

Horloge numérique

Systèmes numériques

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Sommaire

L'assembleur

Microprocesseur

Le simulateur de netlist

Clock

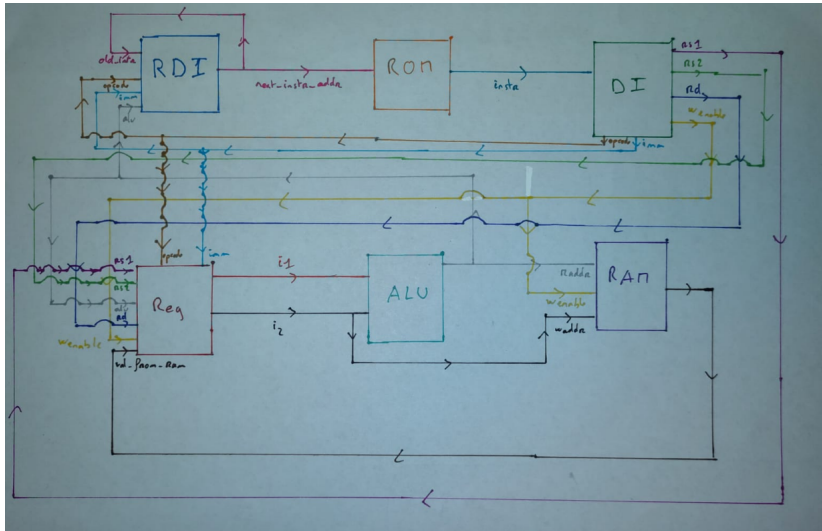
Correspondance syntaxe-addresses

	31	20	19	15	14	10	9	5	4	0
R	immédiat		rs2		rs1		rd		opcode	
I	immédiat				rs		rd		opcode	
U	immédiat						rd		opcode	

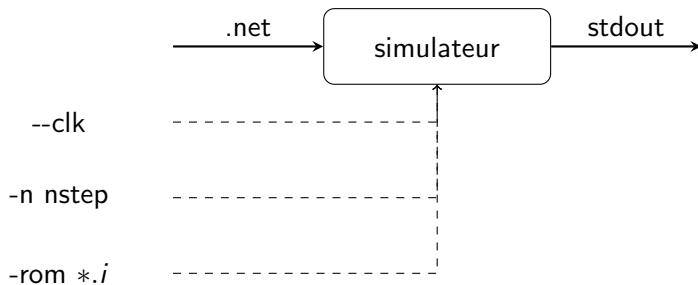
Les opcodes

	000	001	010	011	100	101	110	111
00	Addi		Srli	Srai	Slli	Andi	Ori	Xori
01	Add	Sub	Srl	Sra	Sll	And	Or	Xor
10	Lw	Sw		Beq	Bne	Bltn	Bltn	Bge
11	Lui	Auipc	Jal	Jalr			Slt	Slti

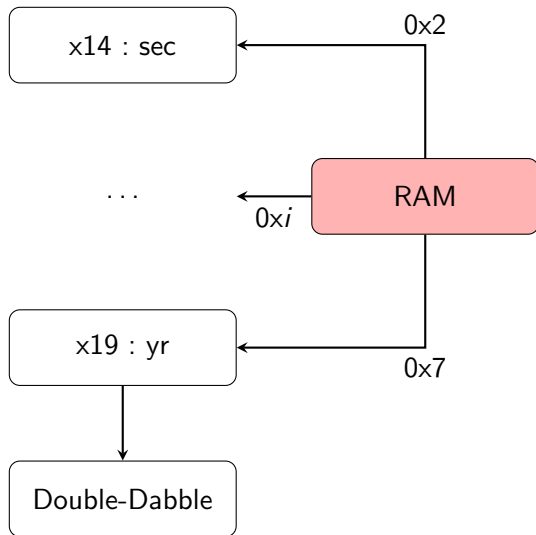
Schéma du microprocesseur



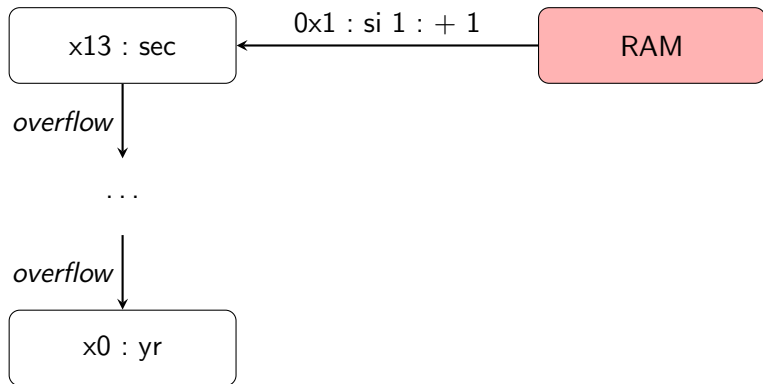
Le simulateur de netlist



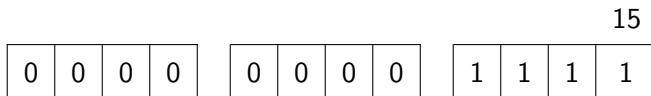
A l'initialisation



Pendant un cycle



Double-Dabble



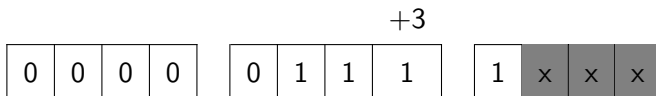
Double-Dabble

0	0	0	0	0	0	0	1	1	1	x
---	---	---	---	---	---	---	---	---	---	---

Double-Dabble

0	0	0	0	0	0	1	1	1	1	x	x
---	---	---	---	---	---	---	---	---	---	---	---

Double-Dabble



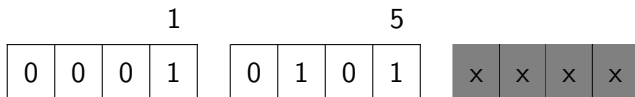
Double-Dabble

0	0	0	0
---	---	---	---

1	0	1	0
---	---	---	---

1	x	x	x
---	---	---	---

Double-Dabble



Ce qui peut être amélioré

- ▶ Double-Dabble en dur
- ▶ Meilleur Jal
- ▶ Découper la RAM en octets