MLP-Aware Dynamic Instruction Window Resizing for Adaptively Exploiting Both ILP and MLP

Yuya Kora

Kyohei Yamaguchi

Hideki Ando

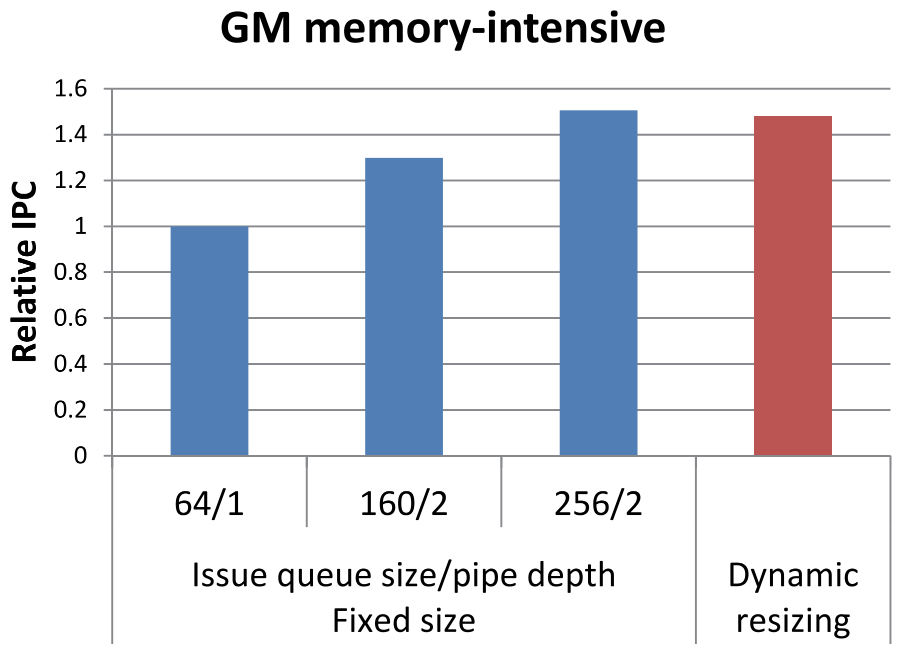
Nagoya University

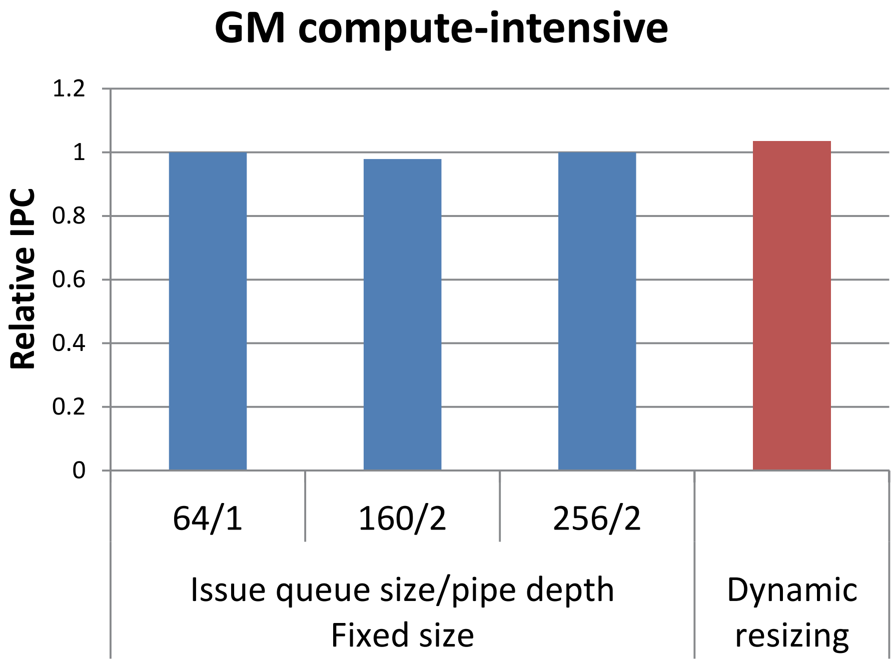
Problem to Solve

- Difficult to improve single-thread performance in memory-intensive programs
  - Memory wall
- Very large instruction window can overcome this problem by exploiting MLP
  - This degrades the clock cycle time
  - While pipelining can solve this, it instead prevents ILP exploitation, degrading IPC in compute-intensive programs

Dynamic Instruction Window Resizing

- Adapt window size to available parallelism
  - ILP or MLP
  - Based on prediction





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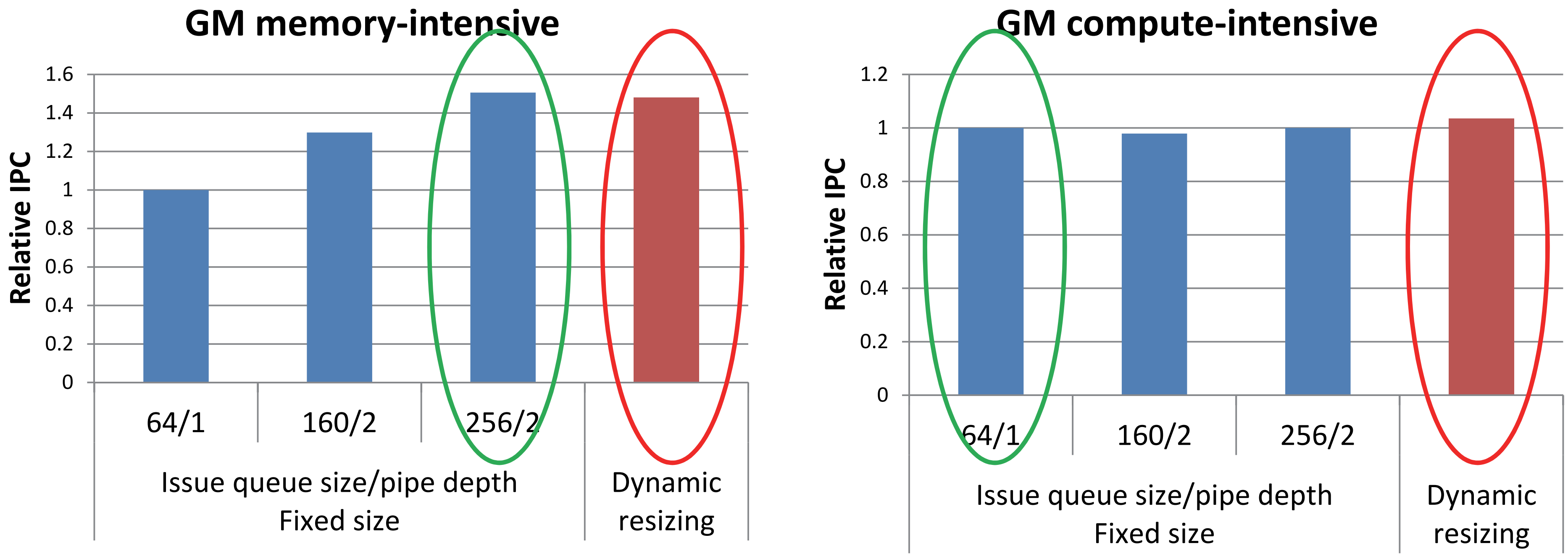

21% speedup on average