

## 8 bit computer ligisim simple version

இங்கே **8-bit computer (simple version) logic system** — மிகவும் எளிமையாக, ஆரம்ப stage புரிந்து கொள்வதற்கு உகந்த விளக்கம் தருகிறேன். இது breadboard-ல் அல்லது simulator-ல் (Logisim, Digital, Falstad) செய்யலாம்.

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### ✓ 1. What is an 8-bit computer?

ஒரு 8-bit computer என்பது **8 wires = 1 byte = 0–255 values**.  
CPU ஒரே நேரத்தில் **8 bits** process செய்யும்.

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### ✓ 2. Basic Blocks in a Simple 8-bit Computer

#### (A) Registers (8-bit)

8-bit computer-க்கு minimum 3 registers:

1. **A register** (Accumulator)
2. **B register**
3. **Instruction Register (IR)**

Registers = data temporarily store பண்ணும் இடம்.

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#### (B) ALU (Arithmetic Logic Unit)

Simple ALU performs:

- ADD
- SUB
- AND
- OR
- XOR
- NOT (optional)
- OR it may only do ADD (minimum design)

ALU input : A & B

ALU output : 8-bit result + Carry.

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### (C) Program Counter (PC)

Memory-ல next instruction எது என்று pointer காட்டும்.

PC increments automatically ( $PC = PC + 1$ ).

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### (D) Clock

CPU cycle → fetch → decode → execute

Clock pulse gives timing to all blocks.

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### (E) Control Unit

Microcode / Hardwired logic

Every instruction → sequence of control signals:

- Load A
- Load B
- Load PC
- Output to bus
- ALU Add
- etc.

Control unit is the "Brain".

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### (F) Bus (8-bit)

All blocks connect using a common **8-bit BUS**

Data moves one device → bus → another device.

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### (G) RAM (16 bytes to 256 bytes)

Instructions + data stored here.

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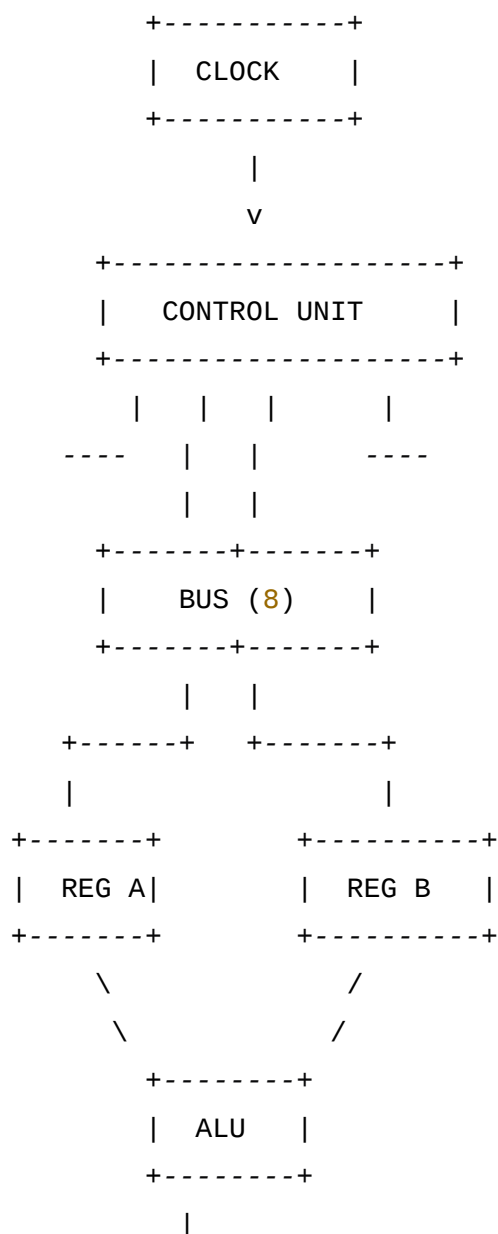


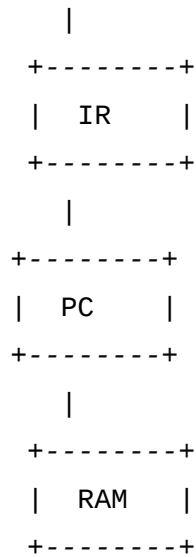
## 3. Simple Instruction Set (Minimum 6 instructions)

Code	Instruction	Action
0001	LD A, addr	Load A from RAM

0001	LDA addr	Load A from RAM
0010	LDB addr	Load B from RAM
0011	ADD	$A = A + B$
0100	SUB	$A = A - B$
0101	STA addr	Store A to RAM
0110	JMP addr	Jump to address

## ✓ 4. Simple 8-bit Computer Architecture Diagram (Easy)





## ✓ 5. Logisim Simple Version Steps (You Can Build Today)

### Step 1: Create an 8-bit BUS

Place 8-bit wire nodes (Logisim → Wiring → Data Bus).

### Step 2: Create Registers A & B

(Logisim → Memory → Register → set width 8)

### Step 3: Build ALU

Use:

- adder
- xor gates
- and/or gates
- mux to select ALU operation.

### Step 4: Add Program Counter

Use incrementer + register.

### Step 5: Add RAM

Use 256-byte RAM.

### Step 6: Control Unit

Use ROM for microcode

Or simple hardwired control signals.

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## If you want, I can give:

- ✓ Full Logisim file (.circ)
  - ✓ Minimal schematic
  - ✓ Step-by-step build plan
  - ✓ 8-bit computer instruction set
  - ✓ Working example program
  - ✓ Minecraft Redstone version
  - ✓ Arduino breadboard version
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நீ எது வேண்டுமோ சொல்லுங்க — **Complete circuit diagram?**  
அல்லது **Logisim simulation file?**