**High Performance Computing**
**Homework 5**

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The following table displays the file types that provide the smallest size, fastest write and load CPU time for each of the matrices.

*Table 1. Smallest file size, fastest write and load CPU times for each matrix.*

| Matrix | Parameter | Value | File type |
|---|---|---|---|
| A | Smallest File Size [MB] | 34 | HDF5 |
| | Fastest Write CPU Time [s] | 0.118072 | NPY |
| | Fastest Load CPU Time [s] | 0.069288 | NPY |
| B | Smallest File Size [MB] | 24 | NPY |
| | Fastest Write CPU Time [s] | 0.015547 | NPY |
| | Fastest Load CPU Time [s] | 0.010096 | NPY |
| C | Smallest File Size [MB] | 34 | HDF5 |
| | Fastest Write CPU Time [s] | 0.114305 | NPY |
| | Fastest Load CPU Time [s] | 0.066683 | NPY |
| D | Smallest File Size [MB] | 0.004 | CSV and NPY |
| | Fastest Write CPU Time [s] | 0.000348 | HDF5 |
| | Fastest Load CPU Time [s] | 0.000087 | HDF5 |
| E | Smallest File Size [MB] | 0.004 | CSV and NPY |
| | Fastest Write CPU Time [s] | 0.000623 | HDF5 |
| | Fastest Load CPU Time [s] | 0.000065 | HDF5 |

It is important to clarify that the HDF5 file size contains all the matrices. It is possible that measuring each matrix separately may change the results seen in the table above.

```
[login001: HW5]$ du -b *
50000000        A.csv
200000128       A.npy
100000000       B.csv
25000128        B.npy
625000000       C.csv
200000128       C.npy
500     D.csv
328     D.npy
56      E.csv
144     E.npy
4423    generate.py
3281    loadFiles.py
34605706        matrix_db.hdf5
511     results_generate_py.txt
715     results_loadFiles_py.txt
```

*Figure 1. Results from du -b command.*

Also note that the command **du -h** seems to round the file size numbers, and the smallest file size that it can display seems to be 4 KB. This is likely the reason why in some cases the same file size was obtained for two different formats (e.g. CSV and NPY for matrix D and E). Using the command **du -b** outputs more accurate results in bytes, as shown in

Figure 1. Results from du -b command.. Again, if this command were used, the results from Table 1 would change.