# INTRODUCTION TO SOFTWARE BUSINESS PRODUCT MANAGEMENT

**Week 2 Day 1**

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for

Oakland University

# PREVIOUS SESSION QUESTIONS

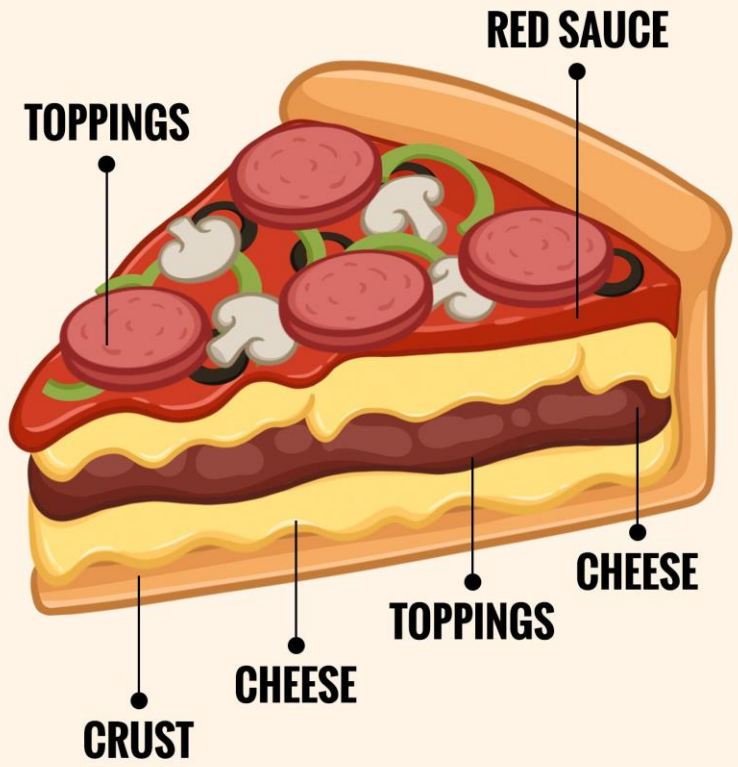
# TERMS TO LISTEN FOR

- Cache
  - A small portion of RAM set aside for temporary storage for frequently accessed data
- Process Register
  - A quickly accessible location available to a computer processor
- Heap & Stack
  - Memory management methods

# APPLICATIONS & OPERATING SYSTEMS

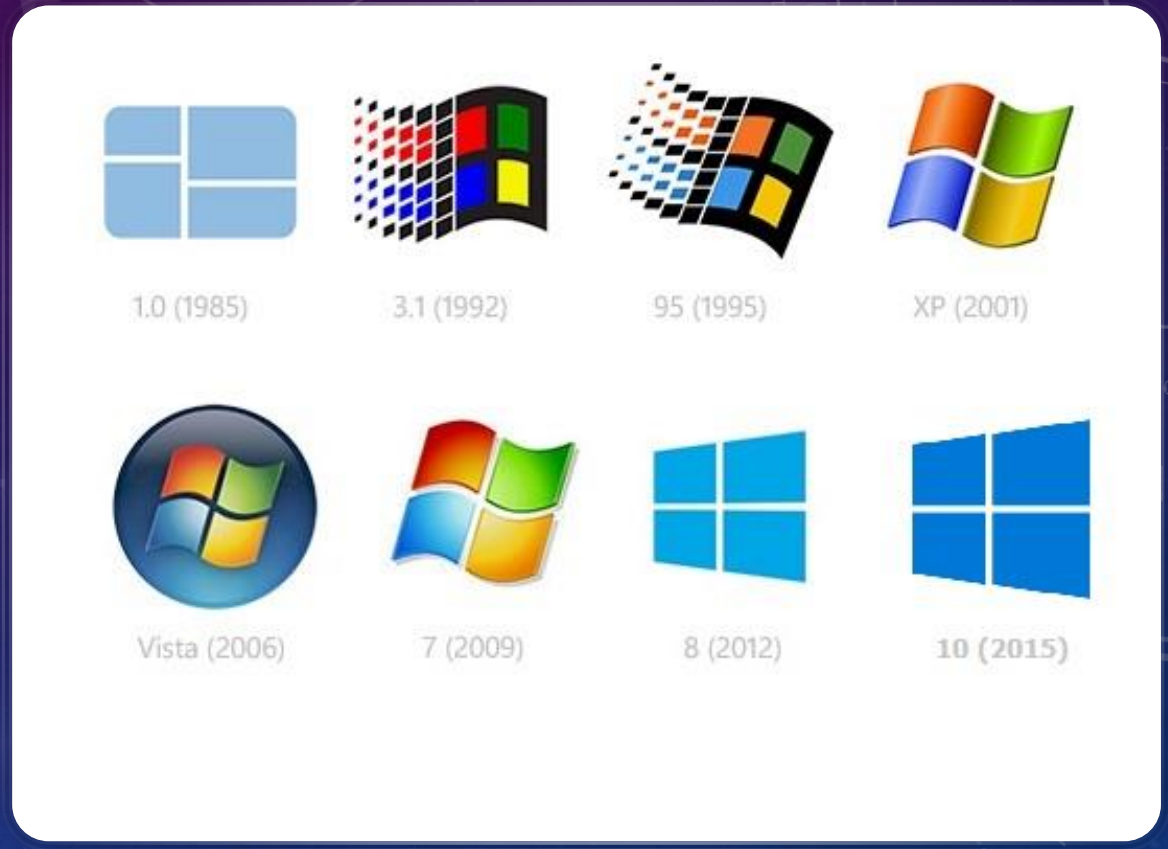
# OPERATING SYSTEMS OVERVIEW

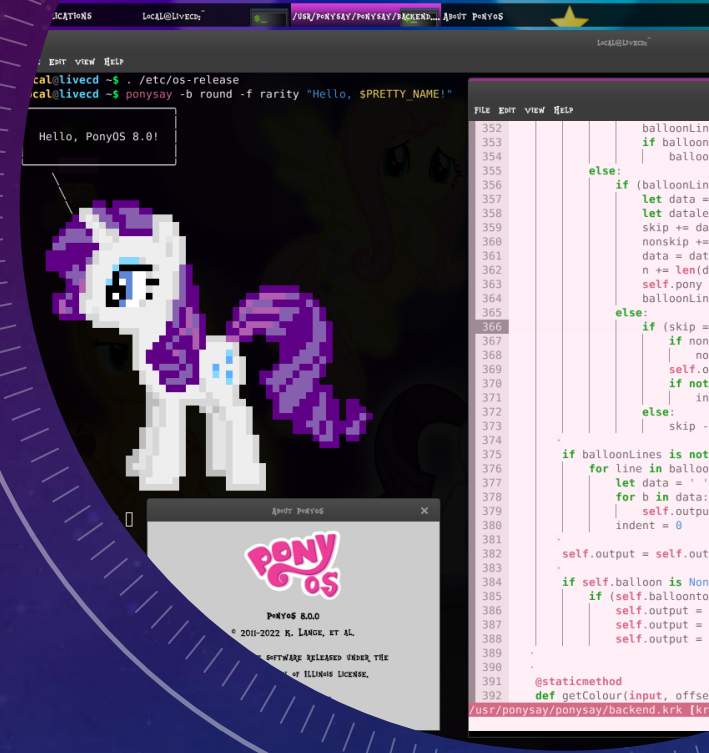
# DEEP DISH PIZZA



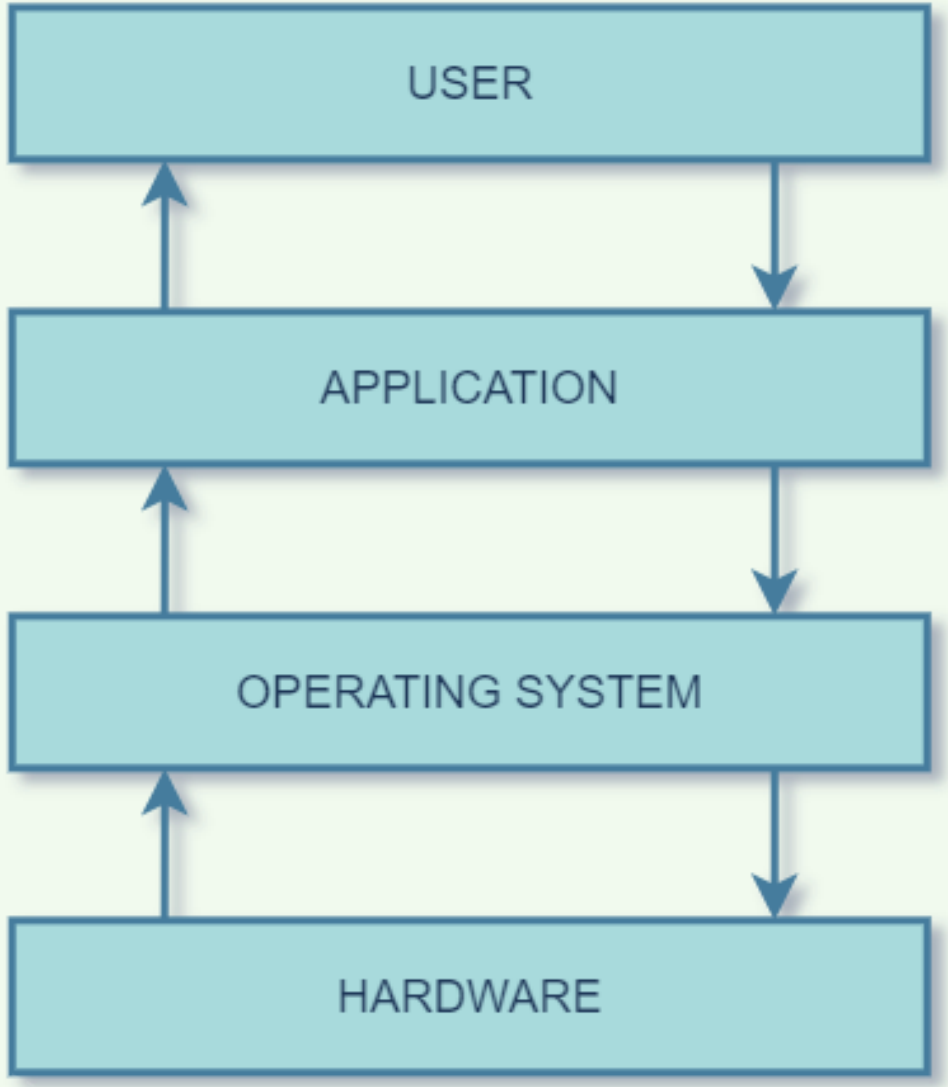
# WELL-KNOWN OPERATING SYSTEMS

# OLD & OUT OF SUPPORT WINDOWS VERSIONS

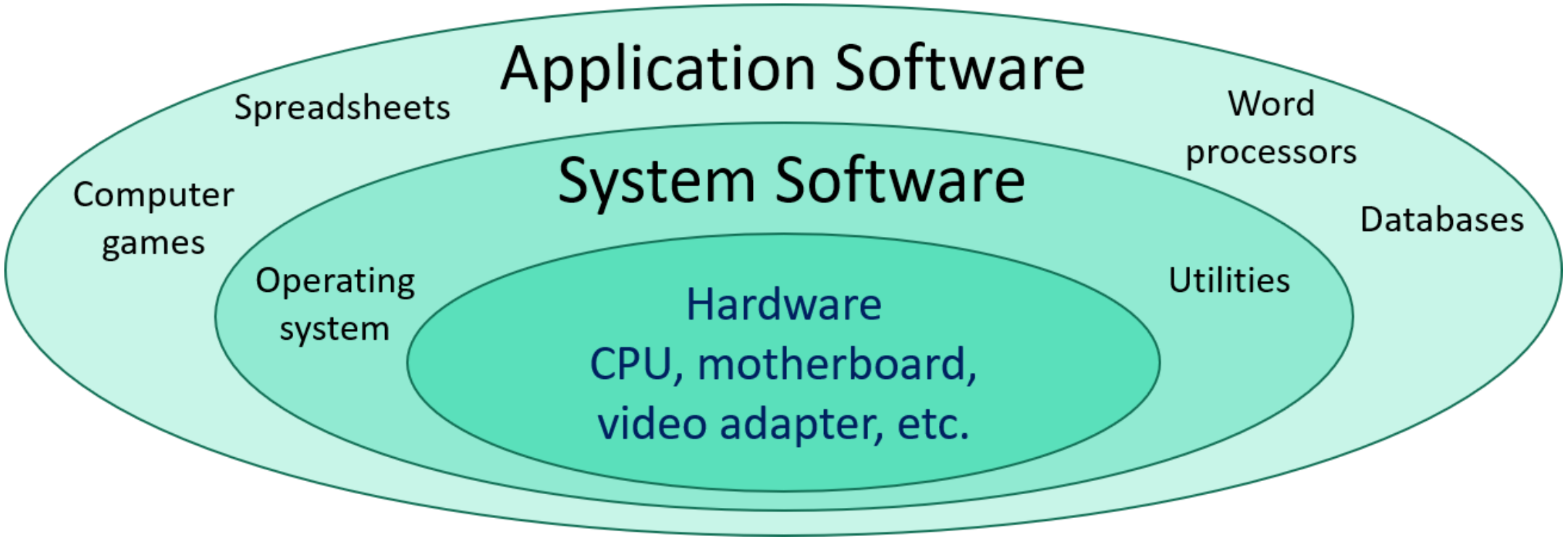




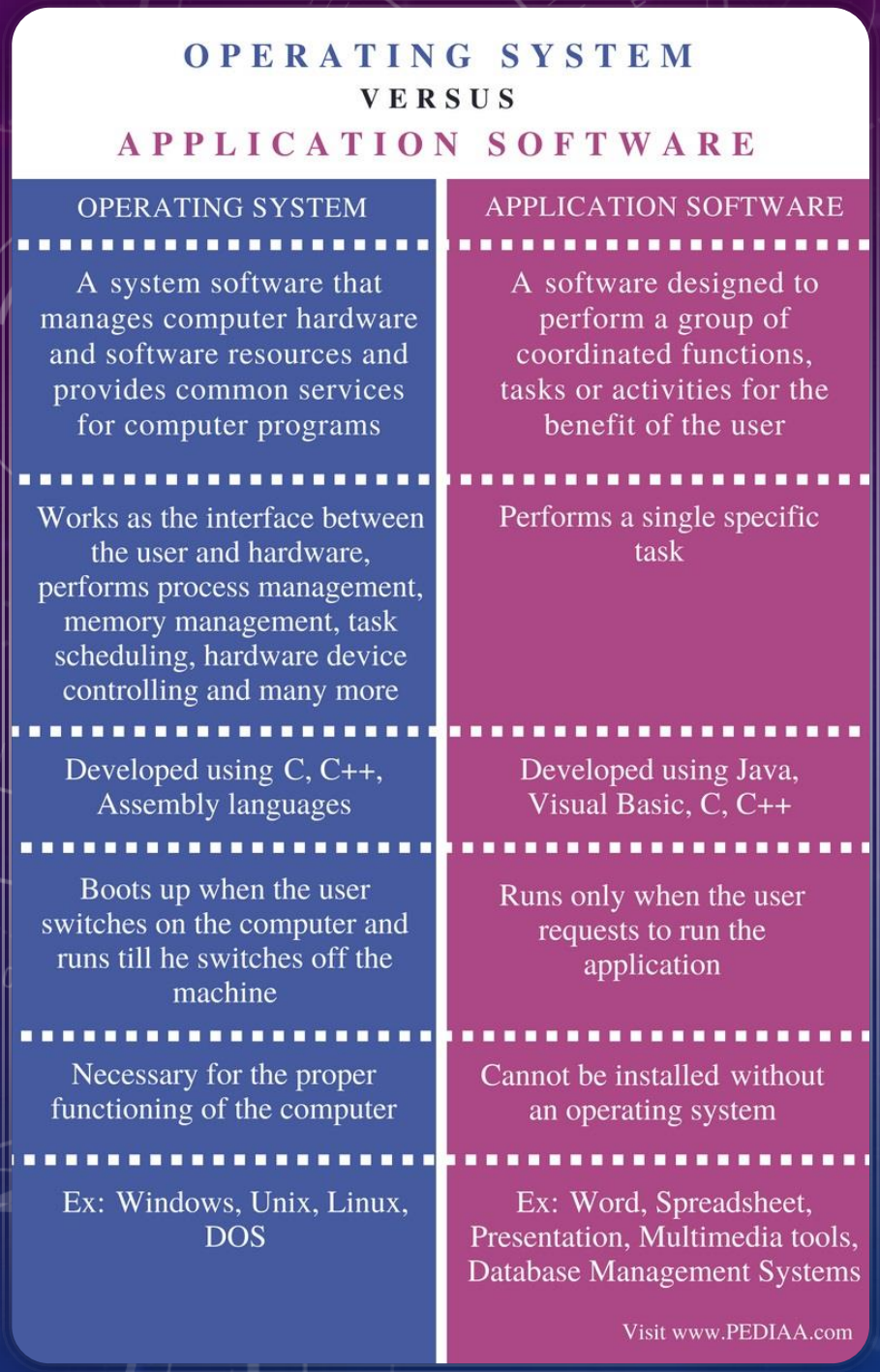
# FUNNY LINUX VARIANTS




# OPERATING SYSTEMS VS APPLICATIONS


Application Software
Spreadsheets
Word processors
Computer games
System Software
Databases
Operating system
Utilities
Hardware
CPU, motherboard, video adapter, etc.

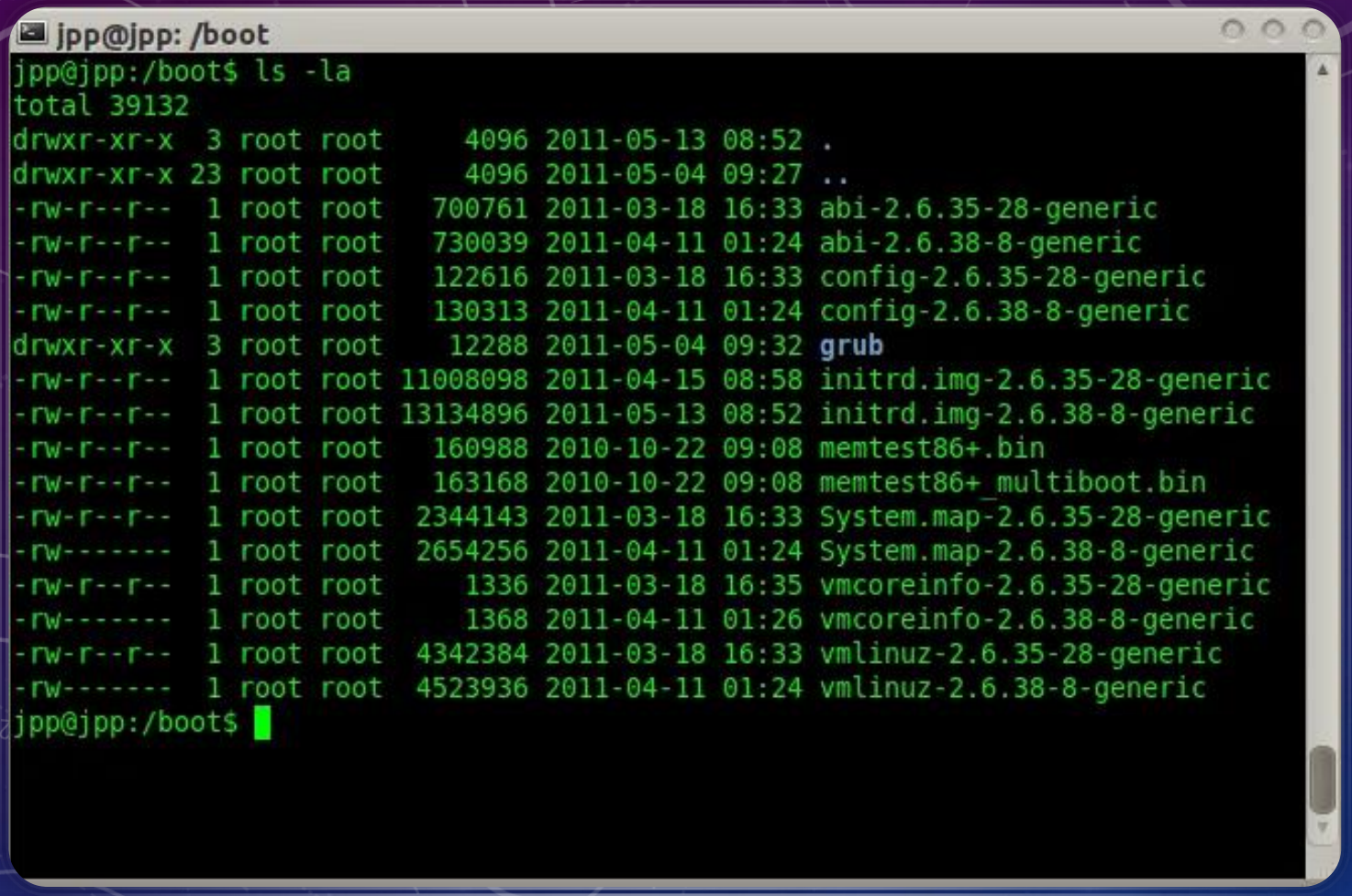
# OS & APP DIFFERENCES



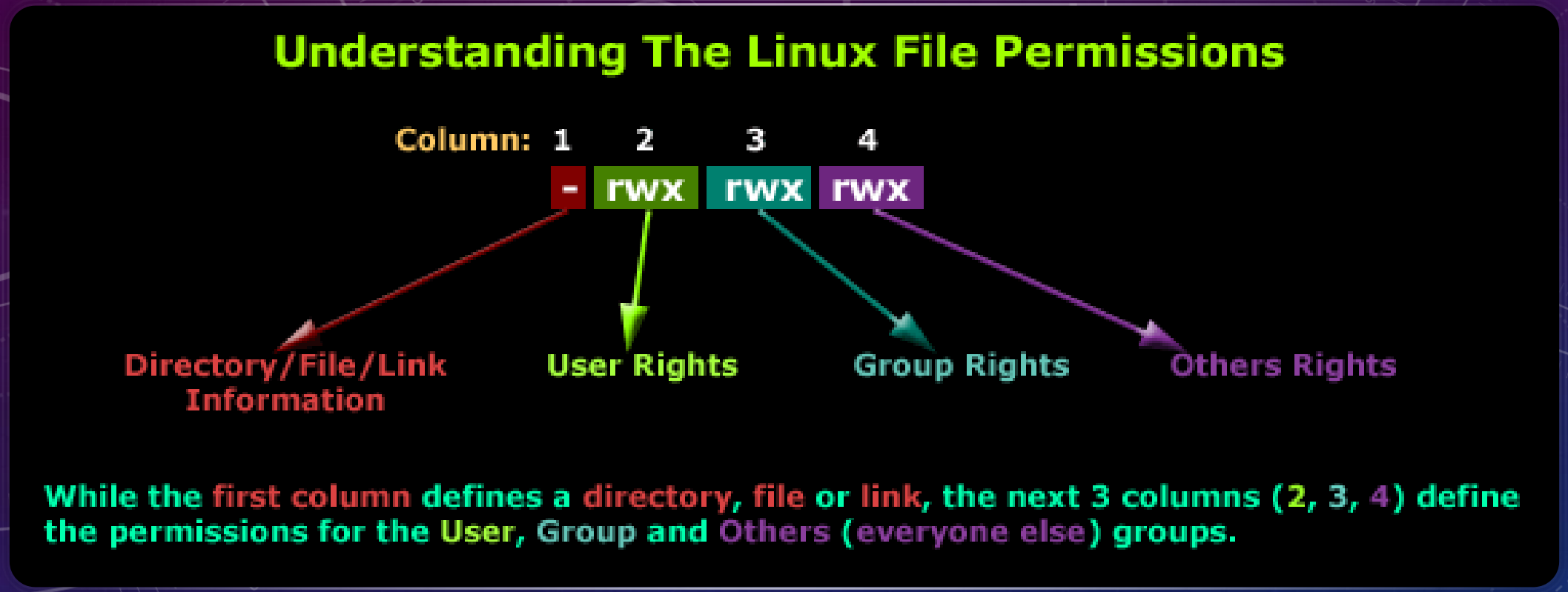
# PERMISSIONS

# WHAT DO PERMISSIONS DO?

- Allow read, write, and execute permissions for files and folders
- Can be changed with those who have rights to change file and folder permissions levels
- Can be customized for users, groups, and “others”

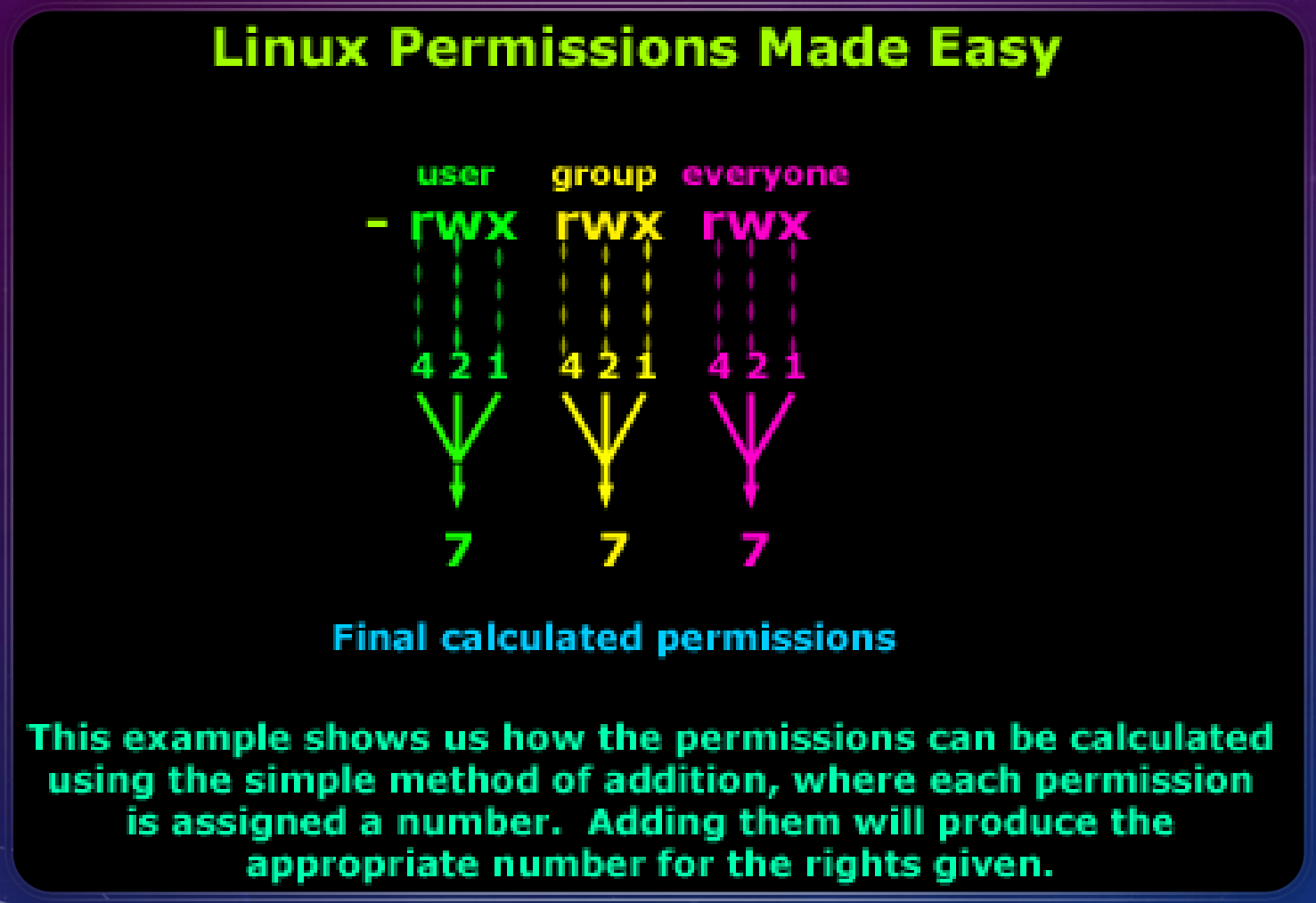


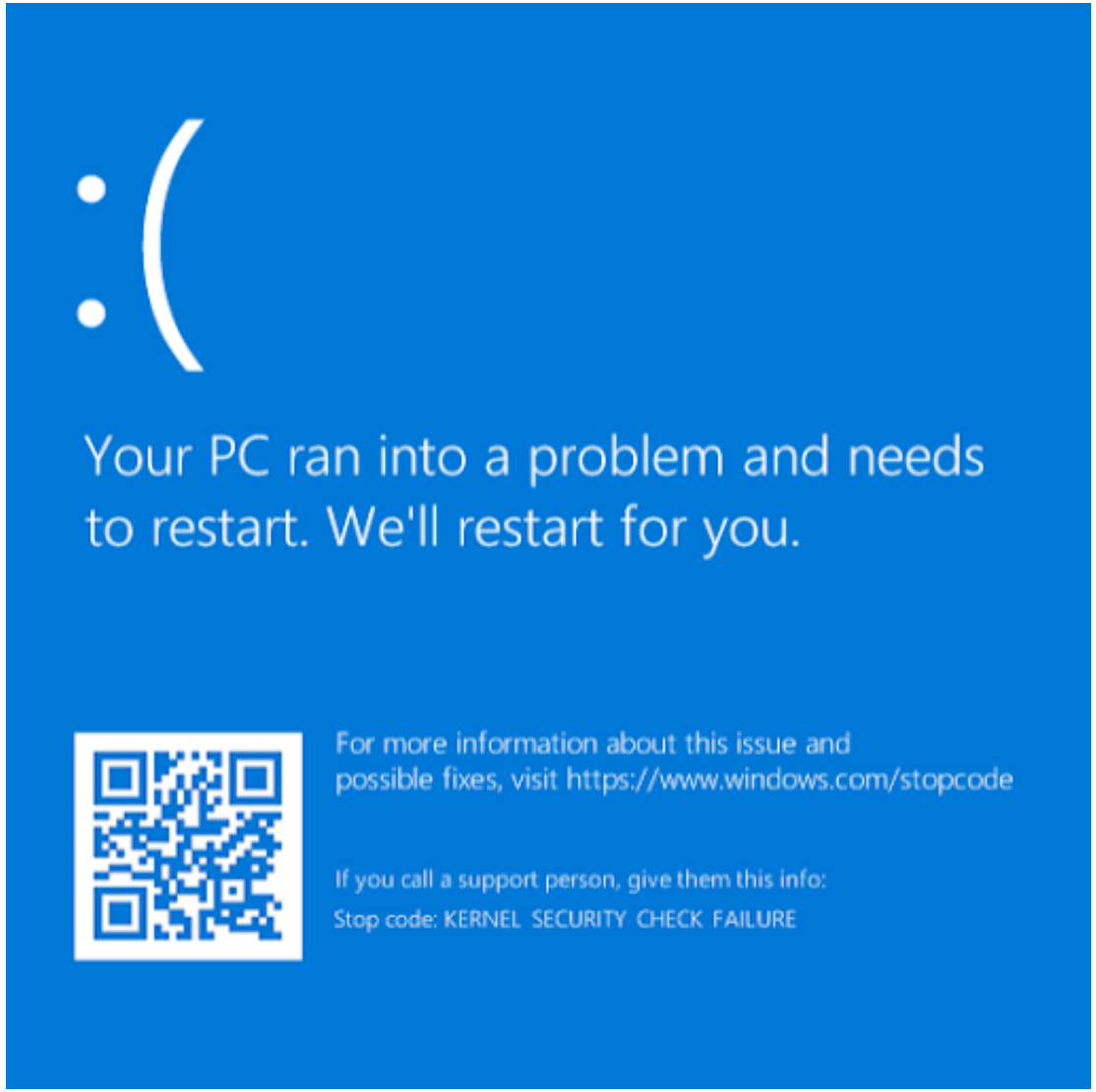

# LINUX PERMISSIONS IN PRACTICE



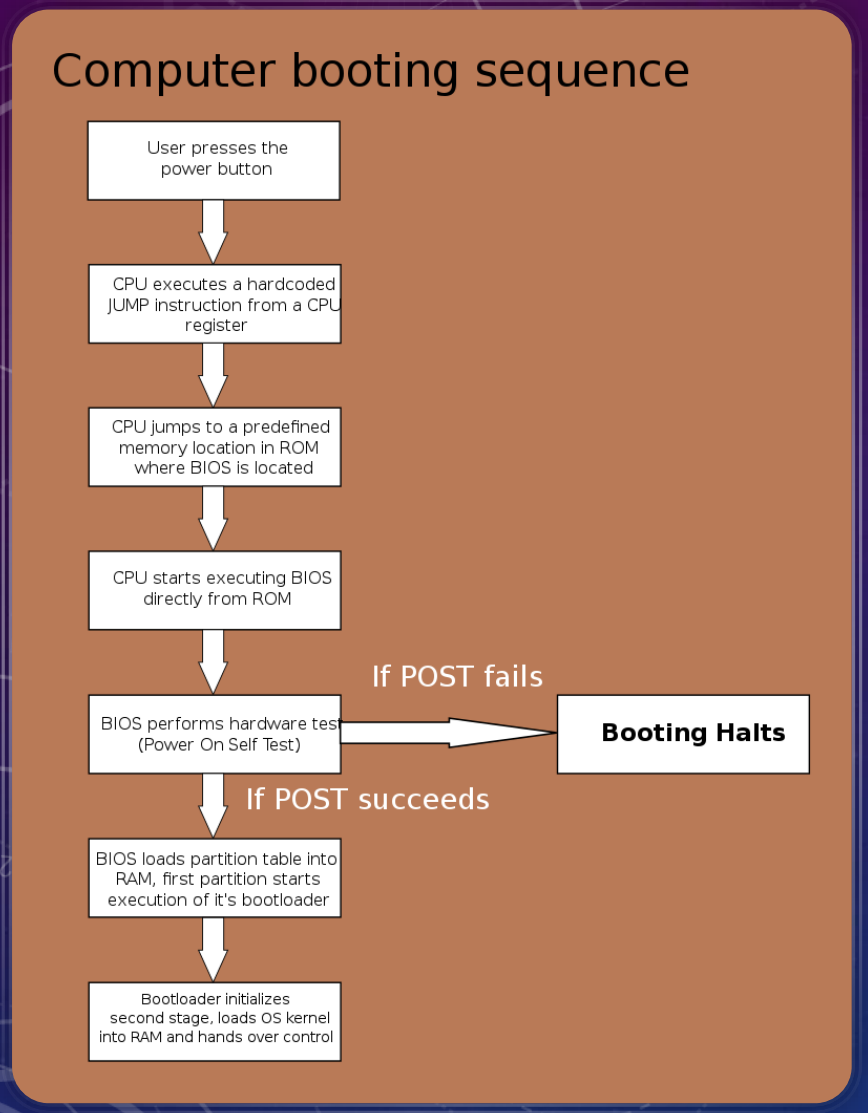

# UNDERSTANDING PERMISSIONS

# LINUX PERMISSIONS

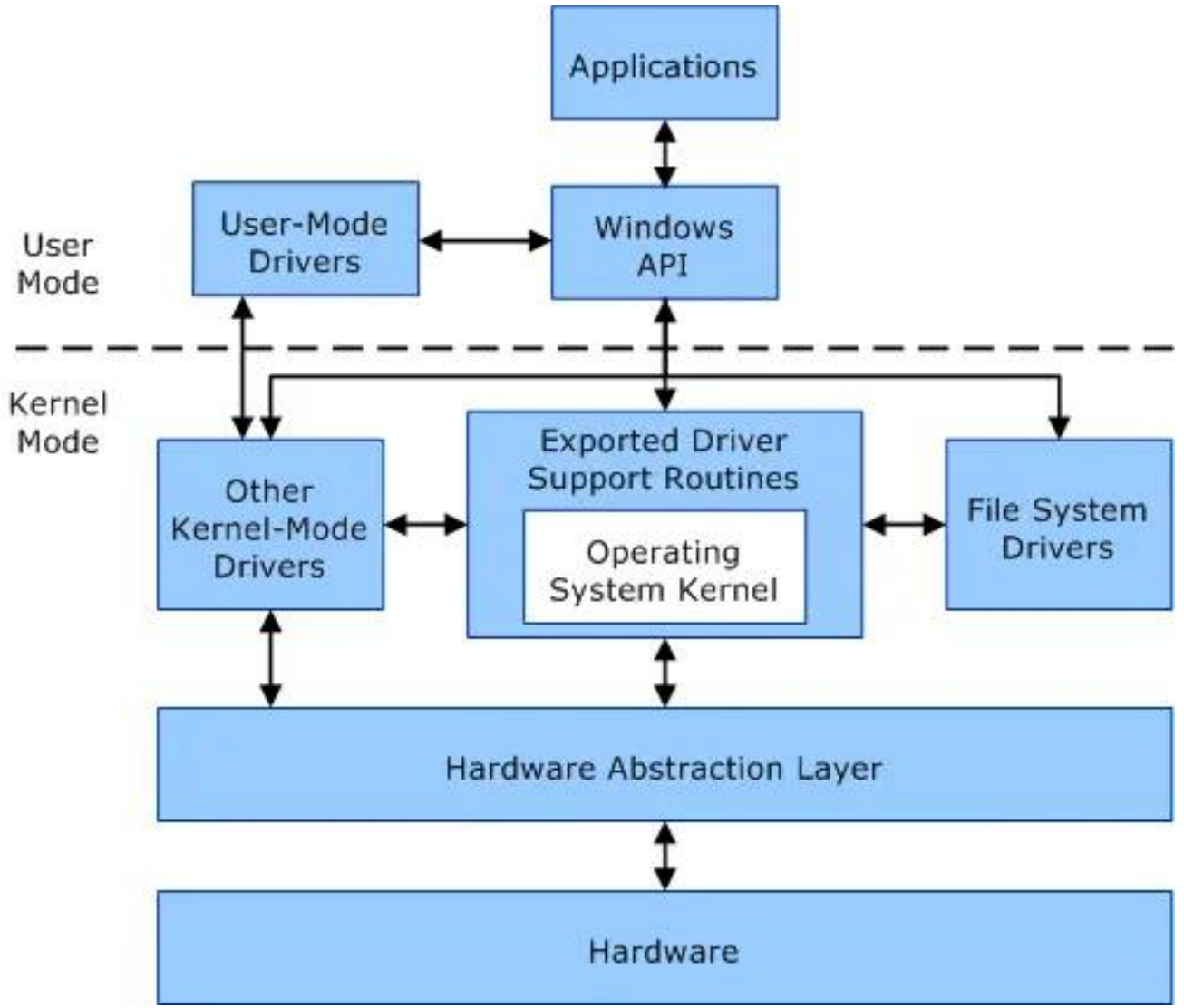


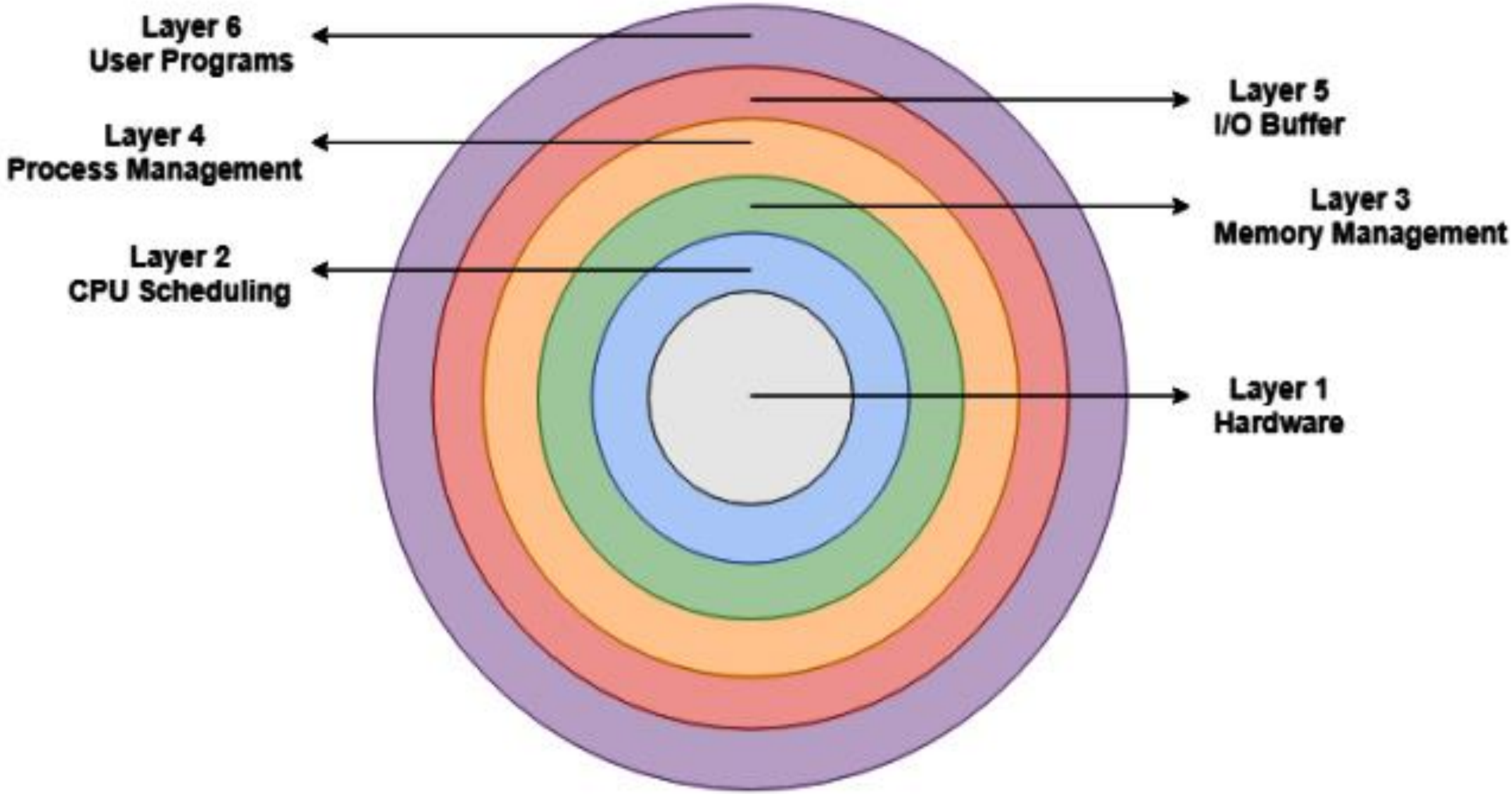

:(
Your PC ran into a problem and needs to restart. We'll restart for you.
For more information about this issue and possible fixes, visit https://www.windows.com/stopcode
If you call a support person, give them this info:
Stop code: KERNEL SECURITY CHECK FAILURE

# POWER-ON SELF-TEST (POST)

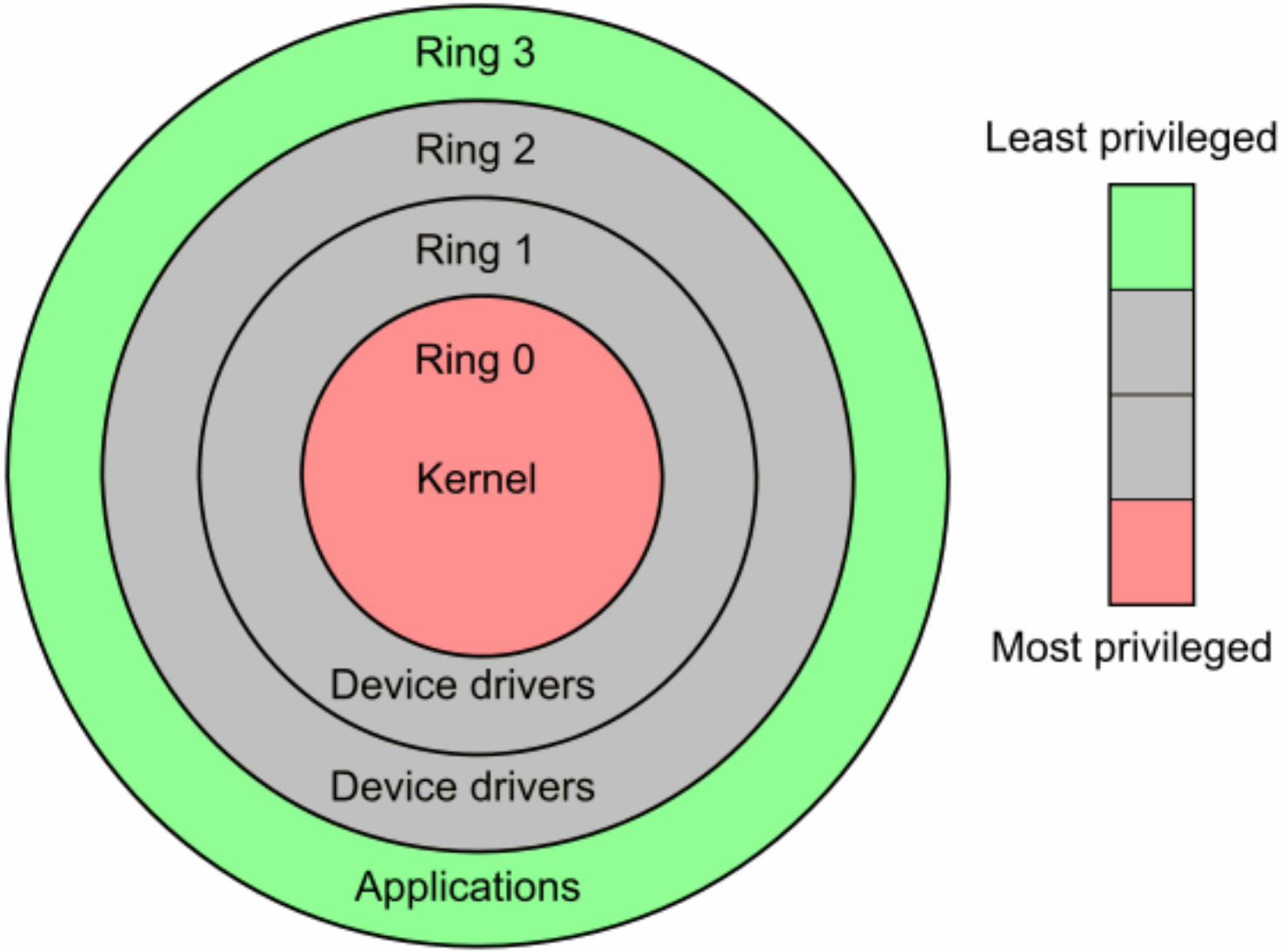


# THE KERNEL

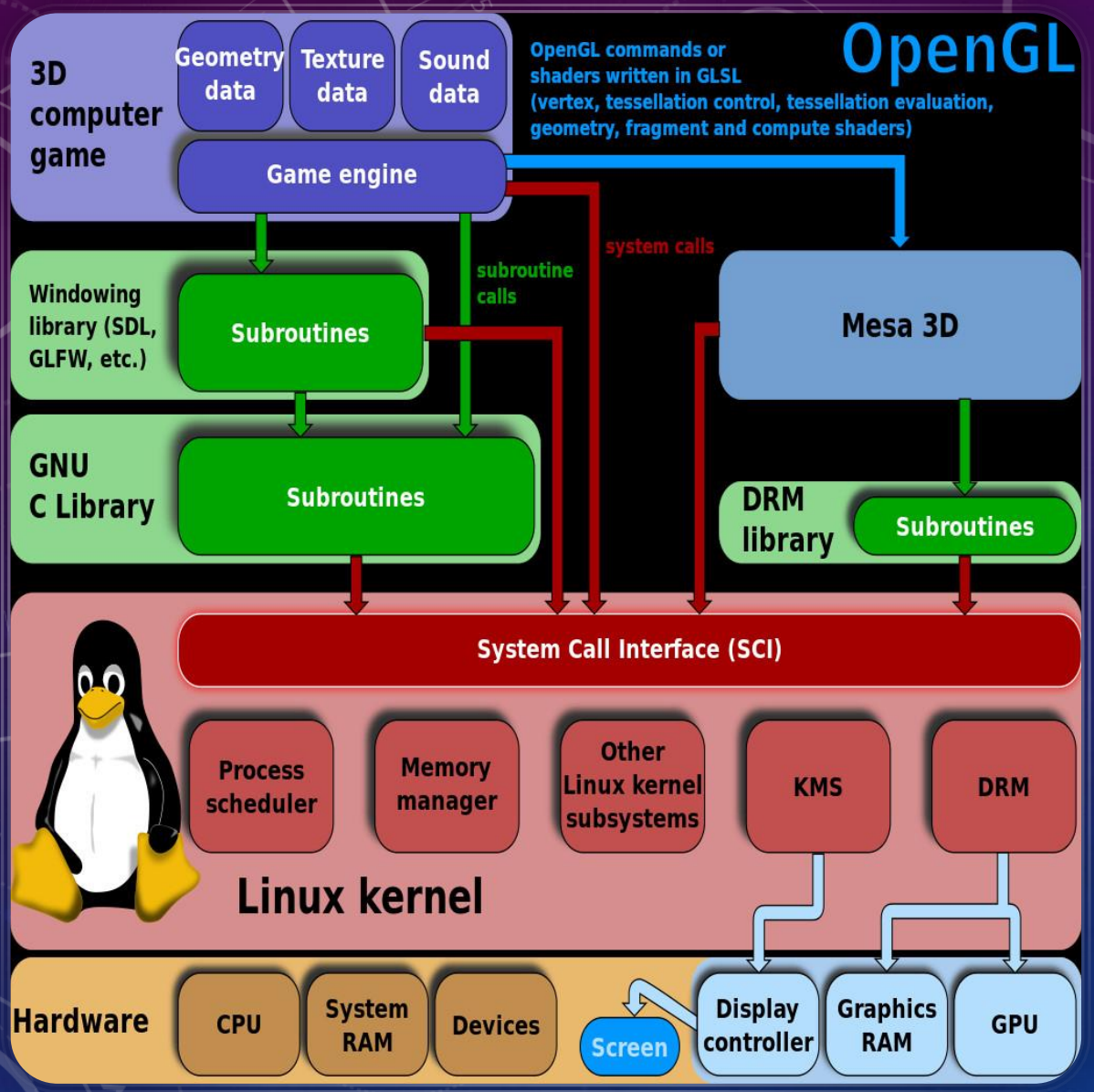

Applications
User-Mode Drivers
Windows API
User Mode
Kernel Mode
Other Kernel-Mode Drivers
Exported Driver Support Routines
Operating System Kernel
File System Drivers
Hardware Abstraction Layer
Hardware



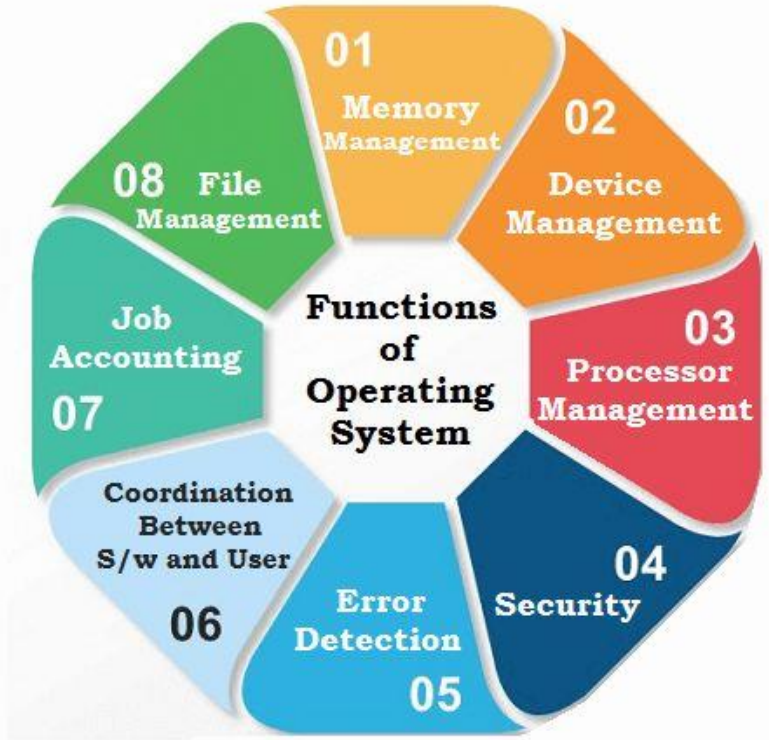

Layers of operating system


Ring 3
Ring 2
Ring 1
Ring 0
Kernel
Device drivers
Device drivers
Applications
Least privileged
Most privileged

# KERNEL OPERATION



# OPERATING SYSTEM SUPPORT



# 10 MINUTE BREAK

# APPLICATIONS

# TYPES OF APPLICATIONS

Mobile applications

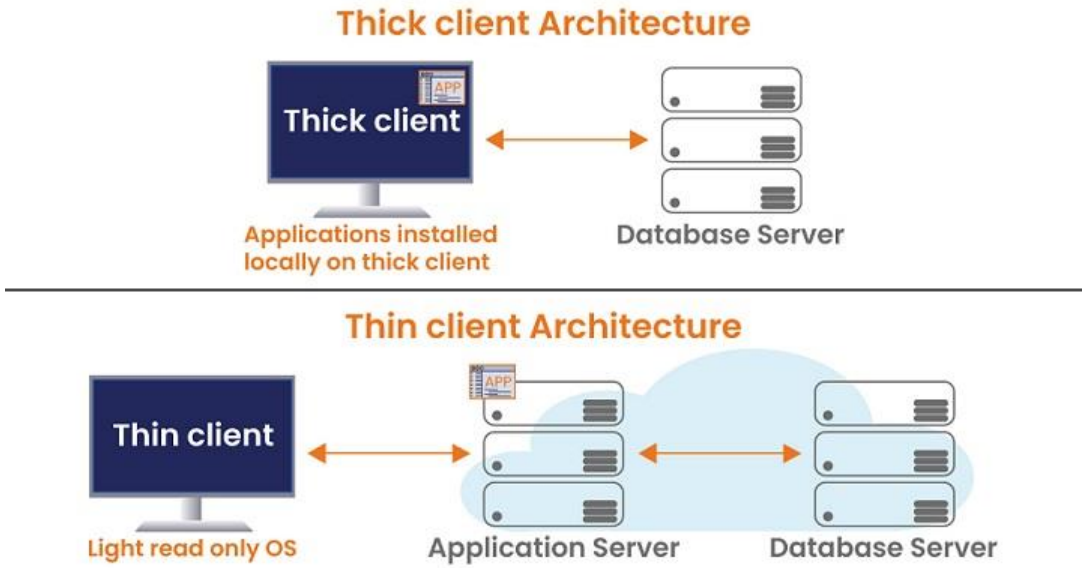
Desktop applications

Embedded applications

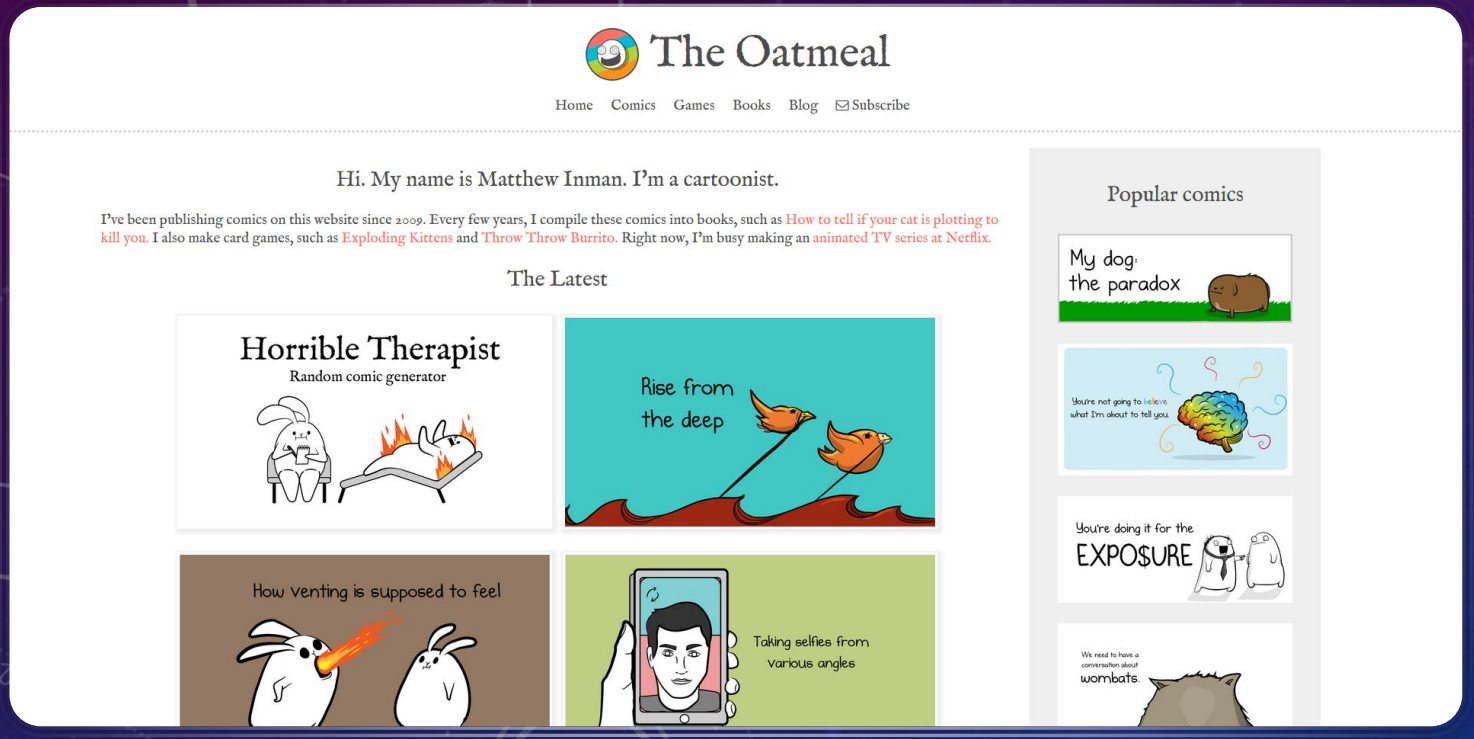
Web applications

# DESKTOP APPLICATIONS

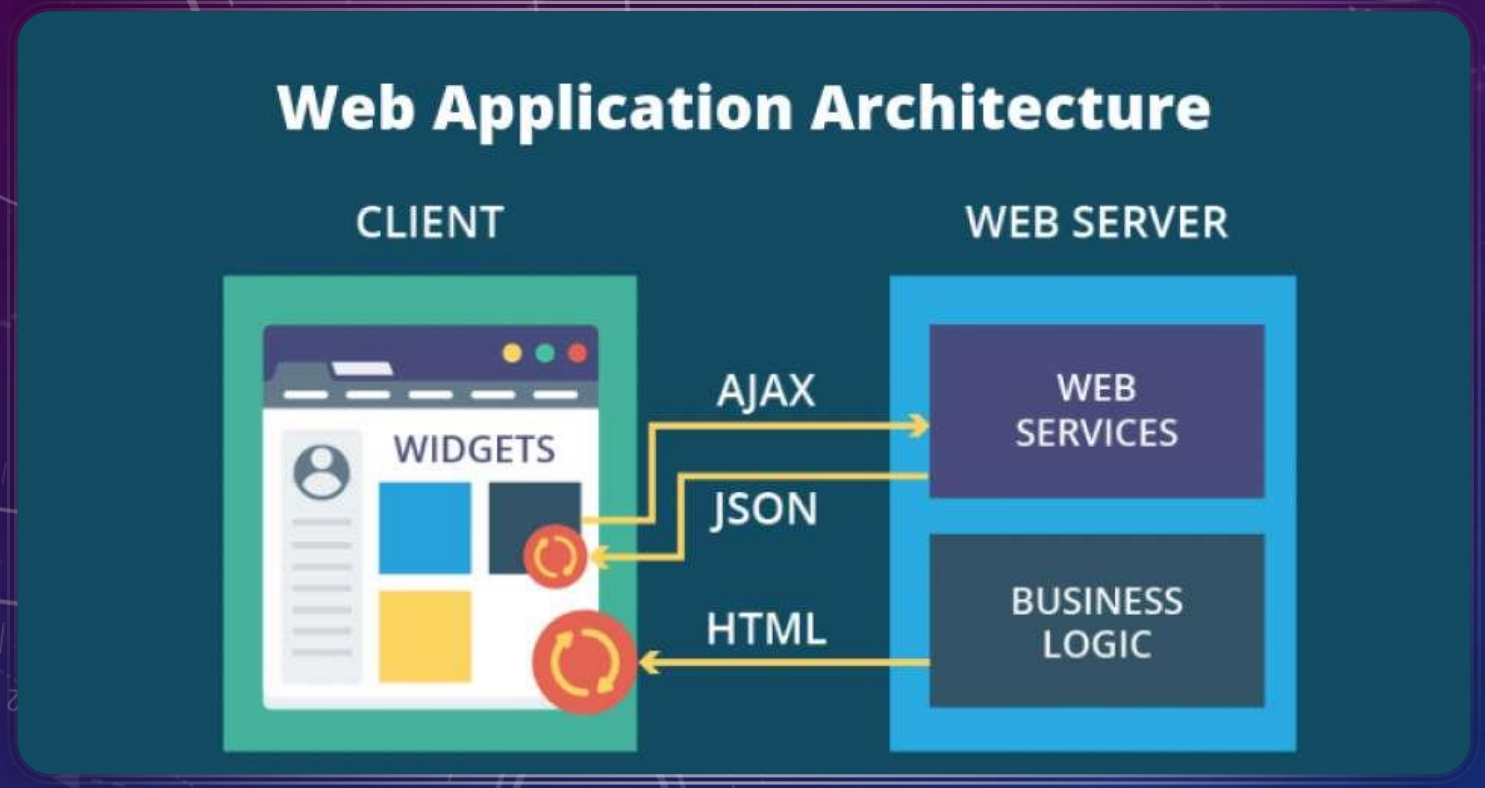
# “THIN” CLIENT VS “THICK” CLIENT



# MOBILE APPLICATIONS

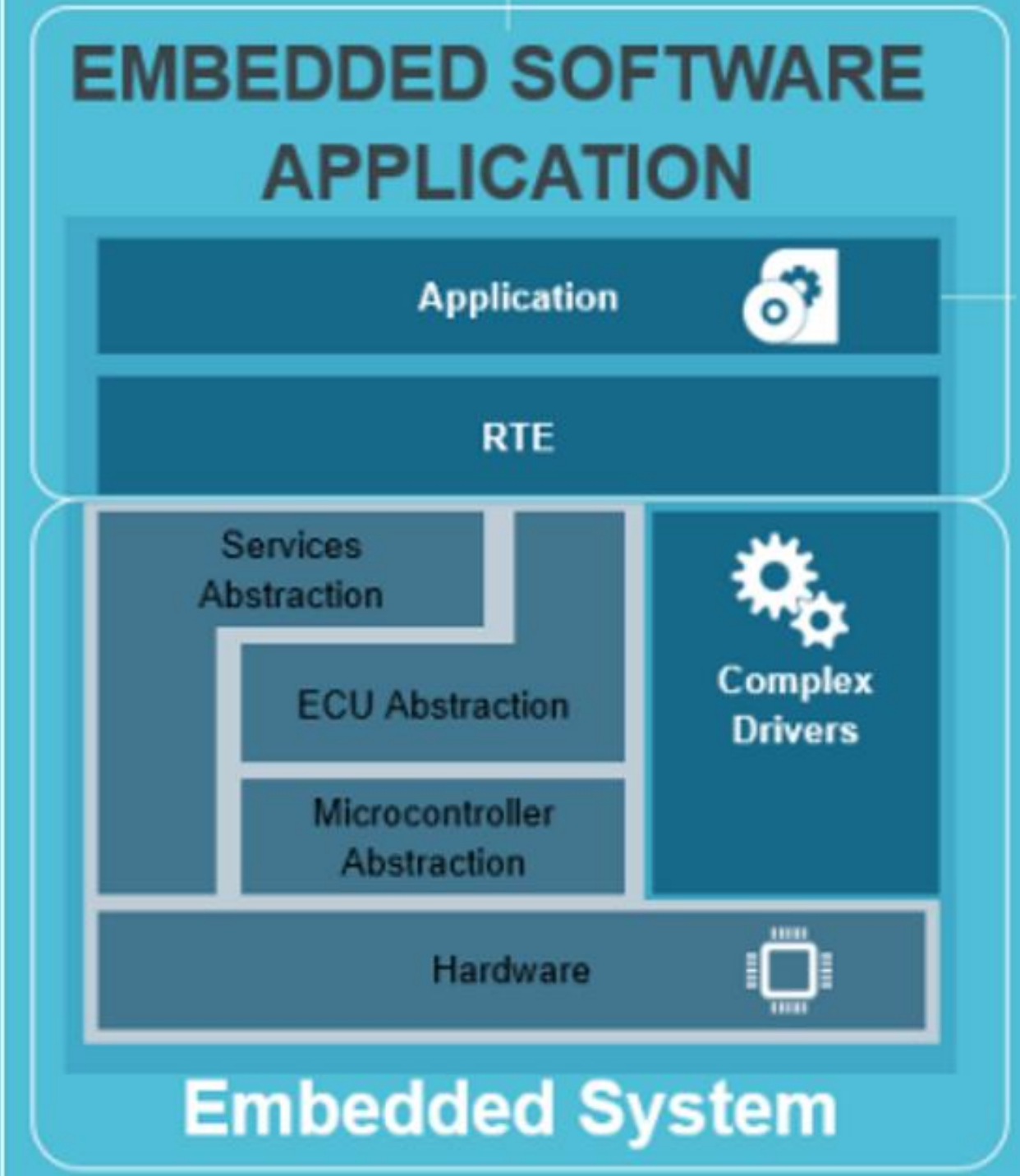

The Oatmeal
Home Comics Games Books Blog Subscribe
Hi. My name is Matthew Inman. I'm a cartoonist.
I've been publishing comics on this website since 2009. Every few years, I compile these comics into books, such as How to tell if your cat is plotting to kill you. I also make card games, such as Exploding Kittens and Throw Throw Burrito. Right now, I'm busy making an animated TV series at Netflix.
The Latest
Horrible Therapist
Random comic generator
Rise from the deep
How venting is supposed to feel
Taking selfies from various angles
Popular comics
My dog: the paradox
You're not going to believe what I'm about to tell you
You're doing it for the EXPOSURE
We need to have a conversation about wombats.

# WEBSITE




# WEB APPLICATIONS

# EMBEDDED SOFTWARE & SYSTEMS

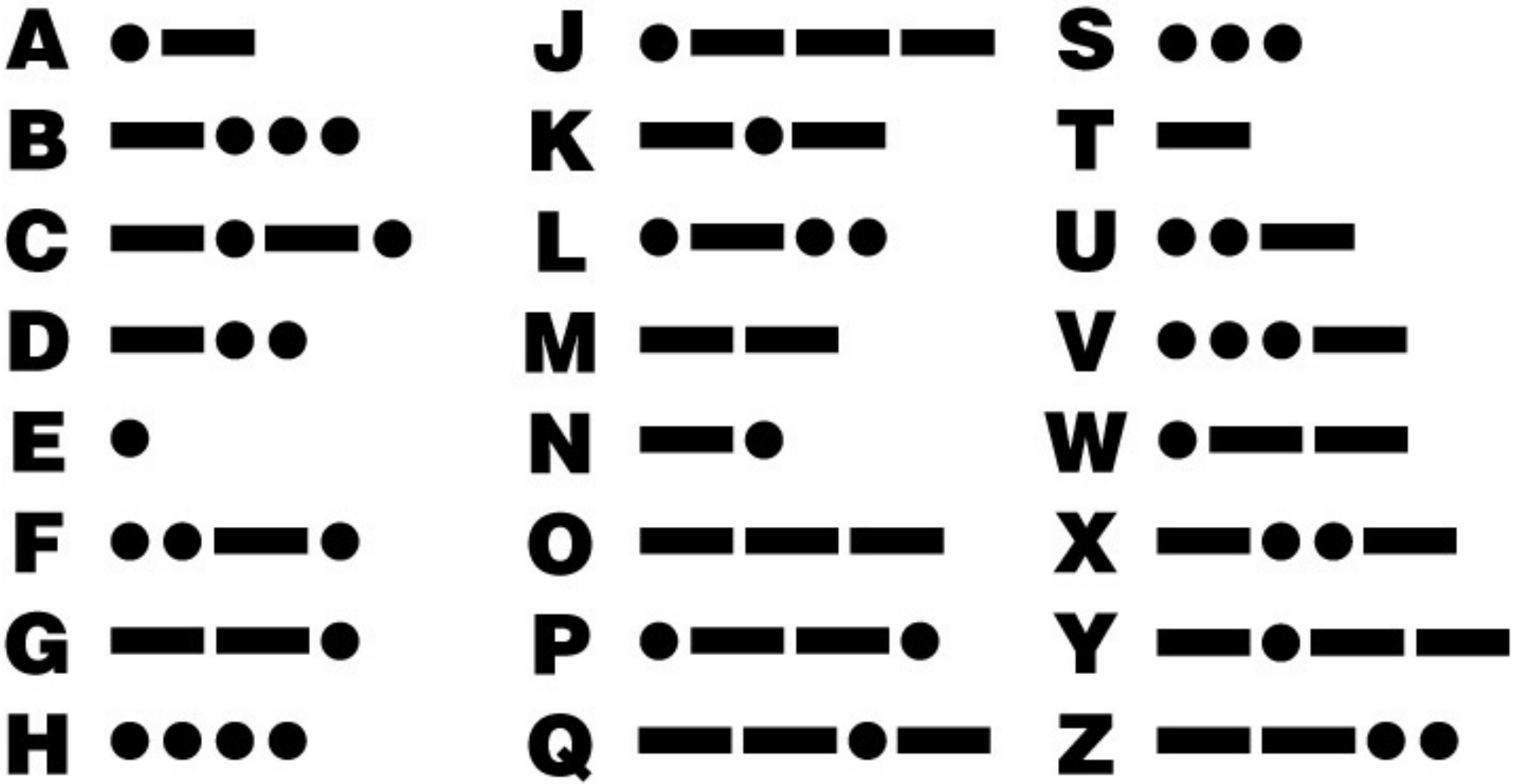

EMBEDDED SOFTWARE APPLICATION
Application
RTE
Services Abstraction
ECU Abstraction
Microcontroller Abstraction
Complex Drivers
Hardware
Embedded System

# WHERE DOES IOT FIT?

- What do we know about IoT?
  - Inside of consumer electronics
    - Embedded applications?
- Can IoT be more than one category?

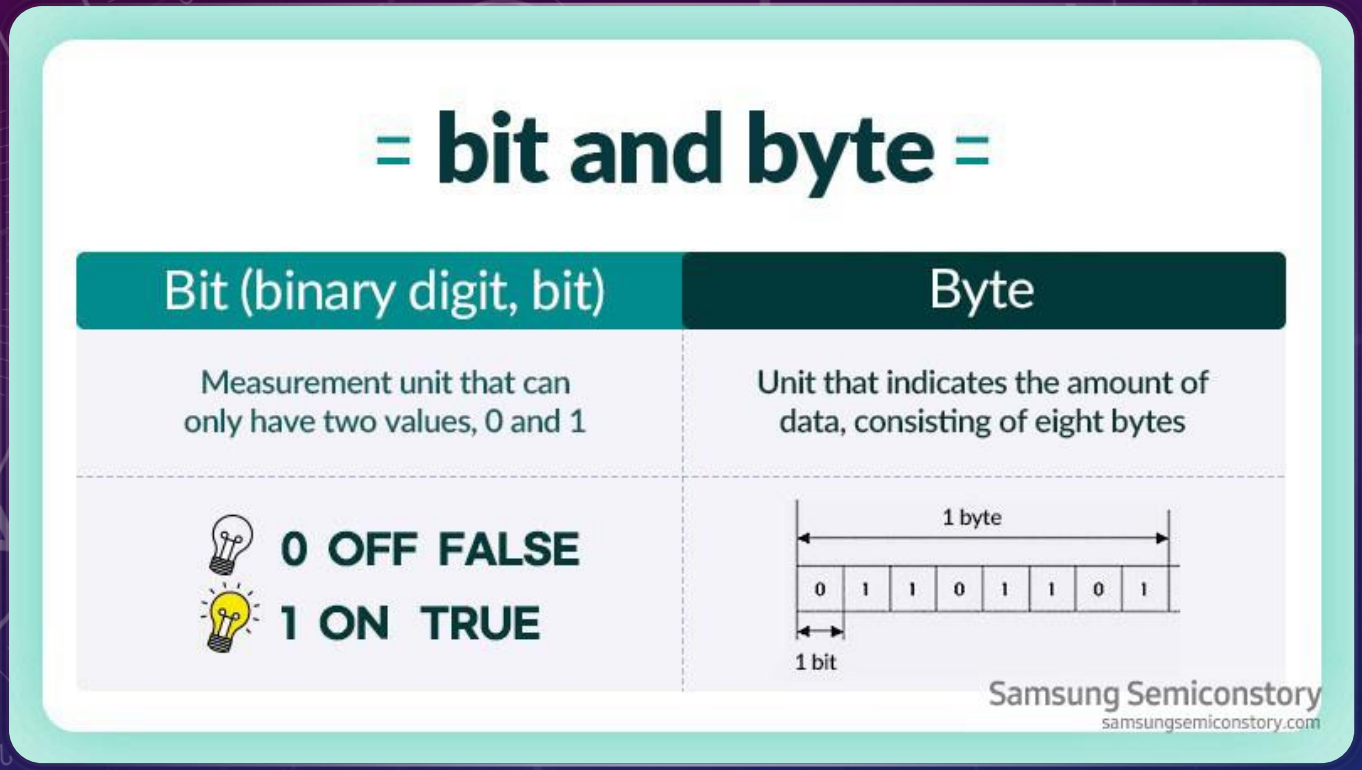
# 10 MINUTE BREAK

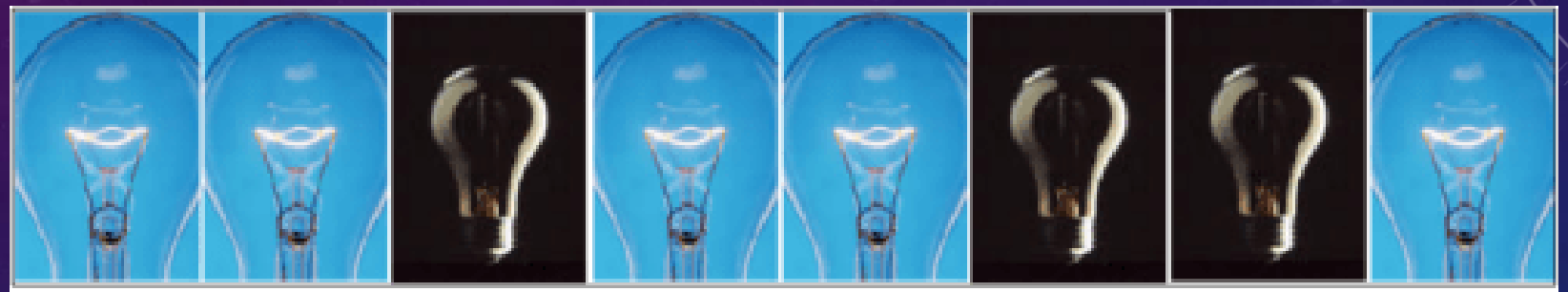
BINARY


A
B
C
D
E
F
G
H
J
K
L
M
N
O
P
Q
S
T
U
V
W
X
Y
Z

BINARY
COMMUNICATION
SOFTWARE
DEVELOPERS
TELEGRAPH
OPERATORS
imgflip.com

# BITS & BYTES


= bit and byte =
Bit (binary digit, bit)
Byte
Measurement unit that can only have two values, 0 and 1
Unit that indicates the amount of data, consisting of eight bytes
0 OFF FALSE
1 ON TRUE
1 byte
0 1 1 0 1 1 0 1
1 bit
Samsung Semiconstory
samsungsemiconstory.com

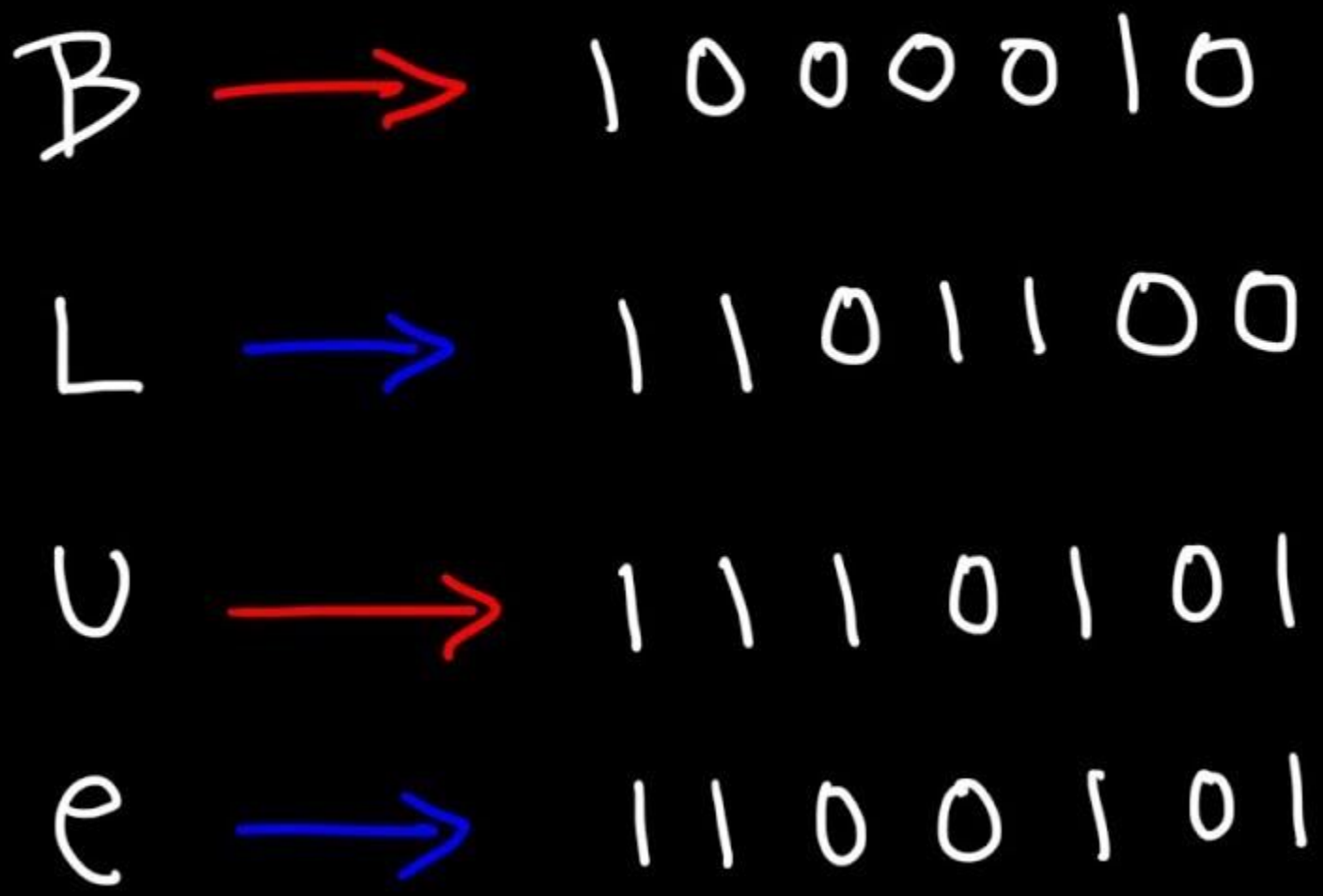


| 128 | 64 | 32 | 16 | 8 | 4 | 2 | 1 |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 |

| LETTER | ASCII VALUES | BINARY VALUES | LETTER | ASCII VALUES | BINARY VALUES |
|---|---|---|---|---|---|
| A | 65 | 01000001 | A | 97 | 01100001 |
| C | 67 | 01000011 | C | 99 | 01100011 |
| D | 68 | 01000100 | D | 100 | 01100100 |
| E | 69 | 01000101 | E | 101 | 01100101 |
| F | 70 | 01000110 | F | 102 | 01100110 |
| G | 71 | 01000111 | G | 103 | 01100111 |
| H | 72 | 01001000 | H | 104 | 01101000 |
| I | 73 | 01001001 | I | 105 | 01101001 |
| J | 74 | 01001010 | J | 106 | 01101010 |
| K | 75 | 01001011 | K | 107 | 01101011 |
| L | 76 | 01001100 | L | 108 | 01101100 |
| M | 77 | 01001101 | M | 109 | 01101101 |
| N | 78 | 01001110 | N | 110 | 01101110 |
| O | 79 | 01001111 | O | 111 | 01101111 |
| P | 80 | 01010000 | P | 112 | 01110000 |
| Q | 81 | 01010001 | Q | 113 | 01110001 |
| R | 82 | 01010010 | R | 114 | 01110010 |
| S | 83 | 01010011 | S | 115 | 01110011 |
| T | 84 | 01010100 | T | 116 | 01110100 |
| U | 85 | 01010101 | U | 117 | 01110101 |
| V | 86 | 01010110 | V | 118 | 01110110 |
| W | 87 | 01010111 | W | 119 | 01110111 |
| X | 88 | 01011000 | X | 120 | 01111000 |
| Y | 89 | 01011001 | Y | 121 | 01111001 |
| Z | 90 | 01011010 | Z | 122 | 01111010 |

# ASCII Code

| Char. | ASCII | Char. | ASCII | Char. | ASCII |
|---|---|---|---|---|---|
| @ | 64 | U | 85 | j | 106 |
| A | 65 | V | 86 | k | 107 |
| B | 66 | W | 87 | l | 108 |
| C | 67 | X | 88 | m | 109 |
| D | 68 | Y | 89 | n | 110 |
| E | 69 | Z | 90 | o | 111 |
| F | 70 | [ | 91 | p | 112 |
| G | 71 | \ | 92 | q | 113 |
| H | 72 | ] | 93 | r | 114 |
| I | 73 | ^ | 94 | s | 115 |
| J | 74 | _ | 95 | t | 116 |
| K | 75 | ` | 96 | u | 117 |
| L | 76 | a | 97 | v | 118 |
| M | 77 | b | 98 | w | 119 |
| N | 78 | c | 99 | x | 120 |
| O | 79 | d | 100 | y | 121 |
| P | 80 | e | 101 | z | 122 |
| Q | 81 | f | 102 | { | 123 |
| R | 82 | g | 103 | \| | 124 |
| S | 83 | h | 104 | } | 125 |
| T | 84 | i | 105 | ~ | 126 |

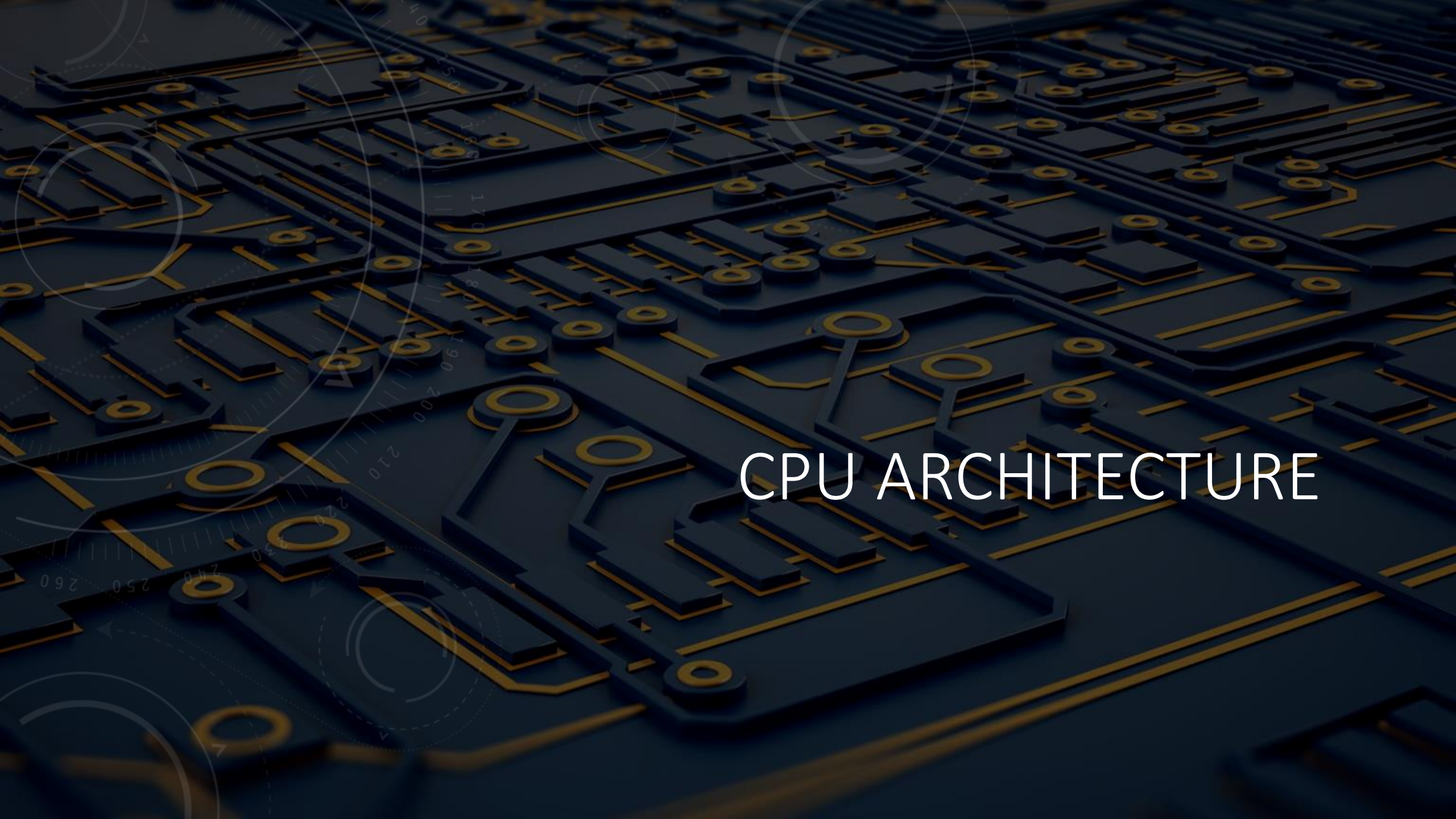


# OTHER BASE FORMATS

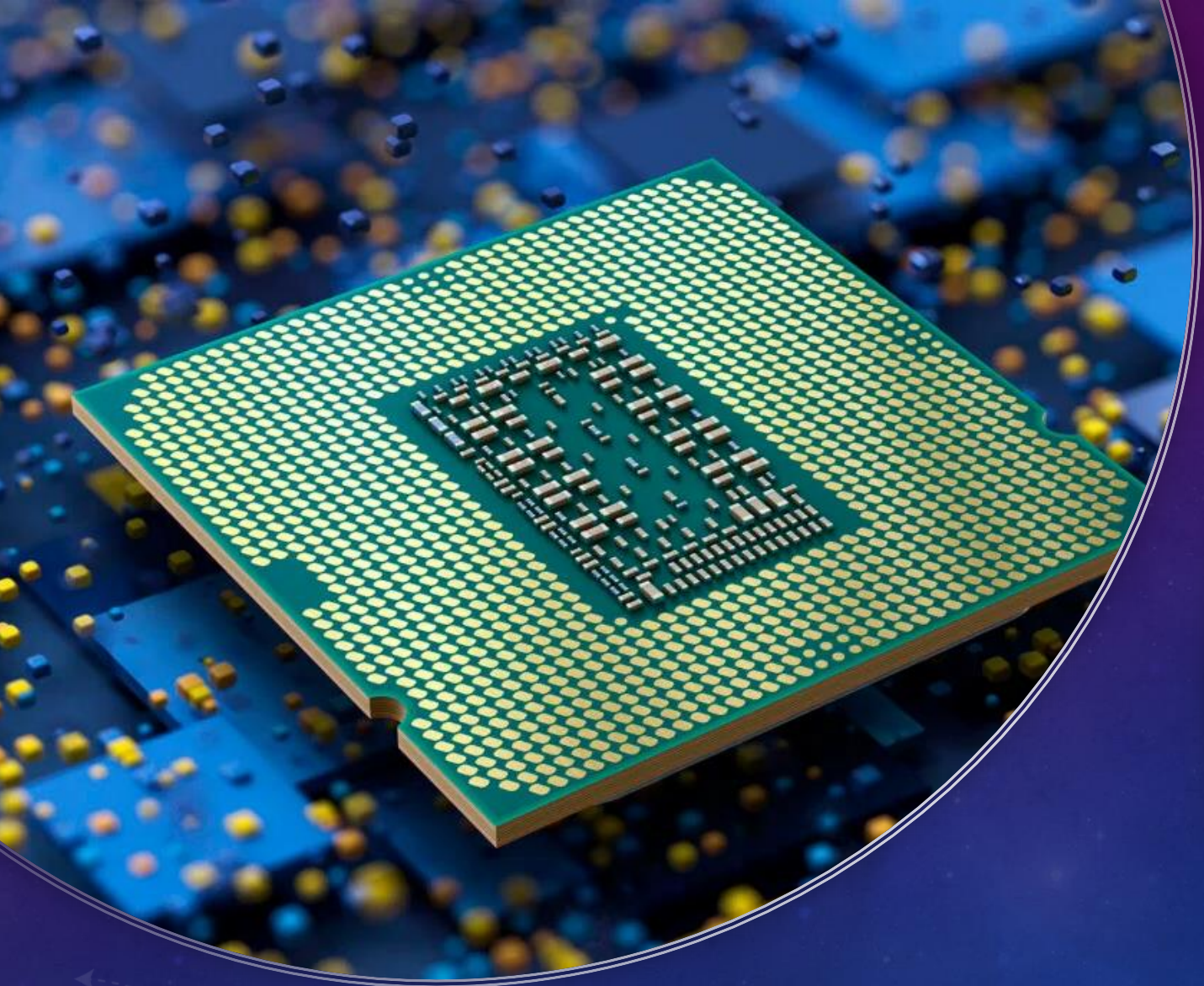
- Binary – Base 2 numbering (1, 0)
- Decimal – base 10 communication (0-9)
- Hexadecimal – base 16  (0-9, A-F)

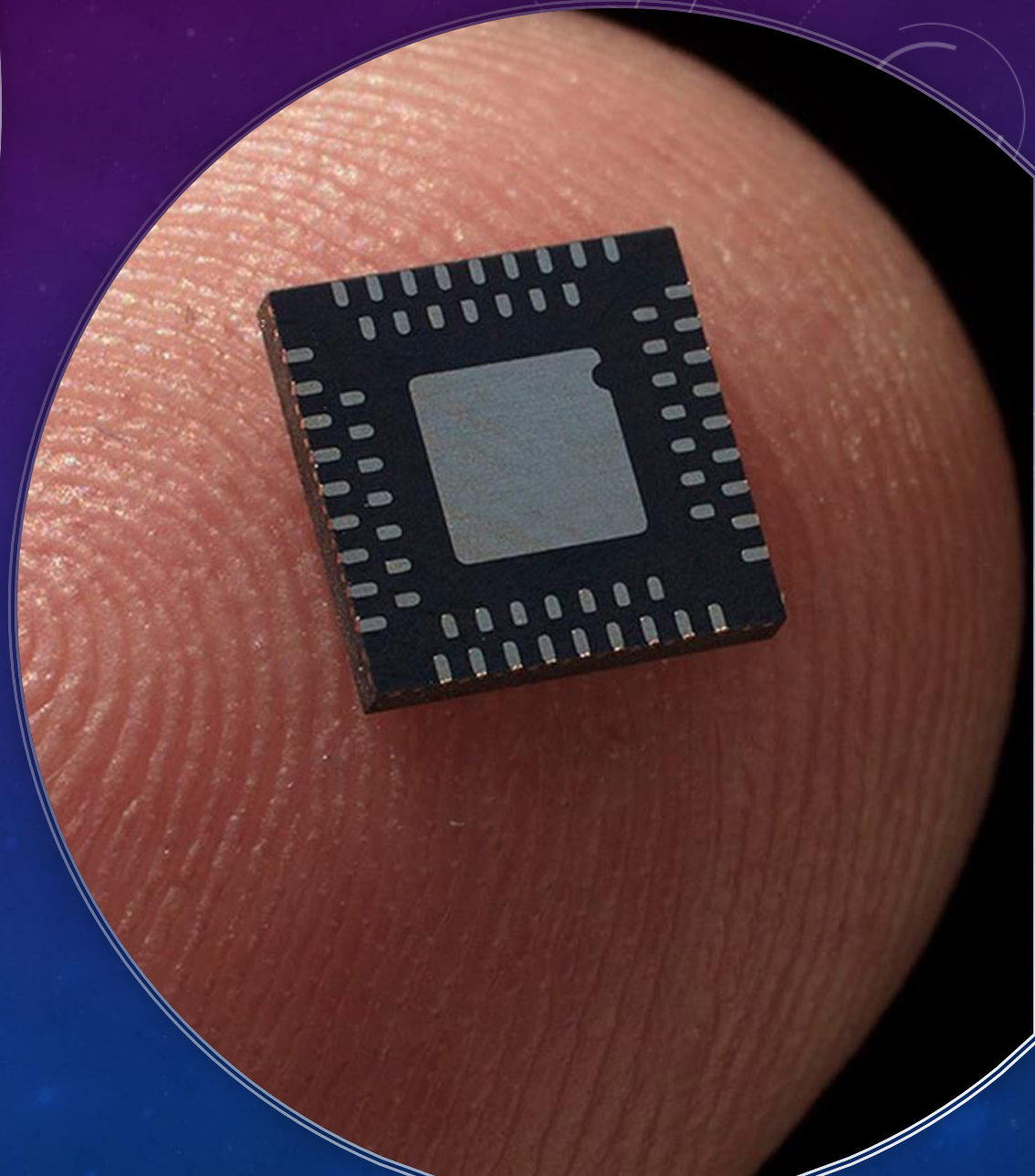
# FUN WITH TRANSLATIONS!

- https://gchq.github.io/CyberChef/



# CPU ARCHITECTURE





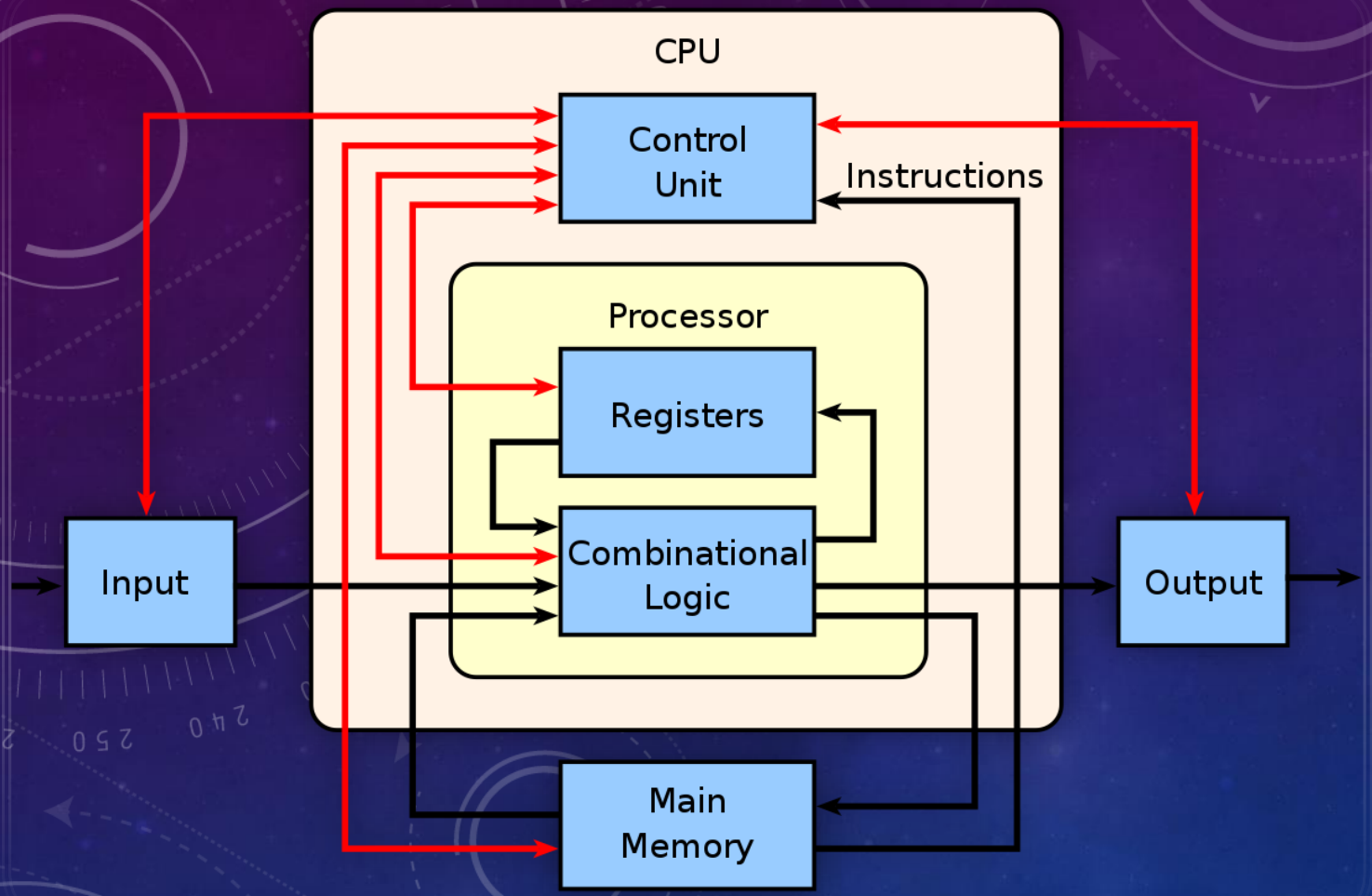
# PROCESSOR CLASSIFICATIONS

- Architecture
- Processed bits
- Design
- Registers

# COMMON CPU ARCHITECTURES

- X86
  - Desktop PCs
  - Most Intel chips are built on this
    - More cores
- Arm/A32
  - Small consumer electronic devices
- Arm/A64
  - New Macbook Pro M1 & M2
- RISC-V

# HOW PROCESSING WORKS



# SESSION REVIEW

QUESTION OR CLARIFICATIONS?

# PREVIEW NEXT SESSION

# SEE YOU NEXT TIME!