Homework 2

MA 453 – High Performance Scientific Computing
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Assignment Outline

1. Rewrite the Python code `heat2d.py` for 2D heat equation using Cython. Use `numexpr` in the code `heat2d.py` to get the optimal performance. Compare performances of the original code, `numpy` version, `cython` version, `numexpr` version, and the Fortran version. Use `graphics=False` while timing and profiling.

2. Prepare a small report (nothing fancy) showing your results. Zip all the files as a zipped file, `your_name_hw2.zip`, and submit it through Canvas.

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1 Discussion

From Table 1, the best-performing code was the one used with NumPy. The second best is the Cython code. Overall, the pure Python method was the flat-out slowest, and the other three were significantly faster.

2 Execution Time Results

Type	Execution Time (sec)
Pure Python	3.6122829914093018
NumPy	0.13004541397094727
Cython	0.7204704284667969
NumExpr	0.49570202827453613

Table 1: Final execution time results