Optimizations

COP 6622 — Dr. Whalley — Summer 2018

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For the following tables, we have the following optimizations

- U: unreachable code elimination
- B: reverse branches
- C: branch chaining
- R: register allocation
- O: copy propagation
- D: dead assignment elimination
- P: peephole
- M: loop-invariant code motion
- E: local cse
- F: fill delay slots

The test were carried out with 10 peephole rules, and with all object files except fillslots.o from Dr. Whalley's obj directory. Numbers in the tables represent a ratio, where the baseline is the number without any optimizations applied.

	Optimization	banner	cal	echo	find	half	queens	square	wc	Average
Static Instructions	-U	1	0.9962	1	1	0.9444	1	1	1	0.9925
	-C	1	1	1	1	1	1	1	1	1
	-B	0.9884	0.9754	0.9913	0.9574	1	0.9777	1	0.9895	0.9850
	-R	1	1	1	1	1	1	1	1	1
	-O	1	1	1	1	1	1	1	1	1
	-D	1	1	0.9826	1	1	1	1	1	0.9978
	-P	1	0.9981	1	1	1	1	1	1	0.9998
	-M	1	1	1	1	1	1	1	1	1
	-E	1	1	1	1	1	1	1	1	1
	-F	0.9537	0.9630	0.9388	1	0.9444	0.9806	0.9500	0.9710	0.9627
Dynamic Instructions	-U	1	1	1	1	1	1	1	1	1
	-C	0.9884	0.9874	1	1	1	1	1	0.9863	0.9953
	-B	0.9902	0.9662	0.9823	0.9492	1	0.9707	1	1.000	0.9823
	-R	1	1	1	1	1.118	1	1	1	1.015
	-O	1	1	1	1	1	1	1	1	1
	-D	1	1	0.9823	1	1	1	1	1	0.9978
	-P	0.9998	0.9998	1	1	1	1	1	1	1.000
	-M	1	1	1	1	1	1	1	1	1
	-E	1	1	1	1	1	1	1	1	1
	-F	0.9912	0.9321	0.9469	0.9746	0.9412	0.9943	0.9500	0.9741	0.9631
Memory References	-U	1	1	1	1	1	1	1	1	1
	-C	1	1	1	1	1	1	1	1	1
	-B	1	1	1	1	1	1	1	1	1
	-R	0.2035	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-O	1	1	1	1	1	1	1	1	1
	-D	1	1	1	1	1	1	1	1	1
	-P	1	1	1	1	1	1	1	1	1
	-M	1	1	1	1	1	1	1	1	1
	-E	1	1	1	1	1	1	1	1	1
	-F	1	1	1	1	1	1	1	1	1

	Optimization(s)	banner	cal	echo	find	half	queens	square	wc	Average
Static Instructions	-U	1	0.9962	1	1	0.9444	1	1	1	0.9926
	-UC	1	0.9924	1	1	0.9444	1	1	1	0.9921
	-UCB	0.9884	0.9641	0.9913	0.9574	0.9444	0.9777	1	0.9895	0.9766
	-UCBR	0.9884	0.9641	0.9913	0.9574	0.9444	0.9777	1	0.9895	0.9766
	-UCBRO	0.9884	0.9641	0.9913	0.9574	0.9444	0.9777	1	0.9895	0.9766
	-UCBROD	0.8532	0.8318	0.8522	0.8936	0.8333	0.7989	1	0.8912	0.8693
	-UCBRODP	0.8185	0.8053	0.8348	0.8723	0.8056	0.7654	1	0.8815	0.8479
	-UCBRODPM	0.8185	0.8053	0.8348	0.8723	0.8056	0.7654	1	0.8606	0.8453
	-UCBRODPME	0.8185	0.8015	0.8348	0.8723	0.8056	0.7542	1	0.8606	0.8434
	-UCBRODPMEF	0.7722	0.7089	0.7739	0.7660	0.7500	0.6774	0.9500	0.7875	0.7732
Dynamic Instructions	-U	1	1	1	1	1	1	1	1	1
	-UC	0.9885	0.9874	1	1	1	1	1	0.9836	0.9949
	-UCB	0.9785	0.9582	0.9823	0.9492	1	0.9707	1	0.9836	0.9778
	-UCBR	0.9785	0.9582	0.9823	0.9492	1.118	0.9707	1	0.9836	0.9926
	-UCBRO	0.9785	0.9582	0.9823	0.9492	1.118	0.9707	1	0.9836	0.9926
	-UCBROD	0.7480	0.8270	0.7965	0.8475	0.9412	0.8025	1	0.8498	0.8516
	-UCBRODP	0.7397	0.7738	0.7876	0.8051	0.9118	0.7648	1	0.8241	0.8259
	-UCBRODPM	0.7397	0.7738	0.7876	0.8051	0.9118	0.7648	1	0.8241	0.8259
	-UCBRODPME	0.7397	0.7734	0.7876	0.8051	0.9118	0.7648	1	0.7926	0.8219
	-UCBRODPMEF	0.7309	0.6820	0.7345	0.7373	0.8529	0.7217	0.9500	0.7153	0.7656
Memory References	-U	1	1	1	1	1	1	1	1	1
	-UC	1	1	1	1	1	1	1	1	1
	-UCB	1	1	1	1	1	1	1	1	1
	-UCBR	0.2035	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-UCBRO	0.2035	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-UCBROD	0.2035	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-UCBRODP	0.2305	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-UCBRODPM	0.2305	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-UCBRODPME	0.2305	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062
	-UCBRODPMEF	0.2305	0.1387	0.4054	0.3636	0.4375	0.2586	1	0.4421	0.4062