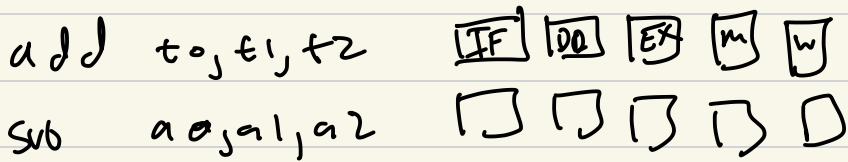# CS 631-01 Advanced Arch and Intro to OS

Review of Hazard Unit

Advanced Arch
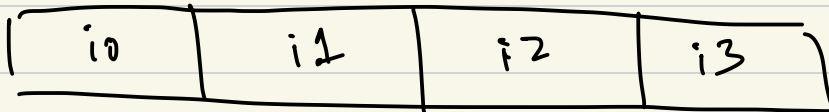
Branch Prediction

Super-scalar   n-way   multip issue

$$add \quad t_0, t_1, t_2 \qquad \boxed{IF} \; \boxed{DO} \; \boxed{EX} \; \boxed{m} \; \boxed{w}$$
$$sub \quad a_0, a_1, a_2 \qquad \boxed{} \; \boxed{} \; \boxed{} \; \boxed{} \; \boxed{}$$

Itanium 64

VLIW   very large instruction word

| i0 | i1 | i2 | i3 |

SIMD   single instruction multiple data

Out of order execution
      ↓

     ld   t0, (+1)
   ↓ addi   t2, t2, 3
      mul   a0, a1, a1
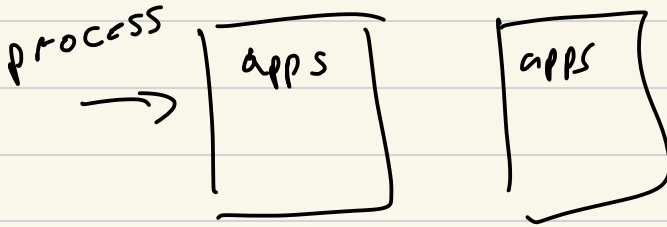
Speculative Execution

Intro to OS

xv6   MIT   RISC-V   lessthan 10,000 LOC

UNIX System Calls   OS

→ Kernel
user progs
tools

process → [apps]   [apps]

Kernel

protection & Isolation
Resource management
Abstration of HW

Kernel Mechanisms

Timer interrupts
Context switching
Virtual Memory