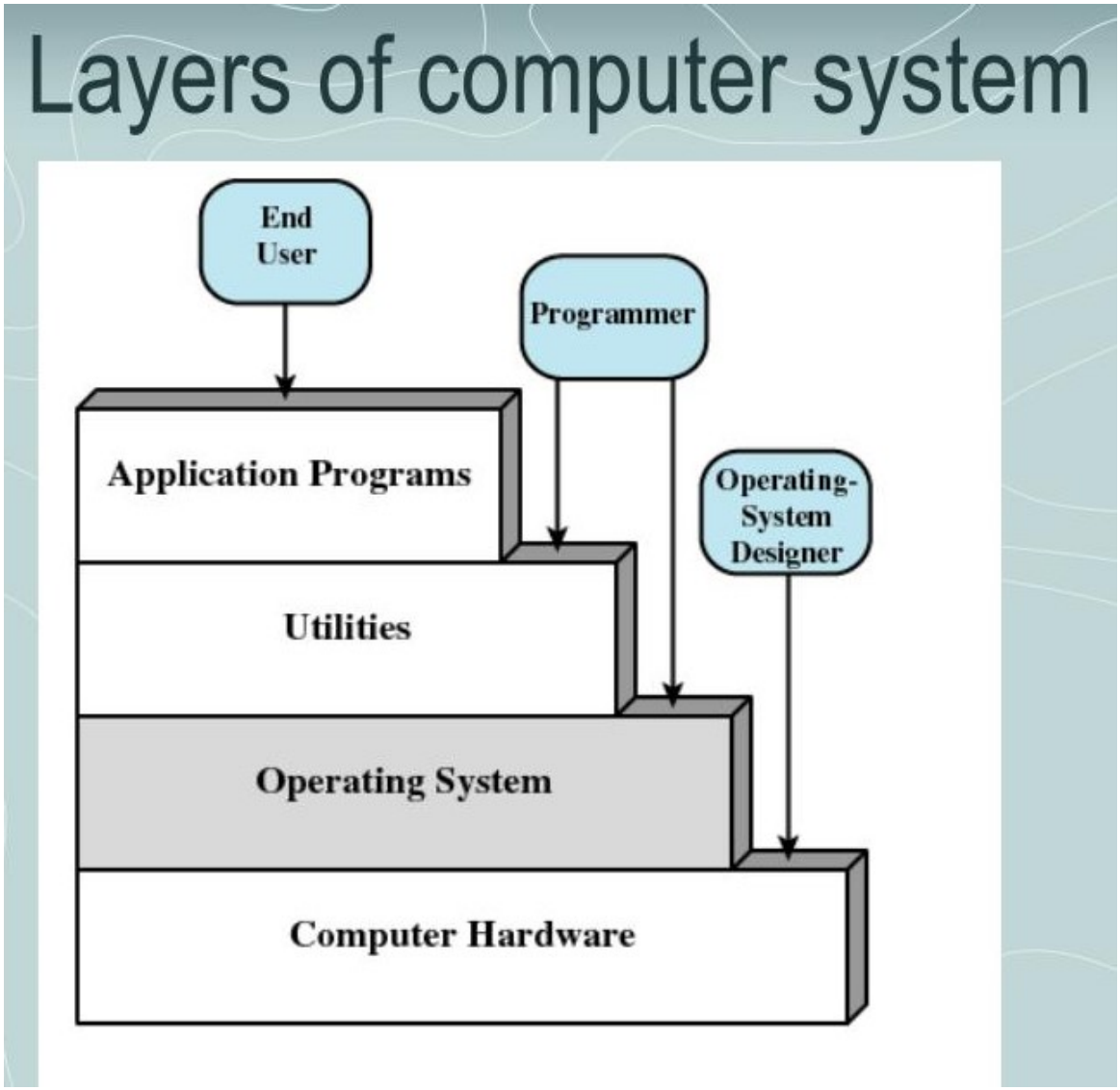
Electronics, networks

Operating system

Software

2.2 Operating Systems

- computers/smartphones come with a pre-loaded set of executable files that create the *operating system environment*
- create an abstract view of the computer: specific hardware details are now trasparent
- special abstraction: **the file system**
- all of them offer basic functionalities for coding
- let's get started with the **file system** and the **command line interface**



2.3 And what's a File?

1 2 3 4 5 6

- computer memory is best seen as a long ribbon where, at different times, we write sequences of bytes, called *files*
- a file is i) a unique name, ii) a memory address inside the compuhardware iii) a sequence of bits, the actual content, iv) ownership information (for later) and v) a format that guides the interpretation of the bits: are they color pixels? Characters? Numbers?

2.4 The File System

1 2 3 4 5 6

- the Os shows files are organised in a hyerachical structure of *manila folders*

- hyerarchy is not about importance. It rather creates *locality*

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2.5 The file system

- a special file, called folder, contains the names and physical addresses of the files within
- each folder contains two special (and secret) files: `.` and `..`
- file `.` contains a reference to the actual positioning of the folder on the memory device
- file `..` contains a reference to the *containing* folder

2.6 The CLI: command-line interface

1 2 3 4 5 6

- iOs: `Terminal`
- Win: `Cmd` or `Powershell` or `Windows terminal`
- Linux/Android: `sh` or `bash`

Structure:

```
>pwd
>dir
>notepad my_converter.py
>cd ..
>dir
>pwd
>notepad my_converter.py
```

2.7 Paths

File must have unique names

No repeated names in the same folder

Ok to repeated names in different folders, how?

absolute path: `C:\Users\ale\git\learn-coding\00-create_platform\my_converter.py`

relative path: `.\my_converter.py`

More relative paths:

```
>pwd
C:\Users\ale\git\learn-coding\10-first_steps
>python ..\00-create_platform\my_converter.py
```