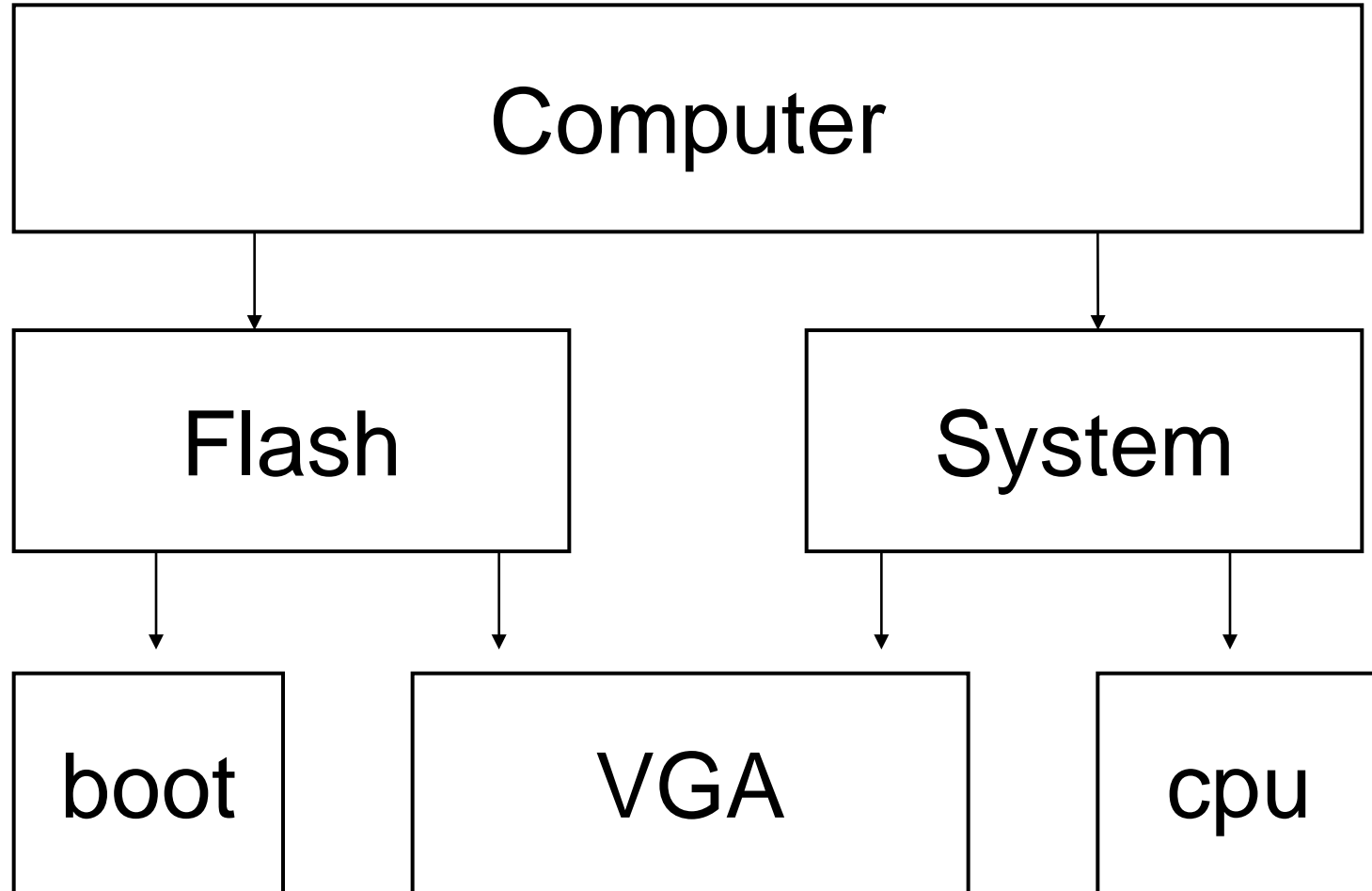
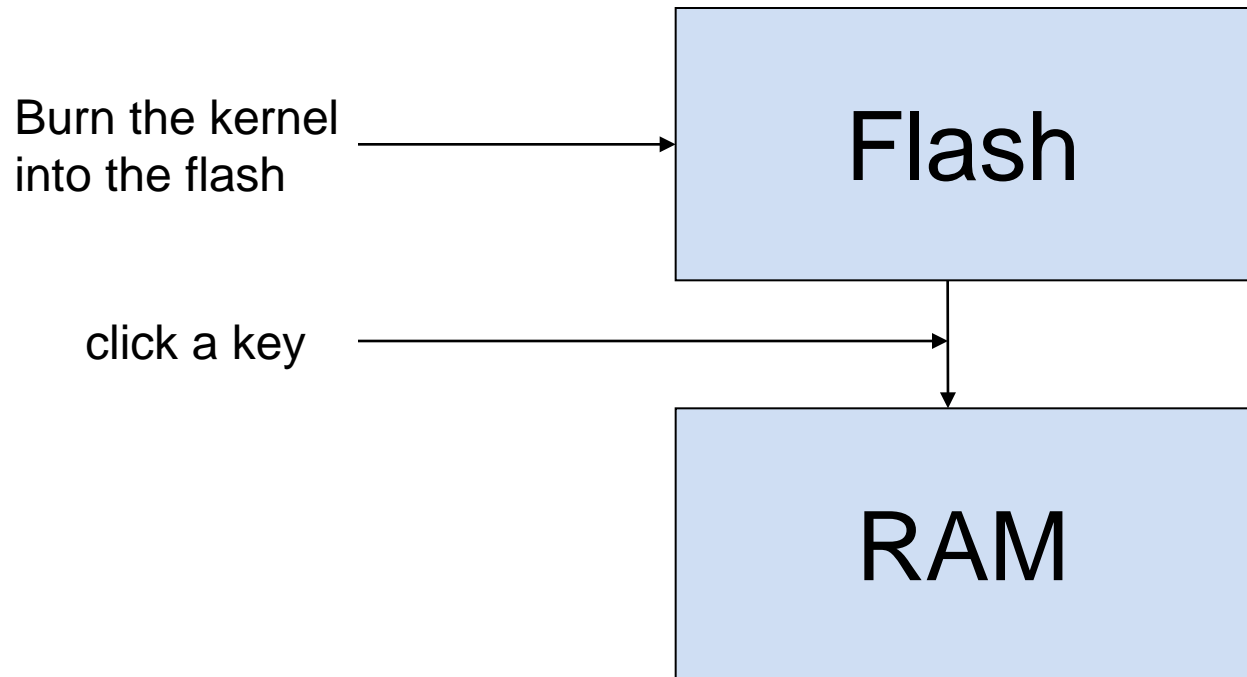


# Architecture

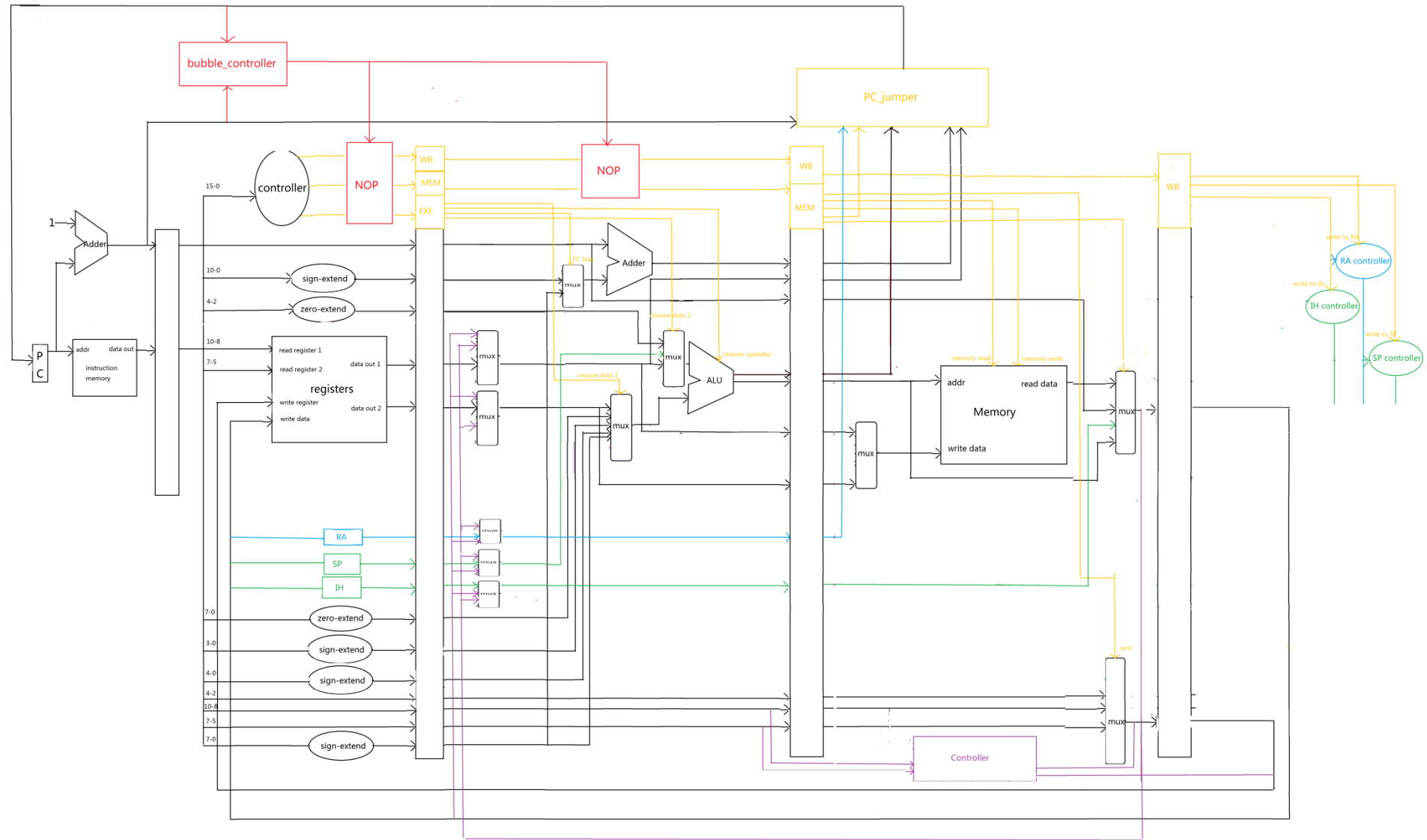


# Booting the Kernel with A Click

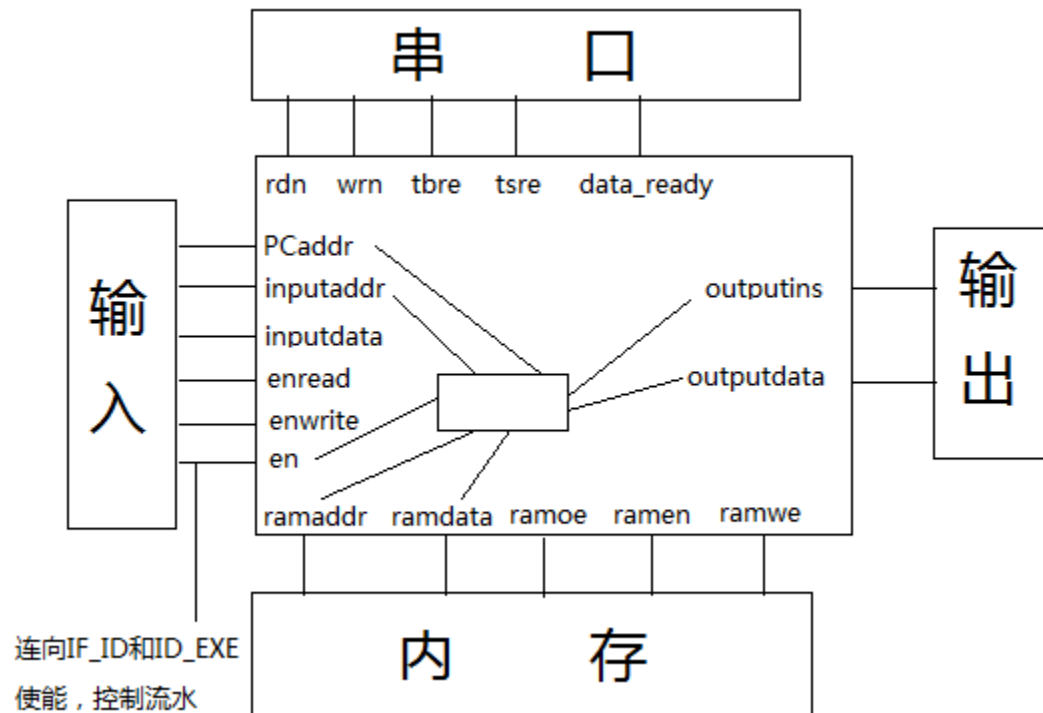
- Burn the kernel into a flash memory.
- When system starts, click on the key to fetch the content in the flash into the ram memory from the lower address to the upper address.



# Datapath of CPU



# Memory Management

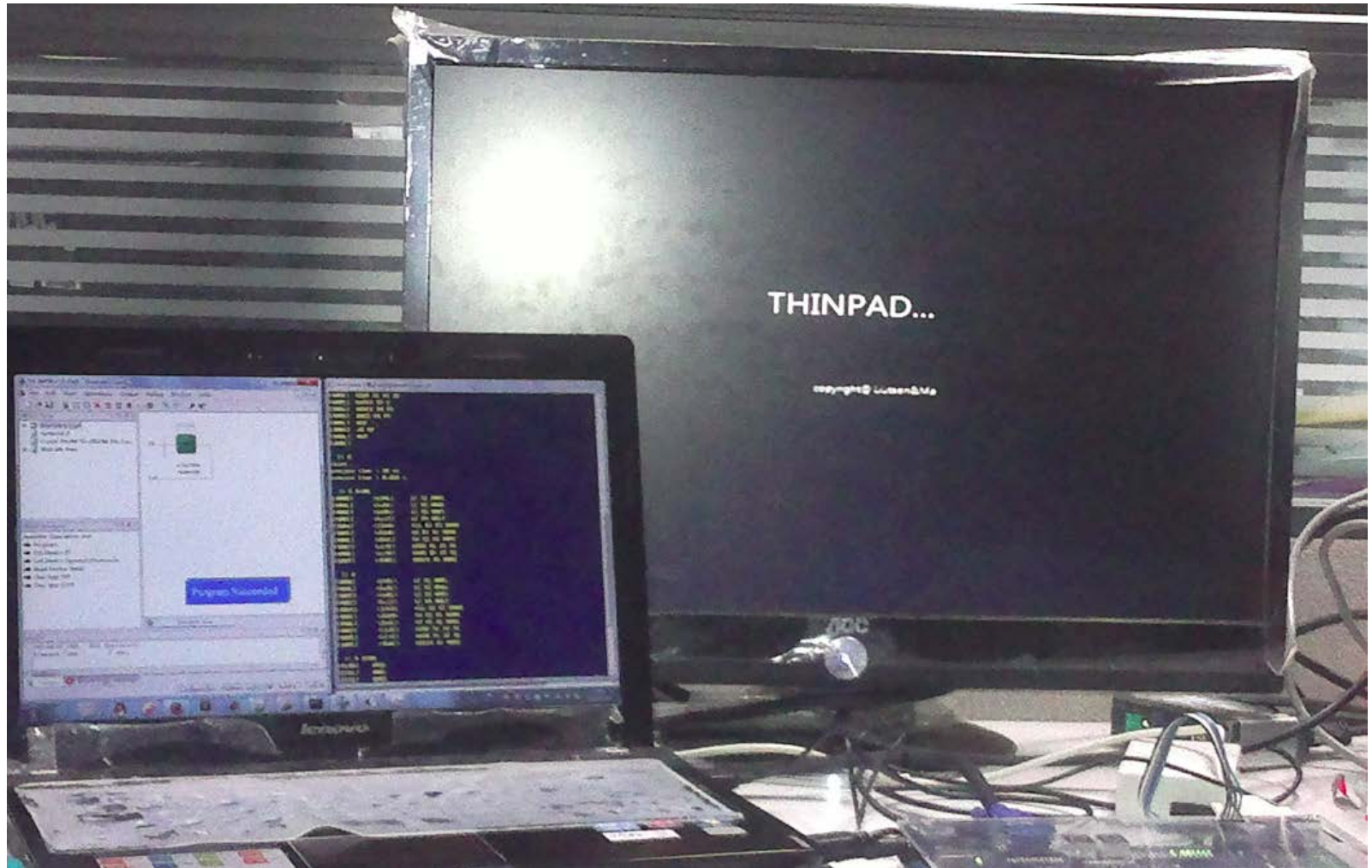


串口-ports, 内存-RAM memory  
输入-input, 输出-output

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

```
G:\Firefox下载\Term\Release\Term.exe

[4008] ADDU R1 R2 R2
[4009] ADDIU R3 2
[400a] ADDIU R4 FF
[400b] BNEZ R4 F9
[400c] NOP
[400d] JR R7
[400e] NOP
[400f]

>> G
start...
execute time : 28 ms
execute time : 0.028 s

>> U 8500
[4000] <6901> LI R1 0001
[4001] <6a01> LI R2 0001
[4002] <6b85> LI R3 0085
[4003] <6c19> LI R4 0019
[4004] <3360> SLL R3 R3 0000
[4005] <db20> SW R3 R1 0000
[4006] <db41> SW R3 R2 0001
[4007] <e145> ADDU R1 R2 R1
[4008] <e149> ADDU R1 R2 R2
[4009] <4b02> ADDIU R3 0002

>> U
[4000] <6901> LI R1 0001
[4001] <6a01> LI R2 0001
[4002] <6b85> LI R3 0085
[4003] <6c19> LI R4 0019
[4004] <3360> SLL R3 R3 0000
[4005] <db20> SW R3 R1 0000
[4006] <db41> SW R3 R2 0001
[4007] <e145> ADDU R1 R2 R1
[4008] <e149> ADDU R1 R2 R2
[4009] <4b02> ADDIU R3 0002

>> D 8500
[8500] 0001
[8501] 0001
[8502] 0002
```

## VGA Screen

