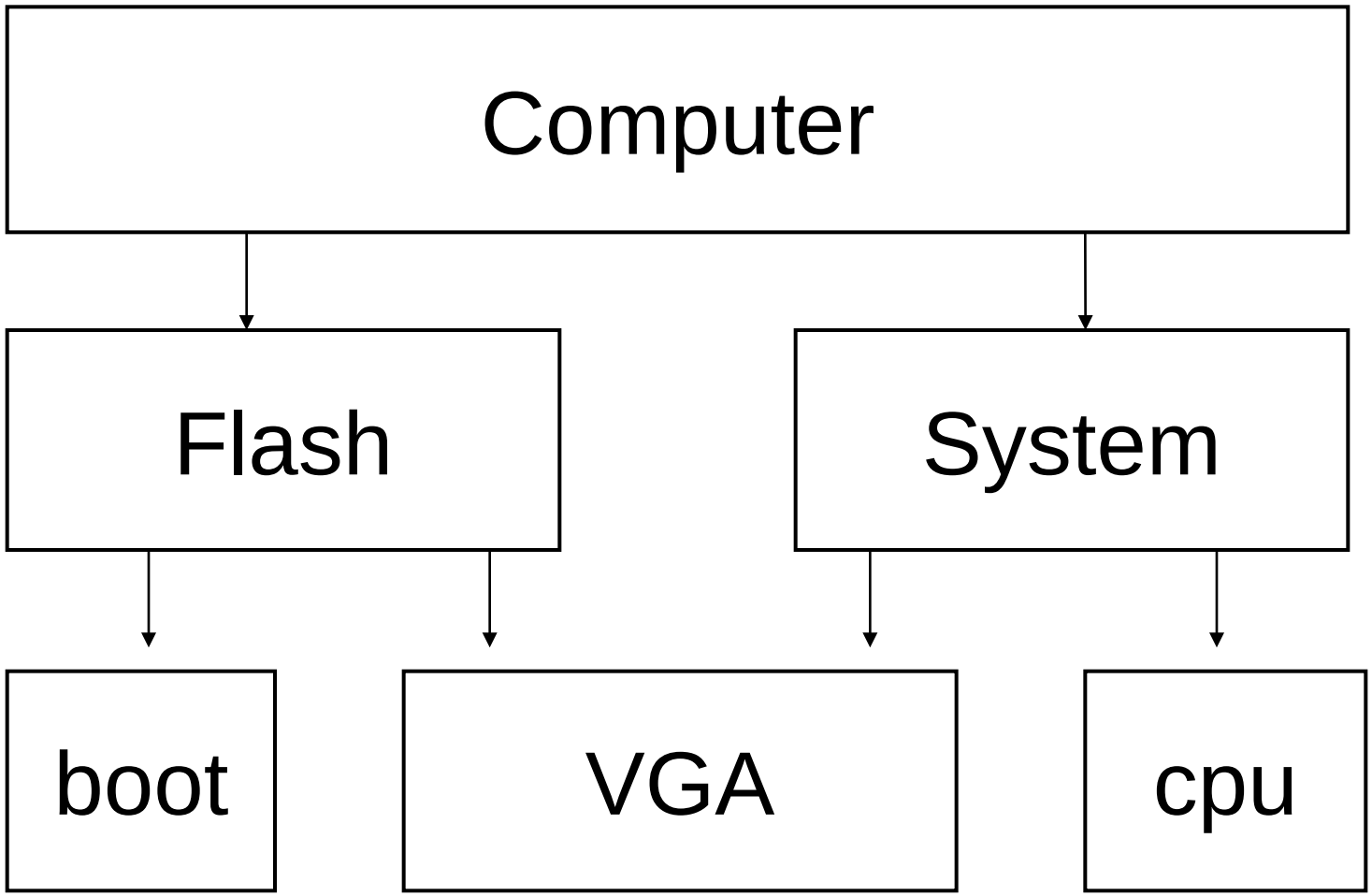
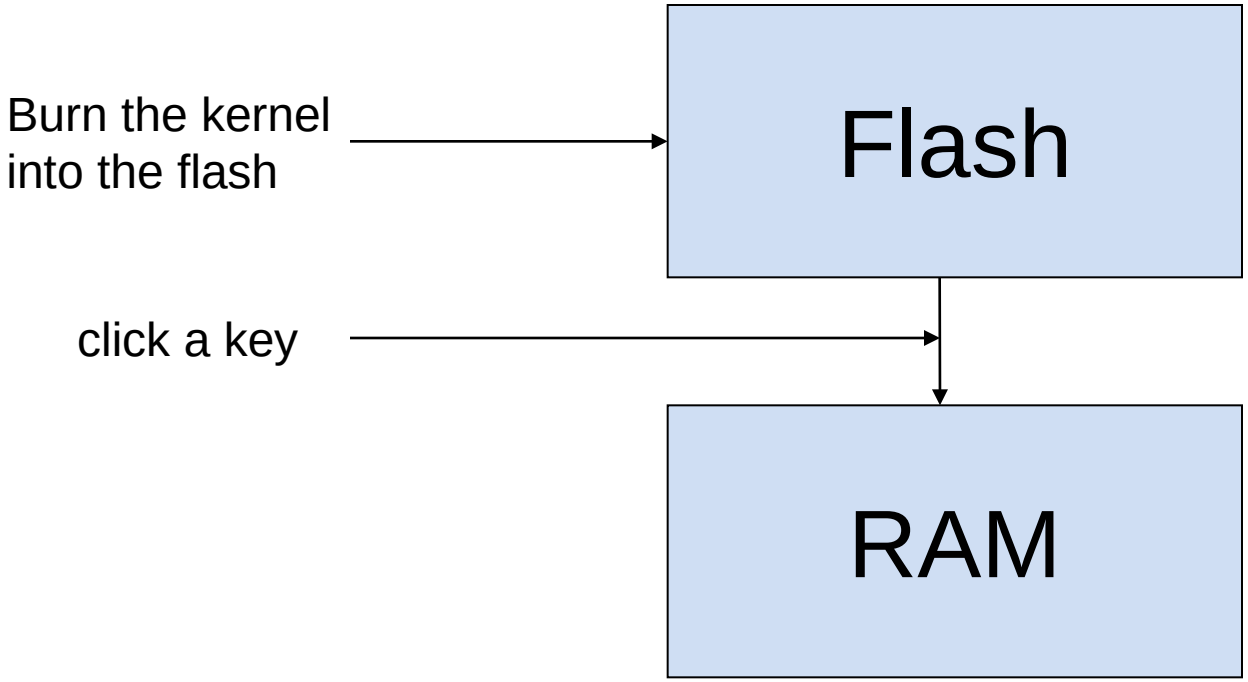
Architecture

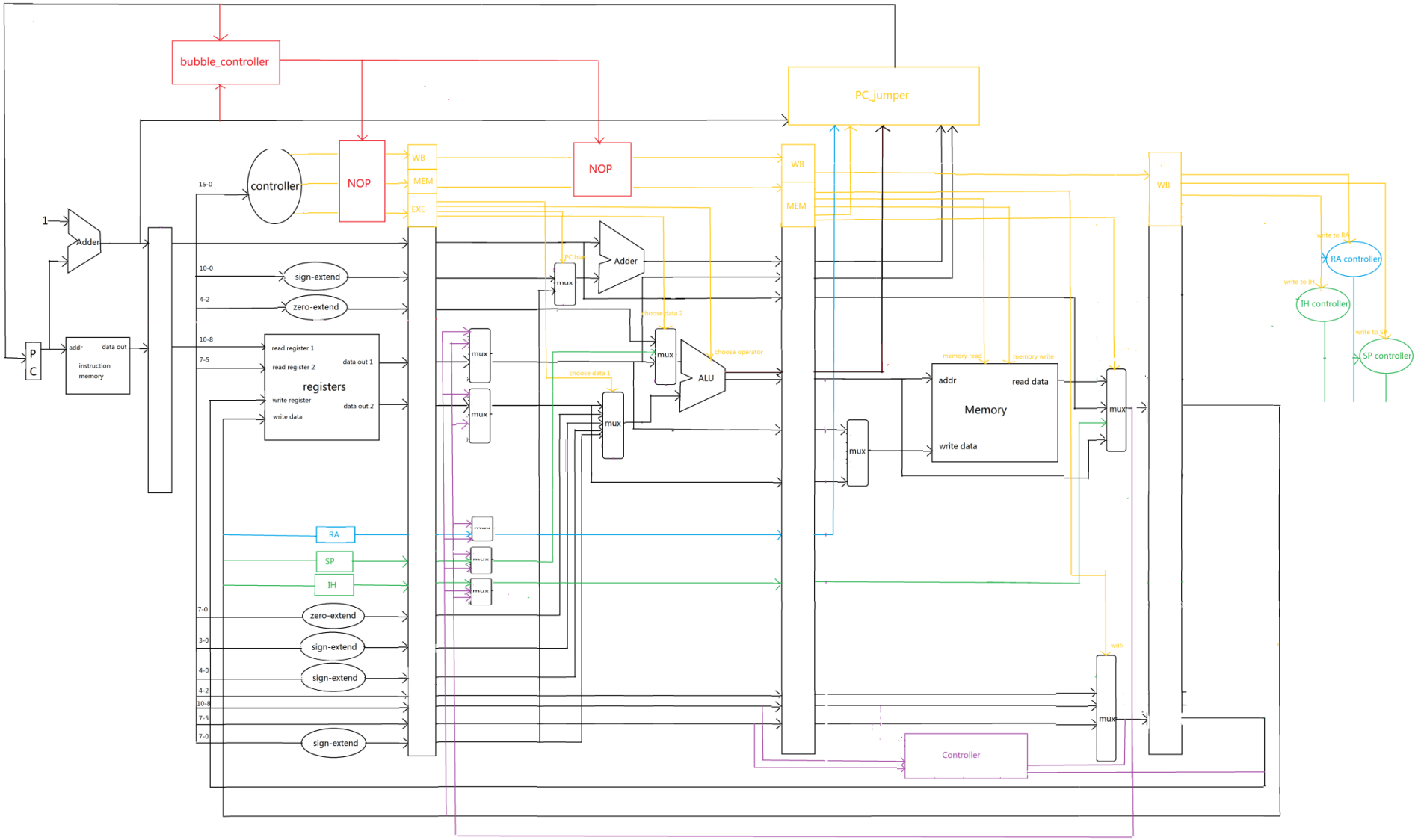


Booting the Kernel with A Click

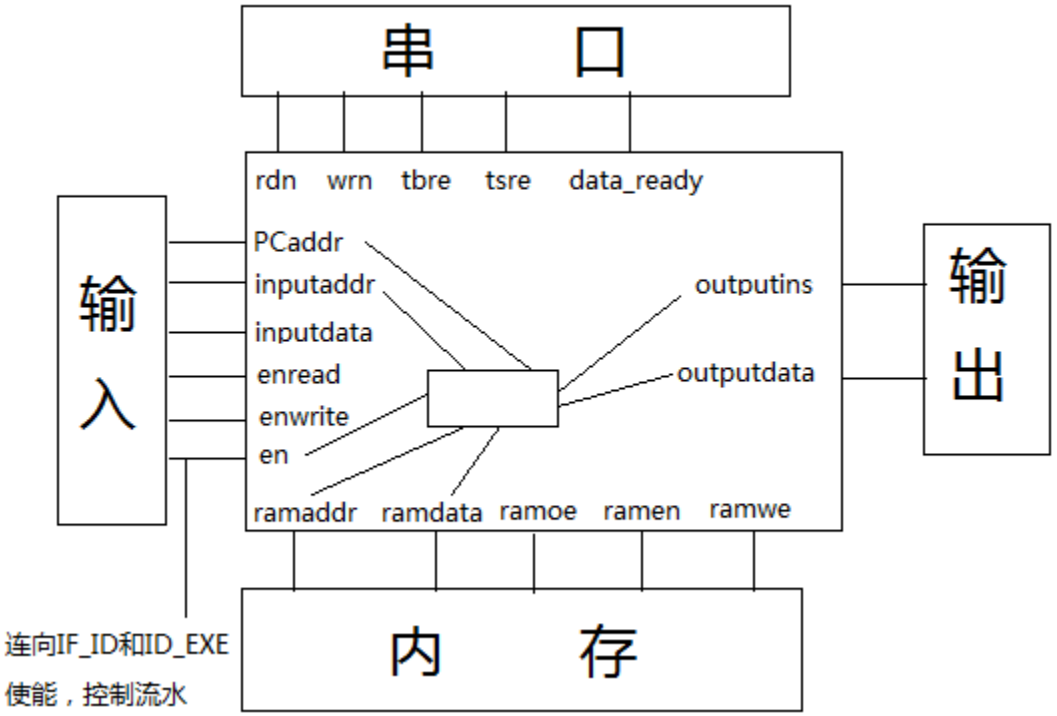
- Burn the kernel into a flash memory.
- When system starts, click on the key to fetch the content in the flash into the ram memory from the lower address to the upper address.



Datapath of CPU



Memory Management

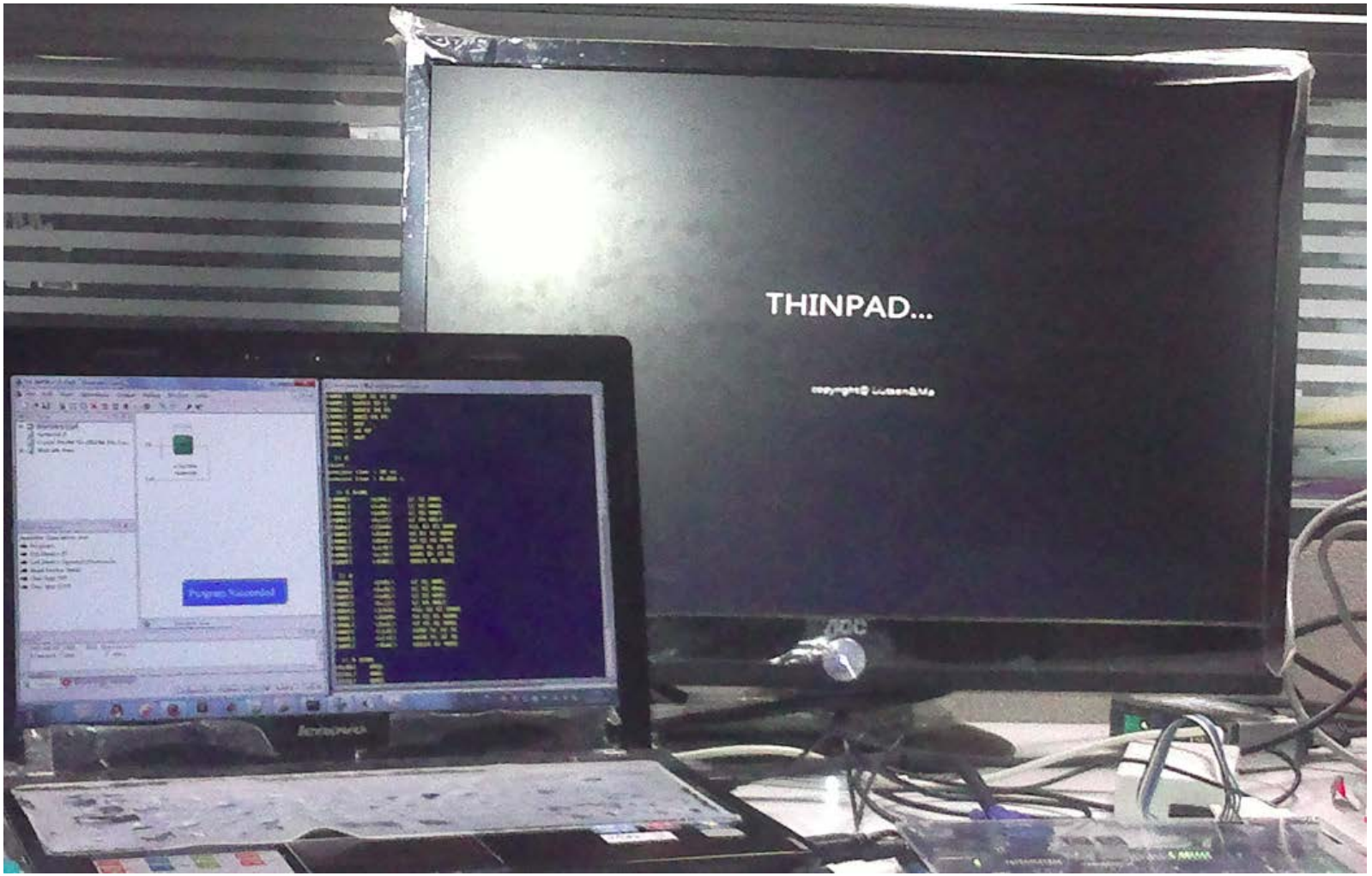


串口-ports, 内存-RAM memory
输入-input, 输出-output

Due to the limits of hardware resources. Data memory and instruction memory are in the same physical memory, which causes conflicts when we try to fetch data and instruction at the same time. The solution to this problem is that we first fetch data and then instruction instead of fetching them at the same time. When fetching data, we freeze the pipeline for one cpu-clock time. After that, we can restart the pipeline to fetch instructions avoiding conflicts with data memory.

Demo

The Whole System



Demo

16bit MIPS Terminal

VGA Screen