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CS 111 Lab 1c Report

Case 1:

bash: time bash -c "sort <Makefile | tr a b | sed s/best/worst/g &>/dev/null; times &>bash11; exit" &>bash11total

dash: time dash -c "sort <Makefile | tr a b | sed s/best/worst/g >/dev/null; times >dash11; exit" &>dash11total

simpsh: time ./simpsh --profile --rdonly Makefile --rdwr /dev/null --pipe --pipe --command 0 3 1 sort --command 2 5 1 tr a b --command 4 1 1 sed s/best/worst/g --close 3 --close 5 --wait | grep "time" >simpsh11 2>simpsh11total

Case 1 compares the speeds of the shells when parsing and implementing multiple pipes. The resulting times are placed in their respective files.

Case 2:

bash: time bash -c "touch a b c d e f g h i j </dev/null; rm -f a b c d e f g h i j &>/dev/null; times &>bash21; exit" &>bash21total

dash: time dash -c "touch a b c d e f g h i j </dev/null; rm -f a b c d e f g h i j >/dev/null; times >dash21; exit" &>dash21total

simpsh: time ./simpsh --profile --rdwr /dev/null --pipe --command 0 2 0 touch a b c d e f g h i j --wait --command 1 0 0 rm -f a b c d e f g h i j --close 2 --wait | grep "time" >simpsh21 2>simpsh21total

Case 2 compares the speeds of the shells when parsing and implementing commands with many arguments. The resulting times are placed in their respective files.

Case 3:

bash: time bash -c "ls </dev/null &>/dev/null & ls </dev/null &>/dev/null & ls </dev/null &>/dev/null & ls </dev/null &>/dev/null & ls </dev/null &>/dev/null & ls </dev/null &>/dev/null & ls </dev/null &>/dev/null & ls </dev/null &>/dev/null; times &>bash31; exit" &>bash31total

dash: time dash -c "ls </dev/null >/dev/null & ls </dev/null >/dev/null & ls </dev/null >/dev/null & ls </dev/null >/dev/null & ls </dev/null >/dev/null & ls </dev/null >/dev/null & ls </dev/null >/dev/null & ls </dev/null >/dev/null; times >dash31; exit" &>dash31total

simpsh: time ./simpsh --profile --rdwr /dev/null --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --command 0 0 0 ls --wait | grep "time" >simpsh31 2>simpsh31total

Case 3 compares the speeds of the shells when parsing and implementing many commands that are to be executed in parallel. The resulting times are placed in their respective files.

Times on each Shell for Each Case

Shell	bash		dash		simpsh	
Time Type	**User**	**System**	**User**	**System**	**User**	**System**
case 1 sample 1	0.004 s	0.005 s	0.002 s	0.005 s	0.003 s	0.005 s
case 1 sample 2	0.003 s	0.005 s	0.002 s	0.005 s	0.001 s	0.007 s
case 1 sample 3	0.005 s	0.004 s	0.000 s	0.007 s	0.003 s	0.007 s
case 1 average	0.004 s	**0.0047 s**	**0.0013 s**	0.0057 s	0.0023 s	0.0063 s
case 2 sample 1	0.002 s	0.005 s	0.001 s	0.004 s	0.002 s	0.005 s
case 2 sample 2	0.002 s	0.004 s	0.000 s	0.006 s	0.000 s	0.007 s
case 2 sample 3	0.002 s	0.005 s	0.002 s	0.004 s	0.003 s	0.005 s
case 2 average	0.002 s	**0.0047 s**	**0.001 s**	**0.0047 s**	0.0017 s	0.0057 s
case 3 sample 1	0.006 s	0.017 s	0.004 s	0.014 s	0.008 s	0.012 s
case 3 sample 2	0.003 s	0.018 s	0.004 s	0.010 s	0.005 s	0.016 s
case 3 sample 3	0.004 s	0.017 s	0.003 s	0.016 s	0.003 s	0.016 s
case 3 average	0.0043 s	0.0173 s	**0.0037 s**	**0.0133 s**	0.0053 s	0.0147 s

In the above table are the results of the testing. The fastest average values of each case are bolded. The dash shell was the fastest in the cases tested, with the lowest average time for all the cases except for system time in case 1, in which bash had the fastest time. Between bash and simpsh, simpsh had lower average user times for cases 1 and 2, and bash had lower average system times for cases 1 and 2. However, bash had a lower average user time compared to simpsh for case 3, while simpsh had a lower average system time compared to bash for case 3.

Total Time of Subprocesses of Shell for Each Case

Shell	bash		dash		simpsh	
Time Type	**User**	**System**	**User**	**System**	**User**	**System**
case 1 sample 1	0.000 s	0.006 s	0.000000 s	0.000000 s	0.001258 s	0.004277 s
case 1 sample 2	0.003 s	0.003 s	0.000000 s	0.000000 s	0.000965 s	0.003340 s
case 1 sample 3	0.000 s	0.005 s	0.000000 s	0.000000 s	0.001078 s	0.003141 s
case 1 average	0.001 s	0.0047 s	**0.000000 s**	**0.000000 s**	0.001100 s	0.003586 s
case 2 sample 1	0.000 s	0.004 s	0.000000 s	0.000000 s	0.001392 s	0.002110 s
case 2 sample 2	0.000 s	0.004 s	0.000000 s	0.000000 s	0.001945 s	0.001384 s
case 2 sample 3	0.001 s	0.003 s	0.000000 s	0.000000 s	0.001326 s	0.001936 s
case 2 average	0.0003 s	0.0037 s	**0.000000 s**	**0.000000 s**	0.001554 s	0.005430 s
case 3 sample 1	0.003 s	0.017 s	0.000000 s	0.010000 s	0.005250 s	0.010901 s
case 3 sample 2	0.004 s	0.016 s	0.000000 s	0.000000 s	0.001575 s	0.014653 s
case 3 sample 3	0.003 s	0.017 s	0.000000 s	0.000000 s	0.007197 s	0.009194 s
case 3 average	0.0033 s	0.0167 s	**0.000000 s**	**0.003333 s**	0.004674 s	0.011583 s

In the above table are the cumulative times for the child processes of the shells. The fastest average values of each case are bolded. The dash shell had the lowest average children times, with the lowest average time for all the cases. The bash shell had lower average children user time in all cases compared to simpsh, but simpsh had lower average children system time in all cases compared to the bash shell.