Lab 1C: Simpleton Shell Performance Report

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1 Test Cases

The input file `a0.txt` [1]. The test cases are shown in Table 1.
Note the `--profile` option is appended after the `--wait` option.

Number	simpsh	bash / dash
1	`./simpsh --rdonly a0.txt \` `--pipe --pipe \` `--wronly out.txt \` `--wronly err.txt \` `--command 3 5 6 tr A-Z a-z \` `--command 0 2 6 cat \` `--command 1 4 6 sort \` `--close 1 --close 2 \` `--close 3 --close 4 --wait`	`cat a0.txt	\` `sort	\` `tr A-Z a-z > out.txt 2> err.txt`
2	`./simpsh --rdonly a0.txt \` `--pipe --pipe \` `--wronly out.txt \` `--wronly err.txt \` `--command 3 5 6 sort \` `--command 0 2 6 cat \` `--command 1 4 6 uniq \` `--close 1 --close 2 \` `--close 3 --close 4 --wait`	`cat a0.txt	\` `uniq	\` `sort > out.txt 2> err.txt`
3	`./simpsh --rdonly a0.txt \` `--pipe --pipe \` `--wronly out.txt \` `--wronly err.txt \` `--command 3 5 6 tr A-Z a-z \` `--command 0 2 6 cat \` `--command 1 4 6 uniq \` `--close 1 --close 2 \` `--close 3 --close 4 --wait`	`cat a0.txt	\` `uniq	\` `tr A-Z a-z > out.txt 2> err.txt`

Table 1: Table of test cases for both *simpleton shell* and *bash / dash*

2 Performance Comparison

Benchmarks were performed on SEASNet server `lnxsrv09`. Results are shown in Table 2.

Number	Time	Type	simpsh	bash	dash
1	user	child processes	5.699s	5.846s	**5.692s**
		shell	**0.000s**	0.002s	0.001s
	kernel	child processes	**0.415s**	0.419s	0.429s
		shell	0.603s	0.002s	**0.001s**
2	user	child processes	**6.134s**	6.215s	6.254s
		shell	**0.000s**	0.002s	0.001s
	kernel	child processes	**0.477s**	0.509s	0.512s
		shell	0.524s	0.003s	**0.001s**
3	user	child processes	**0.590s**	0.601s	0.591s
		shell	**0.000s**	0.002s	0.001s
	kernel	child processes	**0.254s**	0.264s	0.271s
		shell	0.556s	0.002s	**0.001s**

Table 2: Table of benchmark results for *simpleton shell, bash* and *dash*. Smaller is better. Best score is in **boldface**.

3 Conclusion

As we can see from Table 2:

1. *Simpleton Shell* in most cases executes child commands faster both in terms of user time and kernel time than *bash* and *dash*. It is also the most-light weight shell in terms of user time. However, it has a much higher kernel cpu time than *bash* and *dash*.

2. *Bash* is the slowest shell of the three tested.

3. *Dash* performs pretty on par with other shells in terms of both user and kernel time for child processes. However, it is the most light-weight shell in terms of total cpu time among the three tested.

References

[1] `http://web.cs.ucla.edu/~zbu/a0.txt`, *Large input file a0.txt*, Zhaoxing Bu, 2016.