



## TD1

### ❖ Exercice 1 :

- Convert the following numbers between bases:

$(110101001)_2 = ( )_{10}$	$(65)_8 = ( )_{16}$	$(1367)_8 = ( )_{10}$	$(1907)_{10} = ( )_{16}$	$(A5B2)_{16} = ( )_2$
$(11111111)_2 = ( )_{10} = ( )_{16}$	$(8473)_{10} = ( )_2 = ( )_{16}$	$(EF1)_{16} = ( )_2 = ( )_{10}$	$(208)_{10} = ( )_8 = ( )_{16}$	$(15,3125)_{10} = ( )_2$

- Perform the following operations:

$$2BFC + 54A7$$

$$2CF3 + 2B$$

$$(704)_8 + (230)_8$$

$$(11011101)_2 - (55)_{10}$$

$$AC74 - B3F$$

$$10000 - 1101$$

- Apply bitwise logic, Express each result in binary and decimal.

· **AND:**  $1101 \& 1011$

**OR:**  $1101 | 1011$

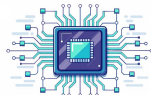
**XOR:**  $1101 \wedge 1011$

### ❖ Exercice 2 :

- 1) A machine instruction is coded on 8 bits. How many different instructions can be coded?
- 2) How many minimum bits are needed to encode:

→ The days of the week

→ the days of a month?





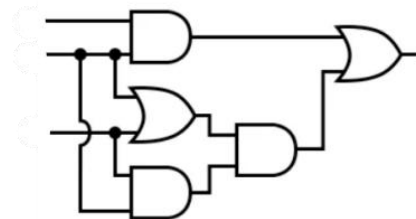
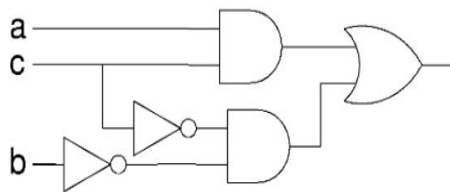
❖ **Exercise 3 :** We have three USB drives: A = 16 GB, B = 800 MB, C = 512 KB.

1. Rank the three USB drives from the **largest to the smallest capacity**.
2. Which USB drive would be the **most suitable to store a 700 MB movie**?

❖ **Exercise 4:**

Consider the following logic circuit with three inputs **a**, **b**, **c**:

1. Write the Boolean expression of the output **F** in terms of **a**, **b**, **c**.
2. Construct the truth table of the circuit.



❖ **Exercise 5:**

Among the following components: video game, PIN code locking system, speed radar sensor, self-checkout system, classroom attendance management system, automatic traffic light, light switch, industrial filling machine, computer keyboard

- which ones operate using **combinational logic**, which ones use **sequential logic**, and which ones process data in **binary form**?

Provide justification for each case.

