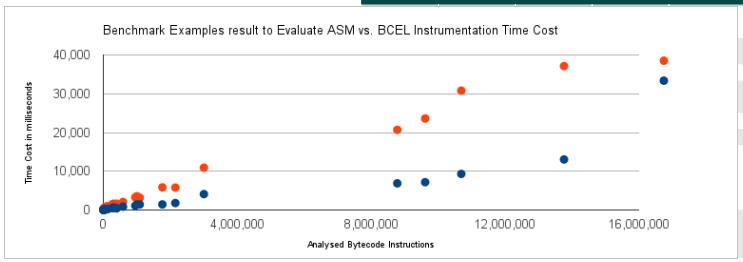
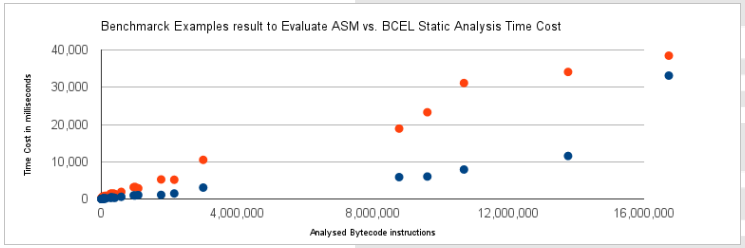
Framework.Evaluation.in.Static.&.Dynamic.analysis.settings.Mar2014.xls - Benchmarking in Static & Dynamic analysis settings

Experiment result on benchmarking SCUBA in both Static and Dynamic analysis settings

	Benchmark	Analysed Types	Analysed Bytecode instructions (ASM count)	Static analysis time (ms)			Instrument time (ms)			analysed /instrumented methods	all visited methods BCEL
				ASM	BCEL	Speed ratio	ASM	BCEL	Speed ratio		
1	fanchallenge.sa.bcel-1.0	5	412	15	109	626.67%	15	172	1046.67%	8	15
2	fanchallenge.sa.asm-1.0.	11	603	15	109	626.67%	15	187	1146.67%	5	38
3	fanchallenge.common-1.3.3	53	4,634	16	187	1068.75%	47	250	431.91%	62	200
4	perf4j-0.9.16	87	9,648	32	281	778.13%	63	390	519.05%	278	707
5	commons-io-2.4	110	20,716	47	374	695.74%	109	484	344.04%	173	1,169
6	cglib-2.2.2	228	22,957	63	421	568.25%	125	546	336.80%	615	1,288
7	slf4j-1.7.5.zip	358	34,346	95	581	511.58%	173	625	261.27%	737	2,534
8	commons-lang3-3.1	153	49,844	78	515	560.26%	141	639	353.19%	591	2,358
9	asm-all-4.2	156	54,420	63	437	593.65%	140	577	312.14%	600	1,665
10	sablecc-3.2	286	61,596	105	561	434.29%	171	640	274.27%	864	2,277
11	bcel-5.2	383	61,617	156	702	350.00%	189	717	279.37%	1,208	2,911
12	fidocadj.jar	173	61,904	80	530	562.50%	156	609	290.38%	177	1,162
13	jmock-2.6.0.zip	685	99,066	188	797	323.94%	282	905	220.92%	1,471	4,411
14	javacc-5.0	154	116,889	93	531	470.97%	203	671	230.54%	1,073	2,149
15	proguard-4.11	592	122,898	173	861	397.69%	282	936	231.91%	1,389	5,643
16	hamcrest-1.3.zip	1,532	263,294	313	1,343	329.07%	469	1,428	204.48%	7,562	10,327
17	findbugs-1.3.9	1,735	286,709	375	1,454	287.73%	547	1,561	185.37%	7,411	11,233
18	pmd-5.1.0	1,288	294,051	453	1,327	192.94%	625	1,545	147.20%	5,921	9,536
19	saxon-9.1.0.8	1,141	353,997	376	1,472	291.49%	578	1,576	172.66%	5,674	10,624
20	swt	897	398,503	297	1,331	348.15%	422	1,610	281.52%	335	10,453
21	truezip-samples-7.0-jar-	3,188	587,575	578	1,911	230.62%	875	2,076	137.26%	6,157	20,971
22	tomcat-8	3,217	954,463	954	3,168	232.08%	1,108	3,277	195.76%	18,873	30,434
23	groovy-all-1.8.6.jar	3,715	997,227	937	3,222	243.86%	1,436	3,543	146.73%	23,022	41,266
24	fanchallenge-1.3.3	5,595	1,088,556	1,046	2,872	174.57%	1,436	3,152	119.50%	13,153	39,713
25	aspectj-1.7.4	5,376	1,764,277	1,093	5,242	379.60%	1,442	5,841	305.06%	35,936	56,219
26	jdownloader.zip	8,221	2,151,198	1,476	5,162	249.73%	1,801	5,784	221.15%	24,476	65,603
27	hibernate-release-4.3.4.	21,204	3,005,295	3,058	10,500	243.36%	4,104	10,920	166.08%	165,895	159,479
28	sonarqube-4.1.2.zip	43,957	8,786,271	5,866	18,893	222.08%	6,881	20,686	200.62%	169,210	322,524
29	jdk1.7.0_10	44,665	9,618,575	6,023	23,276	286.45%	7,177	23,606	228.91%	137,111	355,034
30	jboss-as-7.1.1.final.zip	60,741	10,698,548	7,910	31,123	293.46%	9,318	30,795	230.49%	278,613	457,764
31	eclipse_rcp_kepler_sr2	80,856	13,770,171	11,545	34,103	195.39%	13,043	37,129	184.67%	443,147	568,554
						4.12			3.03		

*ASM ClassWriter with option ZERO; ClassReader with option SKIP_DEBUG)





For my experiment, I used 27 open-source Java applications of different sizes. As shown in the table below. The size of each application is mentioned in terms of types and bytecode instructions including the accompanied external libraries*. I intentionally left the analysers to parse external libraries to run on the largest possible number of bytecode instructions. In the table, the number of all visited methods and the count of interface method invocations are declared. In the last column, the speed ratio of ASM vs BCEL based on the time cost of both analysers on each run is computed. Finally, I concluded that for my static analysis, ASM is in average 3.65 times faster than BCEL. All of my static analyses were done on an Intel Core i7-3630QM machine with 16 GB of memory running x64 Windows 7 Professional. The time cost logged for each experiment run does not include the time spent on file stream reading (i.e., reading the benchmark program from disk, extract the .class files in each .jar or .zip file and provide the parser a raw java.io.InputStream).
Storage device: SSD