BATCH: 250

DT/NT : DT

LESSON : IT FUNDAMENTALS

SUBJECT:

DATE : 02/20/2023

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IT Fundamentals

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ITF GENERAL TOPICS

Title	Title
IT Introduction	Computational Thinking
Hardware Basics	Algorithms
Software Basics	Pseudu Codes
Network Basics	Flowcharts
Security Basics	Programming Basics

IT Fundamentals

Introduction

- What is IT?
- Industrial revolutions
- Web revolutions

Did you practice with the pre-class materials that will prepare you for today's lesson?

WHAT IS IT?

- IT (Information Technologies) is a general term that refers to technologies enabling operations related to the following data.

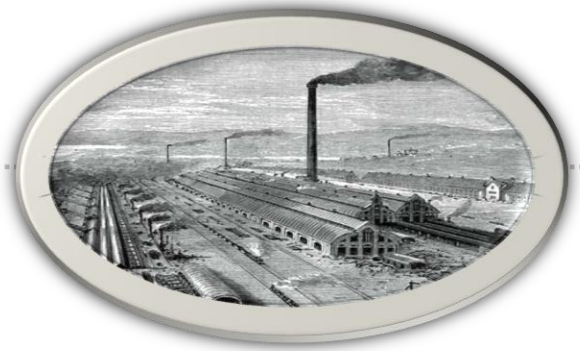
WHAT WORK IS DONE IN IT? WHAT IS ITS IMPORTANCE?

INDUSTRIAL REVOLUTIONS

Industry 1.0
Coal and steam power

1784

1870



Industry 2.0
Electricity, steel, oil, assembly lines, mass production

Industry 3.0
Calculator, semiconductors, computer, telephone, TV, automation, internet, robotics

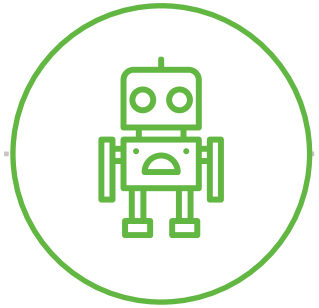
1969

INDUSTRIAL REVOLUTIONS

Industry 4.0
Big Data, Augmented Reality, Simulation Systems, Internet of Things, Cloud Systems, Cyber Security

2011

2017



Industry 5.0
Unmanned Aerial Vehicles, Autonomous Systems powered by Artificial Intelligence, Humanoids

WEB REVOLUTIONS

1991

Web 1.0
Static web

2004

Web 2.0
Social Web Centralized Web

202?

Web 3.0
Semantic Web
Decentralized Web

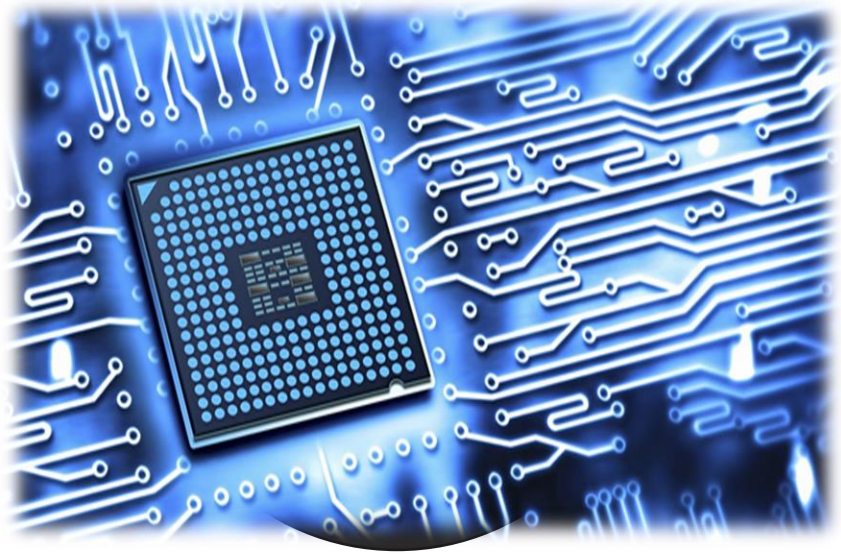
IN ALL FIELDS

IT Fundamentals

Hardware Basics

- Computer
- CPU
- RAM
- DISK
- Motherboard
- Capacity
- Binary system

COMPUTER



Hardware

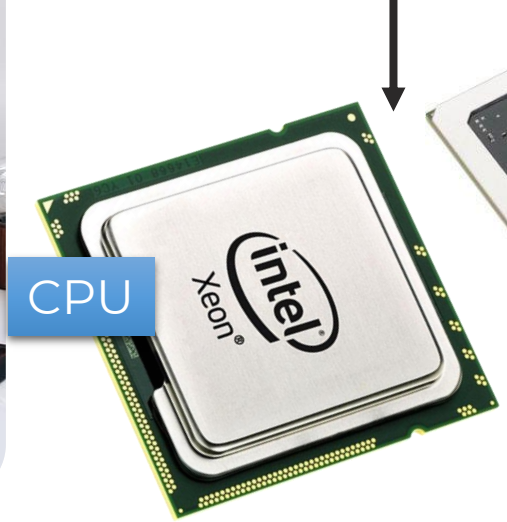
Software

COMPUTER

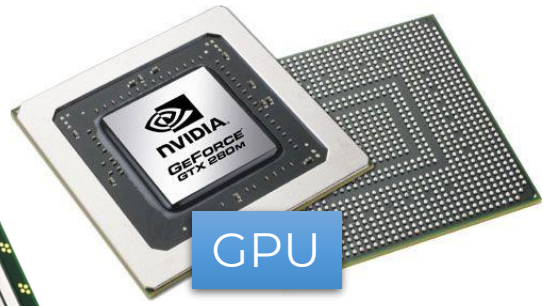
A computer is a machine that can

process, store, and output processed information

through commands given to it.

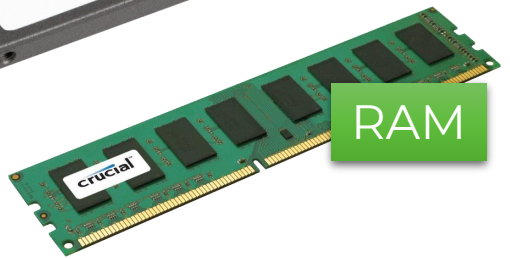


CPU



GPU

Hard Drive



RAM

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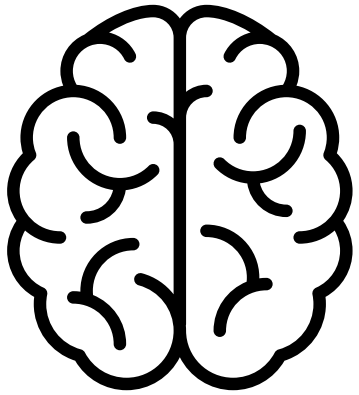
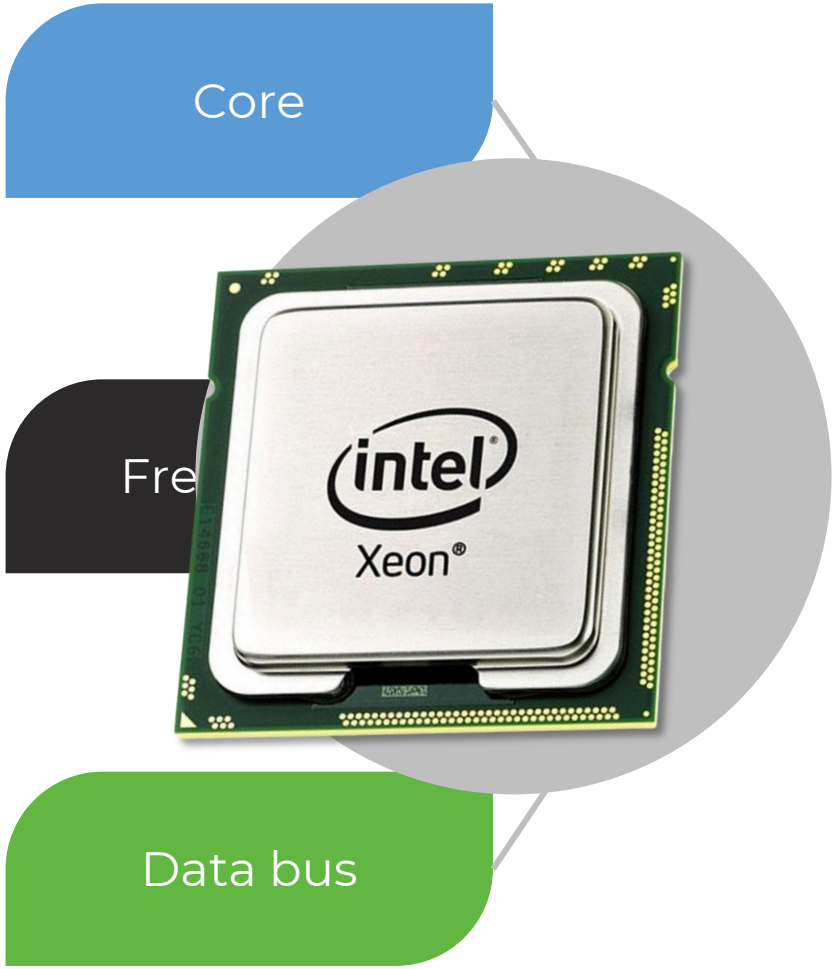
CPU(CENTRAL PROCESSOR UNIT)

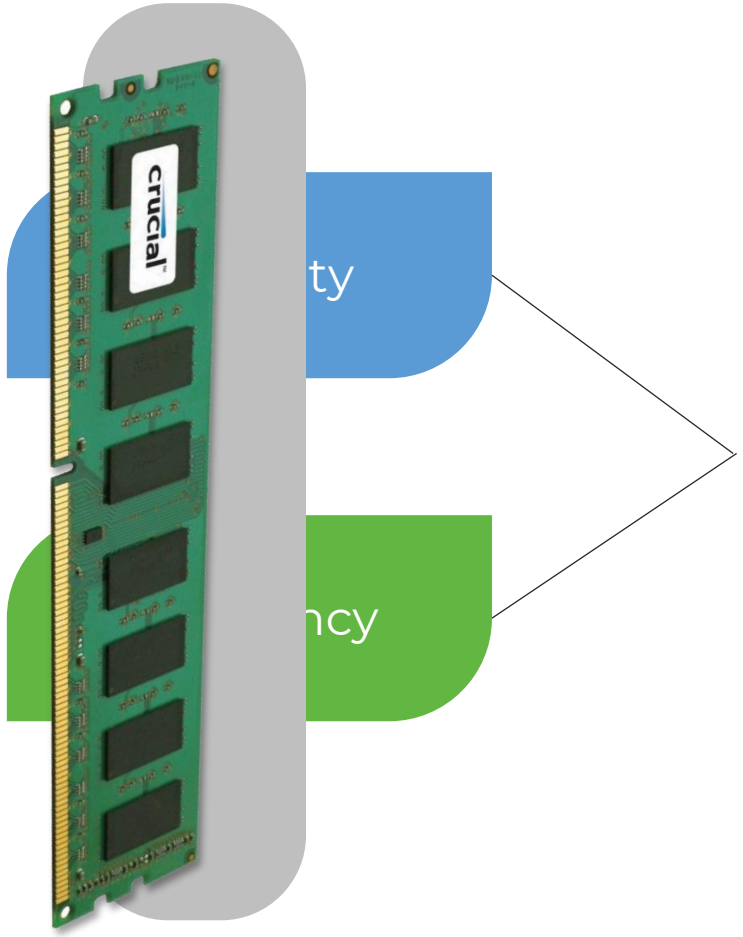


The Central Processing Unit is considered the brain of the computer.

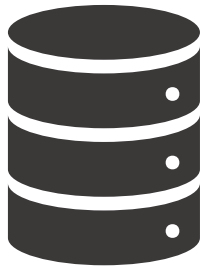


RAM (RANDOM ACCESS MEMORY)

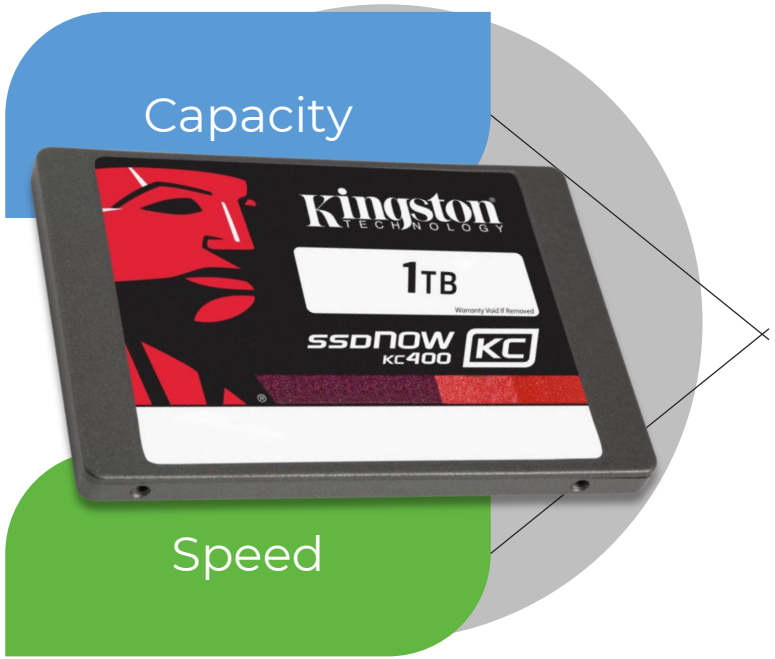
It is the unit where information is temporarily stored.



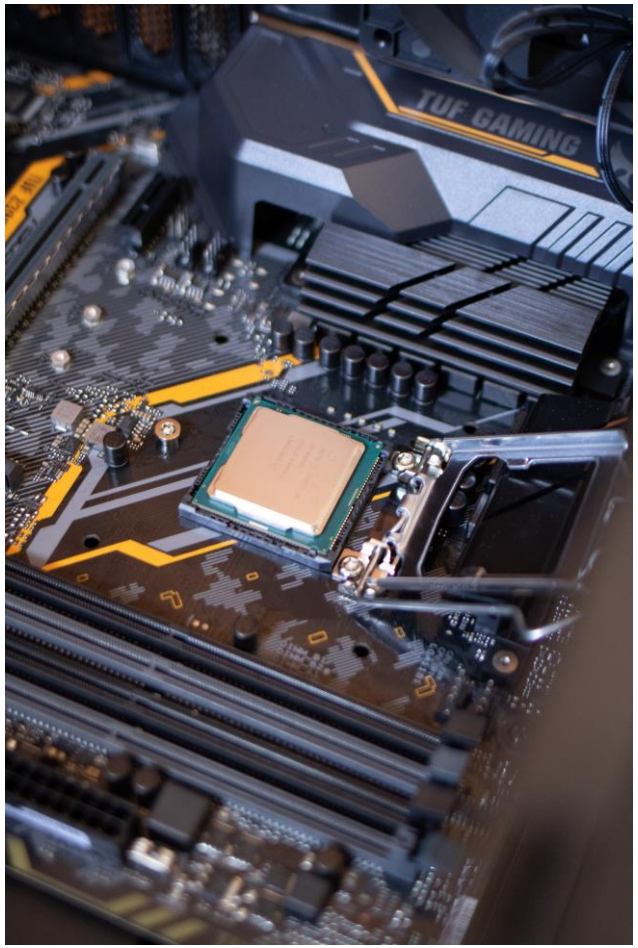
HARD DISK



It is the unit where information is permanently stored.



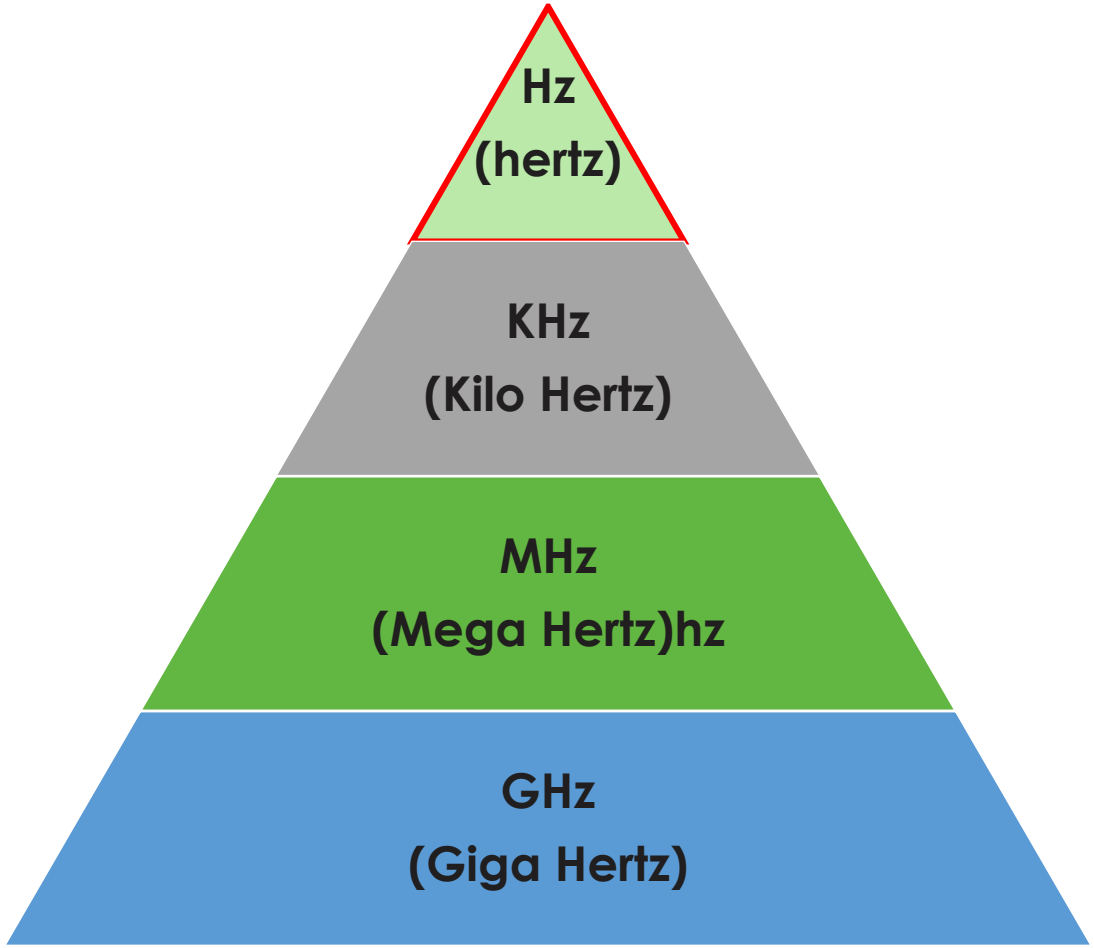
MOTHERBOARD



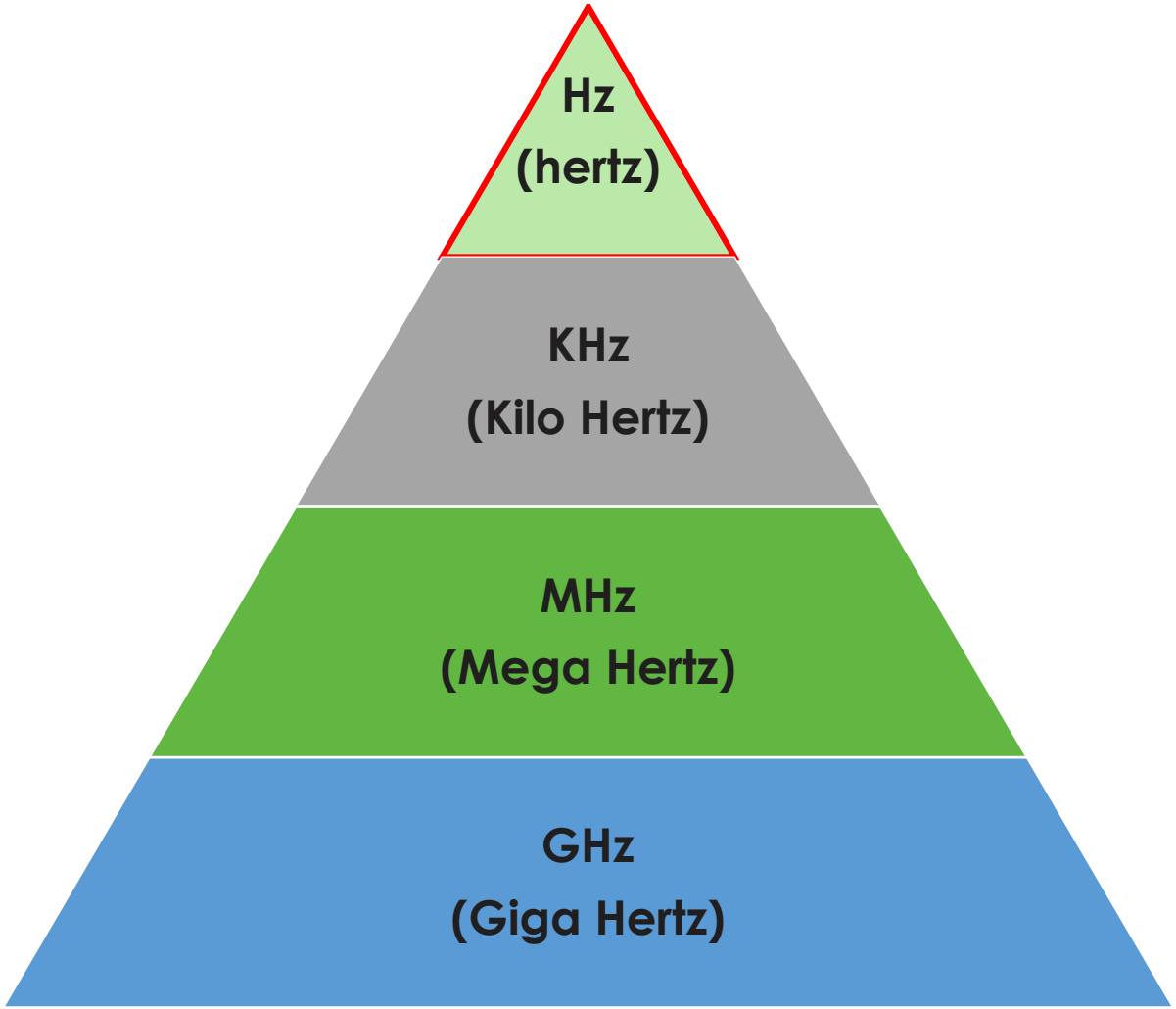
- It is the largest electronic unit that houses all other components in a computer.
- The capacity upgrades in a computer depend on the support of the motherboard.

SPEED UNIT

- The unit of speed is hertz.
- It indicates the amount of work done per second.
- There is a 1000-fold difference between each unit.



SPEED UNIT

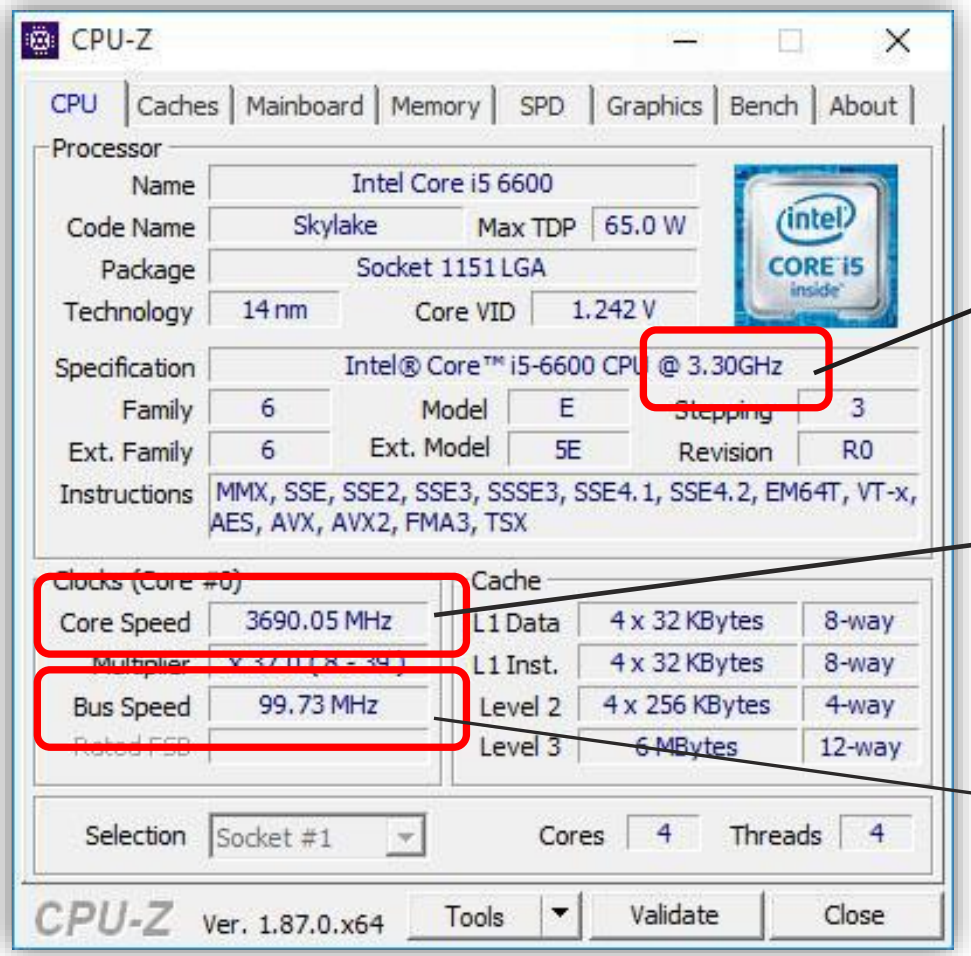


10KHz = ... Hz

3GHz = ... KHz

2000MHz = ... GHz

SPEED UNIT



Frequency

Core

Data bus

STORAGE UNITS

Disket

- En küçük kapasiteli depolama birimidir.
- 1,44 Mblık hafızası vardır.
- İçine word , powerpoint dosyaları ve küçük resim dosyaları sığabilir. Şarkı video sığmaz.

Hafıza Kartı

- Fotoğraf makinesi ve telefonlarda bulunan depolama birimidir. Kart okuyucularla birlikte bilgisayarda da kullanılabilir.
- Günümüzde 8-16-32-64 GB hafıza kartları vardır.

Usb Bellek

- Küçük olması nedeniyle kullanımı kolaydır.
- Günümüzde 4-8-16-32-64-128-256 GB usb bellekler vardır.

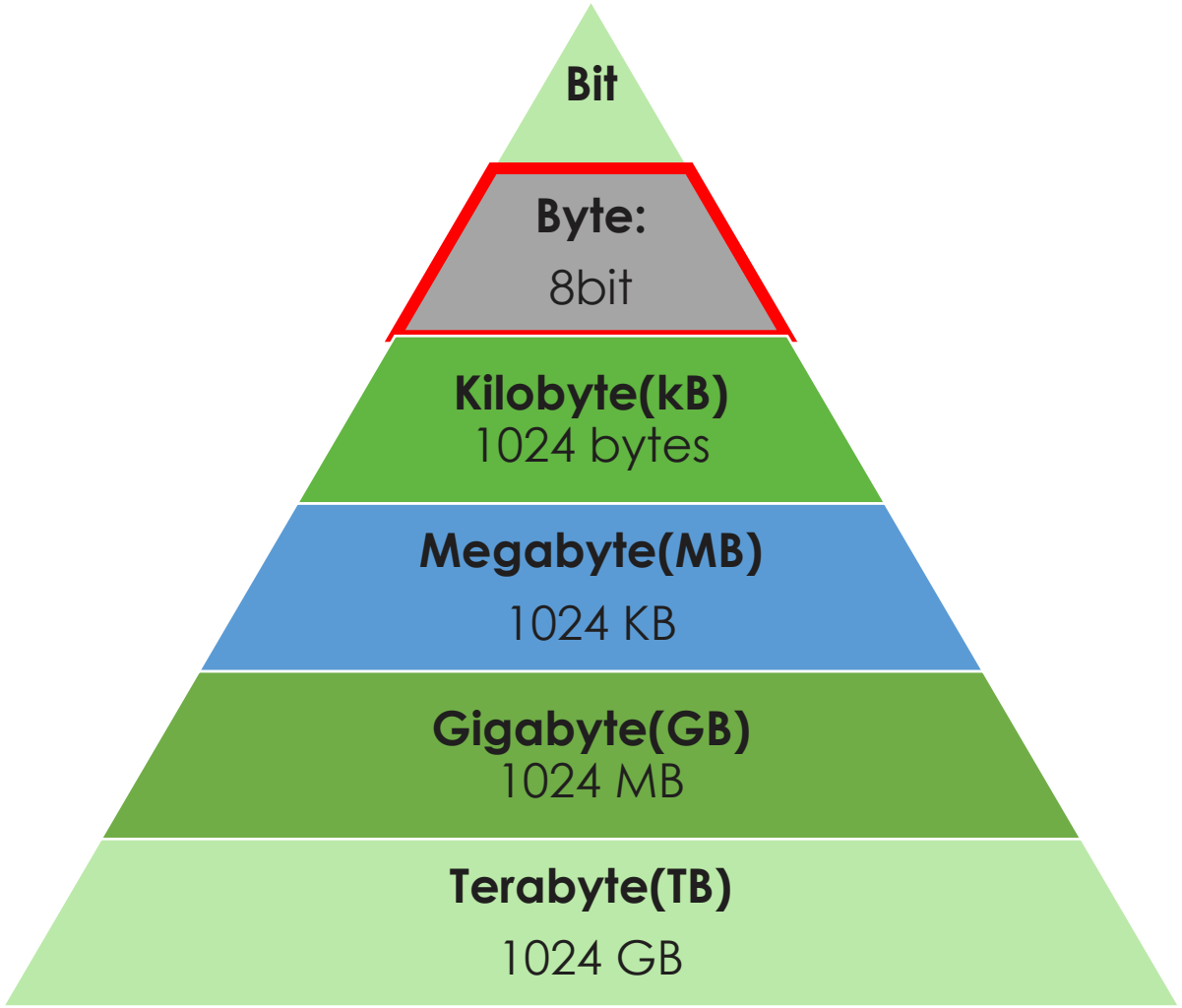
Taşınabilir Disk

- Taşınabilir diskler en büyük kapasiteye sahip depolama birimleridir.
- 500GB – 1 TB – 2 TB aralığında kapasitelere sahiptir.

Sabit Disk

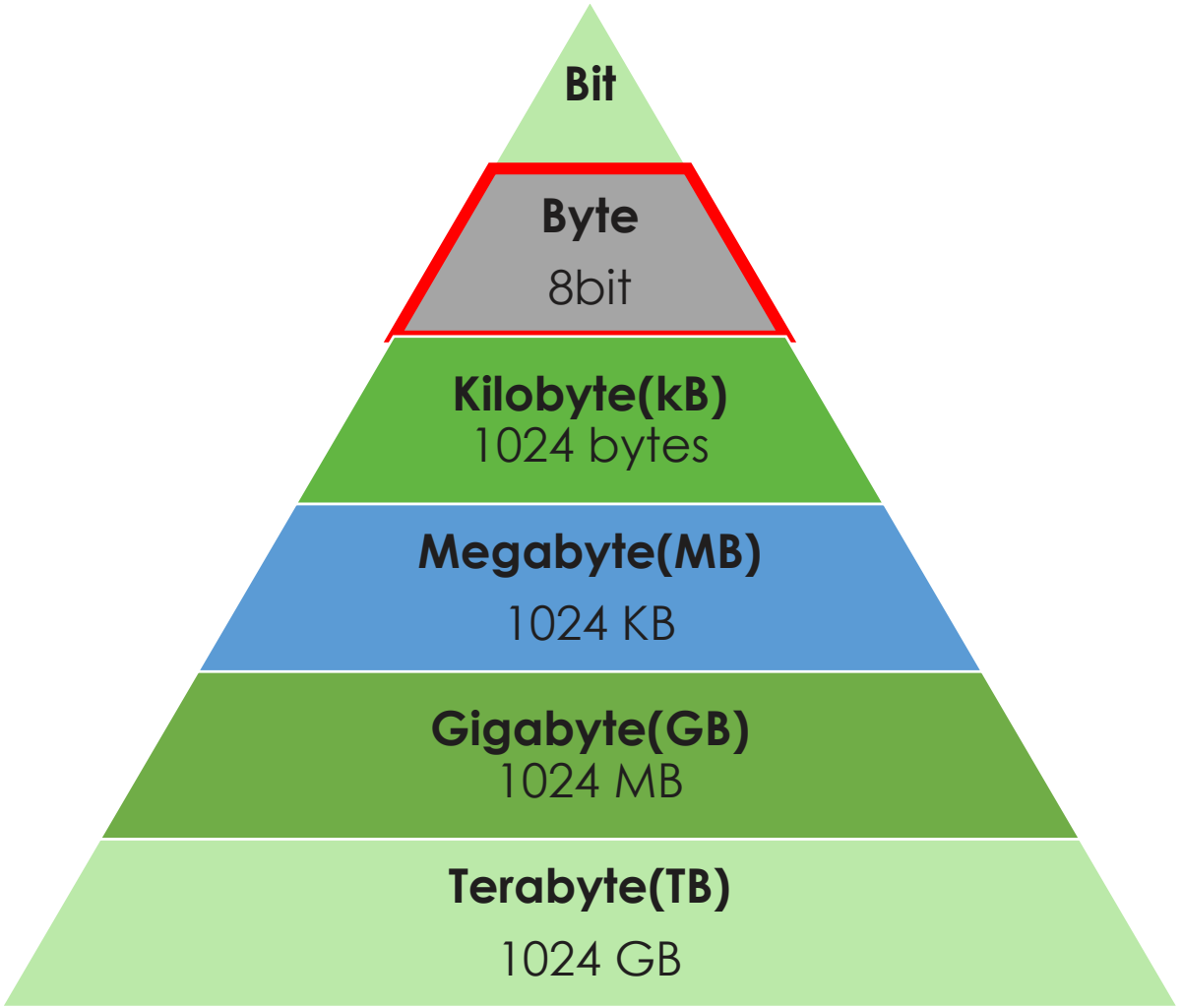
- Hard disk en büyük kapasiteye sahip depolama birimlerinden biridir.
- Günümüzdeki hard diskler 200 GB – 1 TB aralığında kapasitelere sahiptir.

CAPACITY UNIT



- In computers, the unit of capacity is the byte.
- 1 byte consists of 8 bits.
- Bit is the smallest capacity unit that can store a 0 or a 1.
- Bit is used to convert information into an electrical signal.

CAPACITY UNIT



5GB = ... KB

128 MB = ... bit

4096MB = ...GB

40960bit = ...KB

BINARY SISTEM

Computers and their components are electronic parts. Therefore, nothing but electrical signals are meaningful to them.

How is information stored or Transmitted?

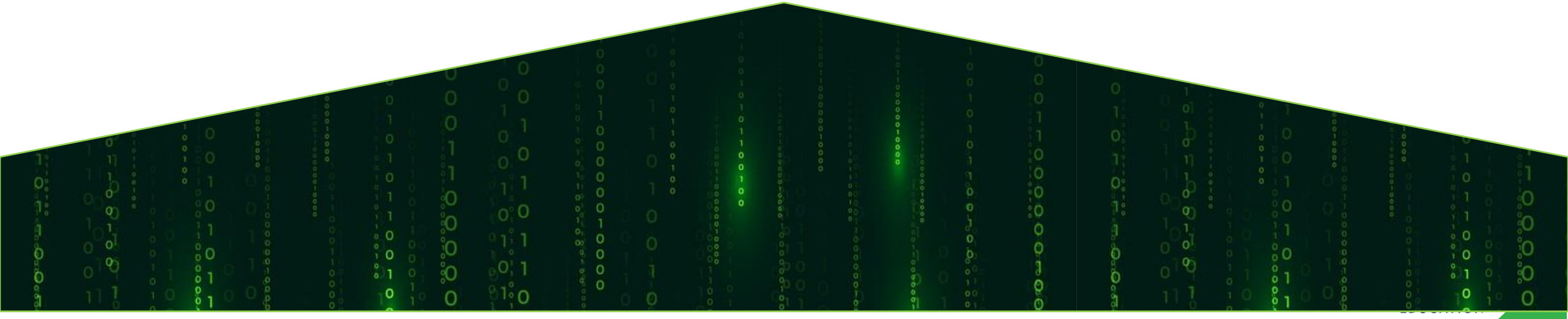
BINARY SISTEM

1

Electricity

0

No Electricity



BINARY SISTEM

Every character has a decimal equivalent.

A=65

1	0	0	0	0	0	1
64	32	16	8	4	2	1

ASCII Chart

DECIMAL	HEXADECIMAL	Symbol	Description
65	41	A	Capital letter A

BINARY SISTEM

1


0

	1024	512	256	128	64	32	16	8	4	2	1
7											
35											
125											
513											
1441											

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- Kahoot

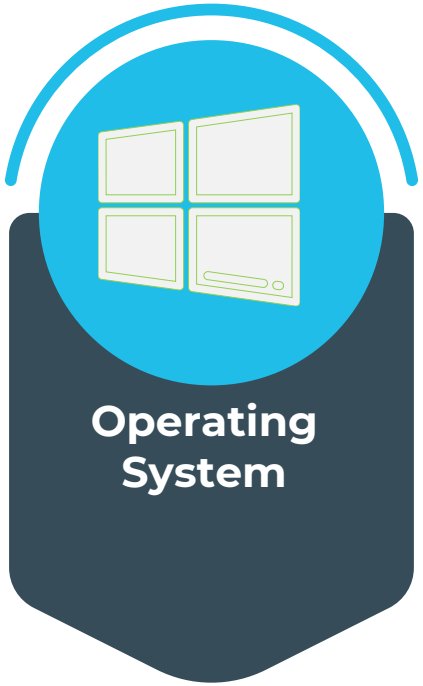
IT Fundamentals

- Software
- Operationg System
- Applications
- Databases

Software Basics

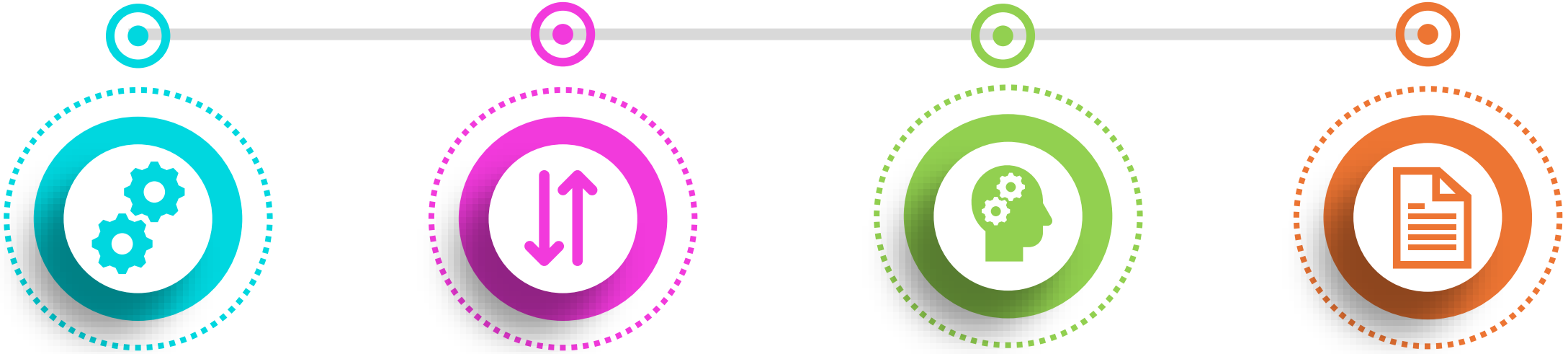
SOFTWARE

They are sets of codes that enable the use of hardware or meet various needs.



OPERATING SYSTEM

They are the software that facilitates communication between the user and the hardware.



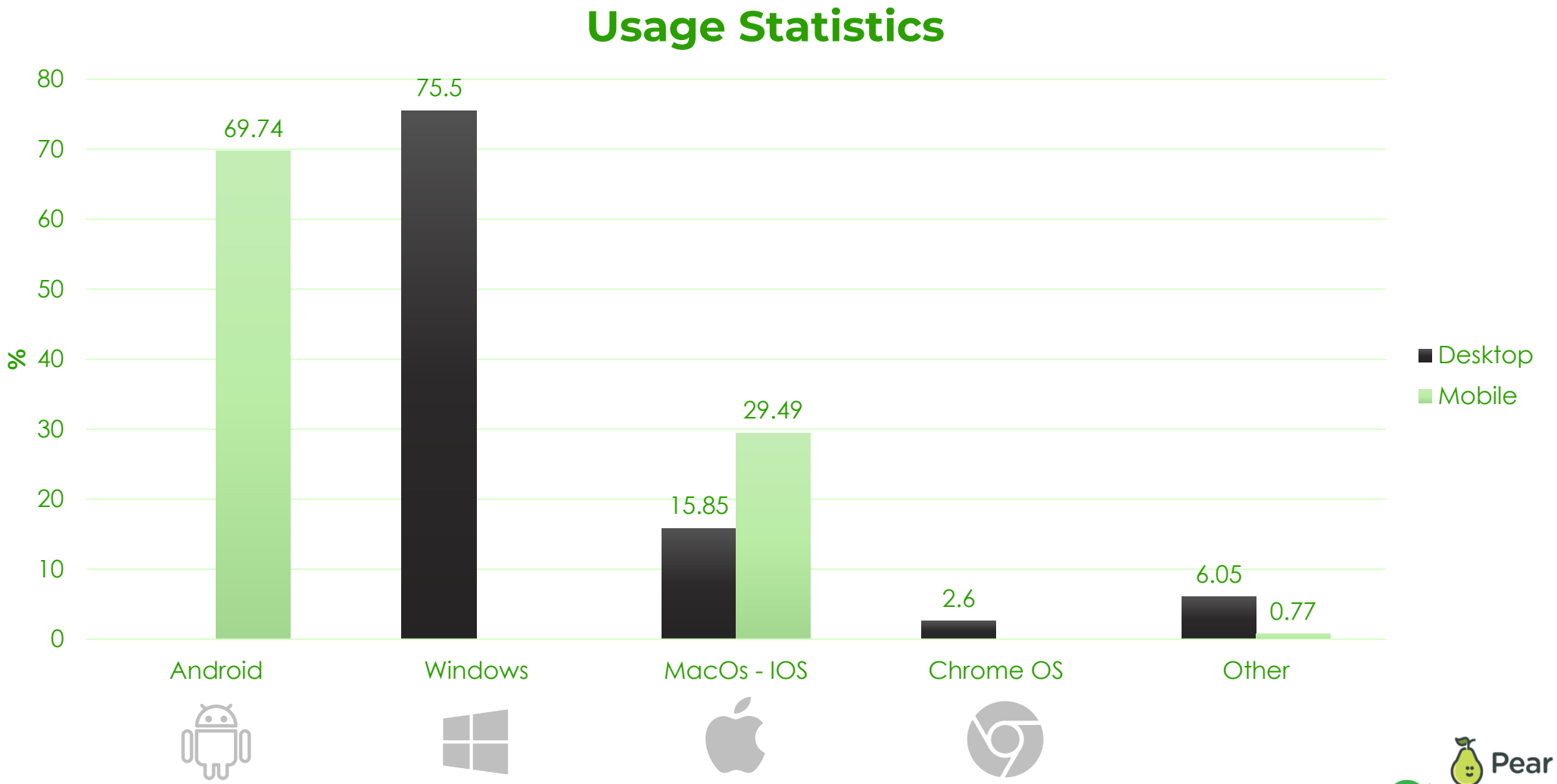
Process Management

Input-Output (I/O) Management

Memory Management

File Management

OPERATING SYSTEM



Pear Deck
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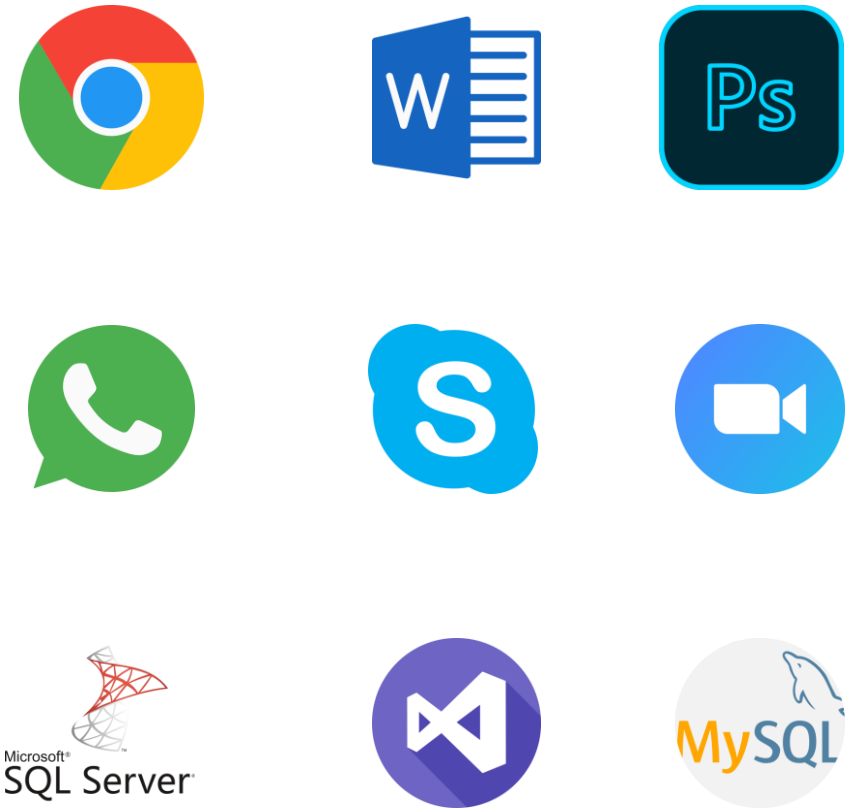
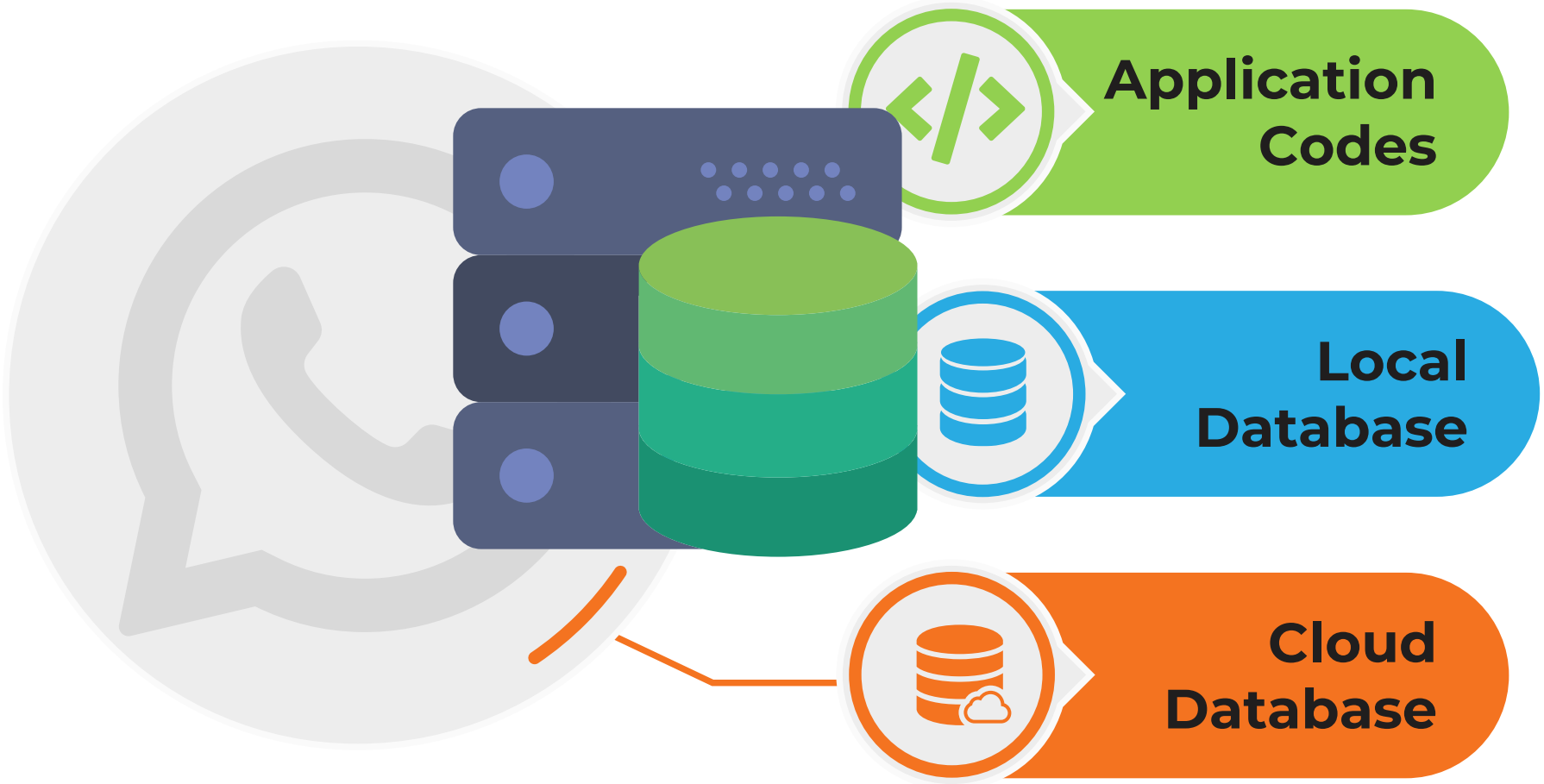
APPLICATION



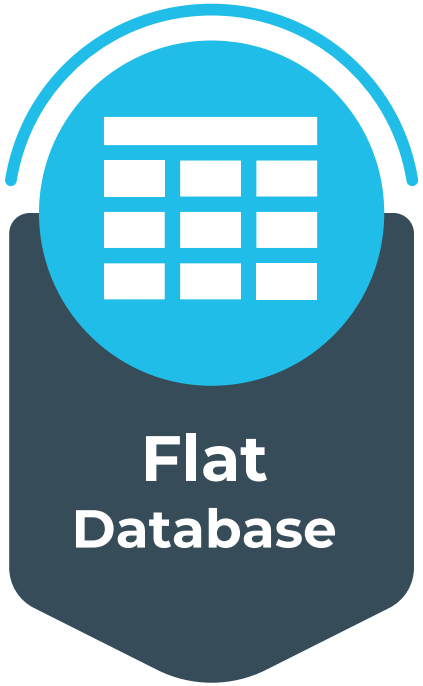
- Applications are programs designed to meet the user's needs and perform specific tasks.
- Word processing, database, web browser, game, communication ...

DATABASE



WHAT IS CHANGE IN LAST 20 YEARS?

DATABASE



Flat Database

Text files,
MS Excel
MS Access

SQL
R-DBMS

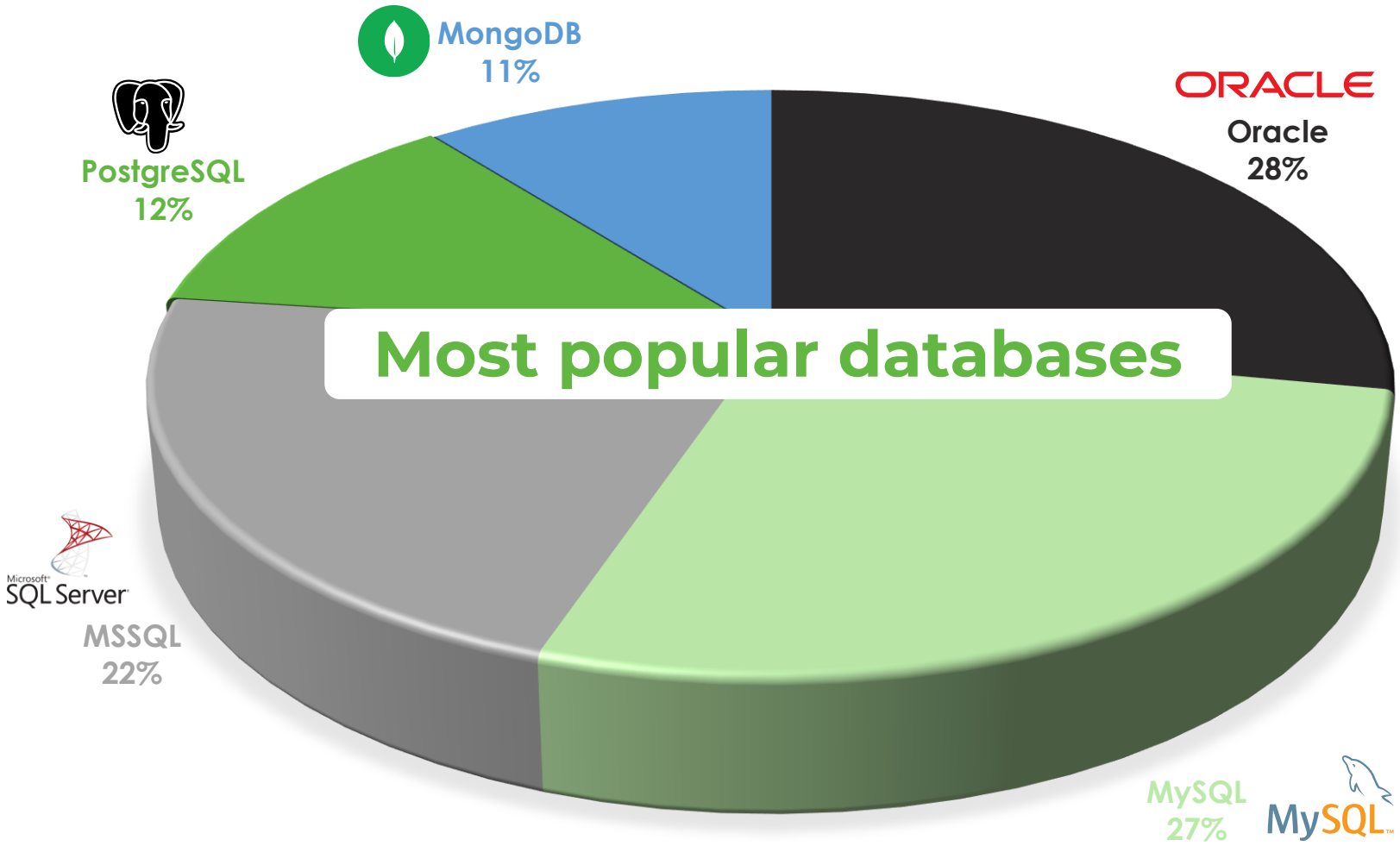
MySql, Oracle
PostgreSql, MSSQL

NO-SQL
NON-R-DBMS

MongooDb

DBMS

DATABASE



- Kahoot

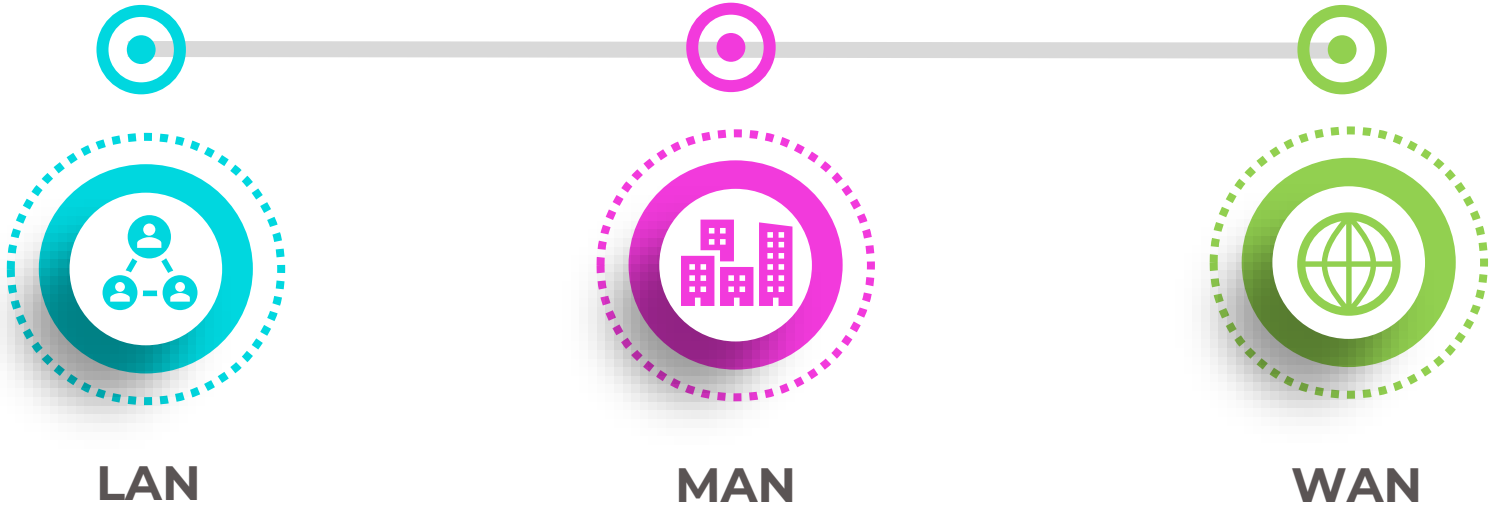
IT Fundamentals

Network Basics

- Network
- LAN, WAN
- Internet
- TCP/IP
- Server – client
- Web Server
- HTTP
- Domain Name
- DNS

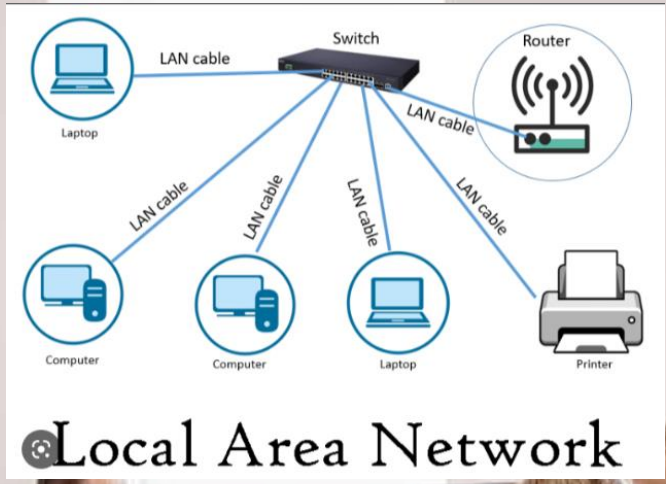
NETWORK

- The communication area created for electronic devices to communicate is called a network.



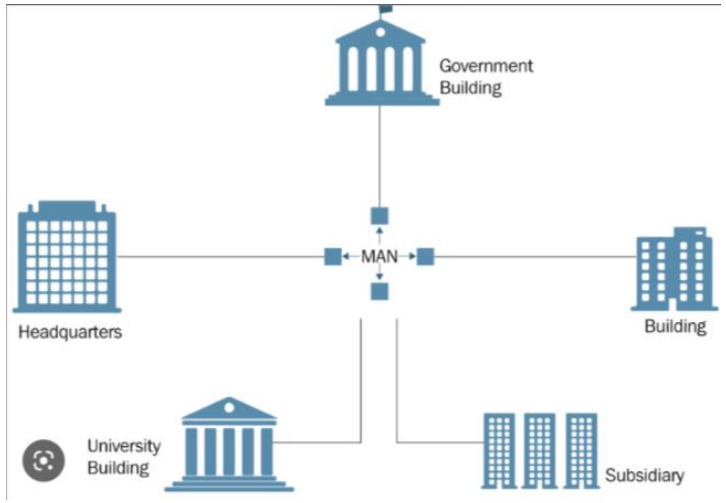
LOCAL AREA NETWORK (LAN)

- These are networks created within a small area such as a school or office, where external access to the network is either restricted or not available.
- Communication can be established either through wired or wireless means.



METROPOLITAN AREA NETWORK (MAN)

- Networks formed by the combination of LANs, often covering entire cities, are typically referred to as Metropolitan Area Networks (MANs).

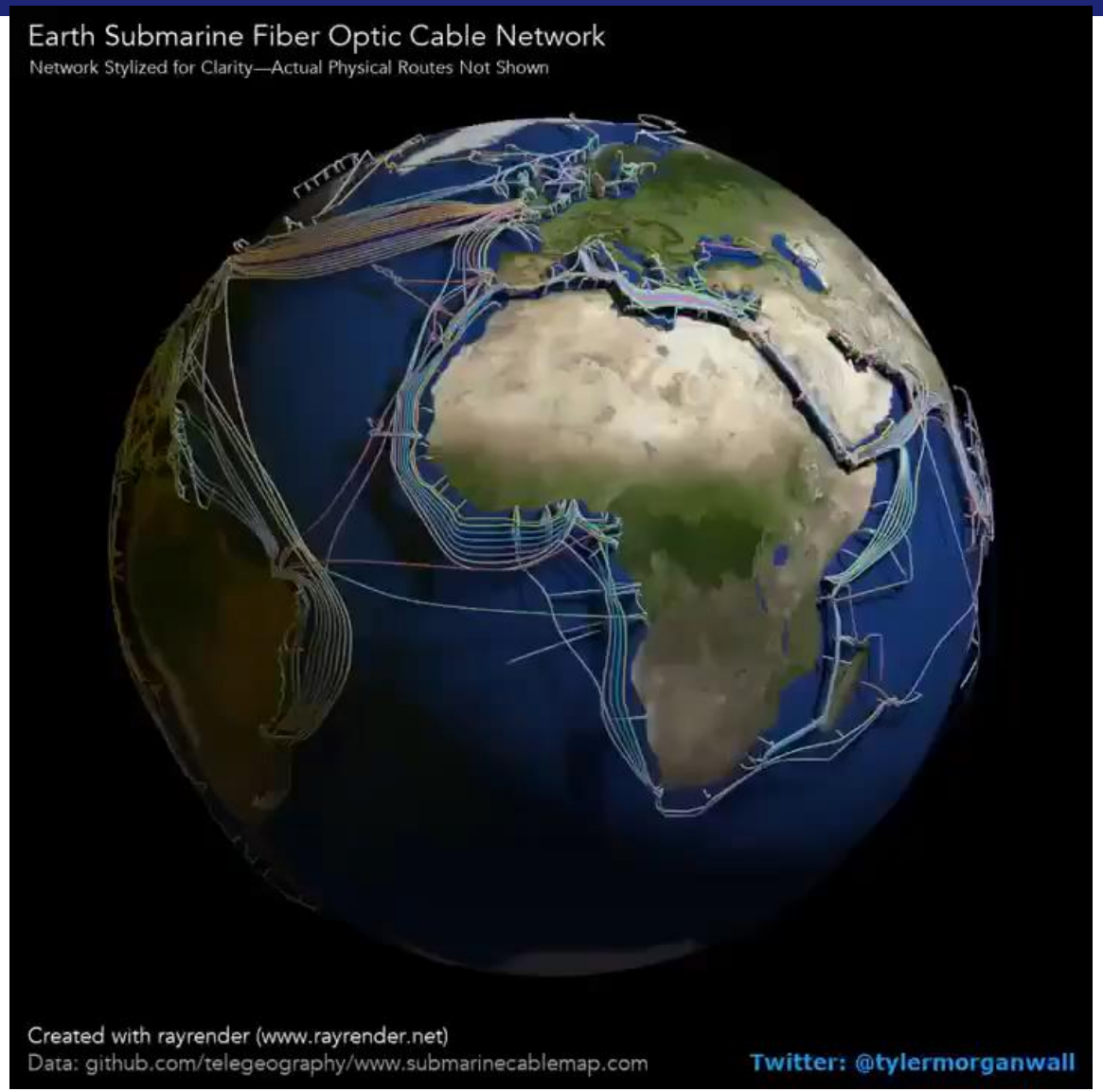


WIDE AREA NETWORK (WAN)

- These are networks created for devices to communicate over a wide area.
- An example could be the connection between different offices of a company in different geographical locations.
- The largest WAN is the internet.

- Network

The network currently established through Zoom can be considered as an example of WAN (Wide Area Network)



INTERNET

- It is the largest WAN that has no specific beginning, end, owner, or controller and where devices communicate using a common language.
- It was initially developed for military purposes (ARPA-NET).

TCP/IP

- On the internet, various types and sizes of data transfers occur among interconnected devices.
- This process is carried out using the Transmission Control Protocol (TCP) and Internet Protocol (IP). TCP/IP is the common communication language of the internet.

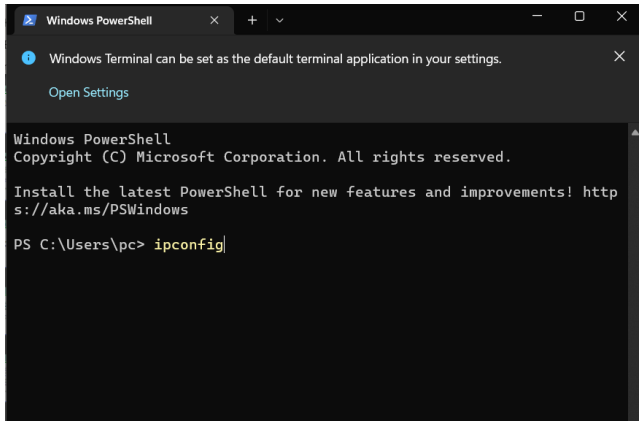
TCP/IP

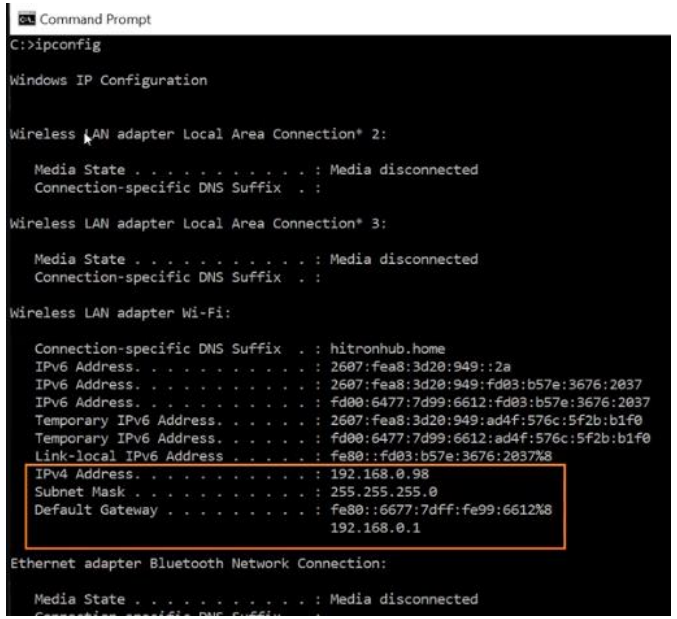
192.168.1.20

- Devices communicating using TCP/IP must have an address, which is known as an IP (Internet Protocol) address.
- Every device connected to the internet has a unique IP address.
- Data transfers are carried out based on these IP addresses.
- There can be both public and private IP addresses.

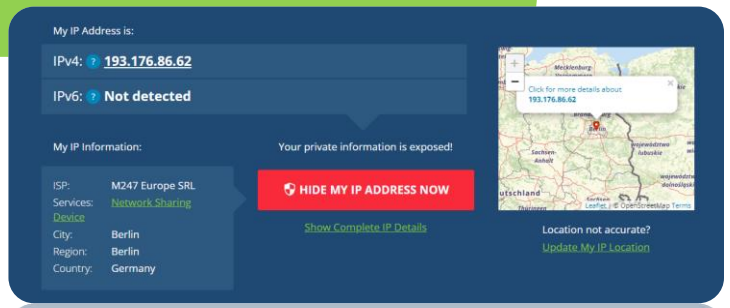
TCP/IP

You can find out your private IP address by using the "**ipconfig**" command in the terminal.



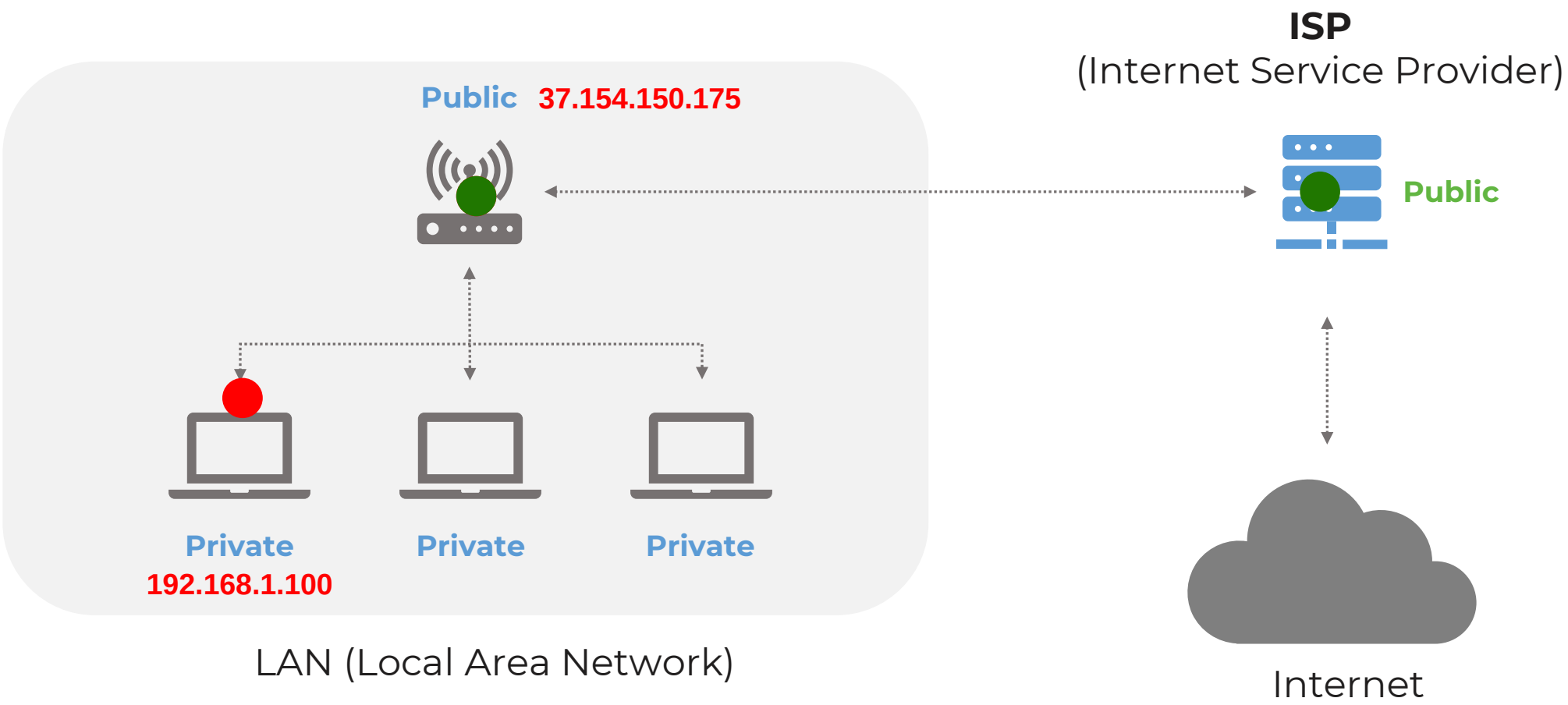


For your public IP address, you can access your modem settings or visit websites like "**whatismyip.com.**"

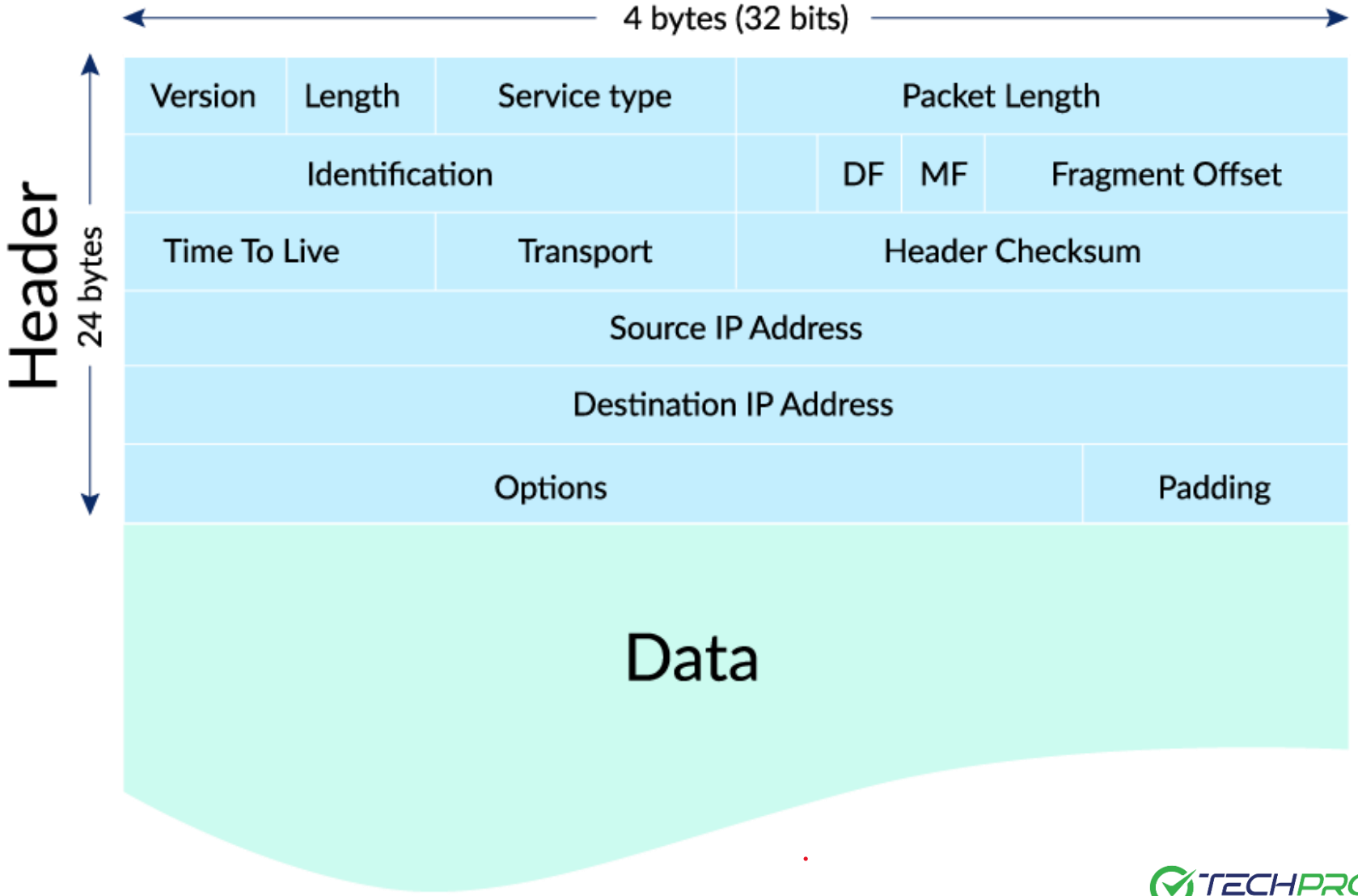


The "**ping**" command can be used to check whether you can reach a target device or not.

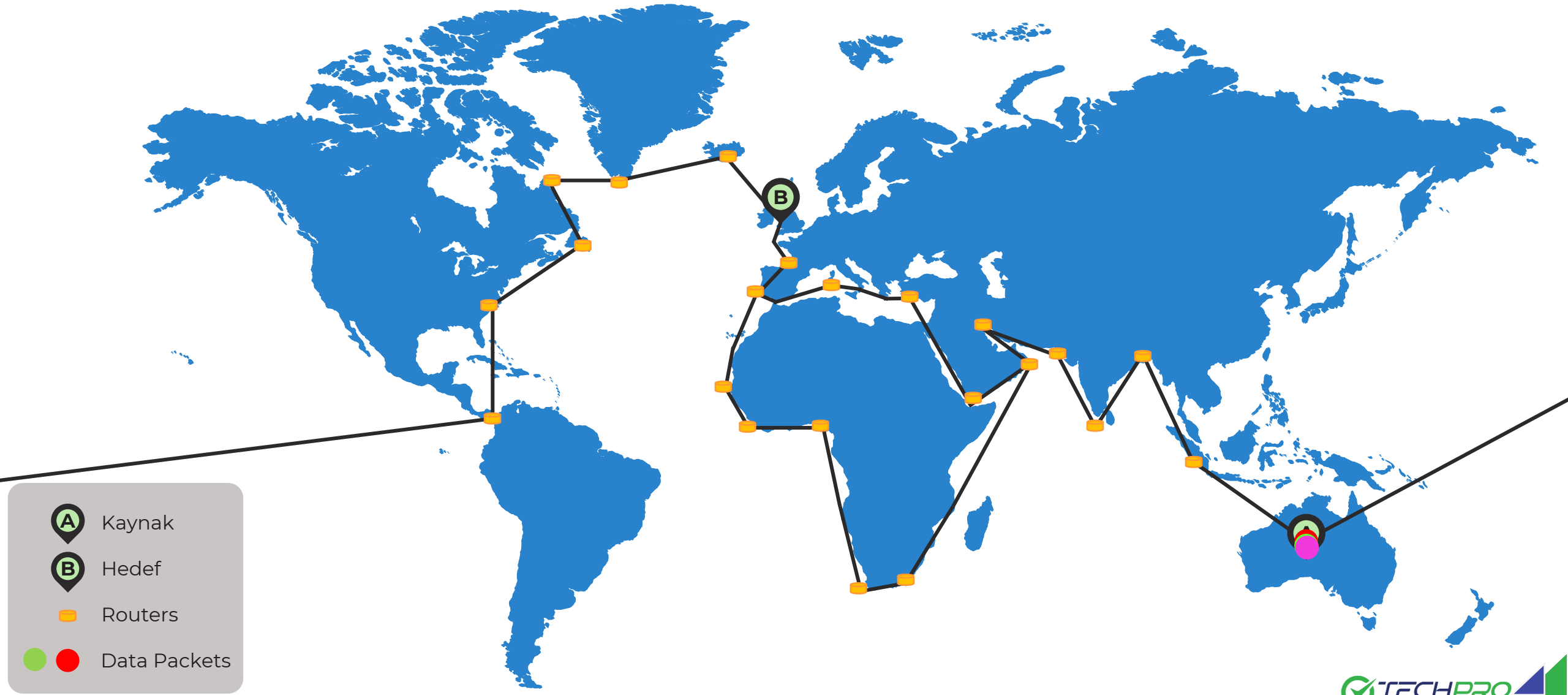
TCP/IP


ISP
(Internet Service Provider)
Public 37.154.150.175
Public
Private
192.168.1.100
Private
Private
LAN (Local Area Network)
Internet

TCP/IP PACKET



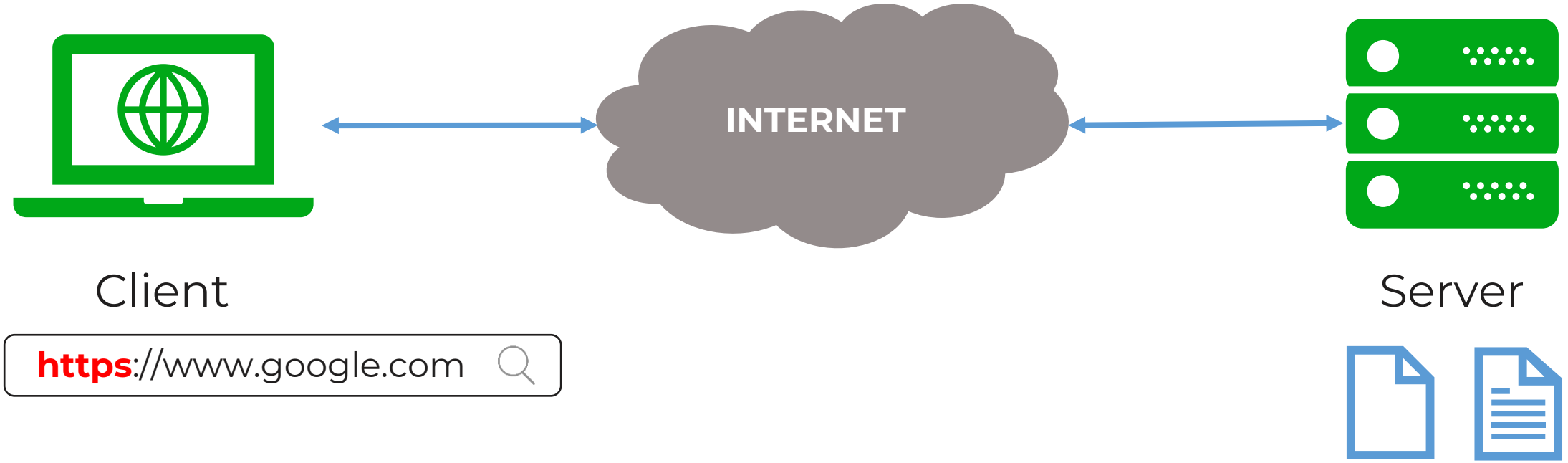
THE JOURNEY OF TCP/IP PACKETS:



TECHPRO EDUCATION

SERVER - CLIENT

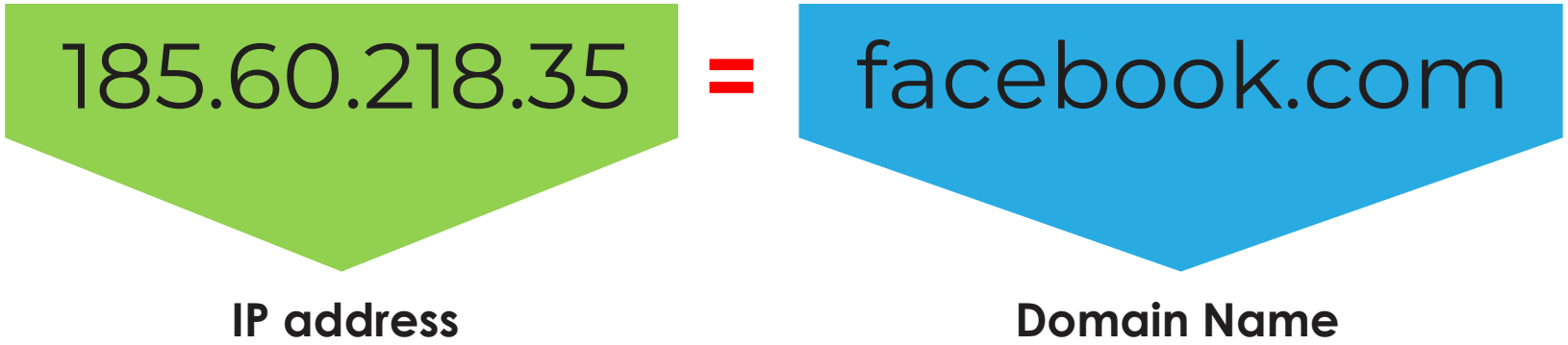
WEB SERVER



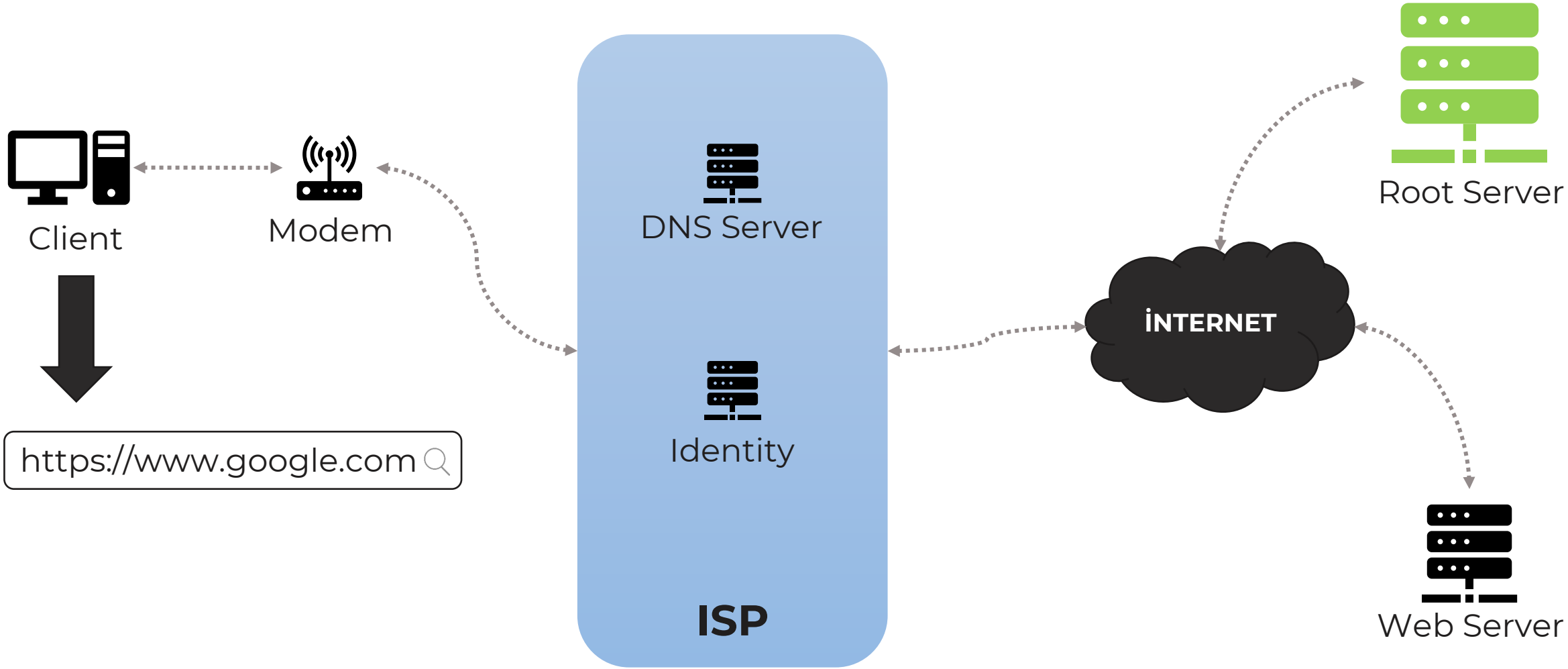
DOMAIN NAME

Domain Name

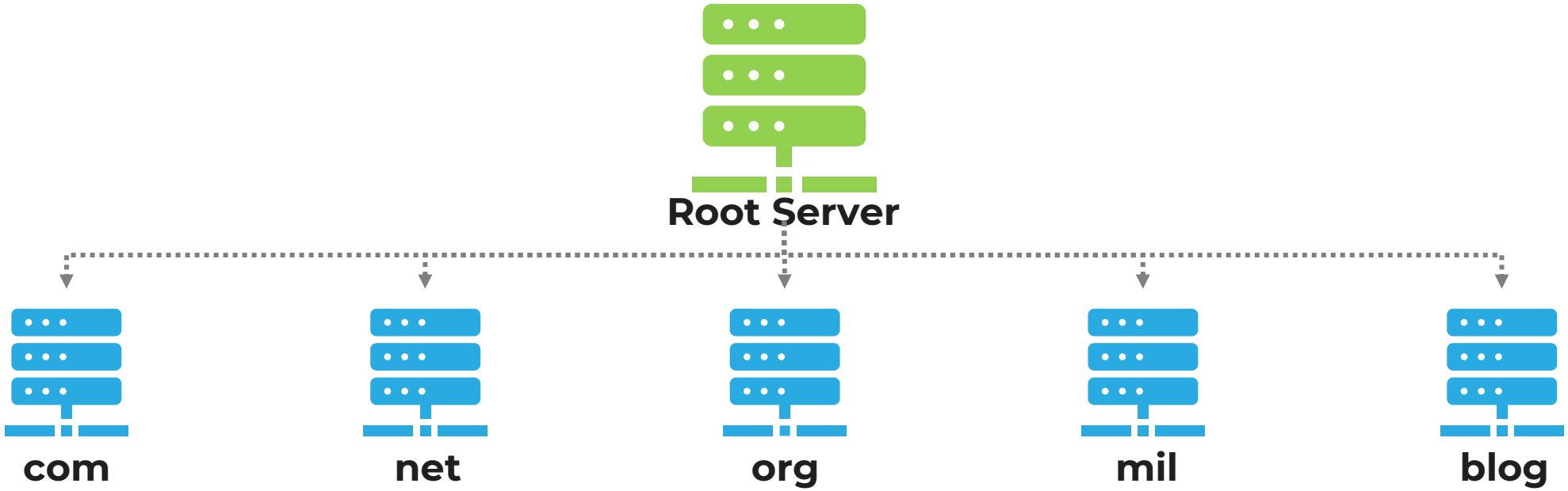
Aliases given to servers for easier memorization of addresses are known as domain names.



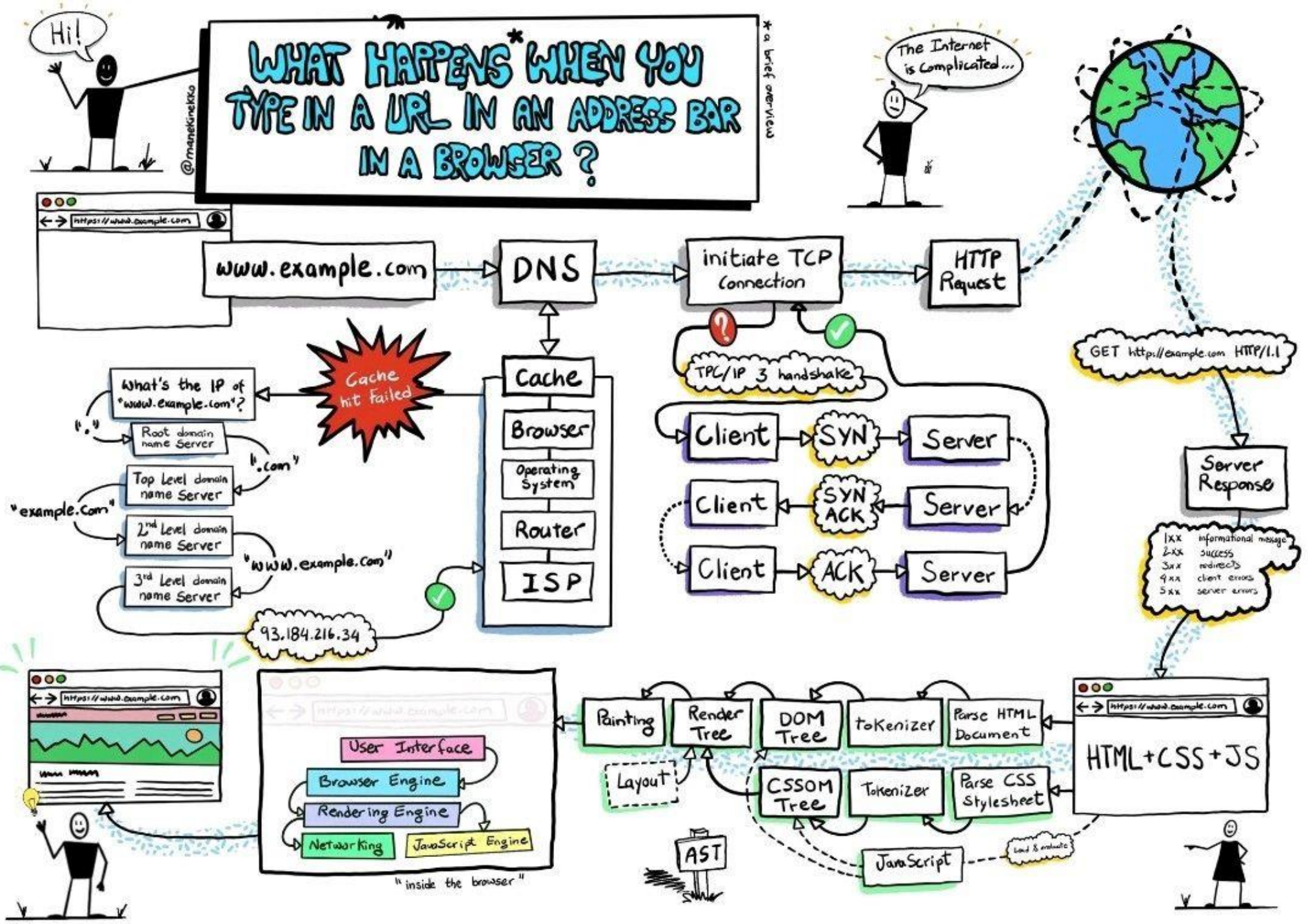
DNS (DOMAIN NAME SYSTEM)



DNS (DOMAIN NAME SYSTEM)



google.com.en


Hi!
@manekineko
WHAT HAPPENS* WHEN YOU TYPE IN A URL IN AN ADDRESS BAR IN A BROWSER ?
* a brief overview
The Internet is complicated...
https://www.example.com
www.example.com
DNS
initiate TCP connection
HTTP Request
GET http://example.com HTTP/1.1
Server Response
1xx informational message
2xx success
3xx redirects
4xx client errors
5xx server errors
TPC/IP 3 handshake
Client
SYN
Server
Client
SYN ACK
Server
Client
ACK
Server
Cache
Browser
Operating System
Router
ISP
Cache hit Failed
What's the IP of "www.example.com"?
"."
Root domain name Server
".com"
Top Level domain name Server
"example.com"
2nd Level domain name Server
"www.example.com"
3rd Level domain name Server
93.184.216.34
HTML+CSS+JS
Parse HTML Document
tokenizer
DOM Tree
Render Tree
Painting
Layout
Parse CSS Stylesheet
Tokenizer
CSSOM Tree
JavaScript
Load & evaluate
AST
User Interface
Browser Engine
Rendering Engine
Networking
JavaScript Engine
"inside the browser"

KAHOOT

Kahoot!

IT Fundamentals

- Malware
- Antivirus
- Firewall
- VPN

Security Basics

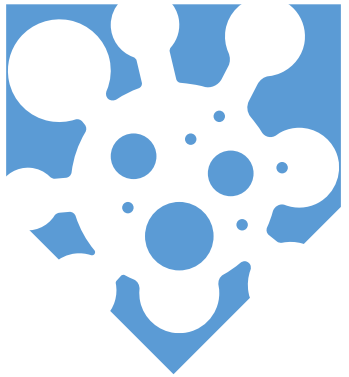
MALWARE

- The general term for malicious software is called "malware" (malicious software).

MALWARE TYPES

Ransomware

Encryption
Ransom



Virus

Destruction, slowdown, obstruction, They do not work without being triggered.

Worm

Like a virus, but no need for triggering.

Trojan

They present themselves as harmless.

Bot

They turn devices into zombies.

ANTIVIRUS

- They are software programs that combat malware, prevent its infection, and if infected, detect and clean it.

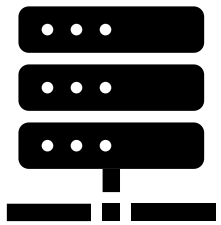
MALWARES

WHAT CAN BE DONE TO PREVENT MALWARE INFECTIONS?

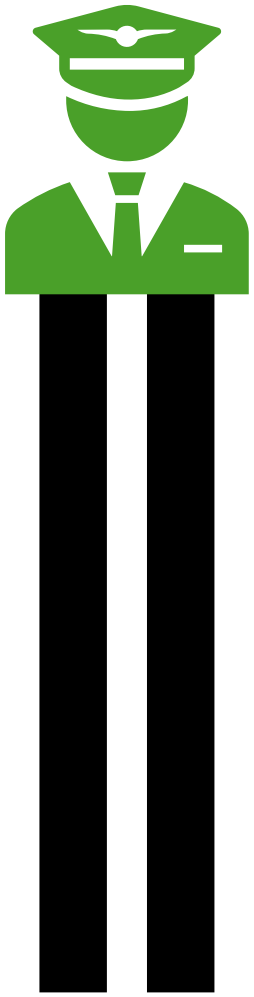
TO PREVENT MALWARE INFECTIONS

- Use antivirus software
- Do not use cracked software
- Install software only from trusted sources or publishers
- Read user reviews
- Check the popularity of applications
- Do not open suspicious emails or click on suspicious links
- Keep your operating system and applications up to date
- Be cautious when connected to free WiFi networks
- Be careful when using USB devices

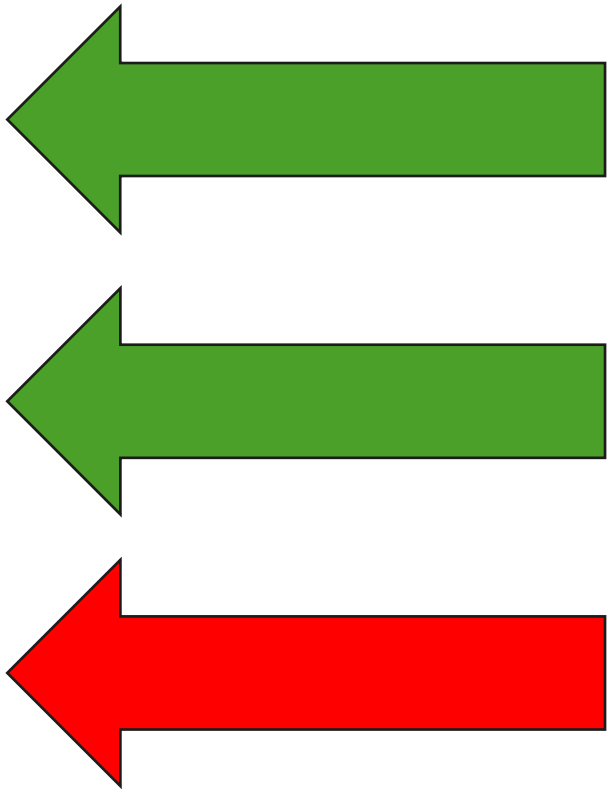
FIREWALL



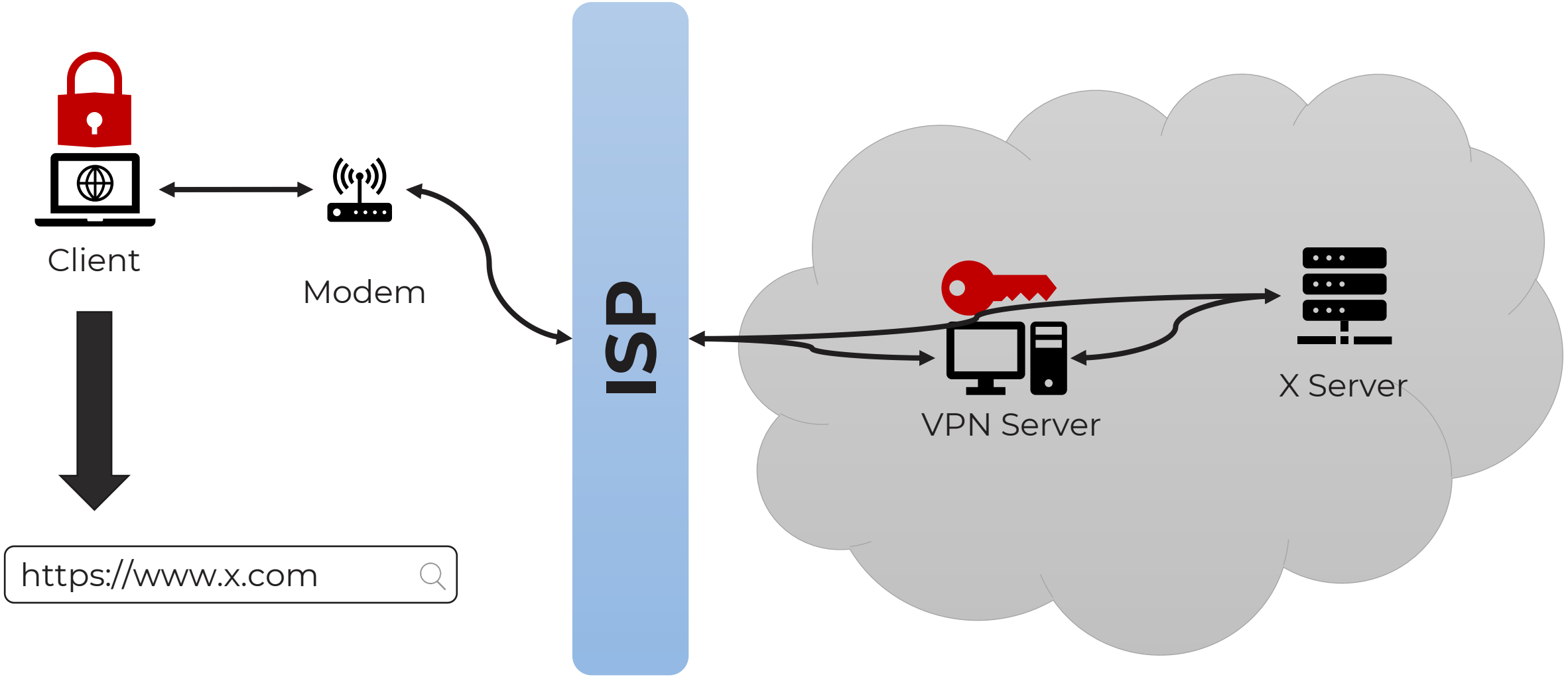
Server



Firewall



VPN (VIRTUAL PRIVATE NETWORK)



- Kahoot

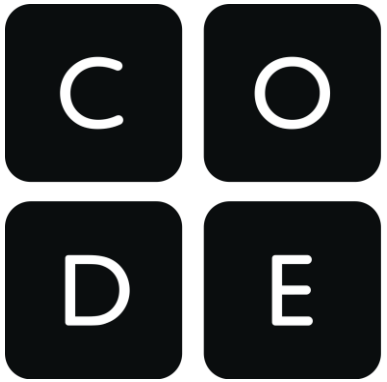
IT Fundamentals

Programming Basics

- Solving Problem
- Computational Thinking
  - Decomposition
  - Pattern Recognation
  - Abstraction
  - Algorithm
- Flowchart
- Pseudo Code

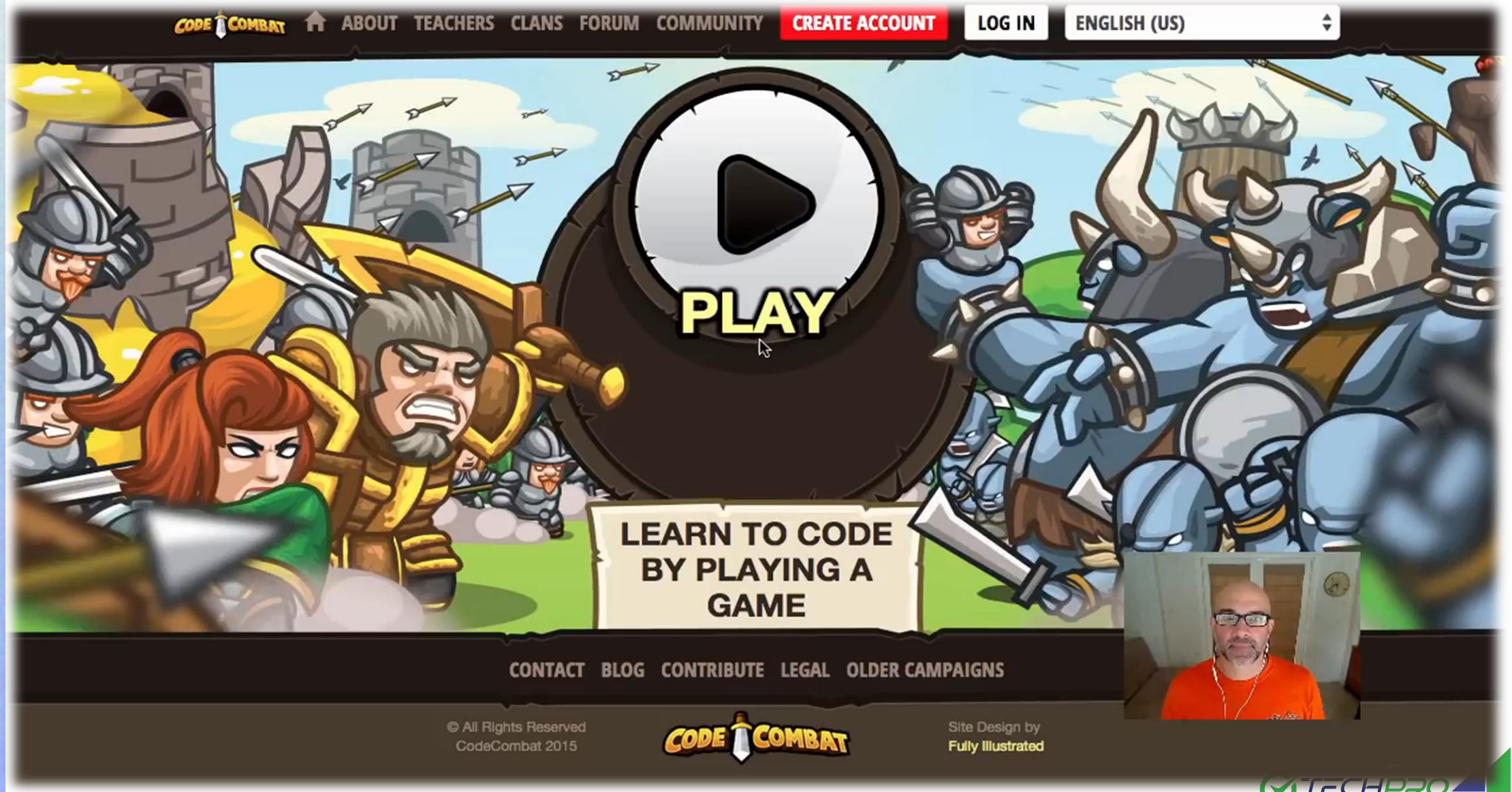
LEARN PROGRAMMING WITH GAMES

HOMEWORK



CODE COMBAT

HOMEWORK



TECHPRO EDUCATION

SOLVING PROBLEM

EVERY SOFTWARE IS ACTUALLY

A SOLUTION

TO A PROBLEM.

SOLVING PROPLM

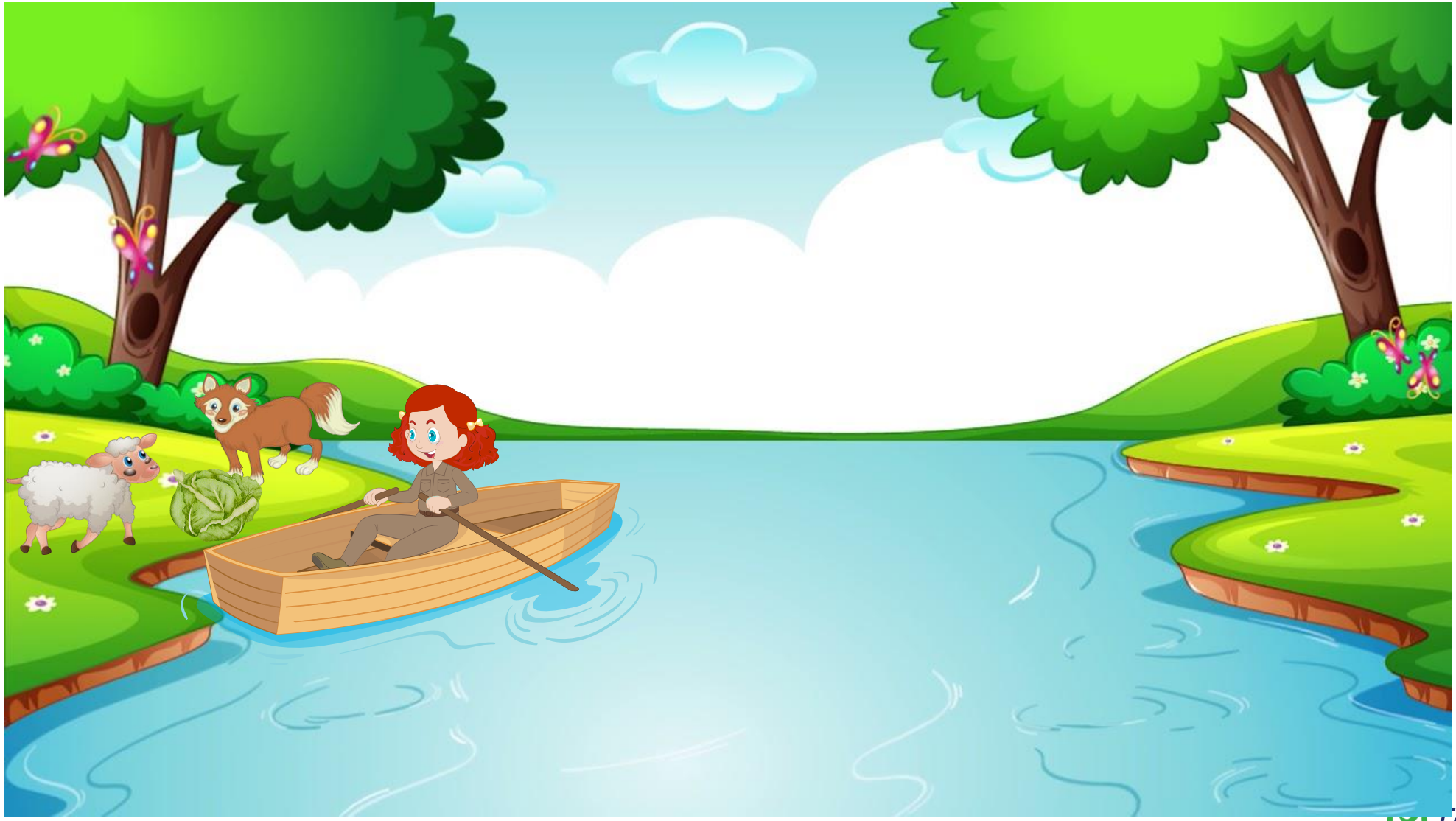
EXAMPLE OF ALGORITMA

https://www.youtube.com/watch?v=xoqQKFtfzvM

GROUP STUDY

- Let's divide into Zoom Breakout Rooms to solve a problem.
- As a group, identify a problem and create steps for a solution.
- You have 15 minutes.
- Upon return, we will randomly select a group.
- We will collect the project idea names from all groups.

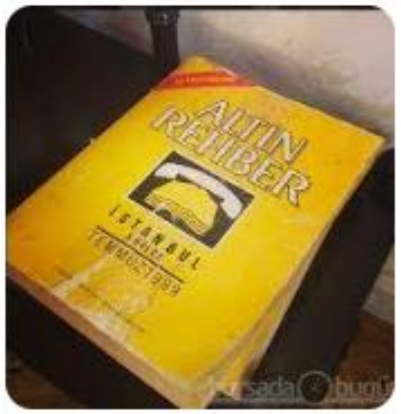
SOLVING PROBLEM



SOLVING PROBLEM

PRACTISE

HOW WOULD YOU SYSTEMATICALLY FIND THE PHONE NUMBER OF A PERSON NAMED JOHN DOE IN AN ALPHABETICALLY PRINTED TELEPHONE DIRECTORY?



Pear Deck
TECHPRO EDUCATION

SOLVING PROBLEM

PRACTISE

1

Checking all the entries one by one from the first page to the last page.

Linear search

2

Dividing the book into blocks consisting of certain pages. Identifying the block where the target is located and searching there.

Jump search

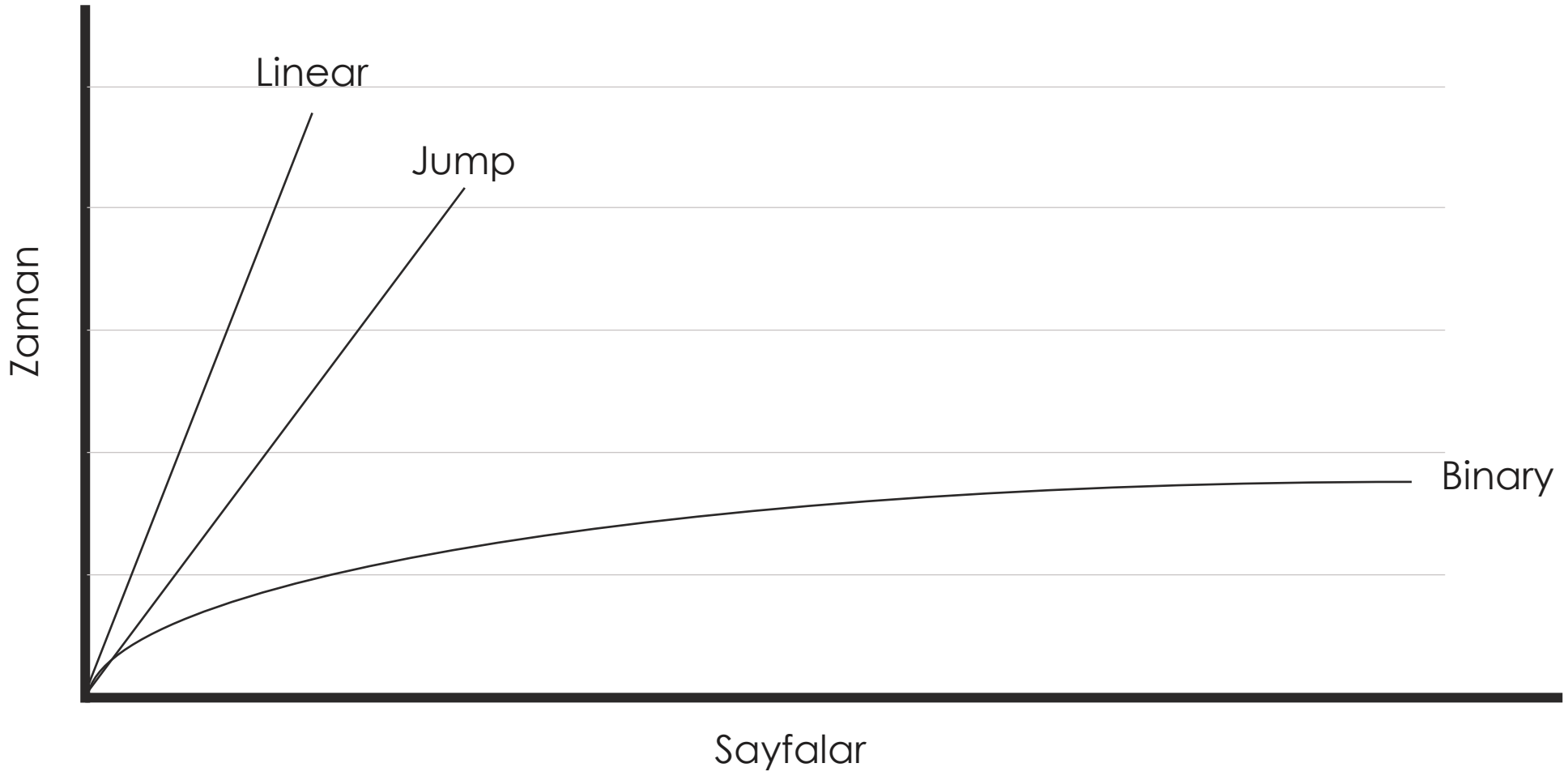
3

Continuously dividing the book in half and proceeding with the division by selecting the side where the target is located.

Binary search

SOLVING PROBLEM

PRACTISE

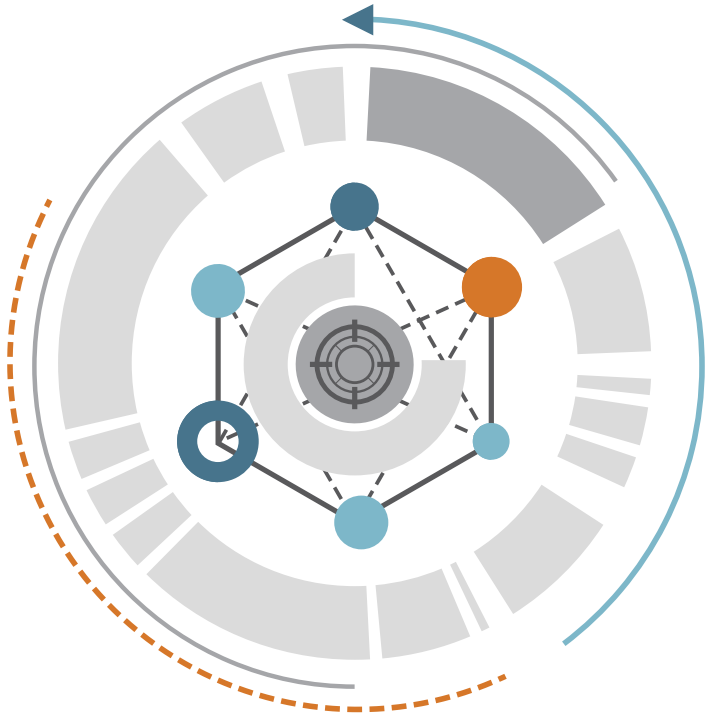


COMPUTATIONAL THINKING

COMPUTATIONAL THINKING

Decomposition | Pattern Recognation | Abstraction | Algorithm

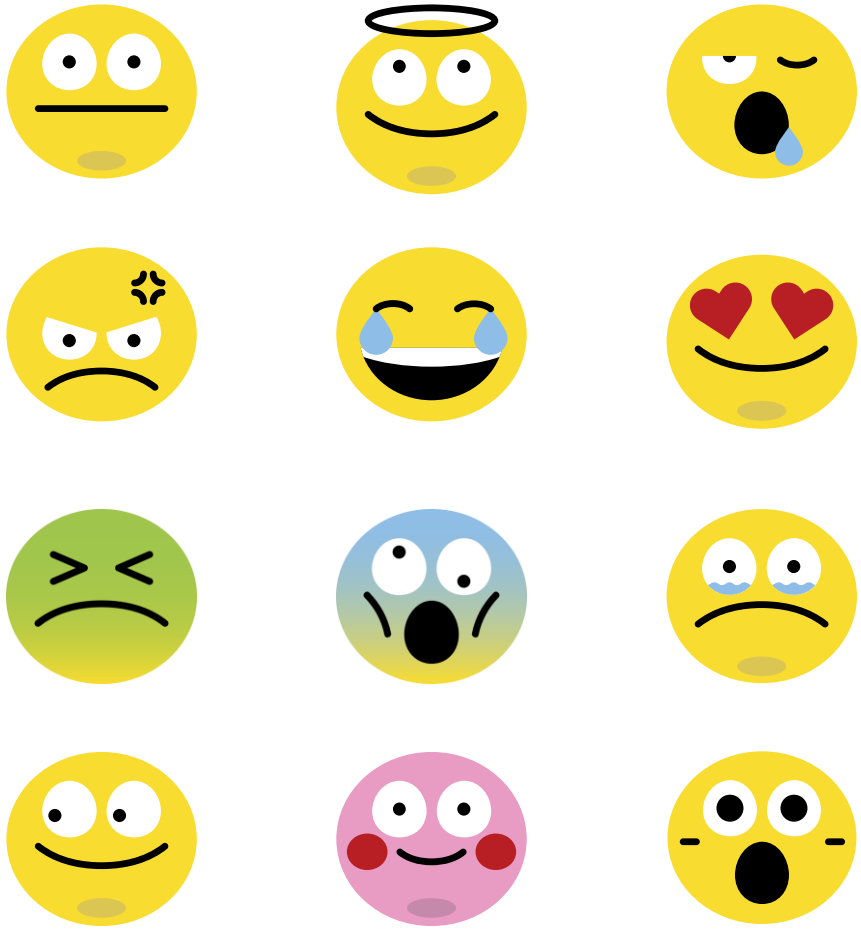
Divide, Break Down, Solve



DECOMPOSITION

PRACTISE

- **An emoji is desired to be created with definable face, eye, and mouth types. Perform decomposition for this project.**



DECOMPOSITION

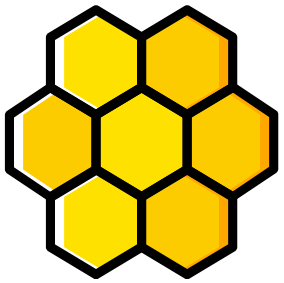
Mouth

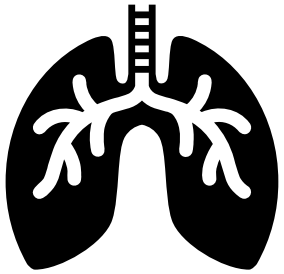
Eyes

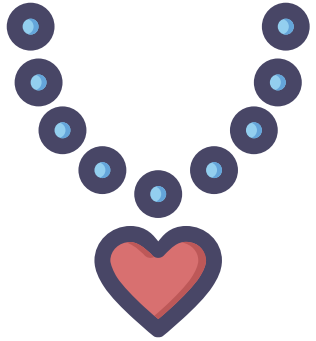
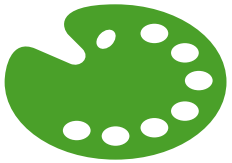
Face

COMPUTATIONAL THINKING

Decomposition | **Pattern Recognation** | Abstraction | Algorithm



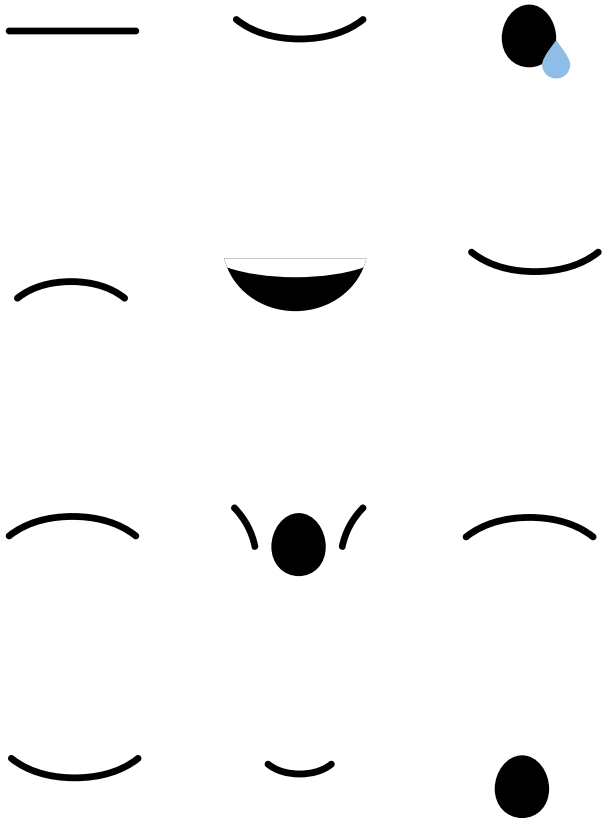


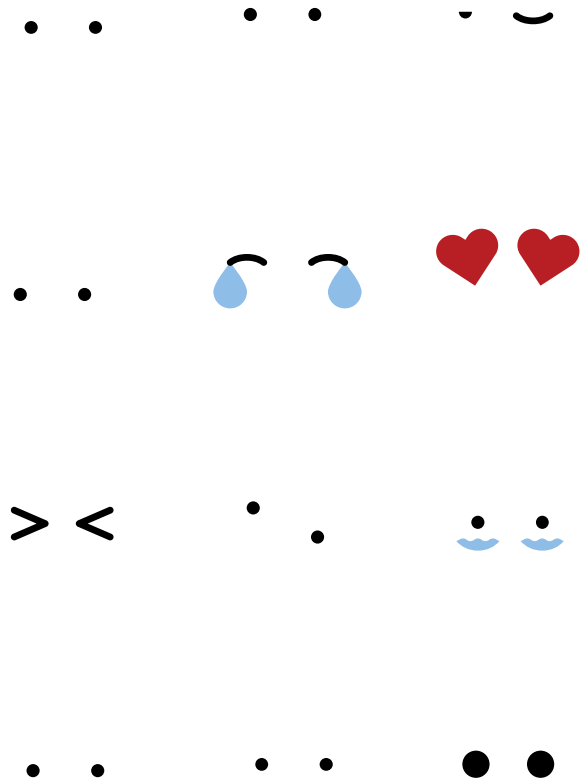
PATTERN RECOGNATION

PRACTISE

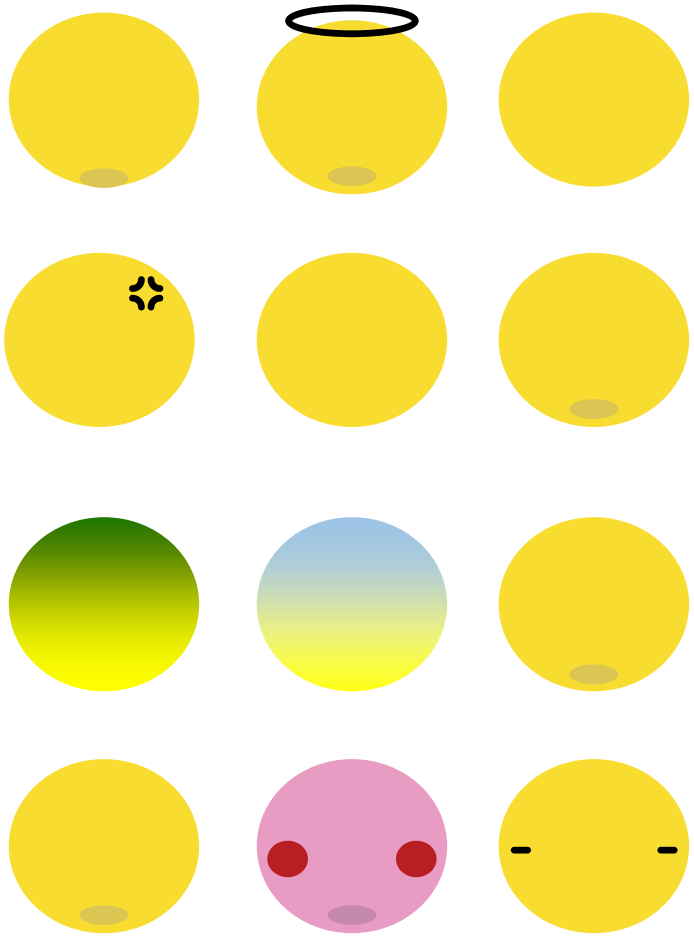
Mouth



Eyes



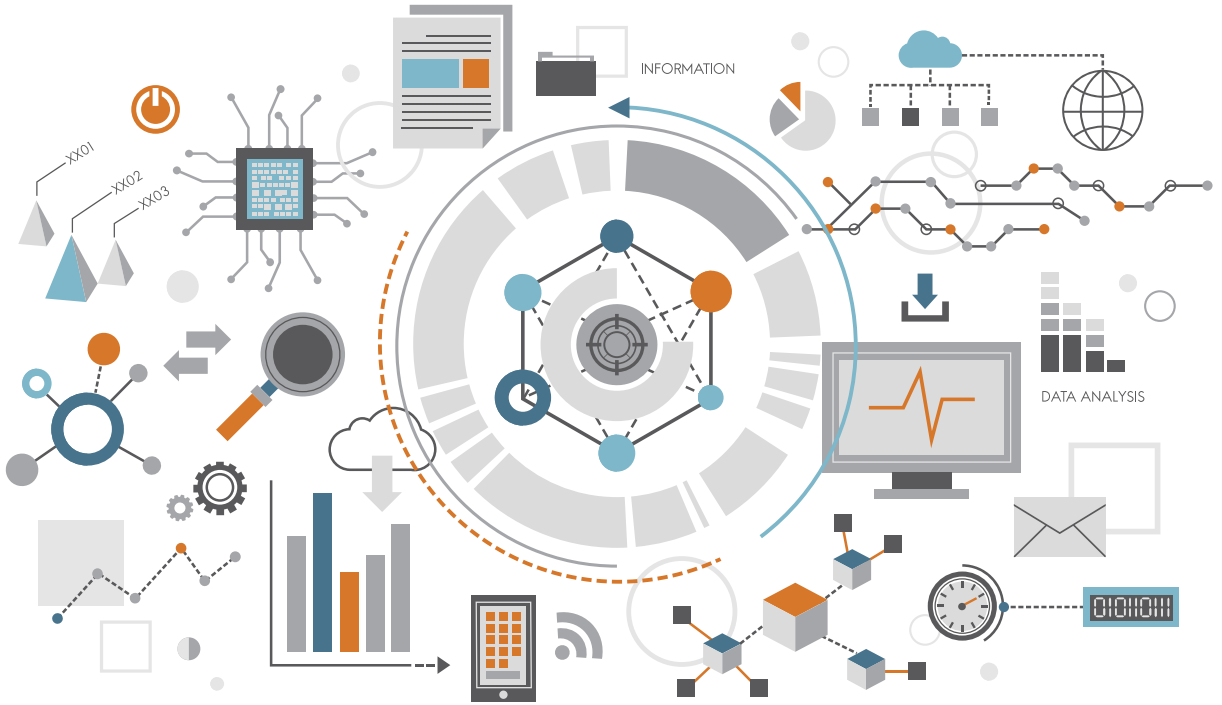
Faces

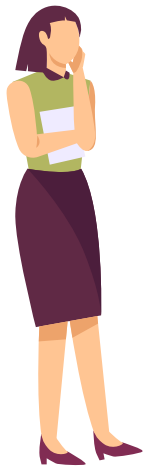


COMPUTATIONAL THINKING

Decomposition | Pattern Recognation | **Abstraction** | Algorithm

«Look at the big picture»

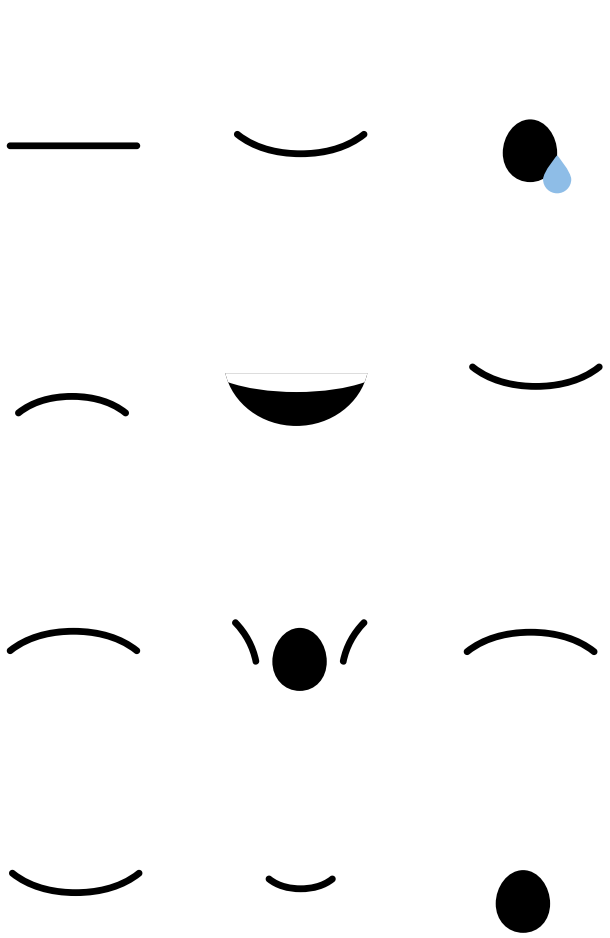


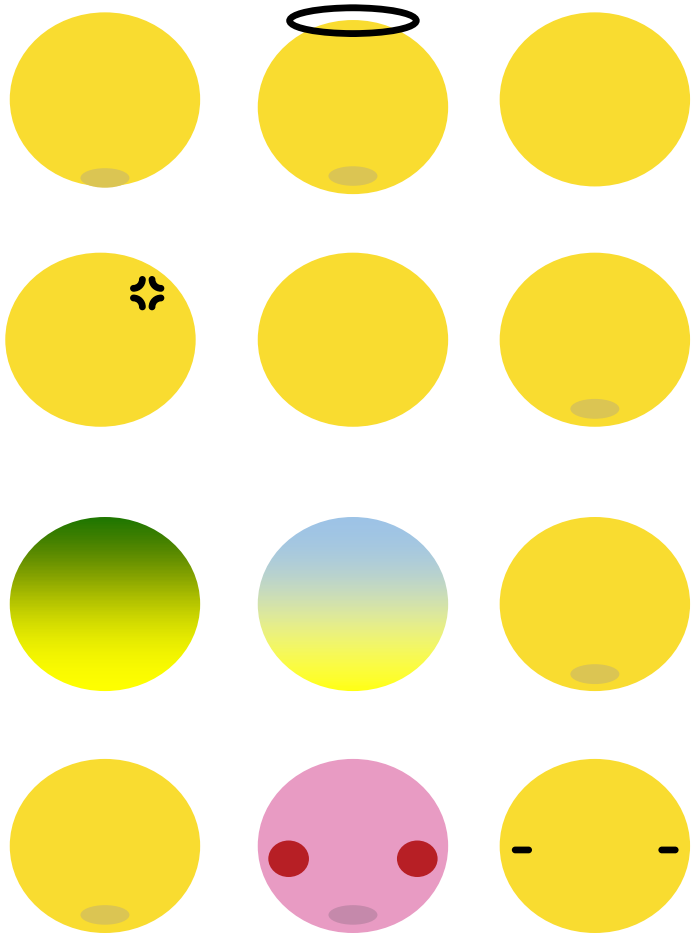


TECHPRO EDUCATION

ABSTRACTION

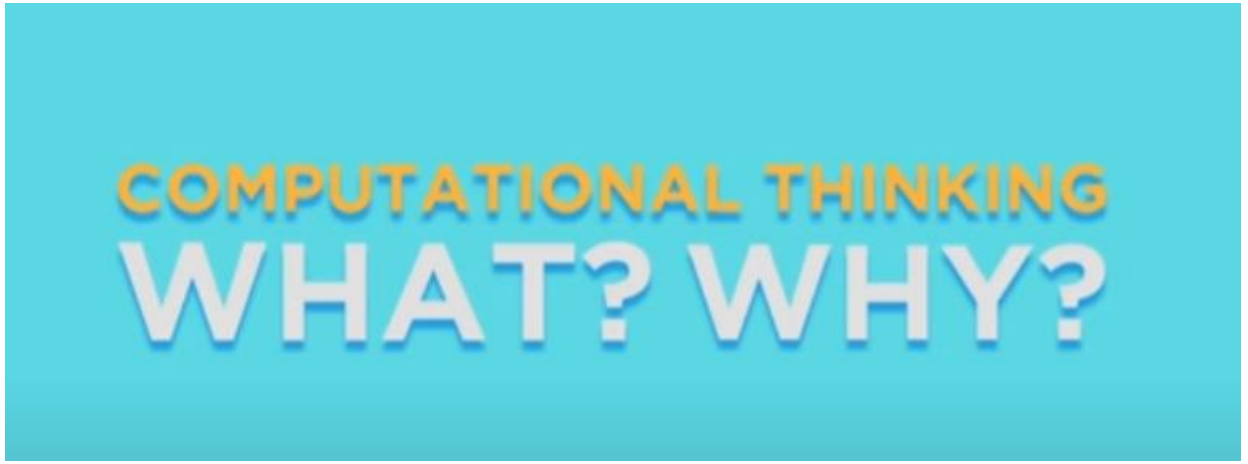
PRACTISE





CT VIDEOS

- https://www.youtube.com/watch?v=mUXo-S7gzds



- https://www.youtube.com/watch?v=_TWsmF8I418
- https://www.youtube.com/watch?v=91utNt5qshE

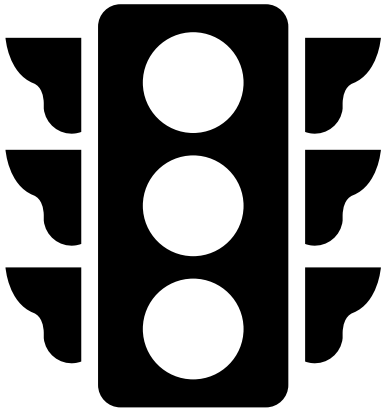
GROUP STUDY

- Let's divide into Zoom Breakout Rooms to solve a problem.
- As a group, identify a problem and try to solve it using Computational Thinking logic.
- You have 15 minutes.
- Upon return, we will randomly select a group.
- We will collect the project idea names from all groups.

COMPUTATIONAL THINKING

PRACTISE

A system will be created to detect vehicles passing through red lights and generate a penalty record for their license plate. Solve this problem using computational thinking.



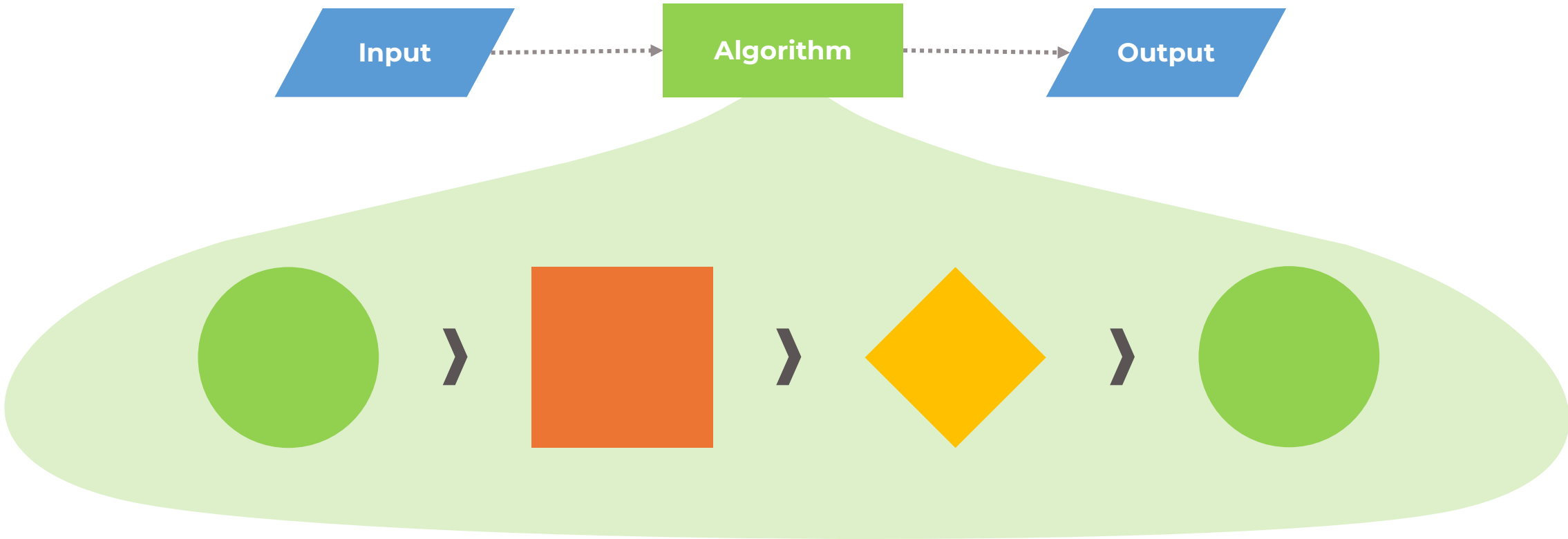
PRACTISE

- Please draw the shape described by your friend in the gray area on the right.*Peardeck*

TECHPRO EDUCATION

COMPUTATIONAL THINKING

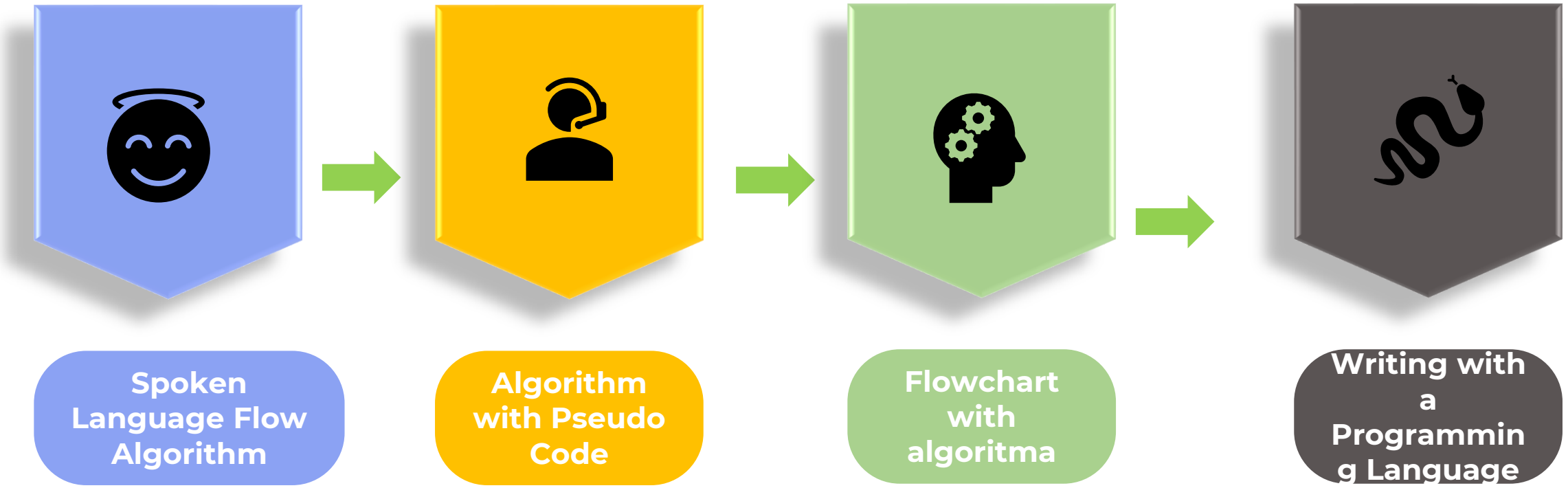
Decomposition → Pattern Recognation → Abstraction → **Algorithm**



CT GROUP STUDY

- Let's split into Zoom Breakouts and solve a problem.
- As a group, identify a problem and evaluate it according to CT steps. You have 15 minutes.
- Upon return, the solution will be explained with a mind map(gitmind.com)
- We will take the name of the Project idea from all the groups.

PROGRAMMING FOUNDATIONS SEQUENCE



FUNDAMENTALS OF PROGRAMMING

How can we tell a small child to turn on the air conditioner when it's hot?

- When you think it's hot, grab the air conditioner remote.
- Find the big red button on the climate control.
- Press the red button once.
- If you have problems, ask an adult for help.

FUNDAMENTALS OF PROGRAMMING

So what if we load this task into a program?

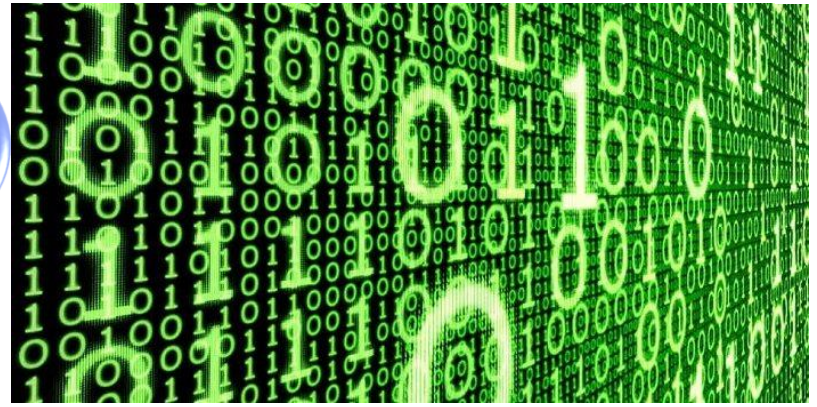
- Measure the ambient temperature.
- If the temperature is above 27 degrees, it will run the air conditioner.
- Measure the ambient temperature every 15 minutes and restart as needed.

FUNDAMENTALS OF PROGRAMMING

What is Algorithm?

What is the benefit of an algorithm?

The logic of programming



ALGORITMA

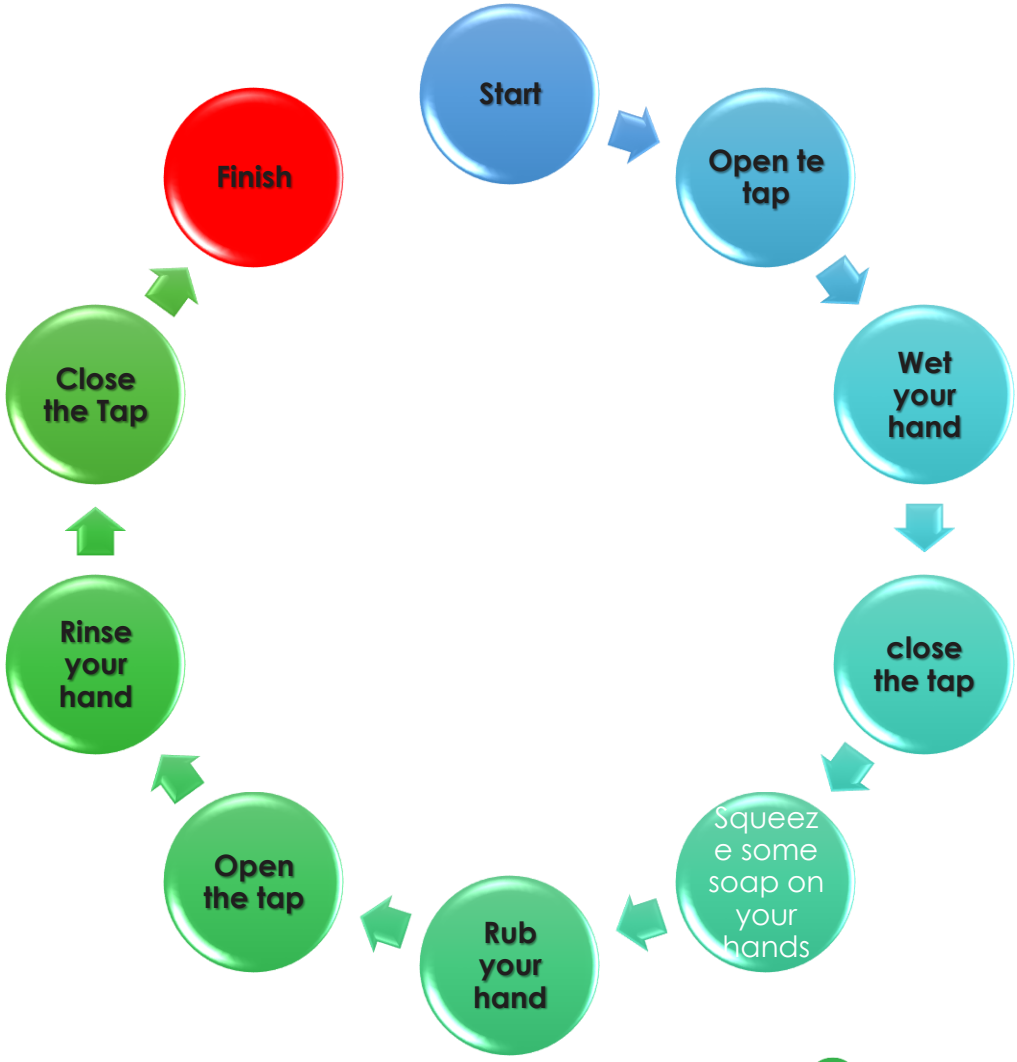
PRACTISE

Listen to your friend, follow the commands and try to draw the desired shape.

ALGORITMA

PRACTISE

Write down the hand washing algorithm



ALGORITMA

PRACTISE

Write the algorithm of the cooking Cake program for 4 people.

Step 1: Get started

Step 2: Take the 20*10 (3 lt) pot

Step 3: Turn on the faucet and fill the pot with 2 liters of running water.

Step 4: Put the pot in which you put water on the stove

Step 5: Turn on the stove where you put the pot

Step 6: Wait for the water to boil

Step 7: Add 1 teaspoon of salt and 1 tablespoon of oil to the water.

Step 8: Take a package of pasta and open the package flat.

Step 9: Slowly pour all of the unpacked pasta into the boiling water.

Step 10: Close the lid of the pot

11. Step: Mix gently for 7 seconds at the 5th and 10th minutes

12th Step: Check the pasta in the 12th minute, if it is cooked, turn off the stove, if not, boil it for 2 more minutes.

Step 13: Take the pot off the stove and carefully pour it into the strainer in the sink.

Step 14: Put the strainer in a suitable place on the counter

Step 15: Put the empty pot back on the stove and start the cooking zone you put in.

16. Step: Put 1 tablespoon of oil and 100 g of butter in the pan and melt it.

Step 17: Put the pasta in the strainer into the saucepan with the melted butter and mix it carefully.

Step 18: Turn off the stove.

Step 19: Finish

ALGORITMA

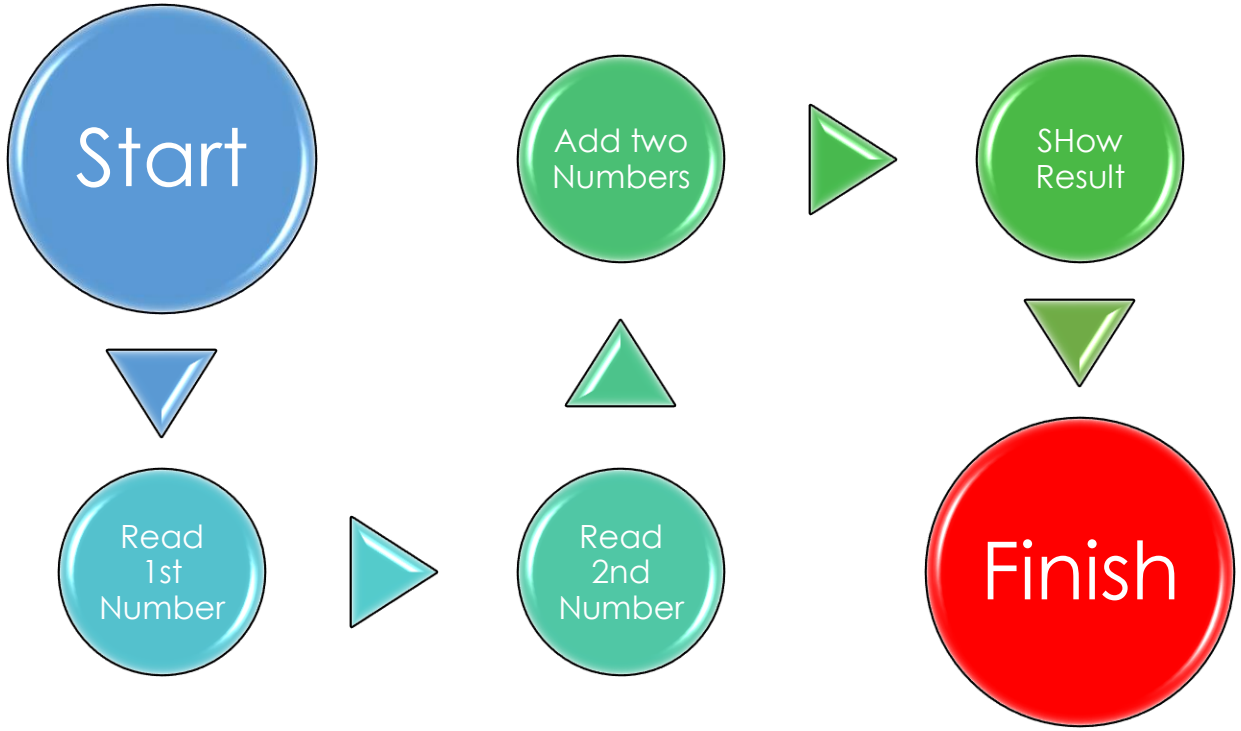
PRACTISE

Write the algorithm of the pasta cooking program for 4 people.

ALGORITMA

PRACTISE

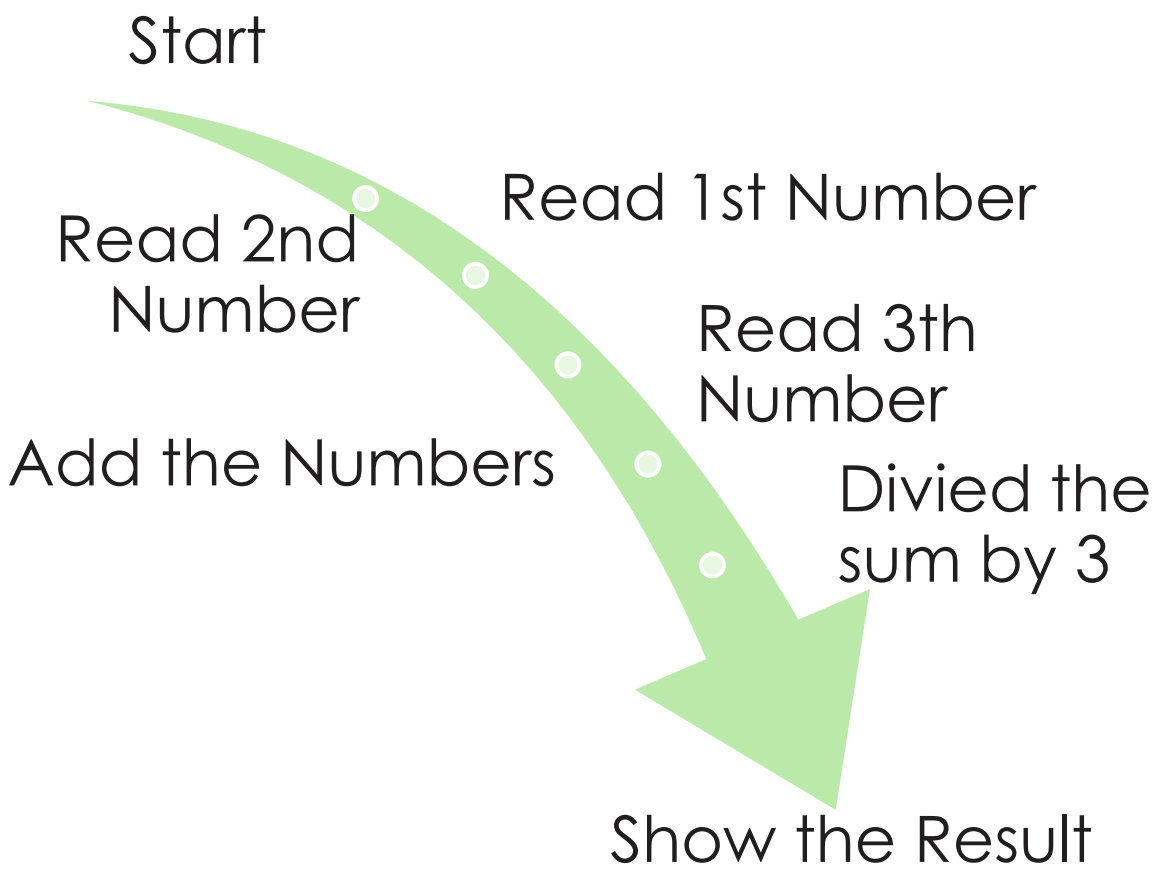
Write the algorithm of the program to find the sum of 2 numbers.



ALGORITMA

PRACTISE

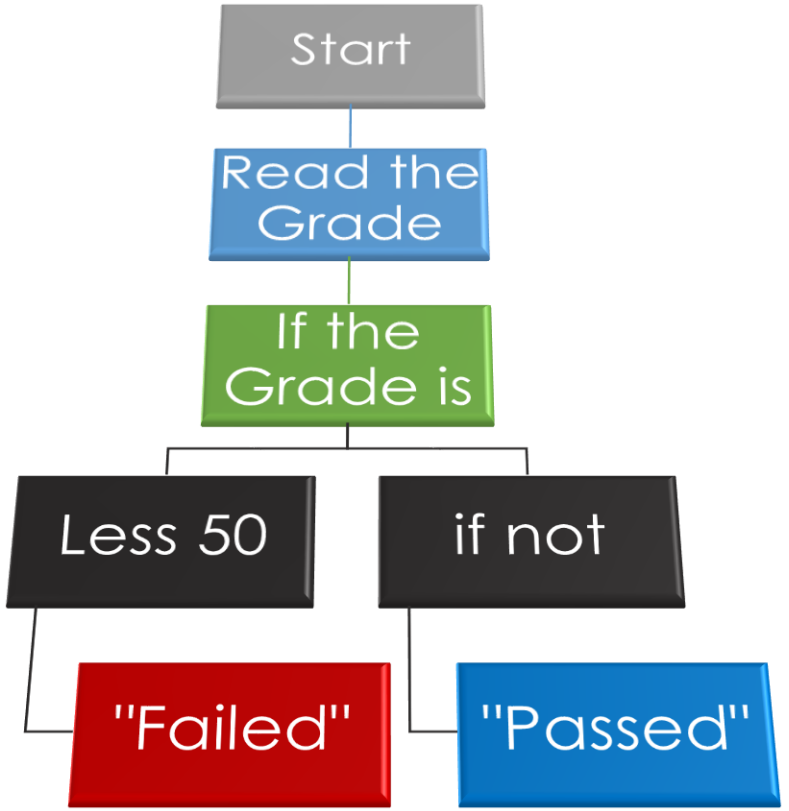
Write the algorithm of the program that finds the average of 3 numbers.



ALGORITMA

PRACTISE

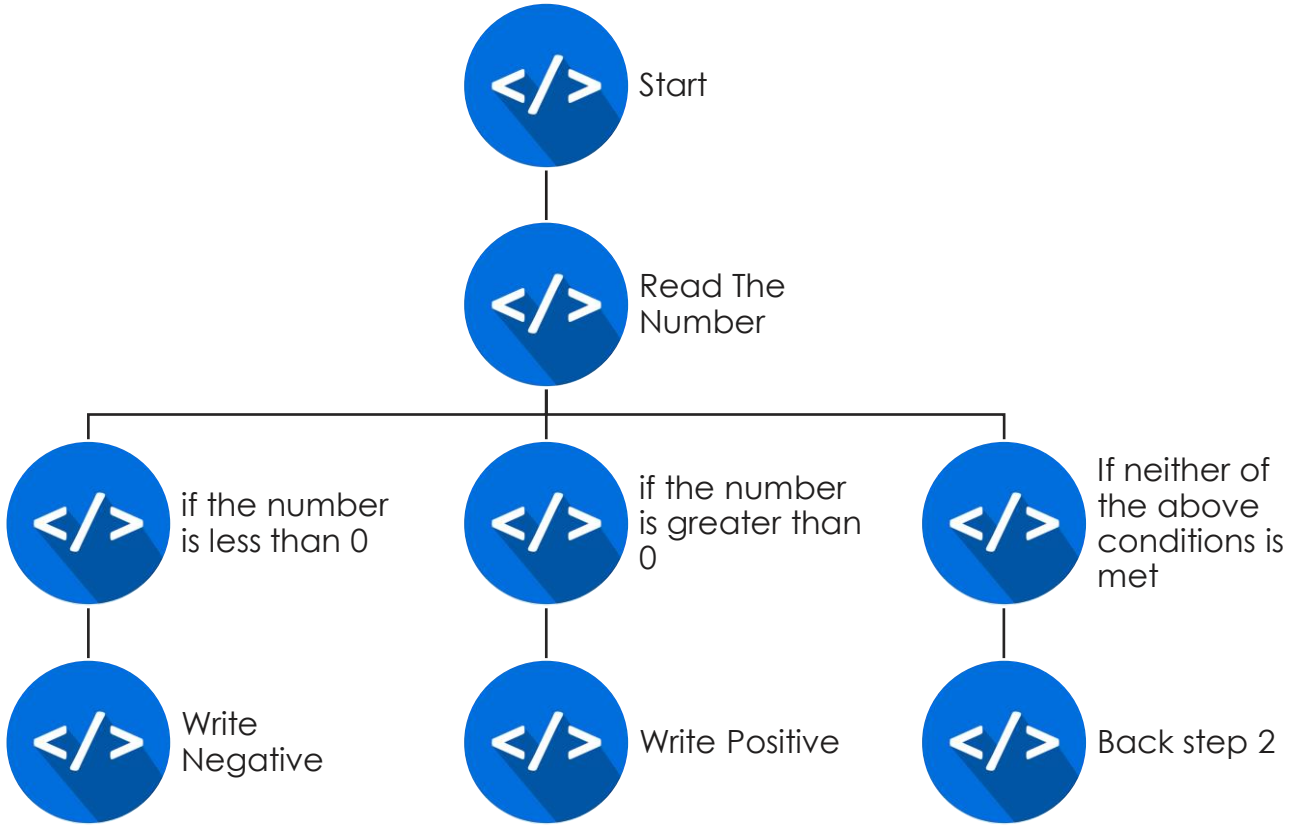
If a grade entered is less than 50, write the algorithm of the program that says "failed", otherwise "passed".



ALGORITMA

PRACTISE

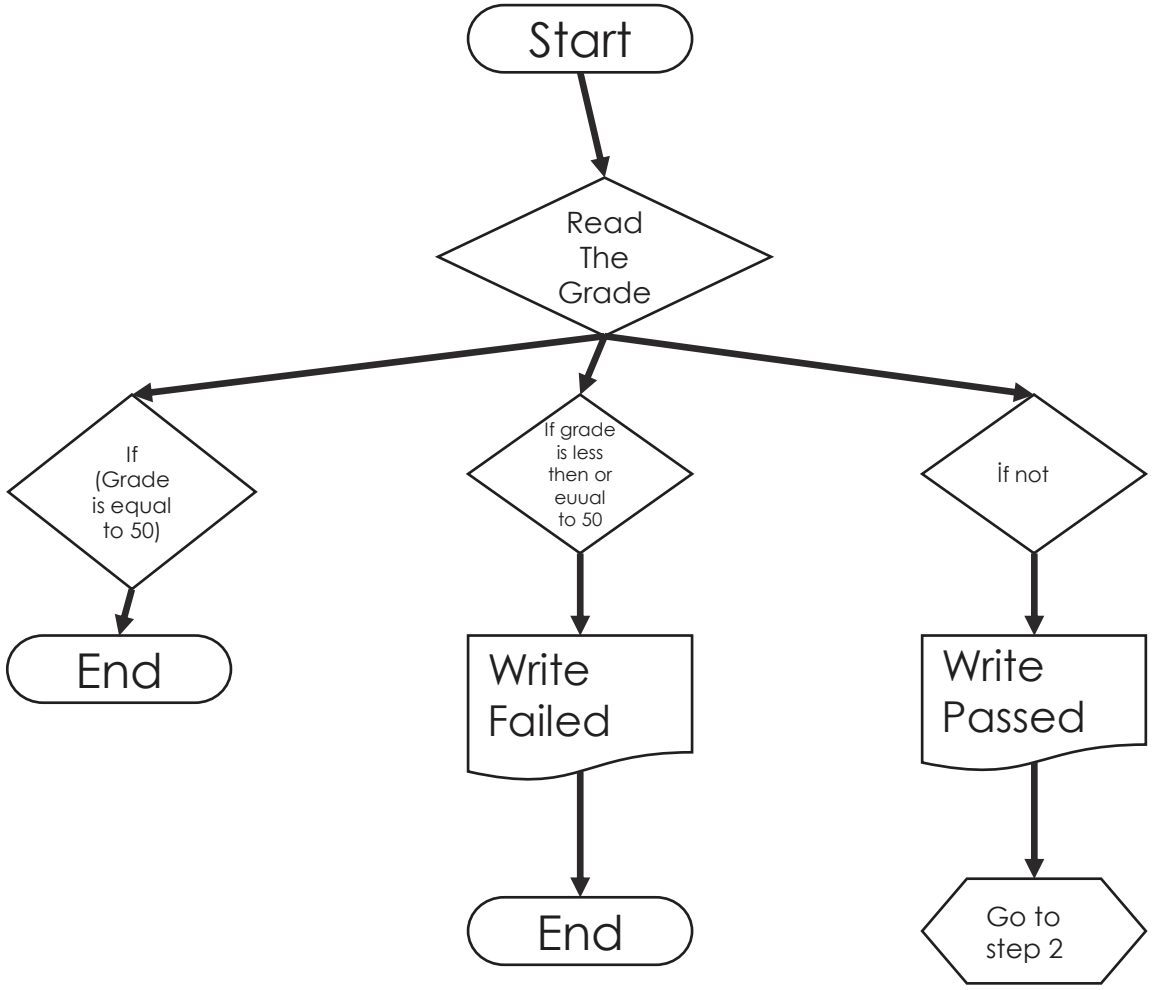
Write the algorithm of a program that determines whether an entered number is positive or negative and requests a new number if zero is entered.



• Algoritma

PRACTISE

Write an Algorithm of the program that writes failed, passed for each student according to whether the grades of the students in a class are less than or greater than 50



TECHPRO EDUCATION

PSEUDO CODE

- The writing of algorithms with expressions closer to programming languages without being dependent on any language is called pseudocode.

PSEUDO CODE

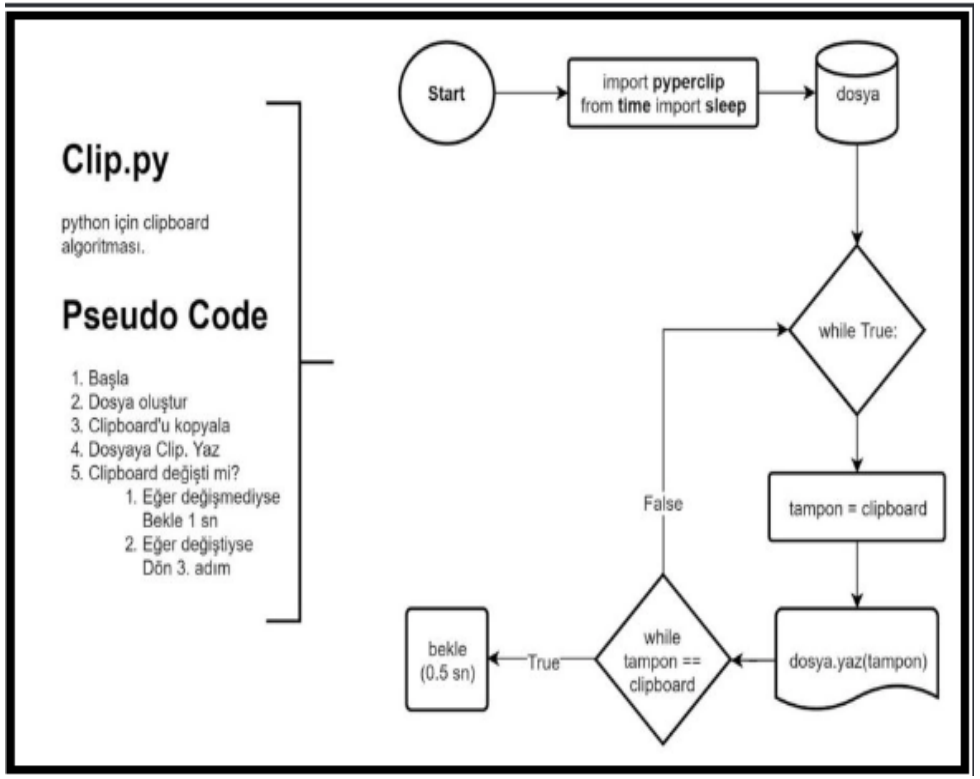
Algorithm and pseudo code study of the program that adds two numbers

Algoritma

1. Start
2. Enter first number
3. Enter the second number
4. add the two numbers
5. Write the result
6. Finish

Pseudo code

1. START
2. DECLARE x, y, t
3. INPUT x, y
4. SET t = x + y
5. PRINT t
6. END



PSEUDO CODE

command	Explanation
START	Pseudo code indicates you have started
DECLARE	It is used to define variables.
INPUT	Used when information is received from the user
READ / GET	Used when reading information from a file
PRINT, DISPLAY, SHOW	Used to show results
SET, INIT	Used to assign a value
IF, ELSE IF, ELSE	Used in decision structures
WHILE	Used to repeat certain code blocks
END	Pseudo indicates that the code is finished

PSEUDO CODE

PRACTISE

Write the algorithm of the program that takes the average of two numbers entered from the keyboard

PSEUDO CODE

PRACTISE

Write the algorithm of the program that calculates the area of the triangle whose sides are entered from the keyboard.

PSEUDO CODE

PRACTISE

Write the algorithm of the program that finds and displays the larger of two numbers entered from the keyboard.

PSEUDO CODE

PRACTISE

Write the algorithm of the program that calculates the average of two grades entered from the keyboard, if the average is less than 45, it says "failed", otherwise "passed"

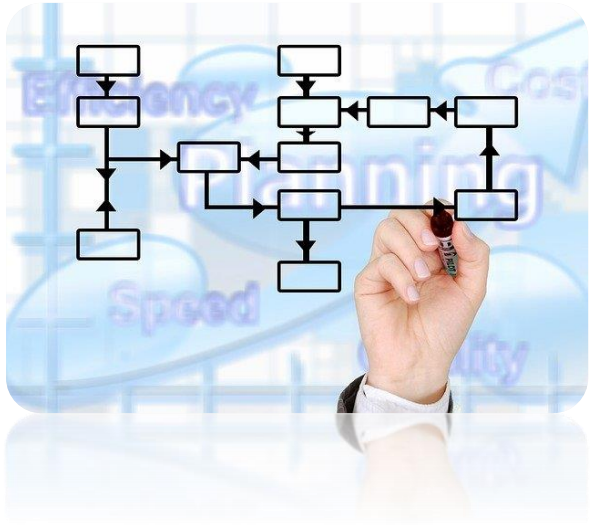
PSEUDO CODE

PRACTISE

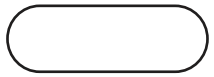
Write the algorithm of the program that prints «Javascript»

10 times to the screen

FLOWCHART



Pseudocode is represented with shapes



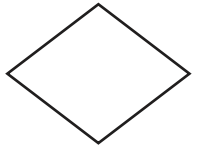
Start and finished

Value assignment and arithmetic operations

data entry

Function

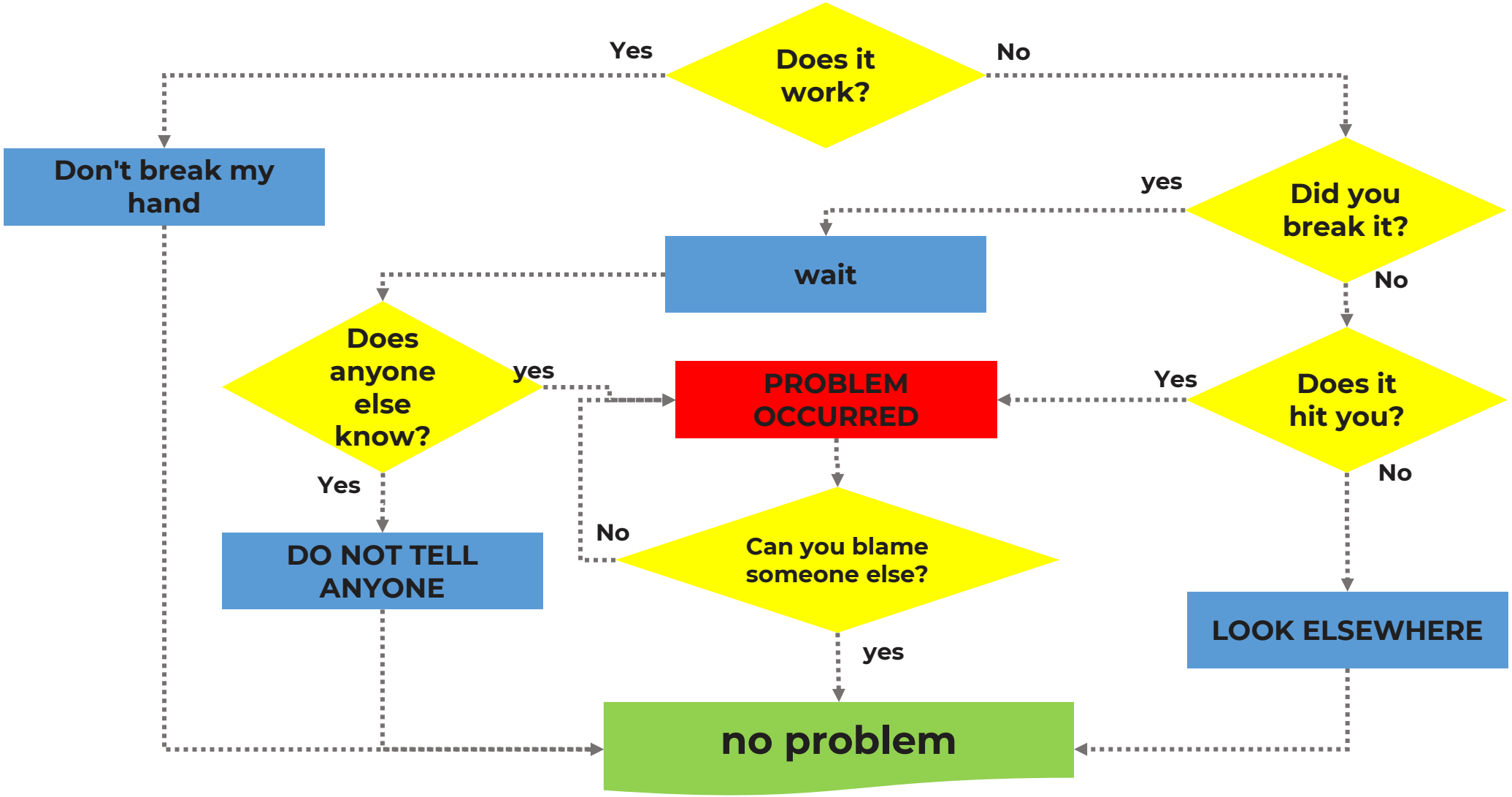
Loop



To decide

Output

FLOW CHART



TECHPRO EDUCATION

FLOW CHART

Download & Install

- **To create a Flowchart, download the application below and install it on your computer.**

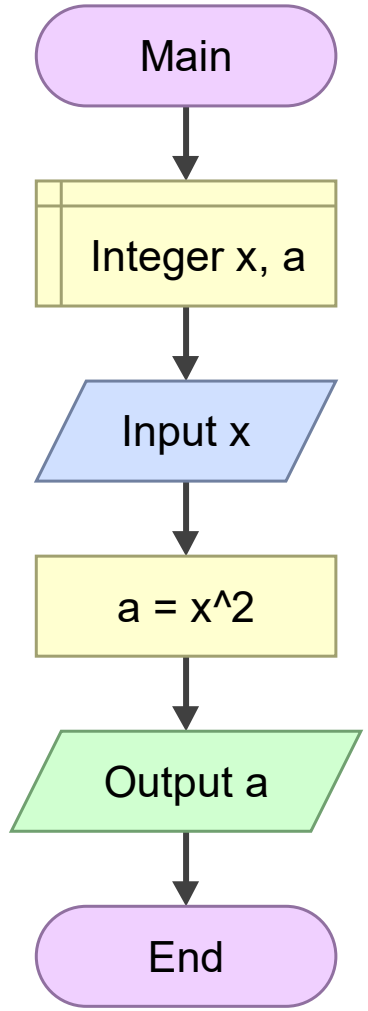
Flowgorithm

http://www.flowgorithm.org

FLOW CHART

PRACTISE

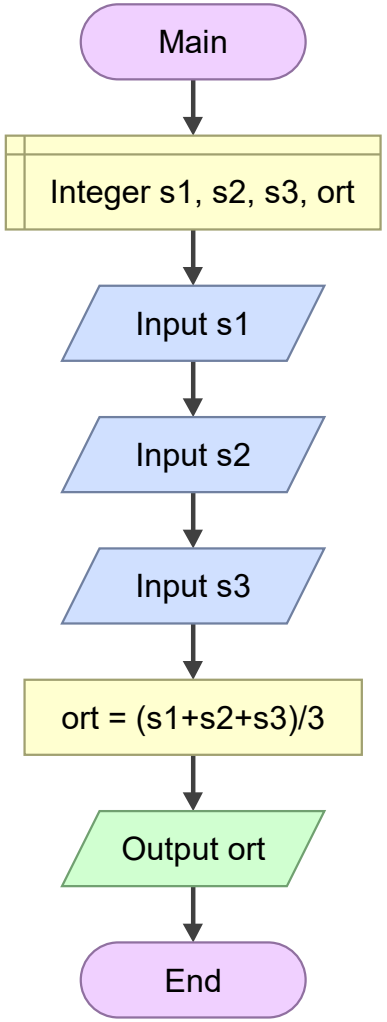
Design the flowchart of the program that finds the area of the square whose side length is entered from the keyboard and shows the result.



FLOW CHART

PRACTISE

Make the flowchart design of the program that finds the average of the 3 numbers entered from the keyboard and shows the result.



Order of Operations

When performing arithmetic operations, the computer performs operations according to operator priority.

( ) Parentheses

** Exponentiation

* Multiplication

/ Division

+ Addition

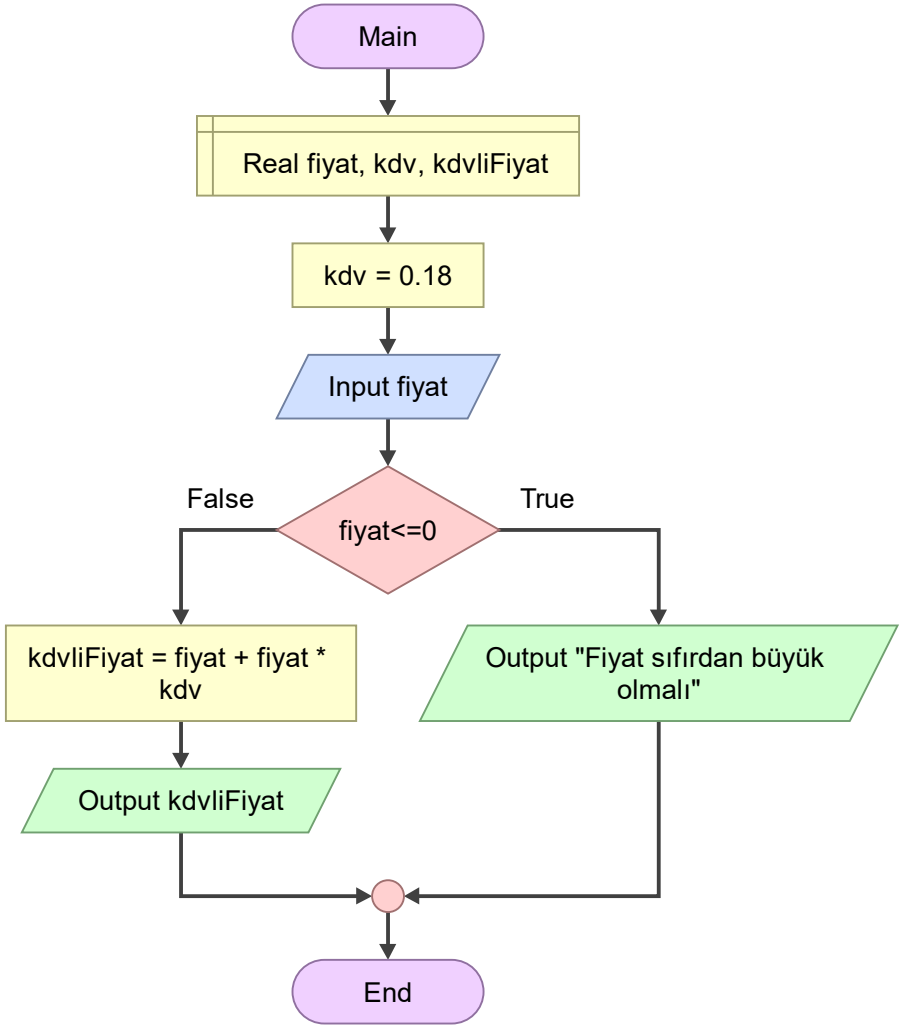
- Subtraction

! If the priority level is the same, it does the left expression first.

FLOW CHART

PRACTISE

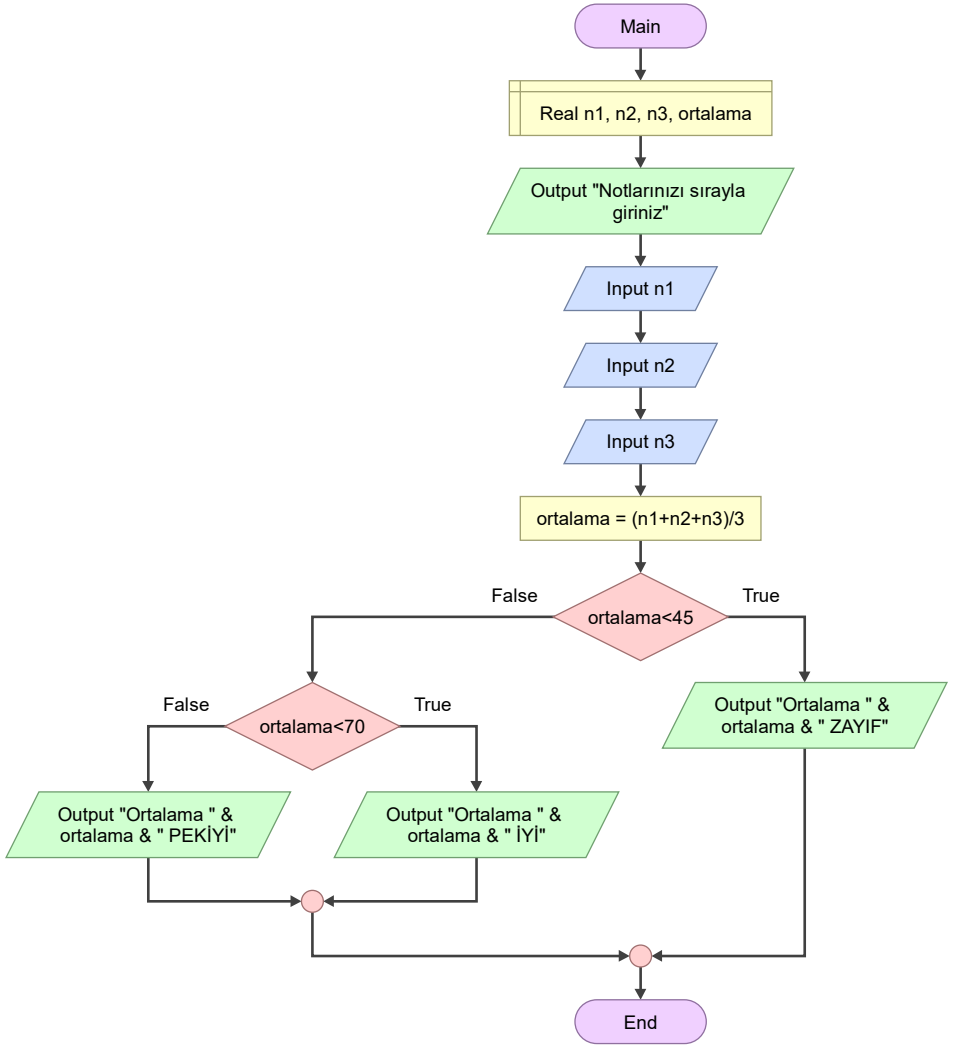
Make the flowchart design of the program that shows the price of the product entered from the keyboard, including 18% VAT. If the entered number is less than or equal to 0, it should give a warning and terminate the program.



FLOW CHART

HOMEWORK

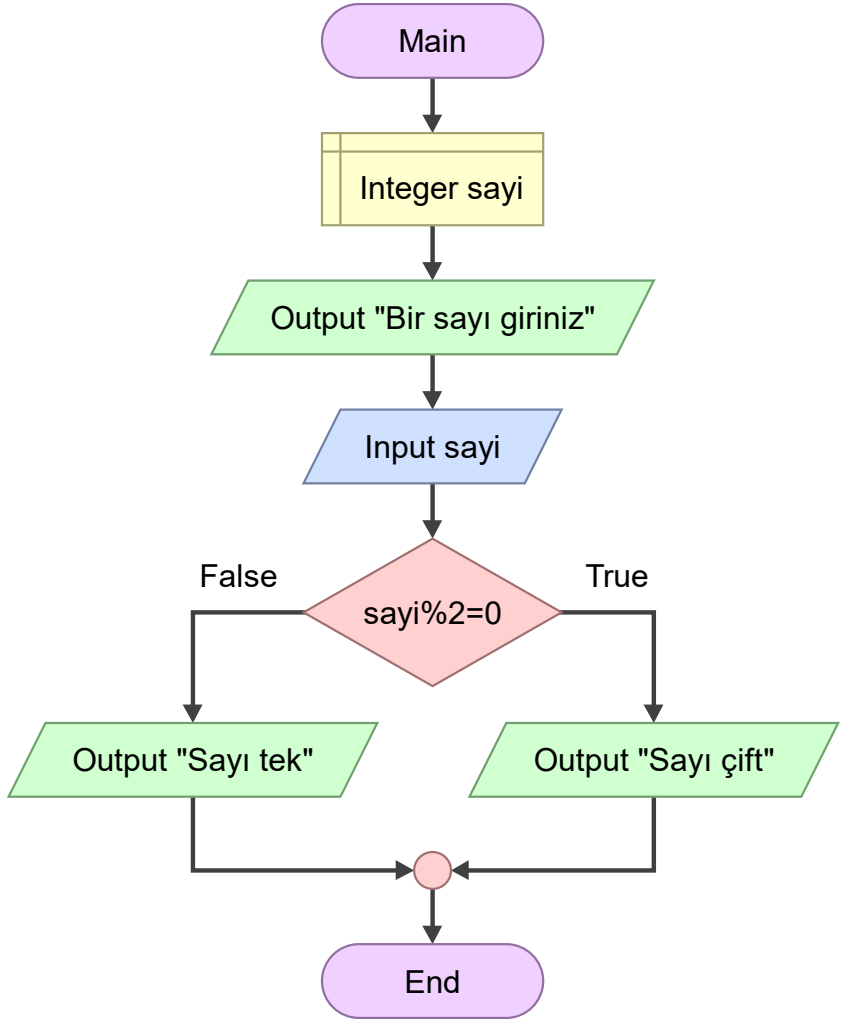
Make the flowchart design of the program that takes the average of 3 notes entered from the keyboard and writes "Poor" if the average is between 0-45, "Good" if it is between 45-70, and "OK" if it is between 70-100.



FLOWCHART

PRACTISE

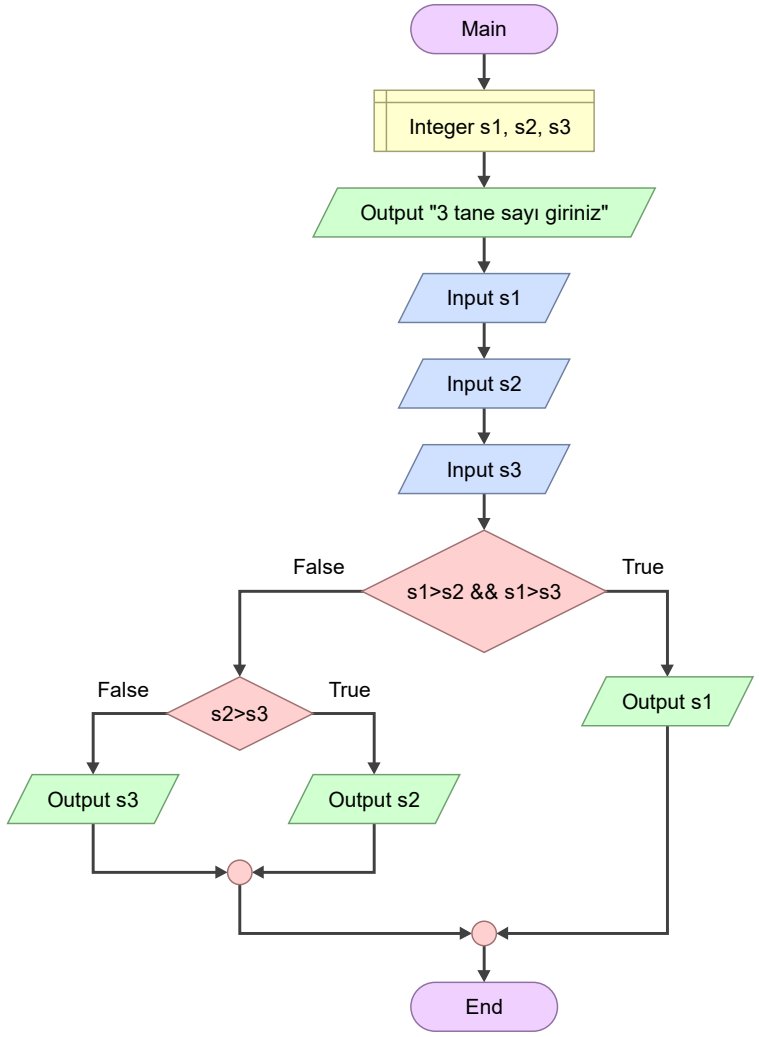
- Make the flowchart design of the program that finds out whether the entered number is odd or even and prints it on the screen.



FLOWCHART

PRACTISE

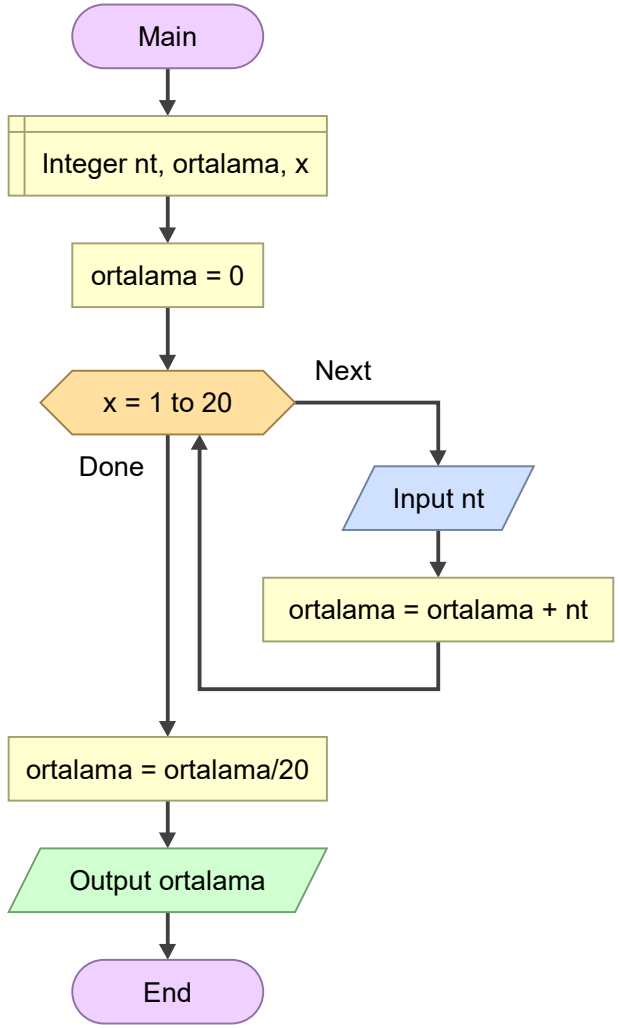
- Design a flowchart of the program that displays the larger of 3 numbers entered from the keyboard.



FLOWCHART

PRACTISE

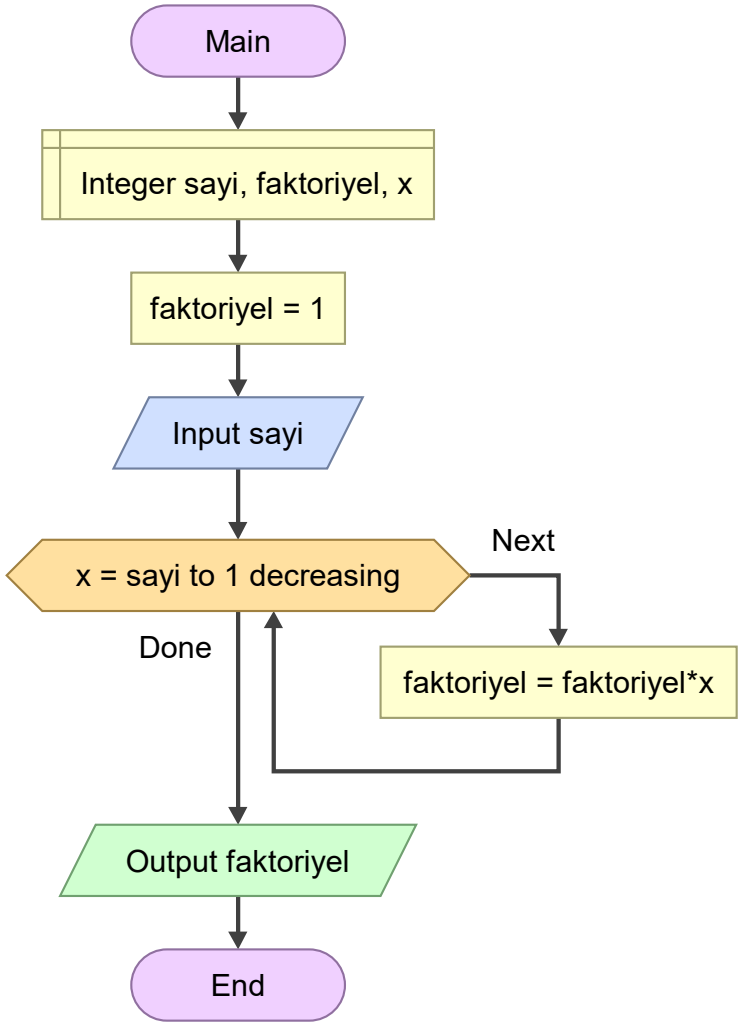
In a class of 20 students, the grades of the students in a course will be entered from the keyboard and the average will be found. Design the flowchart of the program.



FLOWCHART

PRACTISE

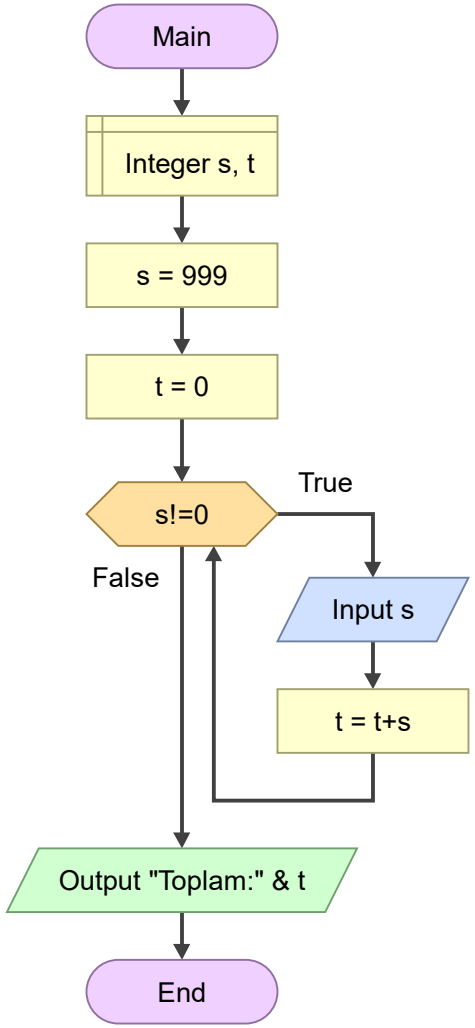
Design the flowchart of the program that calculates the factorial of the number entered from the keyboard.



FLOWCHART

PRACTISE

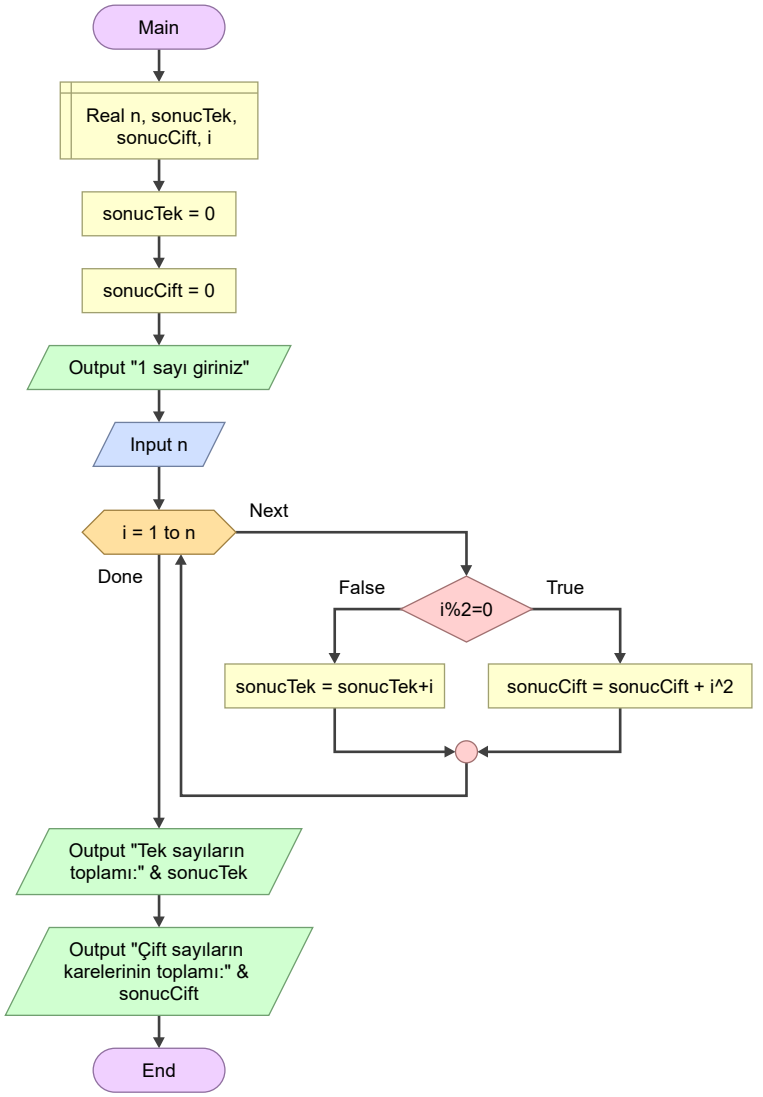
Design a flowchart of the program that collects the entered numbers until 0 (zero) is entered from the keyboard.



FLOWCHART

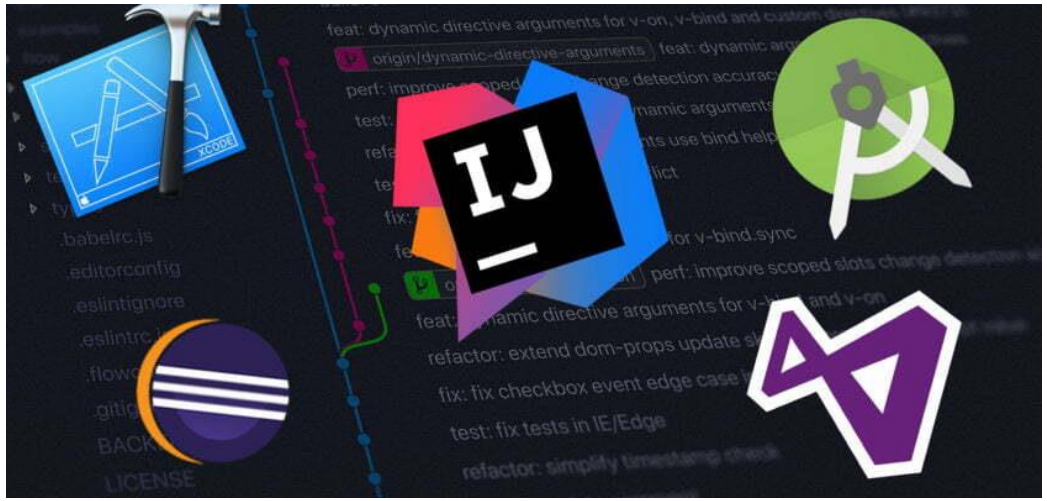
HOMEWORK

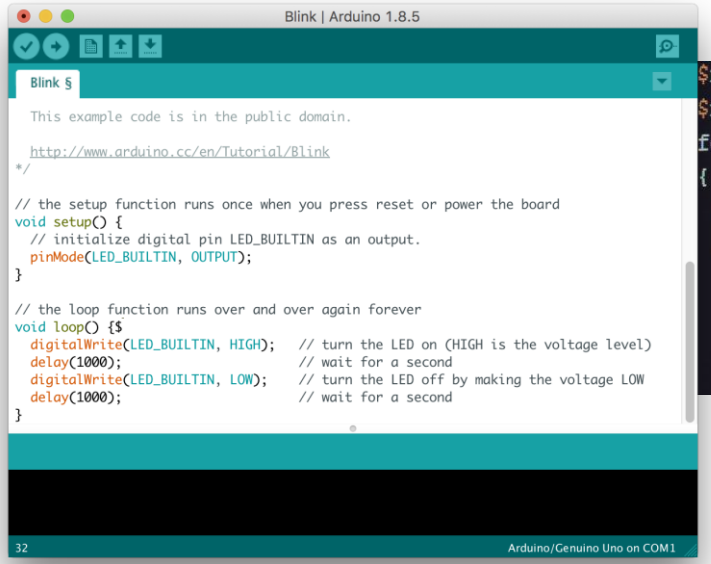
Design the flowchart of the program that finds the sum of the odd numbers from 1 to N, and the sum of the squares of the even numbers, according to the N number entered from the keyboard.



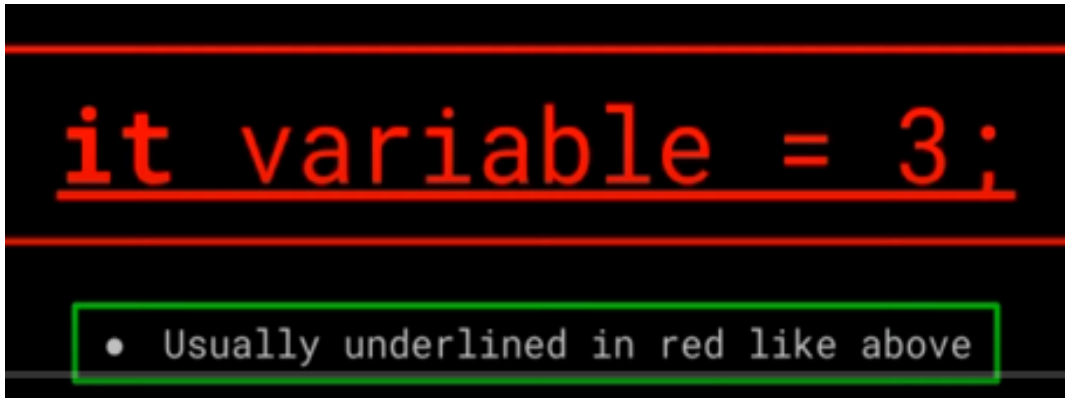
How will we write code?

How to write code?

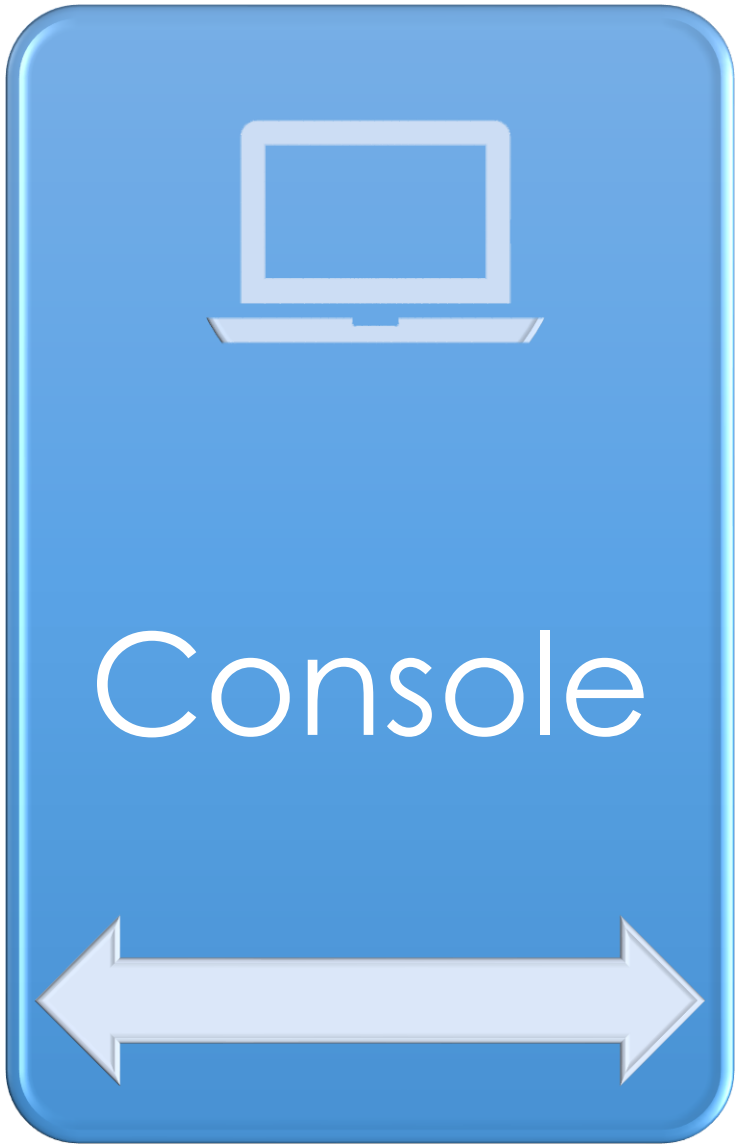


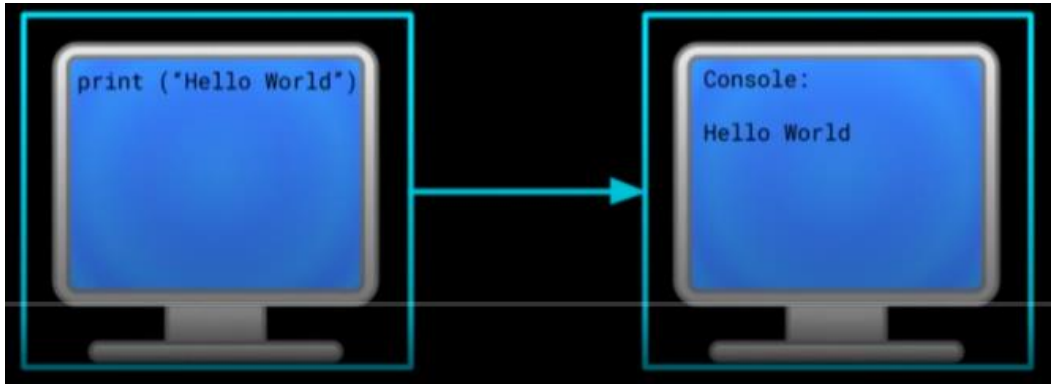


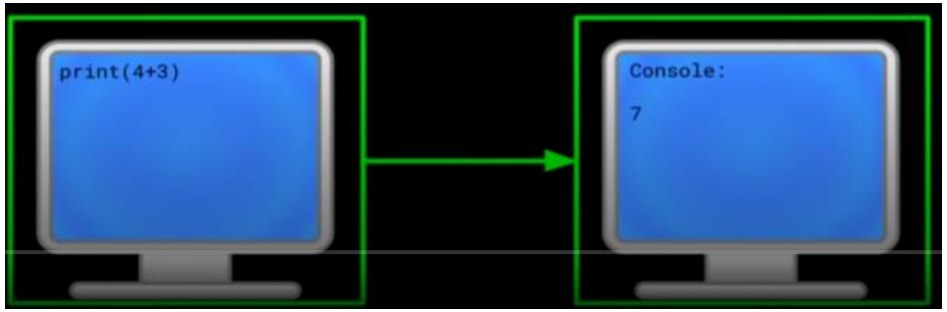
How will we write code?

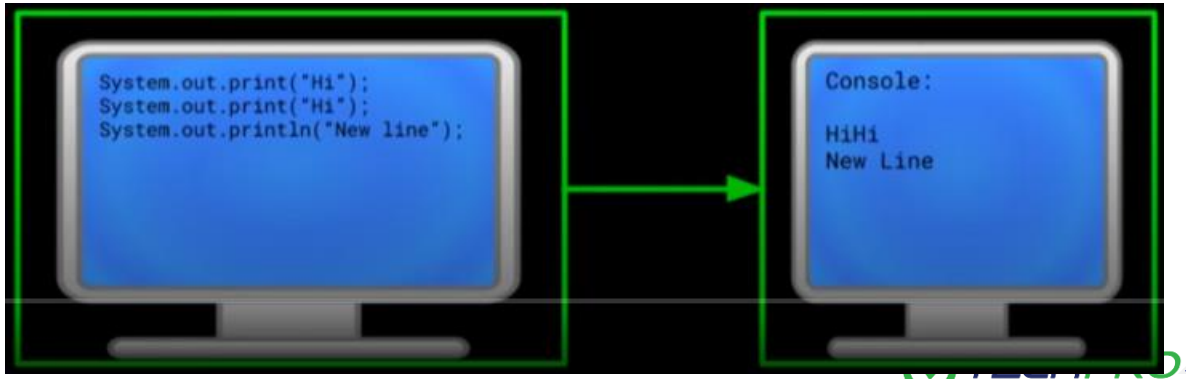


How will we write code?



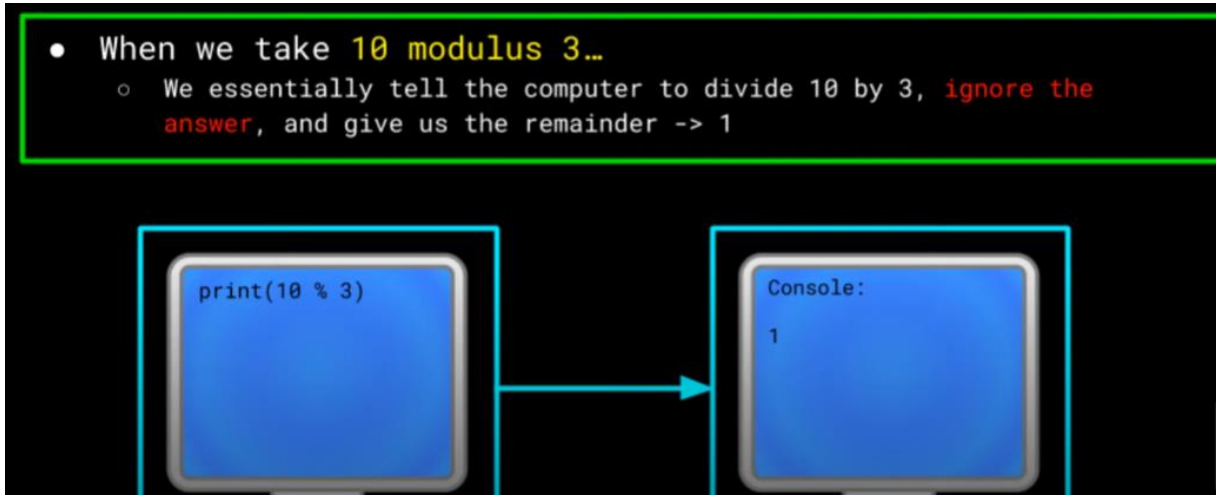


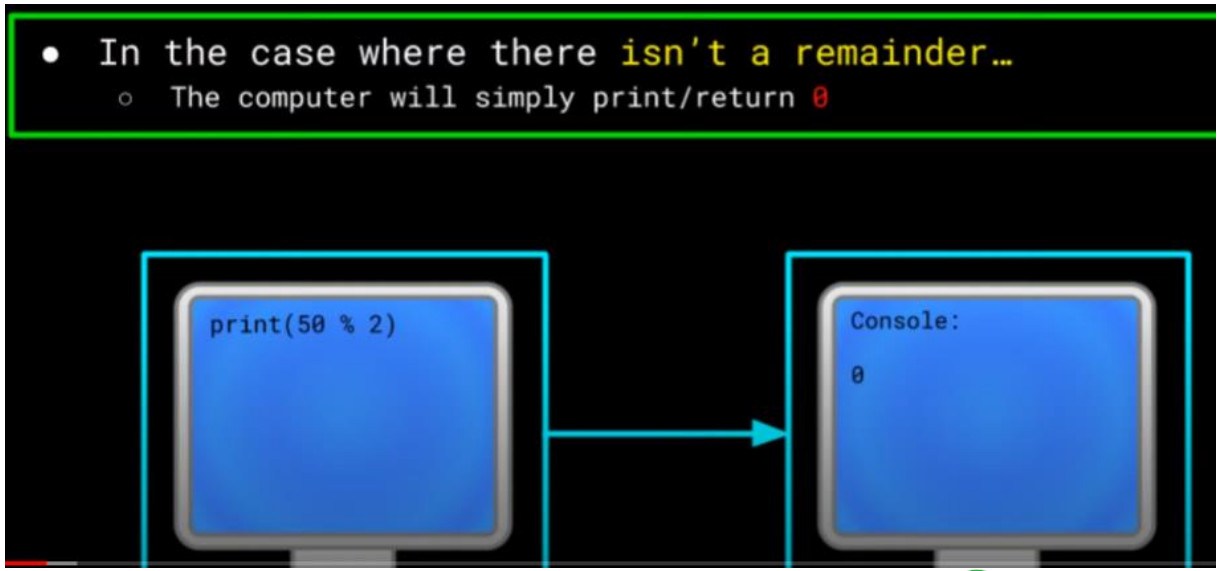




What can a computer do?

- **Mathematics**
- **Modulus**





Arithmetic operators

Operator	Symbol	Example
Addition	+	45+6
Subtraction	-	35-7
Multiplication	*	25*2
Division	/	16/4
Exponent	**	5**3
Modulus	%	12%5

COMPARISON OPERATORS

Operator	Symbol	Example
Equal	== or ===	Mark==75
Not Equal	!= or !==	Mark != 45
Greater Than	>	Age > 45
Less Than	<	Age < 18
Greater Than or Equal To	>=	Avg >=80
Less Than or Equal To	<=	Avg<=90

Comparison Operators return boolean values TRUE or FALSE

Order of Operations

When performing arithmetic operations, the computer performs operations according to operator priority.

( ) Parentheses

** Exponentiation

* Multiplication

/ Division

+ Addition

- Subtraction

! If the priority level is the same, it does the left expression first.

What can a computer do?

- **Odd- Even Numbers**
- **Strings**