



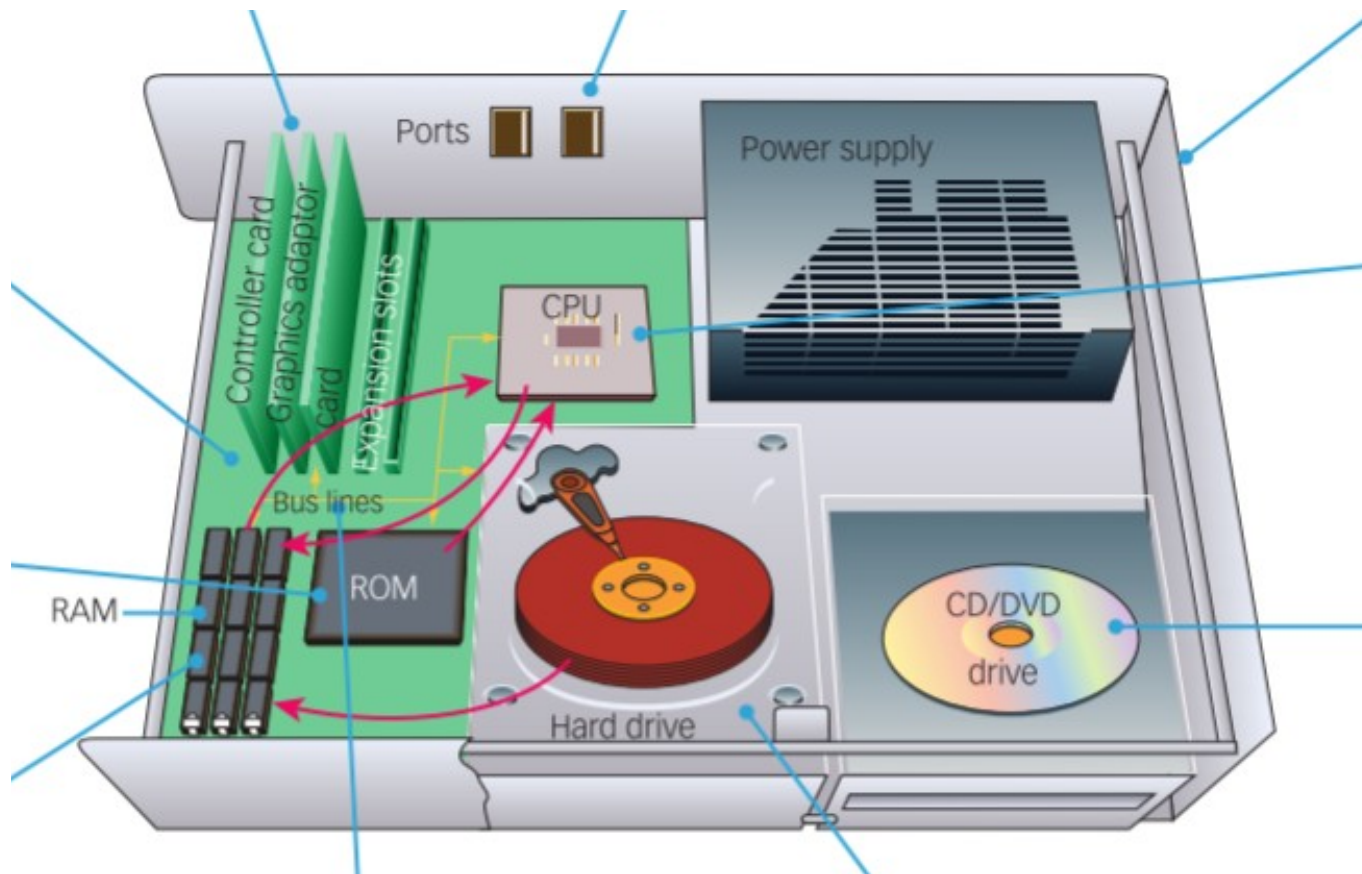
**Day 1**

**Basics**

# What's inside your PC?

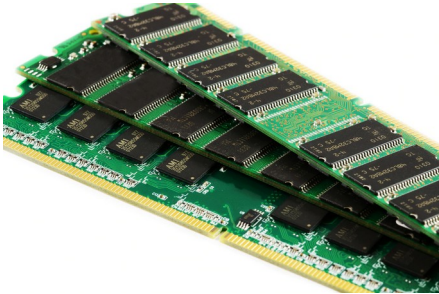


# Simplified





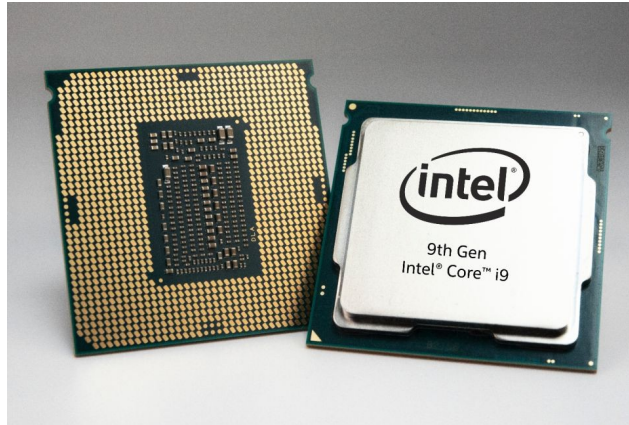
# What does it do?



Stores important information  
Anything that is needed now



Stores information:  
Anything that may be  
needed later



Runs calculations  
Instructs other components

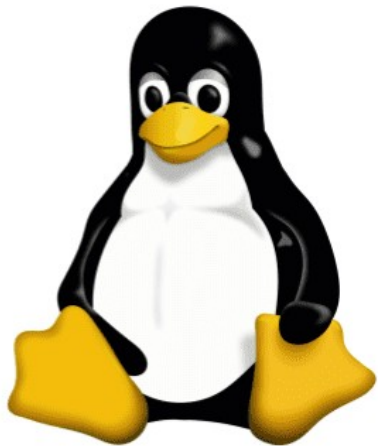


Output to user



Input from user

# Operating Systems





# But all OS's do the same

Manage components

Assign CPU time to programs

Give user an interface: GUI

(Obvious differences in the latter)

# Terminals



```
merlin@mls-pc Beispiel ➤ l 14:54:23
artikel/ artikel3/ artikel6@ artikel.iso artikel.mp4 artikel.ps
artikel2/ artikel4@ artikel.doc artikel.mp3 artikel.png artikel.sh*

merlin@mls-pc Beispiel ➤ cd ~/.oh-my-zsh 14:54:24

merlin@mls-pc .oh-my-zsh ➤ master ✓ touch test 14:54:31

merlin@mls-pc .oh-my-zsh ➤ master ✓ rm test 14:54:38
rm: reguläre leere Datei 'test' entfernen? y

merlin@mls-pc .oh-my-zsh ➤ master ✓ cd plugins/ 14:55:13
cache/ lib/ plugins/ themes/
custom/ log/ templates/ tools/
```

```
PS C:\> Get-Childitem 'MediaCenter\Music' -rec |
>> where < -not $_.PSIsContainer -and $_.Extension -match '.*mp3' > |
>> Measure-Object -property length -sum -min -max -ave
>>

Count      : 1307
Average     : 5491276.09563887
Sum        : 2177097857
Maximum     : 22905267
Minimum     : 3235
Property    : Length

PS C:\> Get-WmiObject CIM_BIOSElement | select biosv*, man*, ser* | Format-List

BIOSVersion : <IOSCPL - 6040000, Ver 1.00PARTIBL>
Manufacturer : TOSHIBA
SerialNumber : M821116H

PS C:\> <[wmiSearcher]@'
>> SELECT * FROM CIM_Job
>> WHERE Priority > 1
>> '().get() | Format-Custom
>>

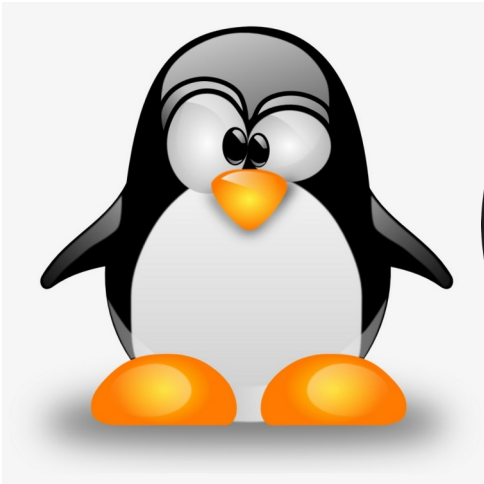
class ManagementObject#root\cimv2\Win32_PrintJob
```

```
Macintosh HD — top — 80x24

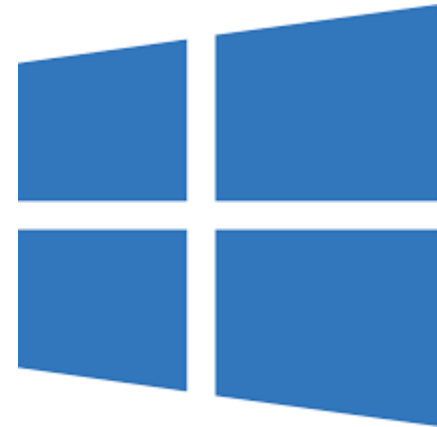
Processes: 210 total, 2 running, 9 stuck, 199 sleeping, 901 threads 23:30:03
Load Avg: 1.40, 1.75, 1.00 CPU usage: 4.15% user, 4.40% sys, 91.44% idle
SharedLibs: 1648K resident, 0B data, 0B linkedit.
MemRegions: 31278 total, 1892M resident, 117M private, 564M shared.
PhysMem: 5893M used (1191M wired), 10G unused.
VM: 523G vsize, 1026M framework vsize, 0(0) swapins, 0(0) swapouts.
Networks: packets: 12105/8925K in, 11907/1964K out.
Disks: 80156/2205M read, 21235/425M written.

PID COMMAND %CPU TIME #TH #WQ #PORT MEM PURG CMPR PGRP PPID
592 screencapt 0.0 00:00.02 7 5 55+ 1952K+ 20K+ 0B 262 262
590 mdworker 0.0 00:00.01 3 0 44 2032K 0B 0B 590 1
589 mdworker 0.0 00:00.01 3 0 44 1572K 0B 0B 589 1
588 top 1.7 00:00.51 1/1 0 22+ 2860K 0B 0B 588 584
584 bash 0.0 00:00.00 1 0 15 588K 0B 0B 584 583
583 login 0.0 00:00.01 3 1 28 1728K 0B 0B 583 482
574 audited 0.0 00:00.00 2 0 25 560K 0B 0B 574 1
567 System Prefs 0.0 00:03.23 3 0 270 39M 8364K 0B 567 1
561 systemstatsd 0.0 00:00.01 2 1 19 1048K 0B 0B 561 1
560 com.apple.We 0.0 00:01.42 9 0 229 25M 0B 0B 560 1
558 com.apple.We 0.0 00:05.07 15 3 224 151M 1716K 0B 558 1
555 bash 0.0 00:00.00 1 0 15 604K 0B 0B 555 554
554 login 0.0 00:00.01 3 1 28 1176K 0B 0B 554 482
550 bash 0.0 00:00.00 1 0 15 608K 0B 0B 550 549
```

# Your terminal



Look for “Terminal”  
Language: Bash (or usually similar)



Look for “Powershell”  
Language: Powershell





# Unix-Like vs Windows

Different file organization

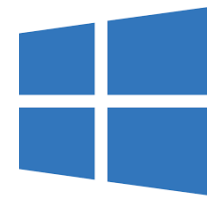
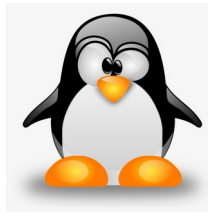
`/home/user/file`

`C:\\User\\folder\\file`

Different language

Bash (1989) is quite popular

Powershell (2006) is a newcomer



Change directories	<code>cd {directory}</code>	Set-Location {directory}, cd
List files in directory	<code>ls</code>	Get-ChildItem, ls, dir
Print current location	<code>pwd</code>	Get-Location
Make a new directory	<code>mkdir {directory}</code>	New-Item -Path '{directory}' -ItemType Directory
Make a new file	<code>touch {file}</code>	New-Item '{file}' -ItemType File
Copy a file	<code>cp {file} {copy}</code>	Copy-Item {file} {copy}
Remove an item (Be <b>very</b> careful!)	<code>rm {file}</code>	Remove-Item {file}
Move/Rename a file	<code>mv {old} {new}</code>	Move-Item {old} {new}



# Try it out!

- Navigate around your file system
- Make some files, move them around, delete them
- Please don't delete anything else! ;)
- Congratulations! You are writing code.



# Starting out Python

- Python is a language, just like Bash
- There are different ways of using it
- Use the Python command (OS-dependent) to get to the interactive shell
- Type in “ `print('Hello world!')` ”
- Congratulations! You just wrote Python code.





# The Interactive Shell

- + Quick
- + Easy
- Have to keep track of things
- No saving your code



# Scripts

Good for *serious* programming

You save your script

Once script is done running, clean exit



# Running a script

{Python} script.py will run the script

Executes line after line

*Prints* output to terminal

# Editors

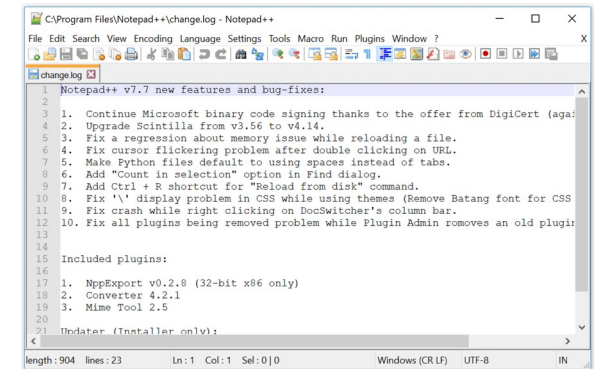
Are just tools to write text

Plain text

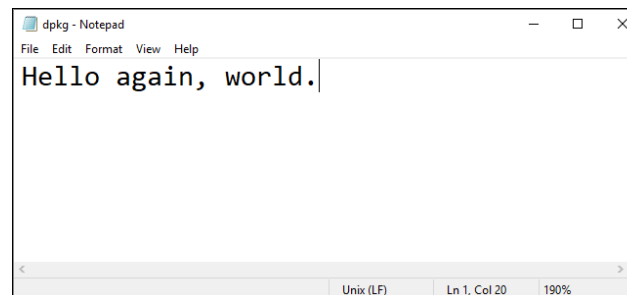
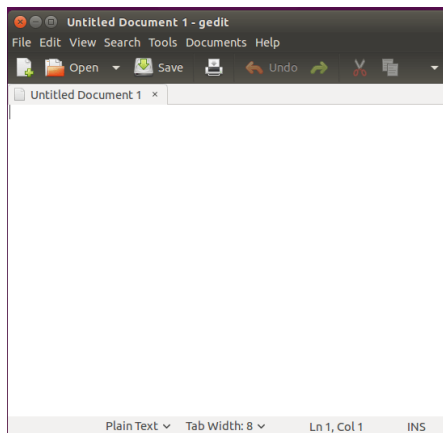
Often highlighting for language

Notepad (Windows)

Gedit or any of hundreds in Linux



A screenshot of the Notepad++ v7.7.0 application window. The title bar reads "C:\Program Files\Notepad++\change.log - Notepad++". The menu bar includes File, Edit, Search, View, Encoding, Language, Settings, Tools, Macro, Run, Plugins, Window, and Help. The toolbar contains various icons for file operations and editing. The main text area displays a list of updates under the heading "Notepad++ v7.7 new features and bug-fixes:". The list includes items like "Continue Microsoft binary code signing thanks to the offer from DigiCert", "Upgrade Scintilla from v3.56 to v4.14", and "Fix a regression about memory issue while reloading a file". It also lists "Included plugins:" such as "NppExport v0.2.8 (32-bit x86 only)" and "Converter 4.2.1". The status bar at the bottom shows "length: 904 lines: 23 Ln: 1 Col: 1 Sel: 0|0 Windows (CR LF) UTF-8 IN".





# IDEs

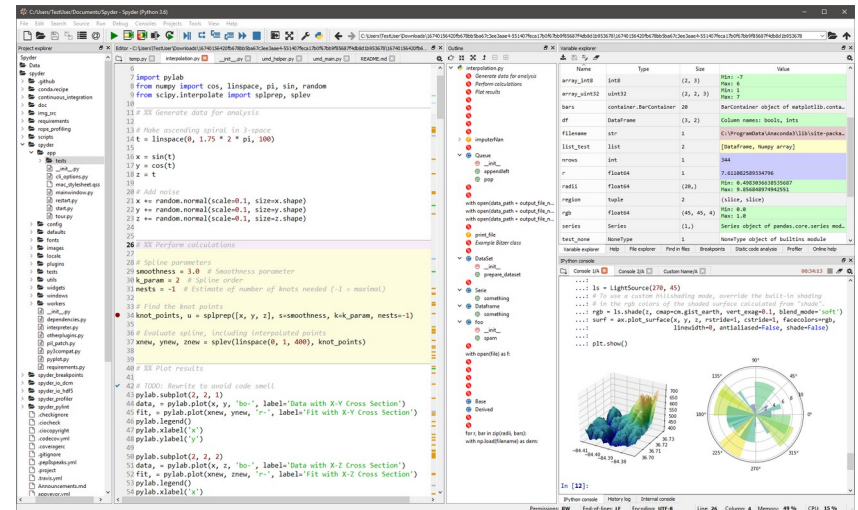
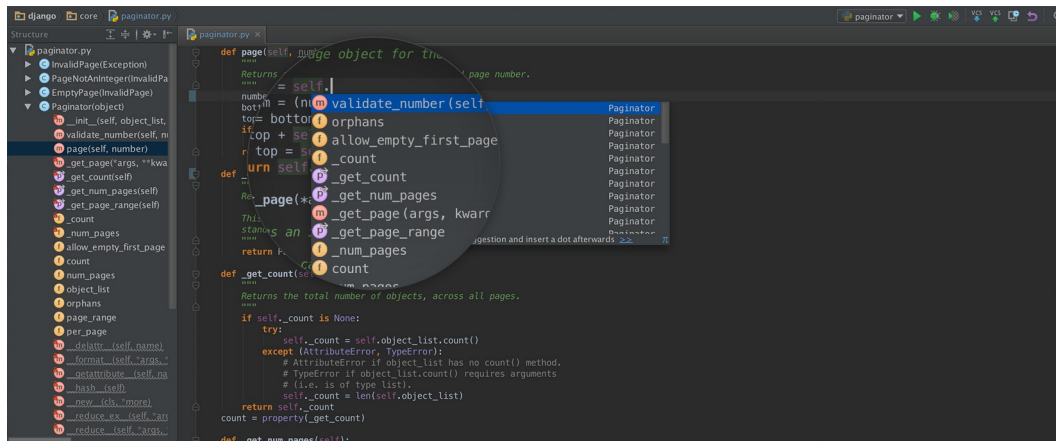
(Integrated Development Environments)

Basically an Editor with more features

Syntax highlighting

Code feedback

Often finds Errors





# Your choice

Try out a few IDEs or editors.  
Which do **you** like best?

A few suggestions:

IDEs: Spyder, PyCharm, VSCode,  
Ninja

Editors: Notepad++ (Windows),  
Geany (Linux), Vim