

Laboratory Notes

Benchmarks used:

Big – sandmark.umz

Medium – advent.umz (partial)

Small – midmark.um

Table 1. Improvements Report

<i>Benchmark</i>	<i>Run 1 Time (s)</i>	<i>Run 2 Time (s)</i>	<i>Run 3 Time (s)</i>	<i>Avg Time (s)</i>	<i>Instructions</i>	<i>Rel to Start</i>	<i>Rel to Prev</i>	<i>Improvement</i>	<i>Bottleneck</i>	<i>Phase / Stage</i>
Big	60.46	56.06	56.04	57.52		1.000	1.000			
Medium	20.51	20.23	19.54	20.09		1.000	1.000	No improvement (starting point)	Bitpack_getu	1
Small	2.61	2.22	2.22	2.35	2.39E+10	1.000	1.000			
Big	48.61	48.83	48.46	48.63		0.846	0.846			
Medium	17.1	17.08	17.23	17.14		0.853	0.853	Compiled with optimization flag -O1 and linked against -lcii-O1	Bitpack_getu	2
Small	1.94	1.93	1.95	1.94	2.22E+10	0.826	0.826			
Big	48.32	48.79	48.46	48.52		0.844	0.998			
Medium	17.11	17.26	17.63	17.33		0.863	1.011	Compiled with optimization flag -O2 and linked against -lcii-O2	Bitpack_getu	3
Small	1.93	1.95	1.95	1.94	2.22E+10	0.827	1.002			

Laboratory Notes

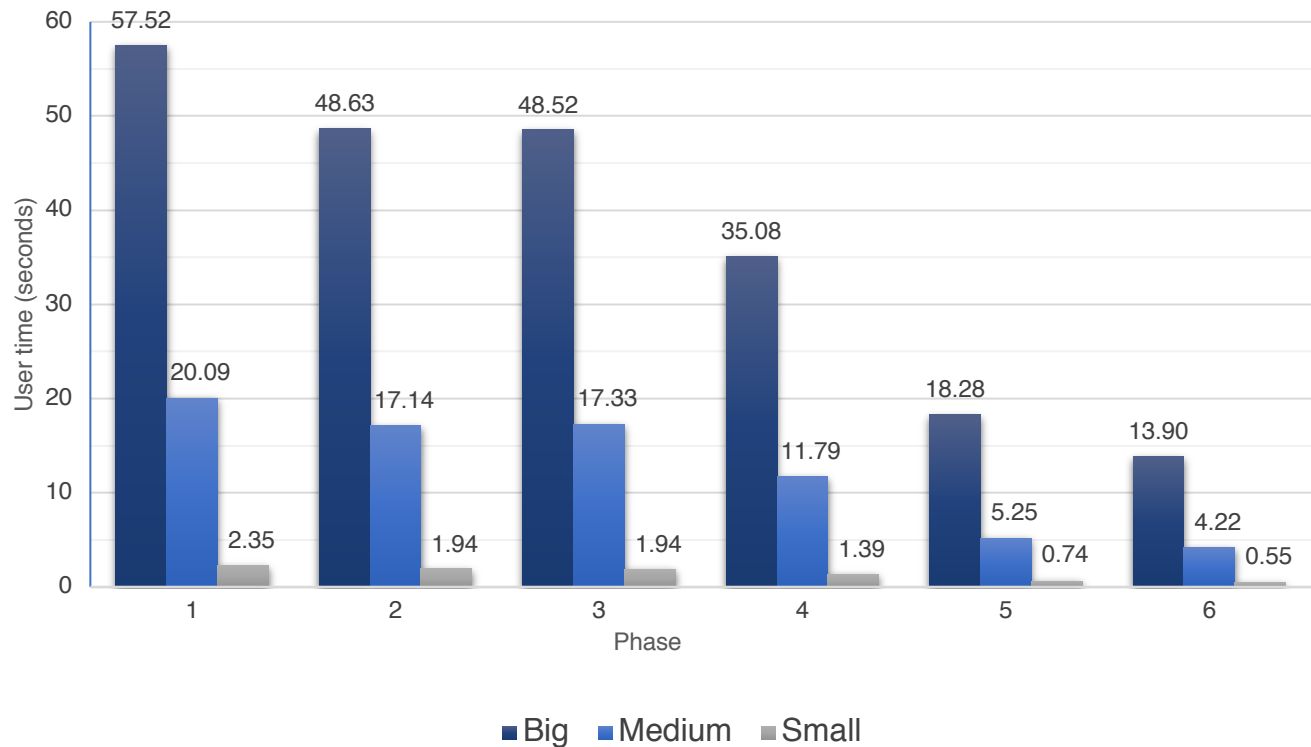
Table 1. Improvements Report

<i>Benchmark</i>	<i>Run 1 Time (s)</i>	<i>Run 2 Time (s)</i>	<i>Run 3 Time (s)</i>	<i>Avg Time (s)</i>	<i>Instructions</i>	<i>Rel to Start</i>	<i>Rel to Prev</i>	<i>Improvement</i>	<i>Bottleneck</i>	<i>Phase / Stage</i>
Big	35.16	35.06	35.02	35.08		0.610	0.723	Eliminated function calls to bitpack_getu. Created smaller, inline version of bitpack_getu using local variables for mask and shift values. This removed assertions found in bitpack, and allows the use of static mask and shift values.	Seq_get, UArray_at	4
Medium	11.79	11.76	11.82	11.79		0.587	0.680			
Small	1.39	1.38	1.39	1.39	1.04E+10	0.590	0.714			
Big	18.29	18.39	18.15	18.28		0.318	0.521	Changed the program_counter to point to the next index directly. This was achieved by incrementing the program_counter by +1, rather than extracting the array from the sequence for each subsequent word.	segmented_load, segmented_store	5
Medium	5.24	5.26	5.26	5.25		0.261	0.446			
Small	0.72	0.76	0.73	0.74	6.94E+09	0.313	0.531			
Big	13.89	13.9	13.9	13.90		0.242	0.760	Removed temporary variables for Seq_get and Uarray_at pairs, removed function calls by integrating all instruction functions into one primary function.	Seq_get, UArray_at	6
Medium	4.32	4.16	4.17	4.22		0.210	0.803			
Small	0.55	0.55	0.55	0.55	6.12E+09	0.234	0.747			

See next page for visual representations.

Laboratory Notes

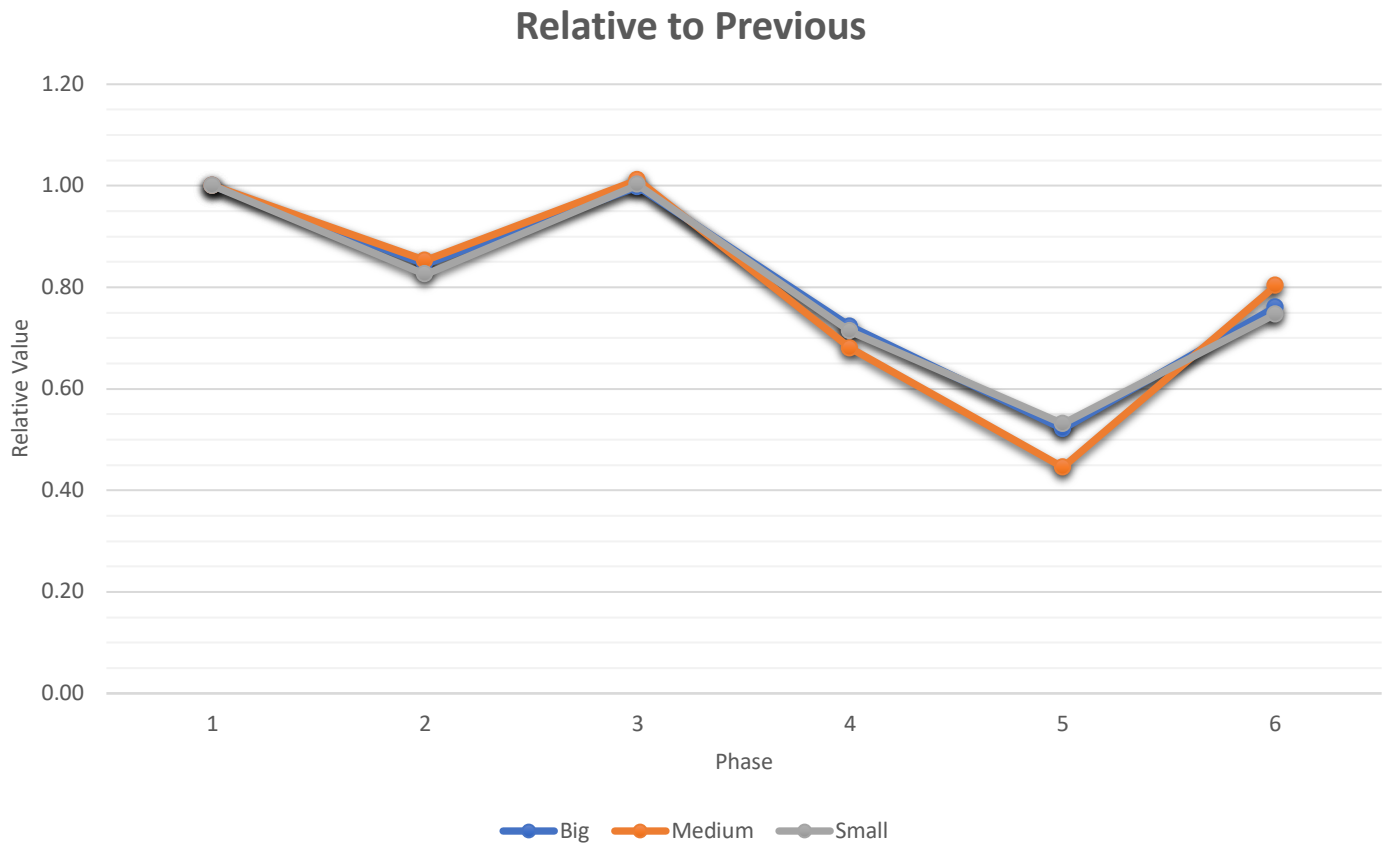
User Time per Optimization Phase



Phase Improvements

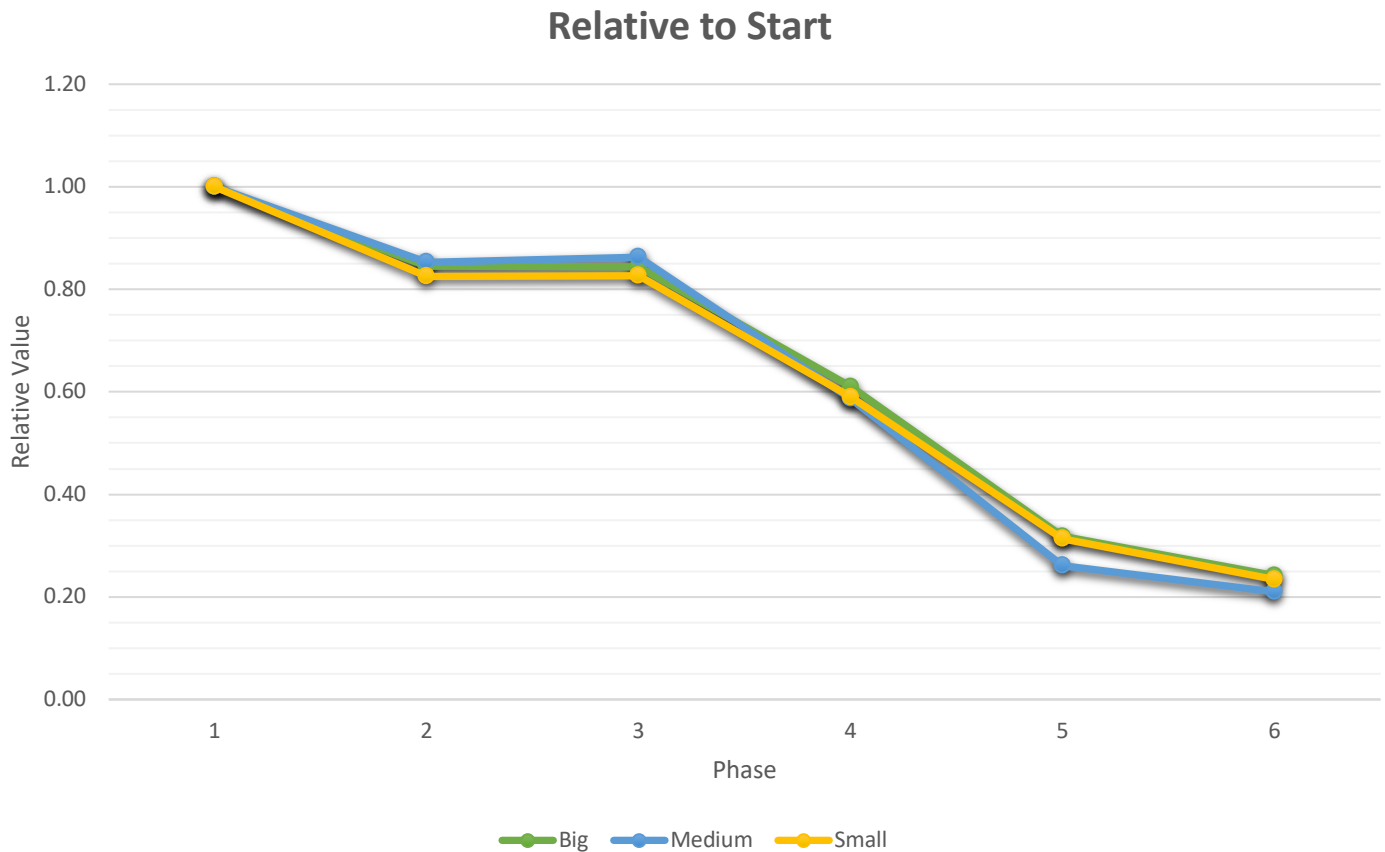
1	No improvement (starting point)
2	Compiled with optimization flag -O1 and linked against -lcii-O1
3	Compiled with optimization flag -O2 and linked against -lcii-O2
4	Eliminated function call to bitpack_getu. Created smaller version of bitpack_getus using local variables for mask and shift values. This removes assertions found in bitpack, and allows the use of static mask and shift values.
5	Changed the program_counter to point to the next index directly. This was achieved by incrementing the program_counter by +1, rather than extracting the array from the sequence at each subsequent word.
6	Removed temporary variables for Seq_get and Uarray_at pairs, removed function calls by integrating all instruction functions into one primary function

Laboratory Notes



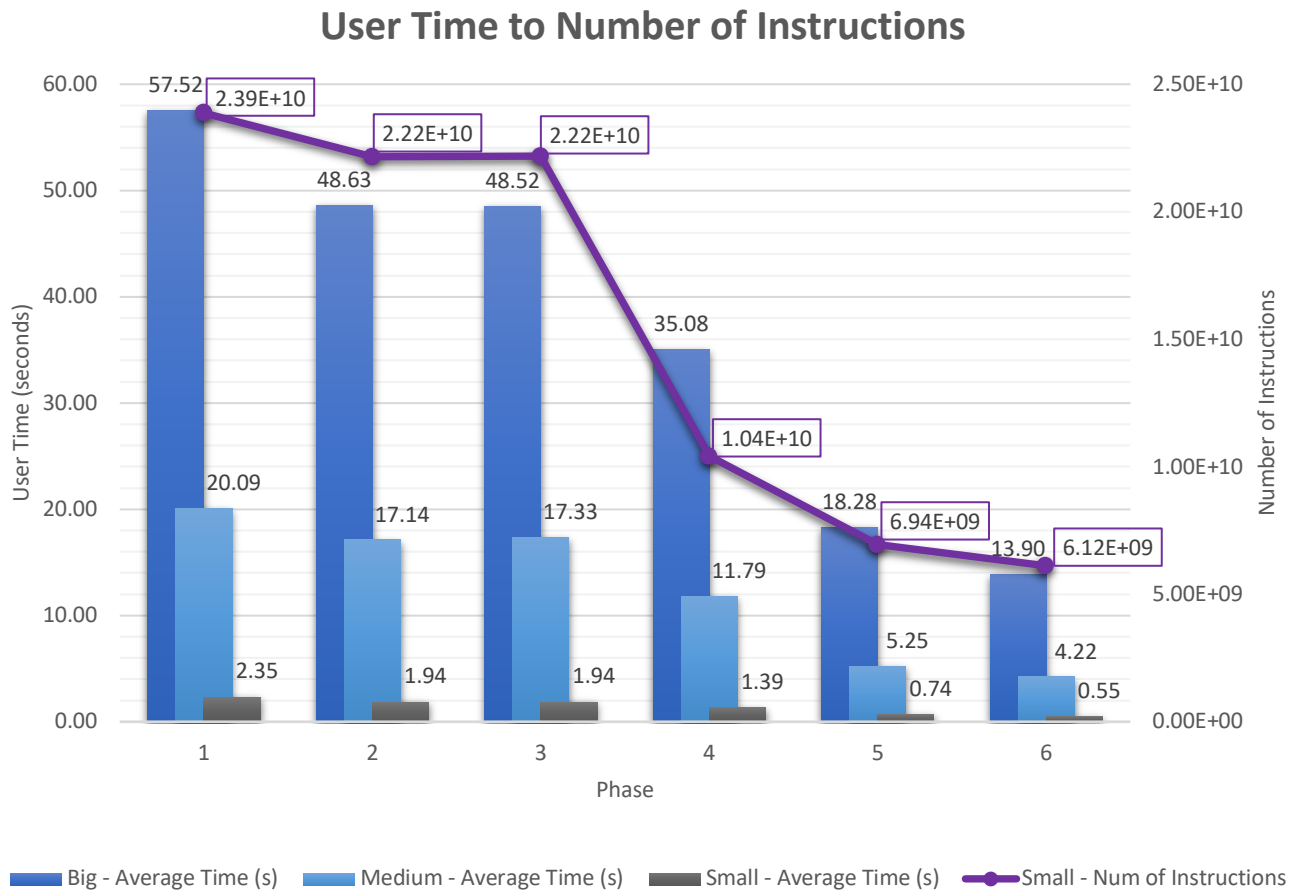
Phase	Improvements
1	No improvement (starting point)
2	Compiled with optimization flag -O1 and linked against -lcii-O1
3	Compiled with optimization flag -O2 and linked against -lcii-O2
4	Eliminated function call to bitpack_getu. Created smaller version of bitpack_getus using local variables for mask and shift values. This removes assertions found in bitpack, and allows the use of static mask and shift values.
5	Changed the program_counter to point to the next index directly. This was achieved by incrementing the program_counter by +1, rather than extracting the array from the sequence at each subsequent word.
6	Removed temporary variables for Seq_get and Uarray_at pairs, removed function calls by integrating all instruction functions into one primary function

Laboratory Notes



Phase	Improvements
1	No improvement (starting point)
2	Compiled with optimization flag -O1 and linked against -lcii-O1
3	Compiled with optimization flag -O2 and linked against -lcii-O2
4	Eliminated function call to bitpack_getu. Created smaller version of bitpack_getus using local variables for mask and shift values. This removes assertions found in bitpack, and allows the use of static mask and shift values.
5	Changed the program_counter to point to the next index directly. This was achieved by incrementing the program_counter by +1, rather than extracting the array from the sequence at each subsequent word.
6	Removed temporary variables for Seq_get and Uarray_at pairs, removed function calls by integrating all instruction functions into one primary function

Laboratory Notes



Phase Improvements

1	No improvement (starting point)
2	Compiled with optimization flag -O1 and linked against -lcii-O1
3	Compiled with optimization flag -O2 and linked against -lcii-O2
4	Eliminated function call to <code>bitpack_getu</code> . Created smaller version of <code>bitpack_getus</code> using local variables for mask and shift values. This removes assertions found in <code>bitpack</code> , and allows the use of static mask and shift values.
5	Changed the <code>program_counter</code> to point to the next index directly. This was achieved by incrementing the <code>program_counter</code> by +1, rather than extracting the array from the sequence at each subsequent word.
6	Removed temporary variables for <code>Seq_get</code> and <code>Uarray_at</code> pairs, removed function calls by integrating all instruction functions into one primary function