

|                                  |              |          |             |            |                                  |  |
|----------------------------------|--------------|----------|-------------|------------|----------------------------------|--|
| Peter Chu                        | Alex DeMello | CPE 315  |             |            |                                  |  |
| Lab 4                            |              |          |             |            |                                  |  |
|                                  |              |          |             |            |                                  |  |
| adpcm - Pi                       | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 7608151      | 7100105  | 7014317     | 7042488    |                                  |  |
| instructions                     | 3055976      | 2766878  | 2736012     | 2727222    |                                  |  |
| runtime (sec)                    | 0.0102       | 0.01     | 0.01        | 0.01       |                                  |  |
| function with greatest exec time |              |          | encode      |            |                                  |  |
|                                  |              |          |             |            |                                  |  |
| aes - Pi                         | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 11756788     | 11597158 | 12859376    | 12309358   |                                  |  |
| instructions                     | 4543578      | 4414546  | 4640714     | 4547704    |                                  |  |
| runtime (sec)                    | 0.0176       | 0.015    | 0.015       | 0.016      |                                  |  |
| function with greatest exec time |              | encrypt  |             |            |                                  |  |
|                                  |              |          |             |            |                                  |  |
| blowfish - Pi                    | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 9198955      | 8623624  | 8565872     | 8414870    |                                  |  |
| instructions                     | 4892992      | 3981616  | 3998564     | 4009938    |                                  |  |
| runtime (sec)                    | 0.0144       | 0.0112   | 0.011       | 0.011      |                                  |  |
| function with greatest exec time |              |          |             | BF_set_key |                                  |  |
|                                  |              |          |             |            |                                  |  |
| dfadd - Pi                       | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 96340341     | 94634120 | 89901963    | 90512614   |                                  |  |
| instructions                     | 44568432     | 44757702 | 46814409    | 47100765   |                                  |  |
| runtime (sec)                    | 0.1326       | 0.1254   | 0.1256      | 0.1258     |                                  |  |
| function with greatest exec time |              | main     |             |            |                                  |  |
|                                  |              |          |             |            |                                  |  |
| dfdiv - Pi                       | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 50986516     | 47638429 | 47994234    | 48013176   |                                  |  |
| instructions                     | 21043268     | 20395256 | 20443008    | 20429922   |                                  |  |
| runtime (sec)                    | 0.067        | 0.067    | 0.067       | 0.067      |                                  |  |
| function with greatest exec time |              |          |             |            |                                  |  |
|                                  |              |          |             |            |                                  |  |
| dfmul - Pi                       | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 48880539     | 45478927 | 45349015    | 46916521   |                                  |  |
| instructions                     | 19474684     | 1861016  | 18940456    | 19404104   |                                  |  |
| runtime (sec)                    | 0.064        | 0.064    | 0.064       | 0.064      |                                  |  |
| function with greatest exec time |              |          | float64_mul |            |                                  |  |
|                                  |              |          |             |            | revise function exec times above |  |
| dfsin -Pi                        | -O0          | -O1      | -O2         | -O3        |                                  |  |
| cycles                           | 70233129     | 70240115 | 70222467    | 73602089   |                                  |  |
| instructions                     | 27387970     | 22831186 | 26008348    | 27112644   |                                  |  |
| runtime (sec)                    | 0.0166       | 0.0276   | 0.0158      | 0.0168     |                                  |  |

|                                  |              |           |                             |           |  |  |
|----------------------------------|--------------|-----------|-----------------------------|-----------|--|--|
| function with greatest exec time |              |           | roundAndPackFloat64         |           |  |  |
|                                  |              |           |                             |           |  |  |
| gsm -Pi                          | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 8912709      | 8935060   | 8331849                     | 8438440   |  |  |
| instructions                     | 3158210      | 3109060   | 3019338                     | 3011470   |  |  |
| runtime (sec)                    | 0.0164       | 0.0176    | 0.0148                      | 0.0146    |  |  |
| function with greatest exec time |              |           | Quantization_and_coding     |           |  |  |
|                                  |              |           |                             |           |  |  |
| jpeg -Pi                         | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 129199399    | 101016056 | 88349474                    | 100254521 |  |  |
| instructions                     | 34715277     | 45572396  | 52277706                    | 45349521  |  |  |
| runtime (sec)                    | 0.0454       | 0.0364    | 0.0356                      | 0.0156    |  |  |
| function with greatest exec time |              |           | DecodeHuffma                |           |  |  |
|                                  |              |           |                             |           |  |  |
| mips -Pi                         | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 6264046      | 7313975   | 7319484                     | 7211833   |  |  |
| instructions                     | 2589990      | 2737780   | 2735590                     | 2726960   |  |  |
| runtime (sec)                    | 0.0092       | 0.025     | 0.0094                      | 0.0106    |  |  |
| function with greatest exec time |              |           | Profile results not showing |           |  |  |
|                                  |              |           |                             |           |  |  |
| motion -Pi                       | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 8037133      | 10028199  | 7186589                     | 7019234   |  |  |
| instructions                     | 2917012      | 3453352   | 2700760                     | 2664102   |  |  |
| runtime (sec)                    | 0.01         | 0.0114    | 0.0114                      | 0.0116    |  |  |
| function with                    | Flush_Buffer |           |                             |           |  |  |
|                                  |              |           |                             |           |  |  |
| sha -Pi                          | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 11550997     | 8140099   | 8227549                     | 8050151   |  |  |
| instructions                     | 6631258      | 4042240   | 4019867                     | 3795336   |  |  |
| runtime (sec)                    | 0.0144       | 0.0122    | 0.0116                      | 0.0114    |  |  |
| function with greatest exec time |              |           | sha_transform               |           |  |  |
|                                  |              |           |                             |           |  |  |
| adpcm - lab                      | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 736,827      | 701,255   | 705,563                     | 707,959   |  |  |
| instructions                     | 465,587      | 489,212   | 485,227                     | 485,964   |  |  |
| runtime (sec)                    | 0.0032       | 0.0032    | 0.0034                      | 0.0036    |  |  |
| function with                    | filitep      |           |                             |           |  |  |
|                                  |              |           |                             |           |  |  |
| aes - lab                        | -O0          | -O1       | -O2                         | -O3       |  |  |
| cycles                           | 769,461      | 716,568   | 742,175                     | 709,521   |  |  |
| instructions                     | 525,345      | 476,010   | 472,634                     | 467,048   |  |  |
| runtime (sec)                    | 0.0036       | 0.003     | 0.0032                      | 0.0032    |  |  |
| function with greatest exec time |              | SubByte   |                             |           |  |  |

|                                  |           |                   |           |                   |  |  |
|----------------------------------|-----------|-------------------|-----------|-------------------|--|--|
|                                  |           |                   |           |                   |  |  |
| blowfish -lab                    | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 1,330,078 | 1,023,874         | 1,006,552 | 1,012,363         |  |  |
| instructions                     | 1,432,255 | 921,768           | 912,173   | 904,666           |  |  |
| runtime (sec)                    | 0.004     | 0.0036            | 0.004     | 0.004             |  |  |
| function with greatest exec time |           | BF_encrypt        |           |                   |  |  |
|                                  |           |                   |           |                   |  |  |
| dfadd - lab                      | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 997,244   | 981,443           | 975,676   | 953,376           |  |  |
| instructions                     | 897,637   | 893,630           | 895,386   | 885,975           |  |  |
| runtime (sec)                    | 0.0038    | 0.0036            | 0.004     | 0.0038            |  |  |
| function with                    |           | extractFloat64Exp |           |                   |  |  |
|                                  |           |                   |           |                   |  |  |
| dfdiv - lab                      | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 861,801   | 836,696           | 847,329   | 840,548           |  |  |
| instructions                     | 659,322   | 652,307           | 651,830   | 650,405           |  |  |
| runtime (sec)                    | 0.0034    | 0.0034            | 0.0034    | 0.0032            |  |  |
| function with greatest exec time |           |                   |           | extractFloat64Exp |  |  |
|                                  |           |                   |           |                   |  |  |
| dfmul - lab                      | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 854,056   | 817,769           | 824,243   | 826,865           |  |  |
| instructions                     | 637,905   | 631,200           | 629,187   | 624,552           |  |  |
| runtime (sec)                    | 0.0032    | 0.0034            | 0.0032    | 0.003             |  |  |
| function with greatest exec time |           |                   |           | extractFloat64Exp |  |  |
|                                  |           |                   |           |                   |  |  |
| dfsin - lab                      | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 1,172,757 | 1,057,713         | 1,007,407 | 1,007,808         |  |  |
| instructions                     | 1,066,506 | 942,885           | 881,689   | 868,367           |  |  |
| runtime (sec)                    | 0.0036    | 0.0036            | 0.0032    | 0.003             |  |  |
| function with greatest exec time |           |                   |           | extractFloat64Exp |  |  |
|                                  |           |                   |           |                   |  |  |
| gsm - lab                        | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 696,538   | 679,509           | 666,047   | 701,612           |  |  |
| instructions                     | 445,463   | 416,110           | 414,428   | 419,309           |  |  |
| runtime (sec)                    | 0.0036    | 0.0032            | 0.0034    | 0.0032            |  |  |
| function with greatest exec time |           |                   |           | gsm_mult_r        |  |  |
|                                  |           |                   |           |                   |  |  |
| jpeg - lab                       | -O0       | -O1               | -O2       | -O3               |  |  |
| cycles                           | 3773230   | 2284324           | 2273944   | 2079508           |  |  |
| instructions                     | 2308617   | 2945431           | 2919120   | 2455608           |  |  |
| runtime (sec)                    | 0.006     | 0.0044            | 0.0044    | 0.004             |  |  |
| function with greatest exec time |           |                   |           | DecodeHuffma      |  |  |
|                                  |           |                   |           |                   |  |  |

|                                  |         |         |              |                     |  |  |
|----------------------------------|---------|---------|--------------|---------------------|--|--|
| mips - lab                       | -O0     | -O1     | -O2          | -O3                 |  |  |
| cycles                           | 670419  | 663472  | 658407       | 649791              |  |  |
| instructions                     | 432794  | 418241  | 421803       | 418267              |  |  |
| runtime (sec)                    | 0.0032  | 0.0032  | 0.0032       | 0.003               |  |  |
| function with greatest exec time |         |         |              | profile not showing |  |  |
|                                  |         |         |              |                     |  |  |
| motion -lab                      | -O0     | -O1     | -O2          | -O3                 |  |  |
| cycles                           | 680350  | 680440  | 650466       | 663147              |  |  |
| instructions                     | 424391  | 411272  | 409099       | 403508              |  |  |
| runtime (sec)                    | 0.0032  | 0.0032  | 0.0032       | 0.0032              |  |  |
| function with greatest exec time |         |         | Flush_buffer |                     |  |  |
|                                  |         |         |              |                     |  |  |
| sha - lab                        | -O0     | -O1     | -O2          | -O3                 |  |  |
| cycles                           | 1400020 | 865089  | 890016       | 864408              |  |  |
| instructions                     | 1667430 | 1022651 | 1032677      | 966733              |  |  |
| runtime (sec)                    | 0.004   | 0.0036  | 0.0032       | 0.0036              |  |  |
| function with greatest exec time |         |         | local_memcpy |                     |  |  |

Lab machines had lower cycle and instruction counts varying from 10 to 100 times.