

CS252
Graduate Computer Architecture

Lecture 18:
Branch Prediction + analysis resources
=> ILP

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Today's Big Idea

- **Reactive: past actions cause system to adapt use**
 - do what you did before better
 - ex: caches
 - TCP windows
 - URL completion, ...
- **Proactive: uses past actions to predict future actions**
 - optimize speculatively, anticipate what you are about to do
 - branch prediction
 - long cache blocks
 - ???

Review: Case for Branch Prediction when Issue N instructions per clock cycle

1. Branches will arrive up to n times faster in an n -issue processor
2. Amdahl's Law \Rightarrow relative impact of the control stalls will be larger with the lower potential CPI in an n -issue processor

conversely, need branch prediction to 'see' potential parallelism