University of Central Florida

Department of Computer Science

CDA 5106: Fall 2020

Machine Problem 3: Dynamic Instruction Scheduling

by

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Honor Pledge: "I have neither given nor received unauthorized aid on this test or assignment."

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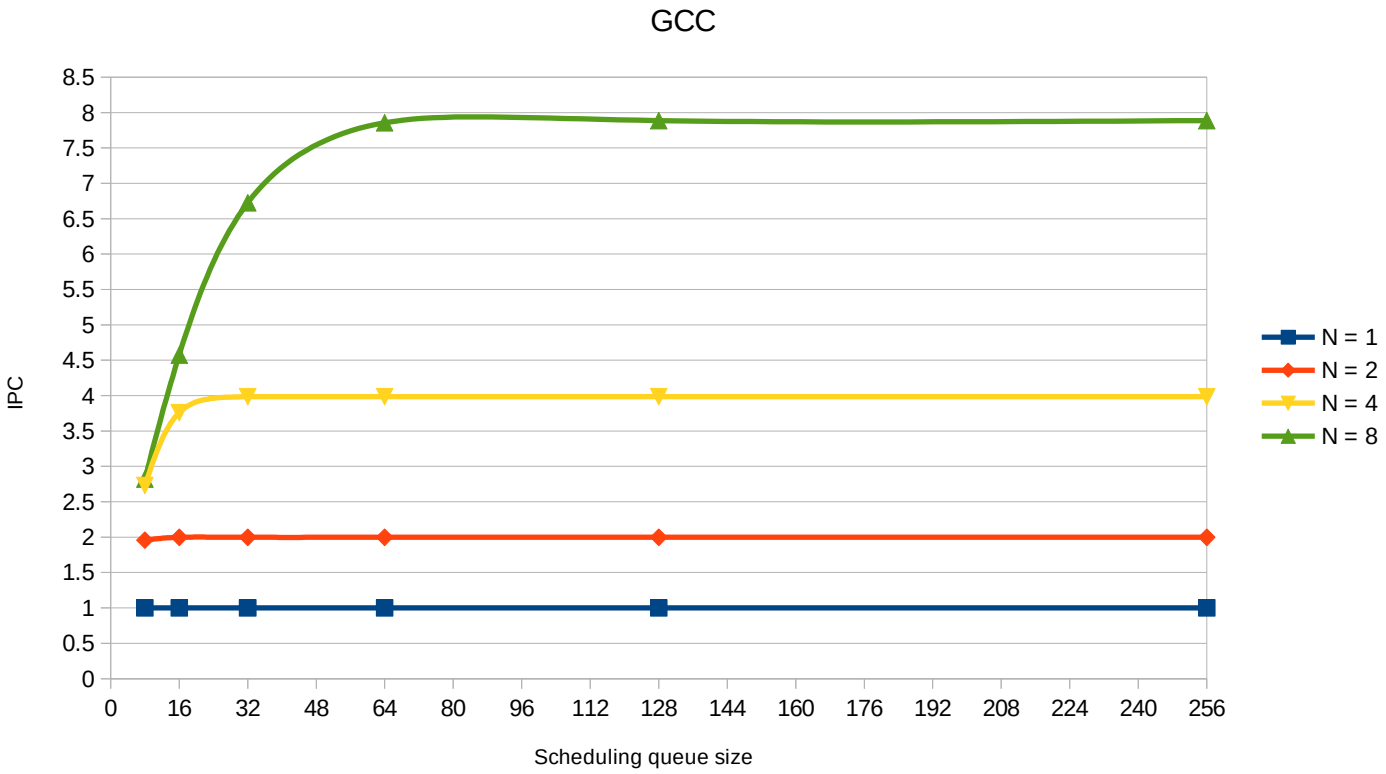
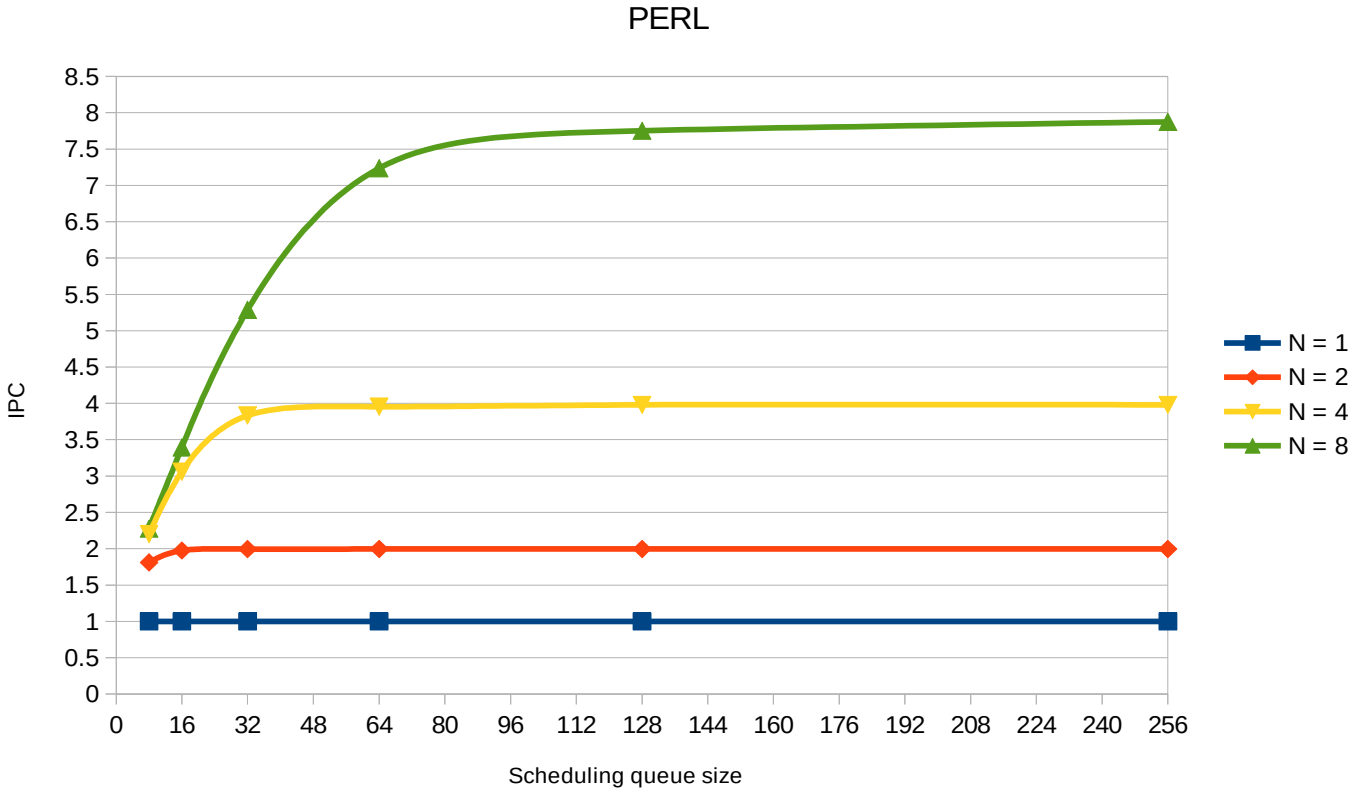
(sign by typing your name)

1. GCC benchmark graph



2. PERL benchmark graph



3. Optimized scheduling queue size per peak fetch rate

	Benchmark = gcc	Benchmark = perl
N=1	8	8
N=2	8	16
N=4	32	32
N=8	64	128

4. Discussion

A) Goal of superscalar processor

- The experiments performed in this project indicate that as scheduling queue size increases, IPC reaches closer to the peak fetch rate. However, IPC never converges with peak fetch rate. One point to note, when N=4, there's a significant improvement in IPC between S=8 and S=16. Also, when N=8, IPC improves as scheduling queue size increases.

B) Difference IPC of trace files

- Experiments show that average IPC with GCC trace files is always better than PERL with similar microarchitecture configurations. One reason could be that GCC file has around 9226 registers as value "-1" and PERL file has 9917, which corresponds to lack of registers and potential dependencies.
- GCC file has 1929 instructions with 5 ex stalls while PERL has 2493 instructions with 5 ex stalls, which could also corresponds to the differences in IPC.
- Taking theses two distinctions in trace files under consideration provides probable reason for differences in IPC.