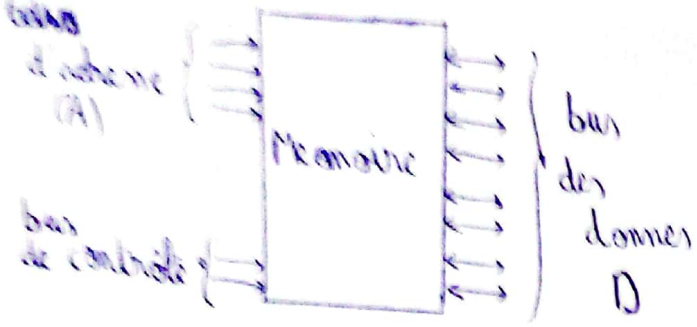
TD 3 : La Mémoire



TM = nb de mots x TMD

- Taille mémoire
- nombre
- Taille d'un mot mémoire

$TM = 2^A \times D$

TM = (@Fin - @Debut + 1) . TMM (0)

~~TM = Nbmot =~~
~~Taille mot~~

nombre de mots = $2^A = 2^3 = 8$

nb de mots							
0	0	0					
0	0	1					
0	1	0					
0	1	1					
1	0	0					
1	0	1					
1	1	0					
1	1	1					

bus d'adresse — bus de donnée

1 octets = 8 bits
1 KO = 1024 O = 2^{10} O
1 MO = 1024 KO = $2^{10} \times 2^{10}$ O = 2^{20} O
1 GO = 1024 MO = $2^{10} \times 2^{20} = 2^{30}$ O

1 TO = 1024 GO = $2^{10} \times 2^{30} = 2^{40}$ O

Exercice 1 :

1 GO = 2^{30} O = $2^{10+20} = 2^{10} \cdot 2^{20} = 2^{10}$ MO
= 1024 MO
= 2^{20} KO = 1048576 KO
= 2^{30} O = 1073741824 O
= $2^{30} \times 2^3 = 2^{33}$ bit

Exercice 2 :

bus d'adresse = 32 bit

1) nombre de mots = 2^{32}

~~(Adr fin - (Adebut + 1)) Taille mot~~

2) TM = (@fin - @Debut + 1) . TMM (0)
$2^{32} \times 1$ O = (@fin - 0 + 1) . 1 O
2^{32} = @fin + 1 ⇒ @fin = $2^{32} - 1$

@fin = $2^{32} - 1$
= FFFF FFFF H

3) nb mot = 2^{32}

4) @Fin = $2^{32} - 1$
= FFFF FFFF H

Exercice 3 :

TM = 128 Go

Taille tampon = 16 bit

Taille mot (D)

$TM = 2^A . D$

8 Go → SRAM (64K x 8)

32 Go → DRAM (1M x 1)

64 Go → ROM (32K x 8)

1) $TM = 2^A . D$

$128\ Go = 2^A . 16$

$2^A = \frac{128\ Go}{16} = \frac{2^7\ Go}{2^4} = \frac{2^7 \times 2^{30}}{2^4}$

$= \frac{2^{37}}{2^4} = \boxed{2^{36}\ mot}$

⇒ 36 bus d'adresse (bit)

2) 8 Go reserver SRAM

Nb de mot $= \frac{8\ Go}{16\ bit} = \frac{8\ Go}{2.2^3} = \frac{8\ Go}{2^4}$

$= 4G = 2^2 \times 2^{30} = 2^{32}$ mot

@debut : 000000000 H

@ Fin : $2^{32} - 1$: 0FFFFFFFF H

$\boxed{nb_{mot} = (@Fin - @Debut + 1)}$

@ Fin = nb mot + @Debut - 1

DRAM :

Nb de mot $= \frac{32\ Go}{16\ bit} = \frac{32\ Go}{2^4} = 16G$

$= 2^4 \times 2^{30} = 2^{34}$

@Debut = @Fin SRAM + 1

= 0FFFFFFFF + 1 = 100000000

@Fin = Nb mot - 1 + @Debut = $2^{34} - 1 + 100000000$

= 11 FFFFFFFF = 3FFFFFFFF

3×2^8 + 100000000

34 mot 4FFFFFFFF

$TM = (@Fin - @Debut + 1) . D$

$\frac{TM}{D}$ = Nb de mot = (@Fin - @Debut + 1)

@Fin = nb de mot + @Debut - 1

@Debut = @Fin precedent + 1

ROM = 64 Mo

Nb mot $= \frac{64\ Mo}{16\ bit} = \frac{2^6\ Mo}{2^0} = \frac{2^6 . 2^{20}}{2}$

$= \frac{2^{26}}{2} = 2^{25}$ mot

@Fin Rom = FFFFFFFFF H

@Debut = FFFFFFFFF

− 001FFFFFF

FFE000000

3) SRAM = 64K x 8 = 64 x 2^{10} x 8

$= 2^A \times D$

$= 2^6 \times 2^{10} \times D = \boxed{2^{16}} D$

@Debut = 0000 H

@Fin = FFFF H

DRAM = 1M × 1
1M = 2^{20} mot

@Debut = 00000H
@Fin = FFFFFH

ROM = 32K × 8 = $32 \cdot 2^{10} = \boxed{2^{15}}$

@Debut = 0000H
@Fin = 7FFF H

4) SRAM = 8Go reseve 64K × 8

Nb de puce = $\frac{8Go}{64K \times 8} = \frac{2^3 \cdot 2^{30} \times 2^3}{2^{16} \times 2^3}$

$= \frac{2^{33}}{2^{16}} = 2^{17}$ Boitier

DRAM = 1M × 1
Nb puce = $\frac{32Go}{1Mo} = \frac{2^5 \times 2^{30} \times 2^3}{2^{20}}$
$= 2^{18}$ boitier

ROM : 64 Mo
32K × 8
Nbpuce = $\frac{64\ Mo}{32K \times 8} = \frac{2^6 \cdot 2^{20}}{2^5 \cdot 2^{10}} = \frac{2^{26}}{2^{15}}$
$= 2^{11}$ Boitier

Exercice 4 :

bus d'adresse : 16 bit
bus de donnée : 8 bit

1) 2^{16} 8 bit = 2^{16} × 1 octet = 2^{16}
= 64 KO

2) $\frac{64Ko}{8Ko} = 8$ boitier

3) boitier 1 : 0000 H → 1FFF H

((@Fin − @debut + 1) × Taille de mot) = Taille de memoire

@Fin = $\frac{TM}{TMM}$ + @debut − 1

= $\frac{8KO}{1\ octet}$ + 0 − 1 = $2^{13} - 1$ #

boitier 2 : @debut = @Fin précédent + 1
= 1FFF + 1 = 2000 H

@Fin = nb mot + @debut − 1 = $2^{13} - 1$ + @Debut + 3
= 1FFF + 2000 = 3FFF

4)