M5470 : Introduction to Parallel Scientific Computing

Homework 5

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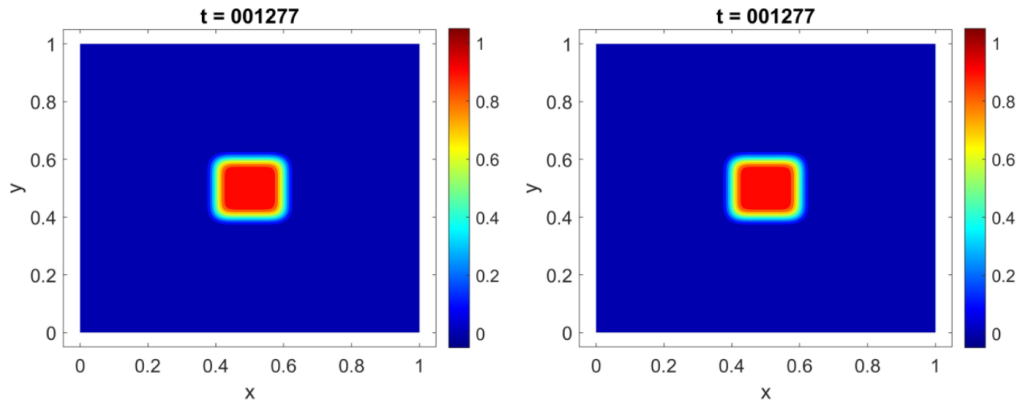
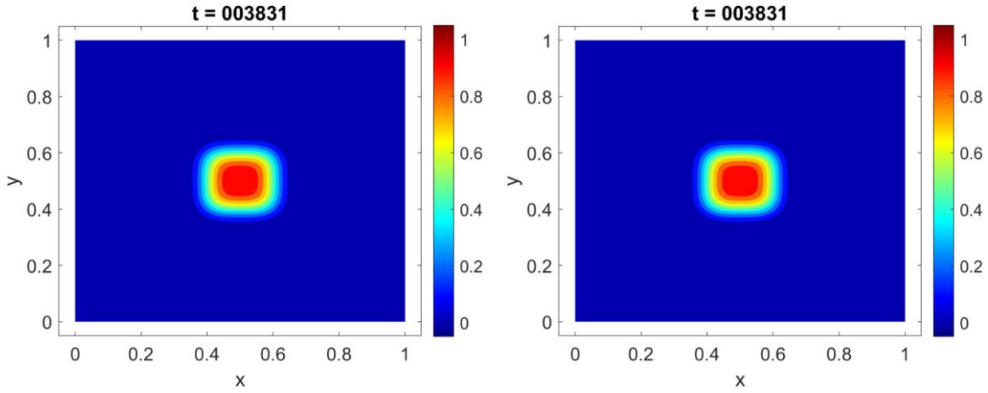
ME21BTECH11043

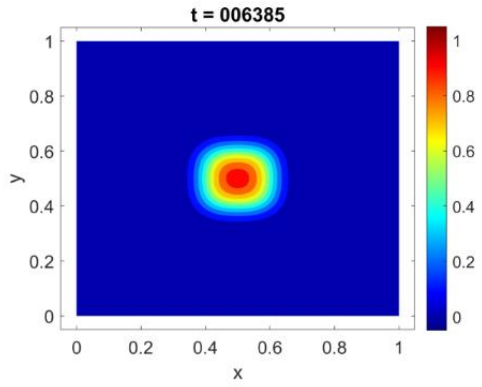
Question 1a)

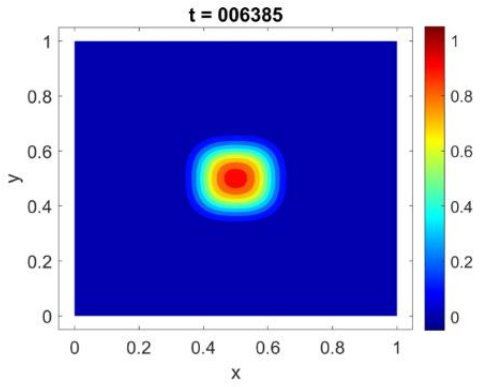
For number of processor 2x2

Serial **Parallel**





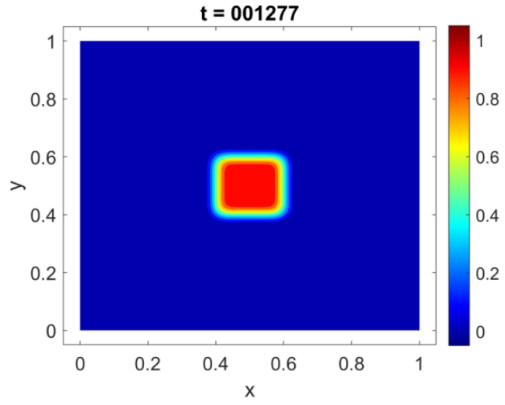


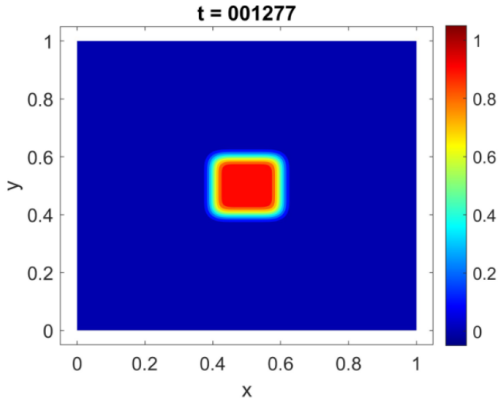


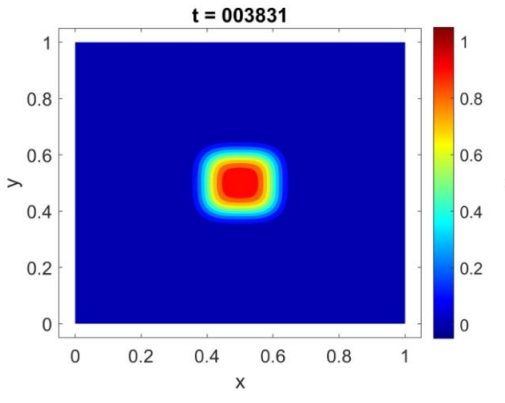
For number of processor 2x4

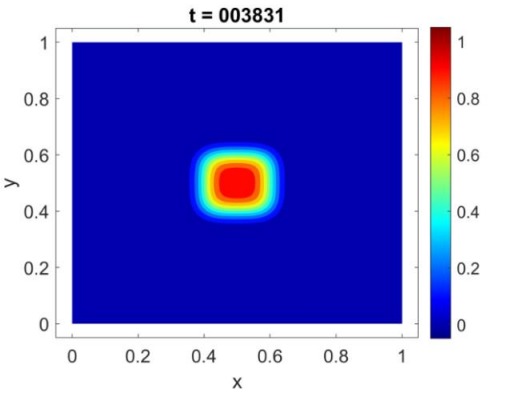
Serial

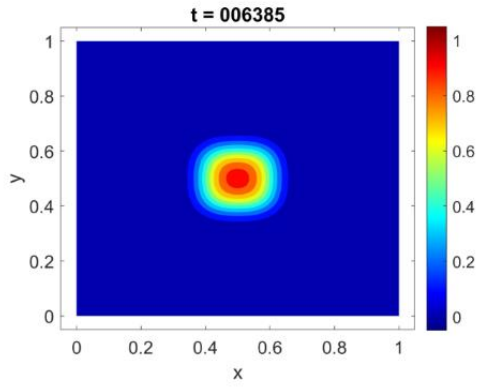
Parallel

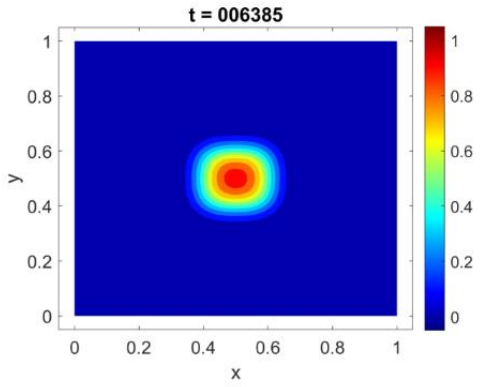






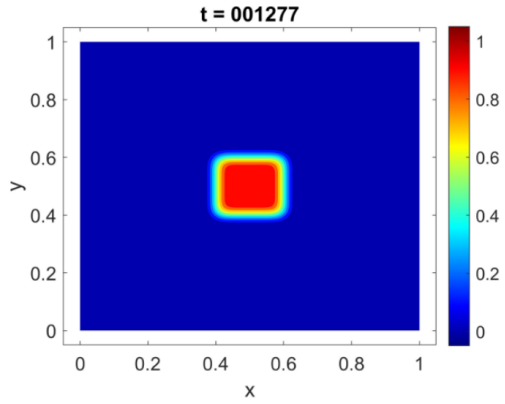




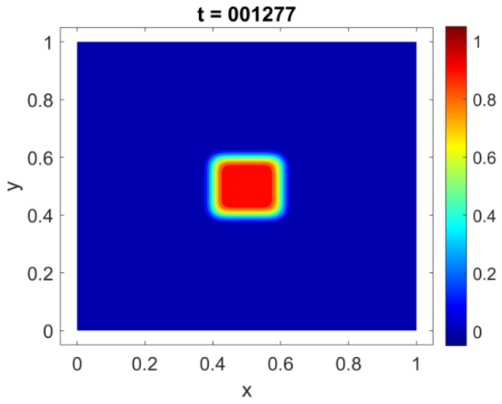


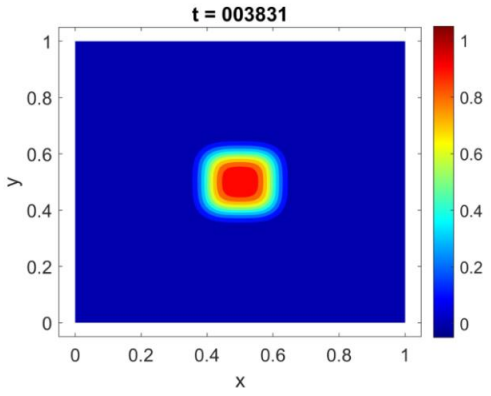
For number of processor 4x4

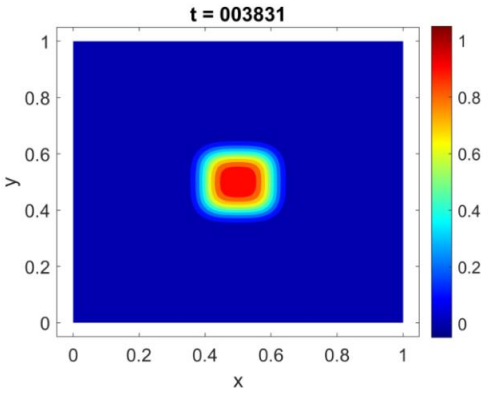
Serial

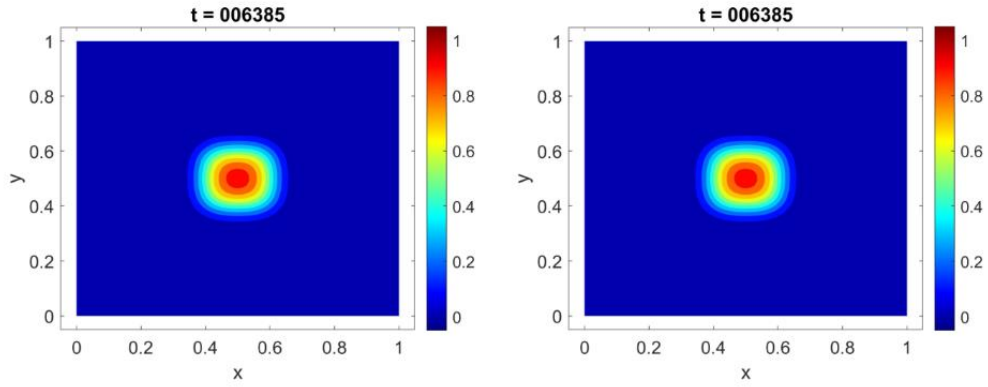


Parallel









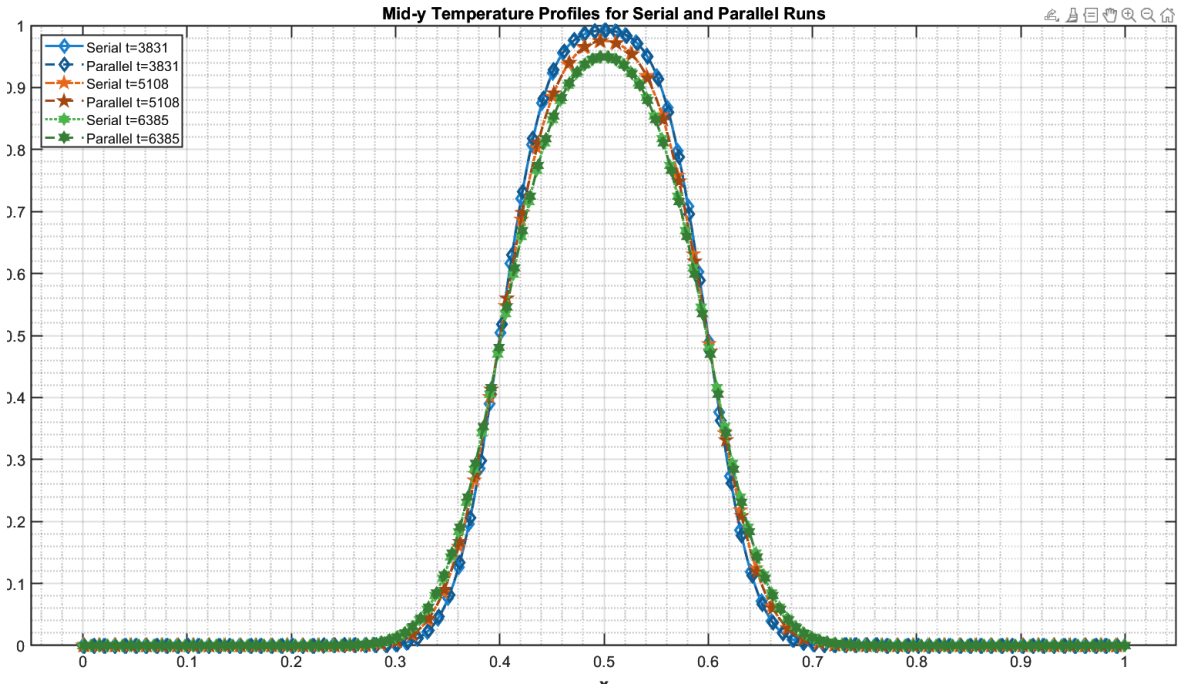
We can observe that Contour plot for are same

- For serial and corresponding parallel code at a timestamp
- For serial and corresponding parallel code with
    - 2x2 processor
    - 2x4 processor
    - 4x4 processor

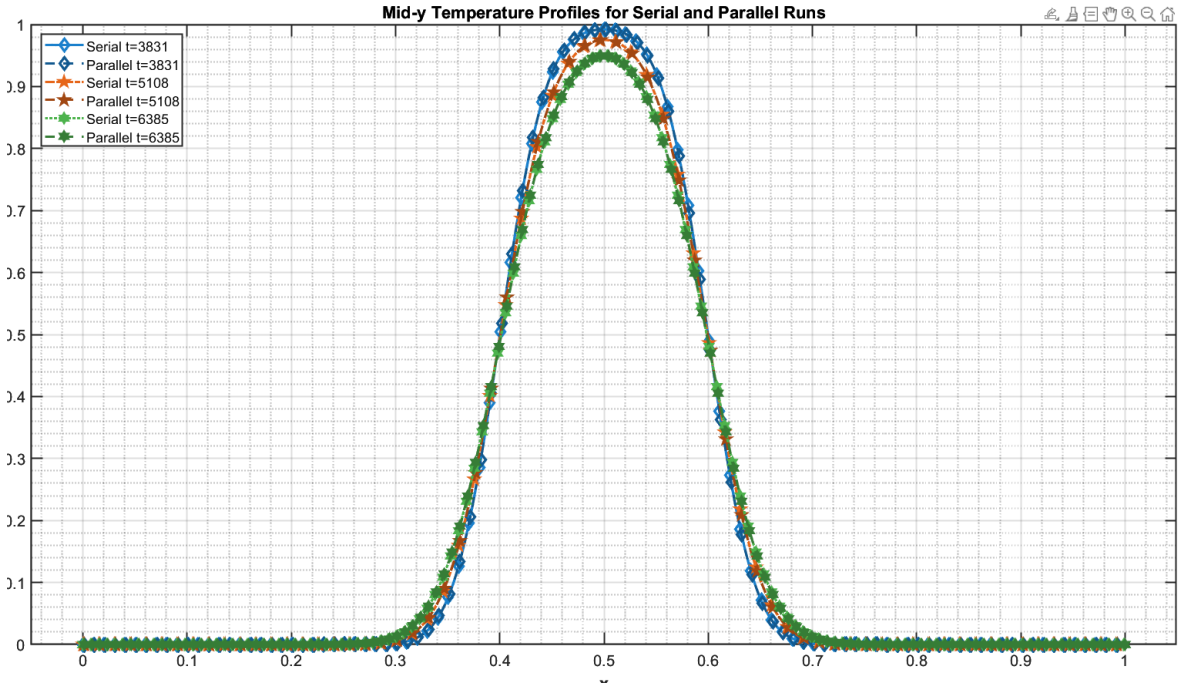
Line plot

Different curves correspond to output at different timestamp plotted against Serial Code for 2x2 , 2x4 and 4x4 processors.

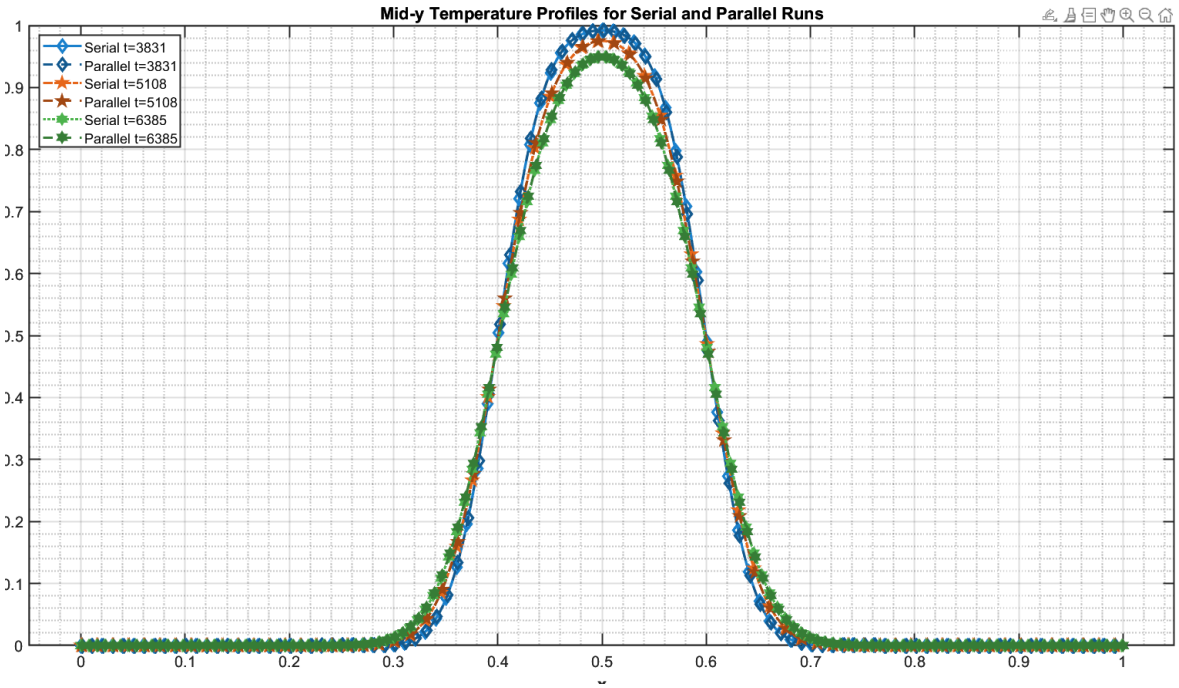
For 2x2 Processor



For 2x4 Processor



For 4x4 Processor



1-B)

The difference between output of Serial files and output of Parallel files.

Processor	Difference
2x2	0.00000e+00
2x4	0.00000e+00
4x4	0.00000e+00

From above we can conclude that difference between serial and parallel for different grid size is 0.00000e+00 which is below machine precision

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1-C)

Time taken per time step for the serial and parallel runs.

Type of Code	Time taken
Serial	0.018497
Processor=2x2	0.005289
Processor=2x4	0.007467
Processor= 4x4	0.008646