

## UCLA ECE 209AS Advanced and Secure Computer Architecture CA2 Report

### Output diff

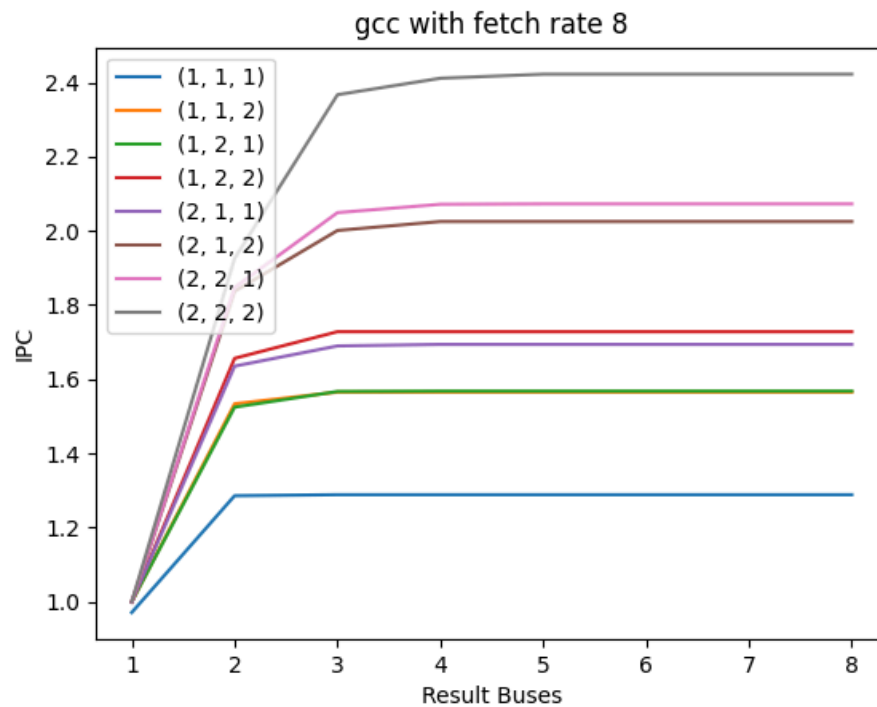
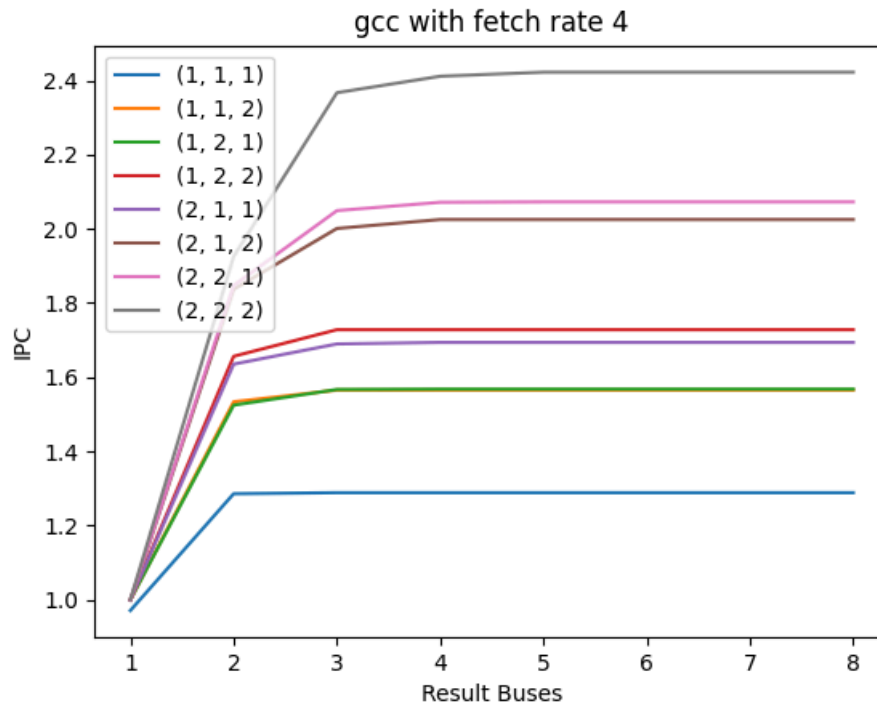
Command explanation:

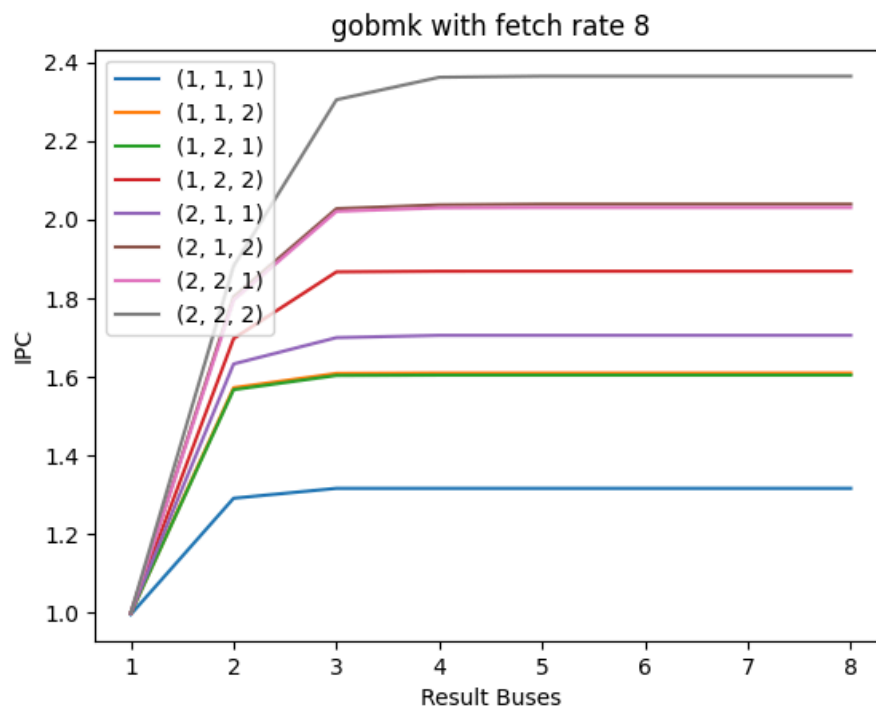
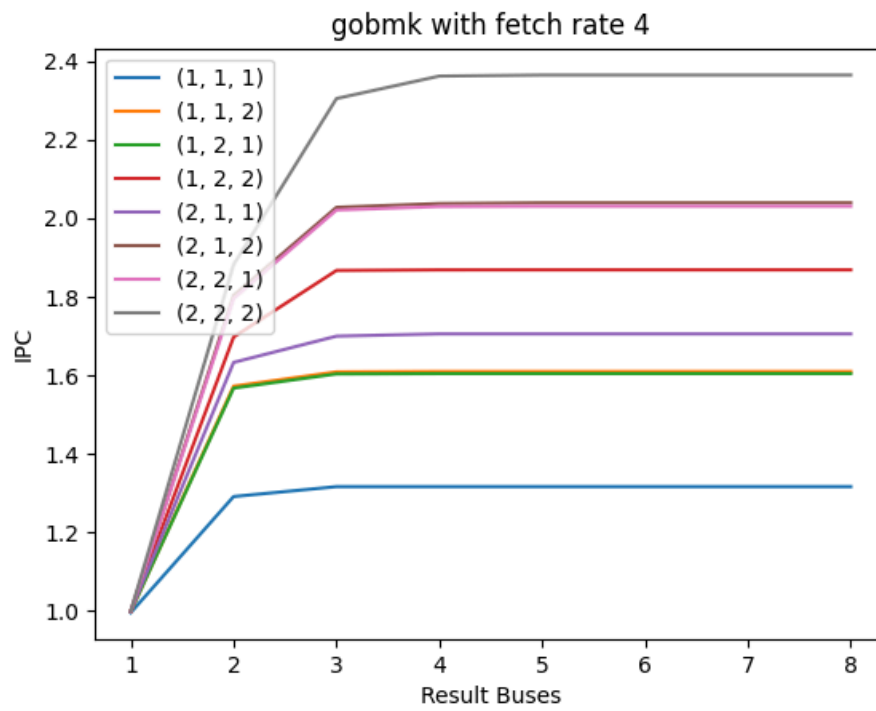
pipe procsim stdout to diff; use "-" to pass stdin as argument to diff

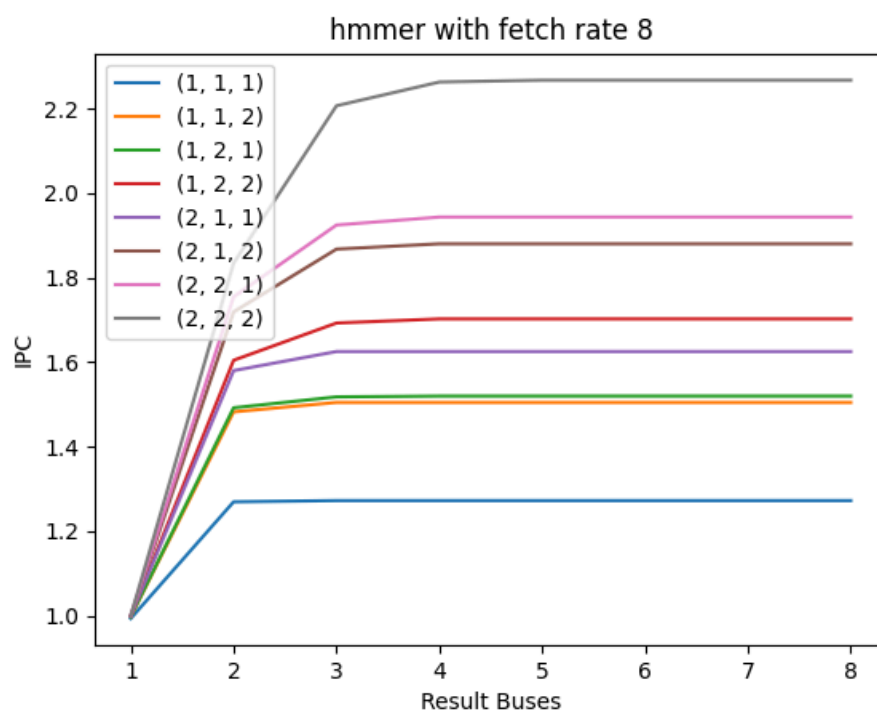
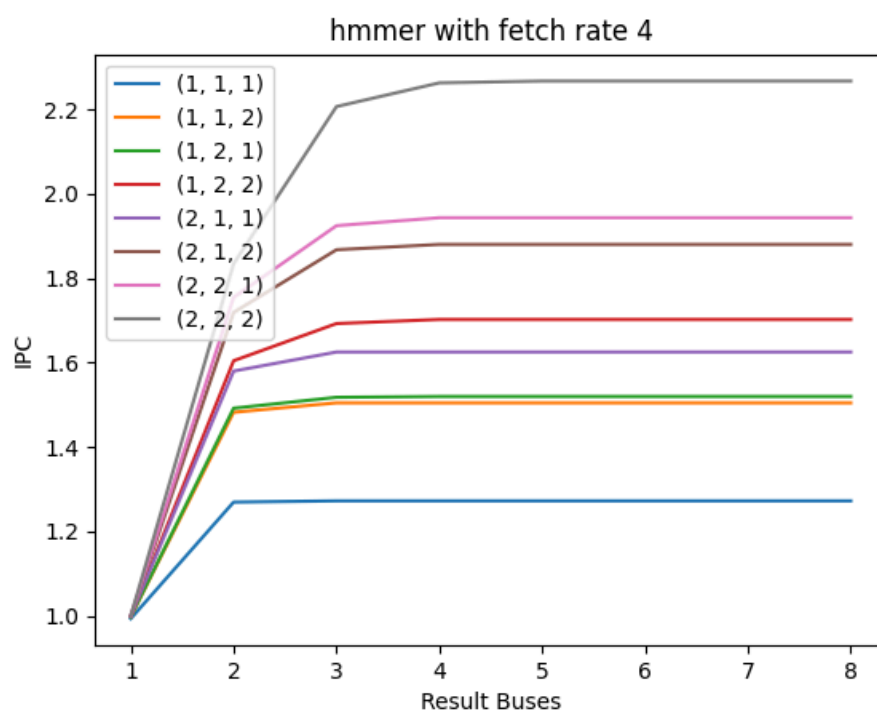
```
● env→ ca2 git:(ca2) x ./procsim -r2 -j3 -k2 -l1 -f4 -i traces/gcc.100k.trace | diff output1.1/gcc.output -
● env→ ca2 git:(ca2) x ./procsim -r2 -j3 -k2 -l1 -f4 -i traces/gobmk.100k.trace | diff output1.1/gobmk.output -
● env→ ca2 git:(ca2) x ./procsim -r2 -j3 -k2 -l1 -f4 -i traces/hmmer.100k.trace | diff output1.1/hmmer.output -
⊗ env→ ca2 git:(ca2) x ./procsim -r2 -j3 -k2 -l1 -f4 -i traces/mcf.100k.trace | diff output1.1/mcf.output -
100012c100012
< Avg Dispatch queue size: 26875.132812
> Avg Dispatch queue size: 26875.130859
```

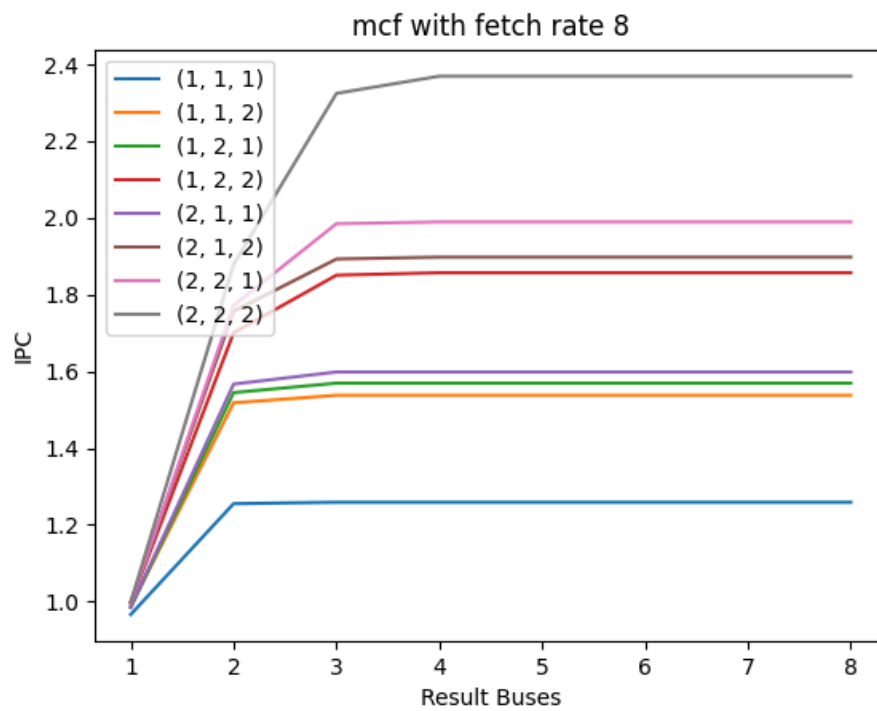
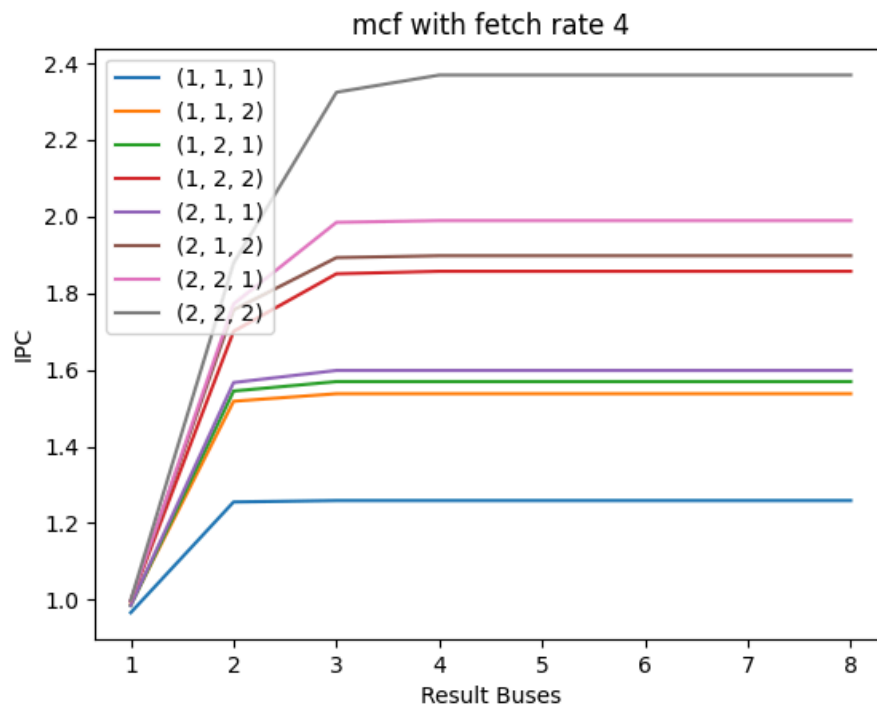
## Design Space Exploration

legend (3, 2, 1) means  $k_0=3$ ,  $k_1=2$ ,  $k_2=1$ . Each plot sweeps result bus size and number of functional units while keeping benchmark and fetch rate fixed.









**Select the least amount of hardware (as measured by total number of FUs ( $k_0+k_1+k_2$ ) and result buses (R)) for each benchmark trace that provides nearly (>95%) of the highest value for retired IPC.**

gcc max IPC = 2.422, 95% max IPC = 2.301  
choose r,j,k,l,f = 3,2,2,2,4 to achieve 2.367 IPC

gobmk max IPC = 2.364, 95% max IPC = 2.246  
choose r,j,k,l,f = 3,2,2,2,4 to achieve 2.305 IPC

hammer max IPC = 2.267, 95% max IPC = 2.154  
choose r,j,k,l,f = 3,2,2,2,4 to achieve 2.206 IPC

mcf max IPC = 2.369, 95% max IPC = 2.251  
choose r,j,k,l,f = 3,2,2,2,4 to achieve 2.325 IPC

Justification: filtered each benchmark results for IPC >95% of max IPC and picked the the benchmark with smallest  $r+j+k+l$

## END OF REPORT

Subsequent pages list benchmark data used to generate this report

## Benchmark data

r	j	k	l	f	trace	ipc
1	1	1	1	1	4 gcc	0.971053
1	1	1	1	1	4 gobmk	0.996185
1	1	1	1	1	4 hmmer	0.993759
1	1	1	1	1	4 mcf	0.966174
1	1	1	1	1	8 gcc	0.971053
1	1	1	1	1	8 gobmk	0.996185
1	1	1	1	1	8 hmmer	0.993759
1	1	1	1	1	8 mcf	0.966174
1	1	1	1	2	4 gcc	0.99996
1	1	1	1	2	4 gobmk	0.999151
1	1	1	1	2	4 hmmer	0.998183
1	1	1	1	2	4 mcf	0.988142
1	1	1	1	2	8 gcc	0.99996
1	1	1	1	2	8 gobmk	0.999151
1	1	1	1	2	8 hmmer	0.998183
1	1	1	1	2	8 mcf	0.988142
1	1	1	2	1	4 gcc	0.99996
1	1	1	2	1	4 gobmk	0.999121
1	1	1	2	1	4 hmmer	0.998183
1	1	1	2	1	4 mcf	0.985008
1	1	1	2	1	8 gcc	0.99996
1	1	1	2	1	8 gobmk	0.999121
1	1	1	2	1	8 hmmer	0.998183
1	1	1	2	1	8 mcf	0.985008
1	1	1	2	2	4 gcc	0.99995
1	1	1	2	2	4 gobmk	0.99974
1	1	1	2	2	4 hmmer	0.99996
1	1	1	2	2	4 mcf	0.996751
1	1	1	2	2	8 gcc	0.99995
1	1	1	2	2	8 gobmk	0.99974
1	1	1	2	2	8 hmmer	0.99996
1	1	1	2	2	8 mcf	0.996751
1	2	1	1	1	4 gcc	0.99996

1	2	1	1	4	gobmk	0.9994
1	2	1	1	4	hmmer	0.99985
1	2	1	1	4	mcf	0.985008
1	2	1	1	8	gcc	0.99996
1	2	1	1	8	gobmk	0.9994
1	2	1	1	8	hmmer	0.99985
1	2	1	1	8	mcf	0.985008
1	2	1	2	4	gcc	0.998941
1	2	1	2	4	gobmk	0.99978
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1	2	1	2	4	mcf	0.996751
1	2	1	2	8	gcc	0.998941
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1	2	1	2	8	mcf	0.996751
1	2	2	1	4	gcc	0.998941
1	2	2	1	4	gobmk	0.99966
1	2	2	1	4	hmmer	0.99996
1	2	2	1	4	mcf	0.995837
1	2	2	1	8	gcc	0.998941
1	2	2	1	8	gobmk	0.99966
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2	1	1	1	4	gobmk	1.291656
2	1	1	1	4	hmmer	1.269696
2	1	1	1	4	mcf	1.255067



2	1	1	1	8	gcc	1.285793
2	1	1	1	8	gobmk	1.291656
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2	1	1	1	8	mcf	1.255067
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2	1	1	2	4	mcf	1.517934
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2	1	1	2	8	gobmk	1.572599
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2	1	2	1	4	hmmer	1.492047
2	1	2	1	4	mcf	1.544545
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2	1	2	1	8	gobmk	1.567619
2	1	2	1	8	hmmer	1.492047
2	1	2	1	8	mcf	1.544545
2	1	2	2	4	gcc	1.656205
2	1	2	2	4	gobmk	1.697591
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3	2	1	2	4	gobmk	2.02774
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6	1	2	2	4	mcf	1.857079



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6	1	2	2	8	hmmer	1.702302
6	1	2	2	8	mcf	1.857079
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6	2	1	1	4	gobmk	1.705699
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7	1	1	2	4	gobmk	1.609995
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7	1	1	2	4	mcf	1.537586
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