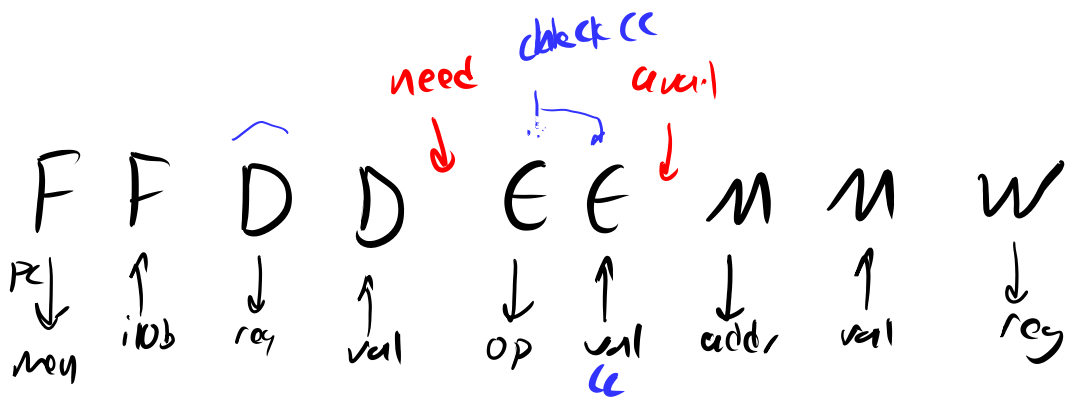




F D E M W
F D D E M W
F F D E M W
F D E M W
F D E M W
F D E M W



add r8 r9

F₁ F₂ D₁ D₂ E₁ E₂ M₁ M₂ W₁

add r9 r10

F₁ F₂ D₁ D₂ D₂ E₁ E₂ M₁ M₂ W

Jle
wrong

F₁ F₂ D₁ D₁ D₂ E₁ E₂ M₁ M₂ W

F₁ F₂ F₂ D₁ D₂ E₁

F

Multiple Issue

F D E M W

F D E M W

D E M W

add₀ %18, %17
add %18, %19

F D E M W
F D D E M W
F D
F F

Parallelism

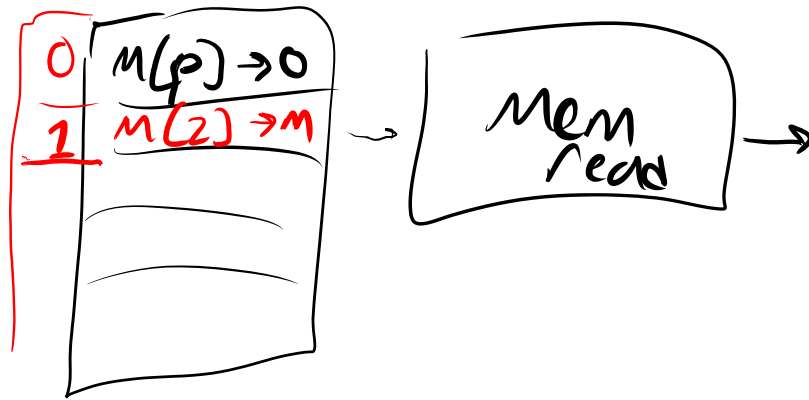
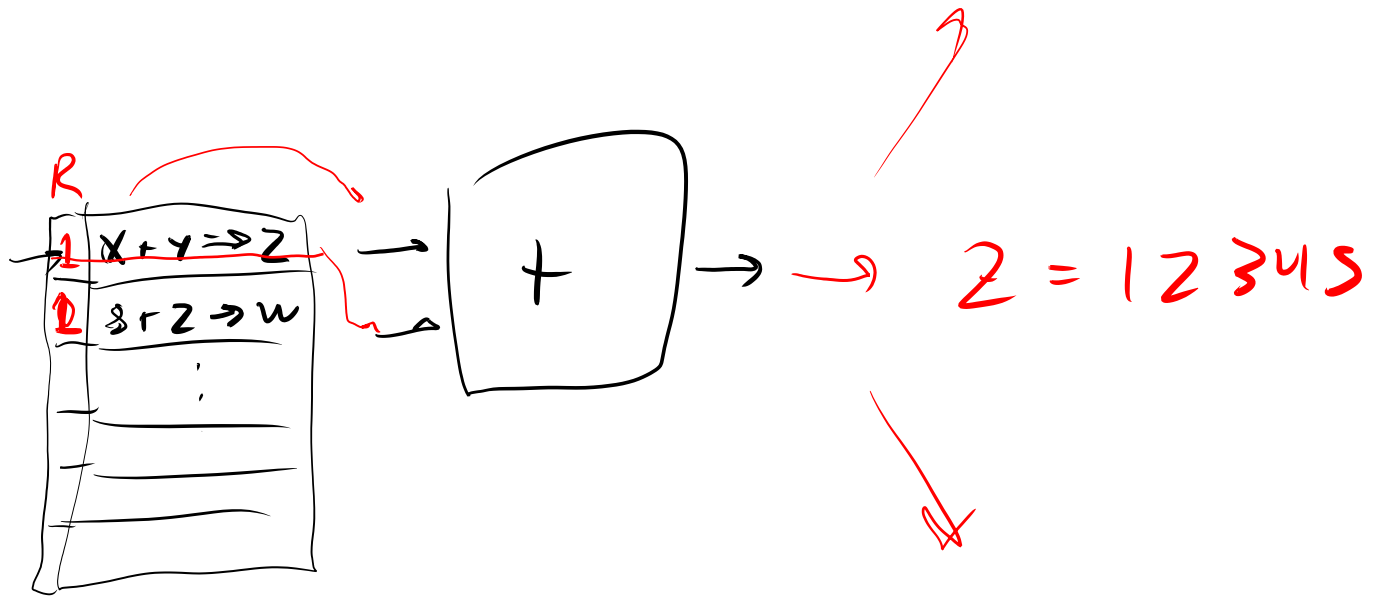
Pipelines ~ top out around 10 stages
Multiple issue ~ 2-4 copies

} Instruction-level - Share Proc State (registers)



Thread-level - Share memory not reg

Out-of-order



adder's queue

xorg, %rcx, %rcx h19 = h18 ^ h18

x9

