VE370 final RC
(part III)

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General Tips

- Difficulty: exam>=homework > slides
  usually harder than midexam

- Suggested Review order: homework > slides

Problem **Guessing** (not sure)

- **Data Hazard**
  - Combing questions with pipeline
  - (1 big question like problem 5 in mid exam)
  - (1 question like the last problem in the mid exam
- **Cache & VM**
  - 1 CPI calculation like problem 1 in HW 8/ problem 2 in HW7
  - 1 Cache problem like problem 3 /problem 4 in HW6
  - 1 VM problem like problem 2 in HW8
- **T/F(10 points)**
- **Multiple Choice (20 points)** **hard**
- **I/O 1** concept question (**5 points**)

Exception

- rarely appear in the exam
- know how pipeline CPU handling exceptions is enough
- If time is enough, memorize other concepts in case of T/F question
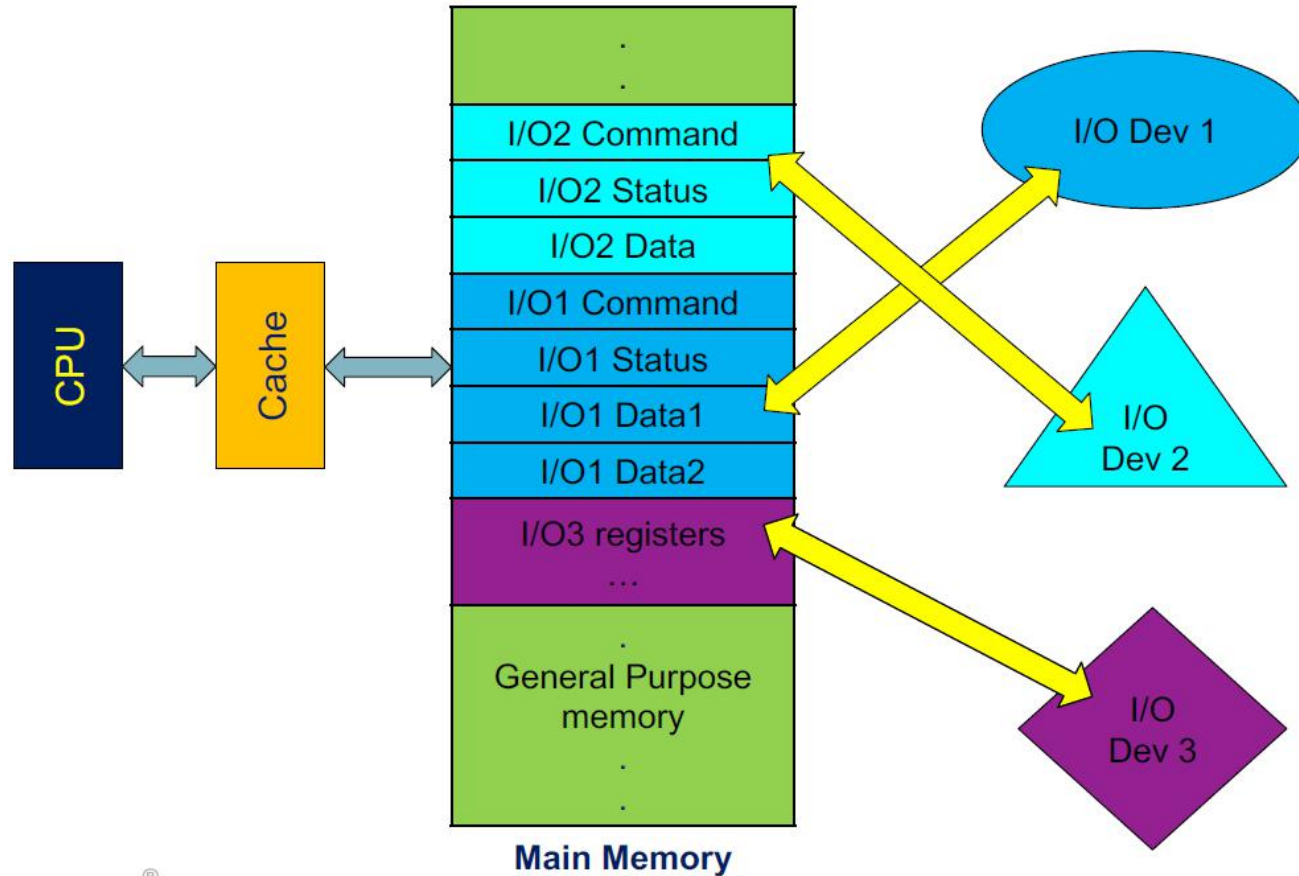
Example (Q1 in HW 6)

- IF.Flush=ID.Flush=EX.Flush=1 PCSel=Exc
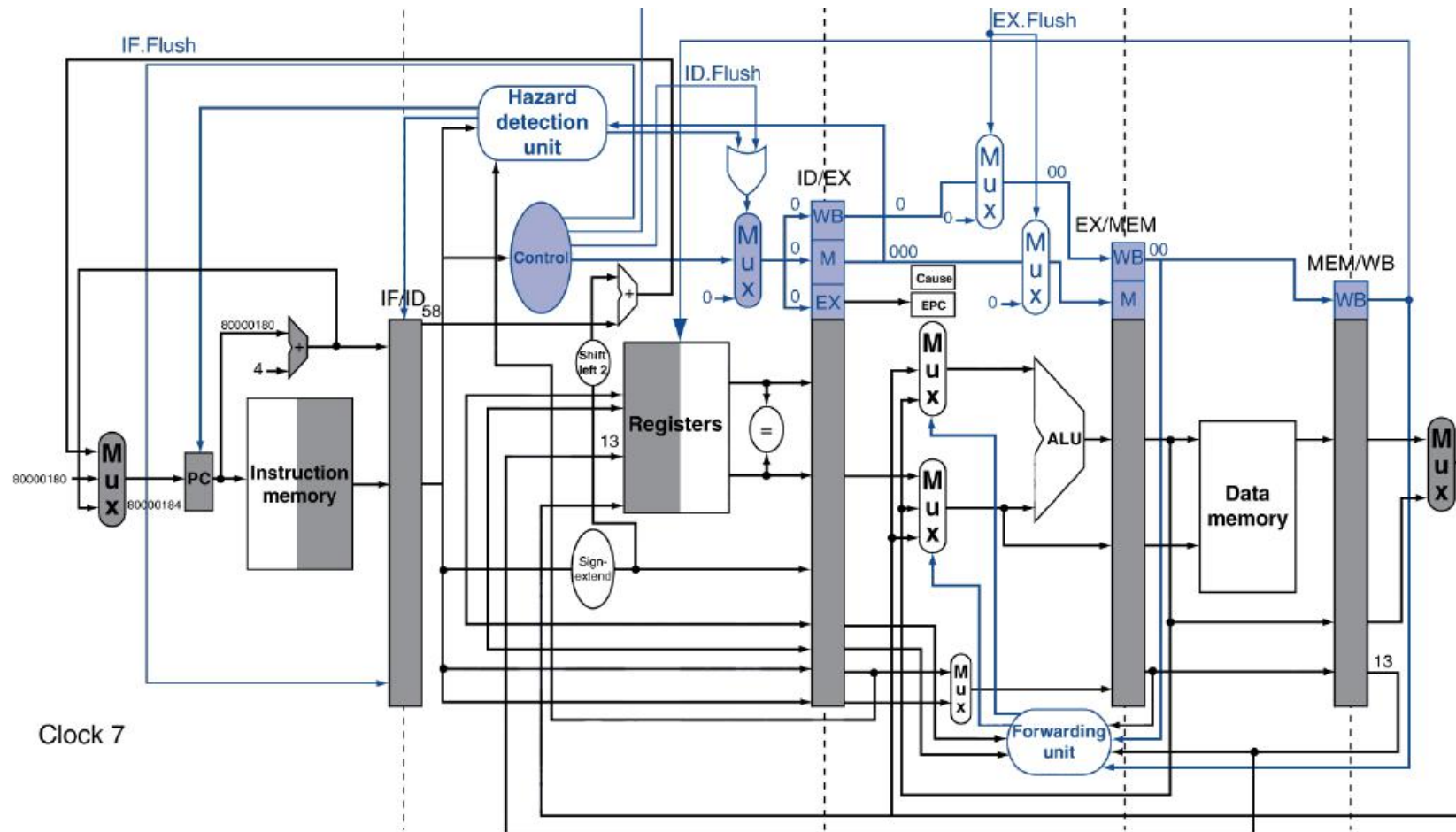
I/O

- Usually only one concept question appear in the exam
- Memmorize
- If time is enough, memorize other concepts in case of T/F question

Memory Mapped I/O

Memory mapped I/O
I/O registers are connected to memory locations
I/Os are accessed as regular memory locations
 Accessible from software by virtual memory addresses
OS writes/reads memory to operate I/O devices
OS uses address translation mechanism to make
them only accessible in kernel mode
Virtual address translation only accessible to OS

Dependability Measures

Newly added

in I/O

this semster

- Dependability
  - Reliability
  - Availability
- Measures
  - Reliability: Mean time to failure (MTTF)
    - Time spent in "service accomplishment"
  - Mean time to repair (MTTR)
    - Time spent in "service interruption"
  - Mean time between failures: MTBF = MTTF + MTTR
  - Availability = MTTF / MTBF
- Improving Availability
  - Increase MTTF: fault avoidance, fault tolerance, fault forecasting
  - Reduce MTTR: improved tools and processes for diagnosis and repair