

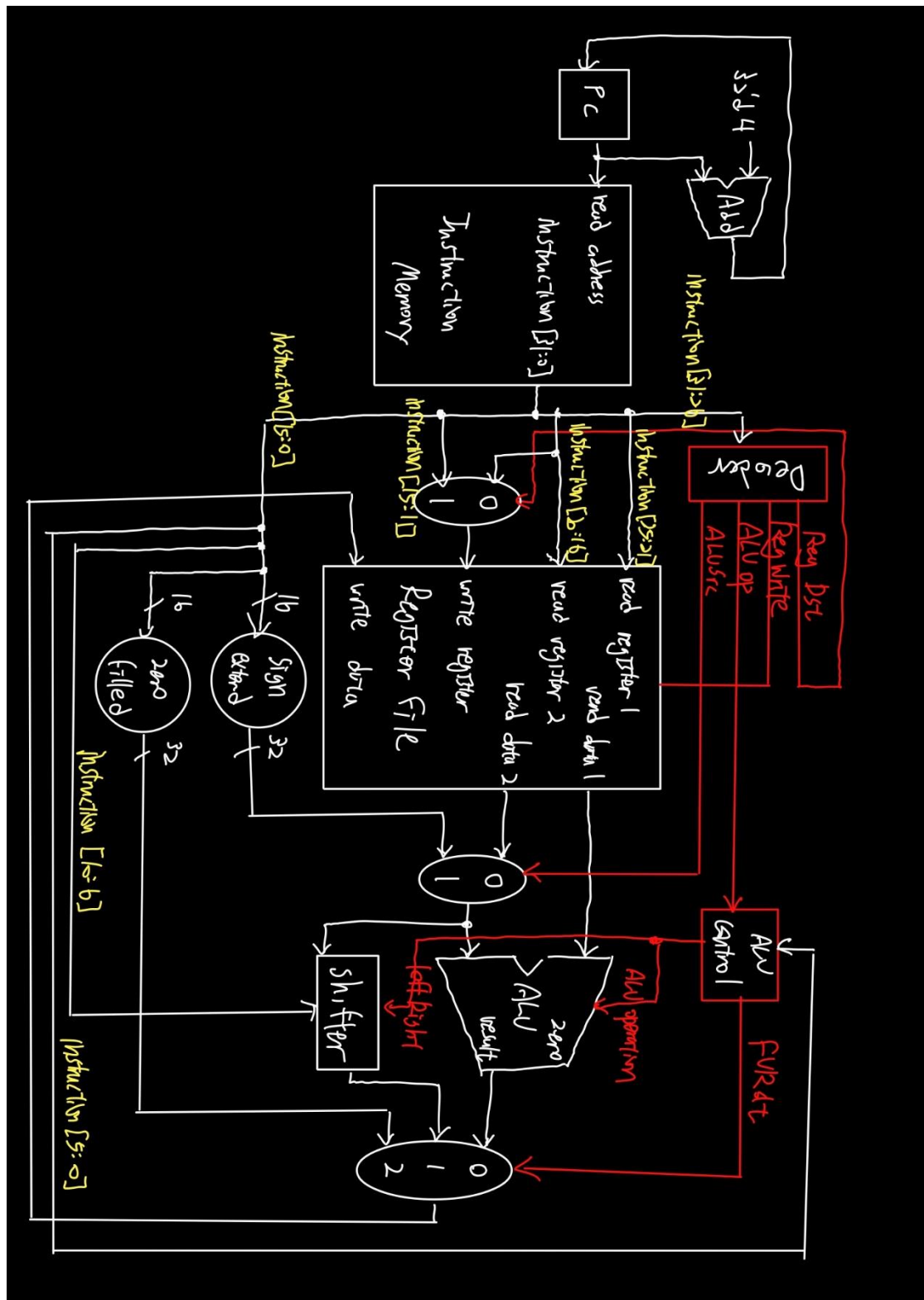
Computer Organization

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- 1. Which part of the module in simple-single-CPU is redundant? Can you design a new instruction to use this module ?**

leftRight_o is the part of the module in simple-single-CPU is redundant. We can implement simple-single-CPU without using this module .

Architecture diagrams:



Yes , we can design a new instruction to use this module .

2. Which instruction is redundant and why?

Redundant R-Type Instructions:

nor: The nor operation can be implemented using the or operation followed by a not operation. However, this doesn't necessarily mean it's redundant since it can simplify certain logical operations. The decision to keep it would depend on the trade-off between instruction set simplicity and potential optimization gains.

2. Redundant I-Type Instructions:

blt: The "blt" (branch if less than) instruction can be implemented using the "bgez" (branch if greater than or equal to) instruction by inverting the operands. If you have "bgez," "blt" might be considered redundant. However, both instructions can offer more intuitive code readability in different scenarios.

3. Redundant J-Type Instructions:

jump: If "jal" (jump and link) is available, "jump" might be redundant since "jal" can achieve the same functionality with the added benefit of saving the return address.

.Because there might be reasons to keep certain instructions even if they can be emulated using other instructions, such as improving code readability, maintaining compatibility with existing software, or facilitating compiler optimizations. Additionally, keeping a diverse set of instructions might help cover a wide range of programming scenarios efficiently.