

ME5470 : Introduction to Parallel Scientific Computing

Assignment-03

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(ME22RESCH11009)

Q1(a). In figure. 1 and 2, we show the temperature contour plot for the 1x1, 2x2, 2x4 and 4x4 processor grid at time = 1025. In figure. 3 and 4, we show the temperature contour plot for the 1x1, 2x2, 2x4 and 4x4 processor grid at time = 1142. In figure. 5 and 6, we show the temperature contour plot for the 1x1, 2x2, 2x4 and 4x4 processor grid at time = 2050. In figure. 7 and 8, we are showing the comparison of the line plot of temperature in the mid-plane of the domain at three different times, $t = 1025$, $t = 1142$ and $t = 2050$ between different processor grids.

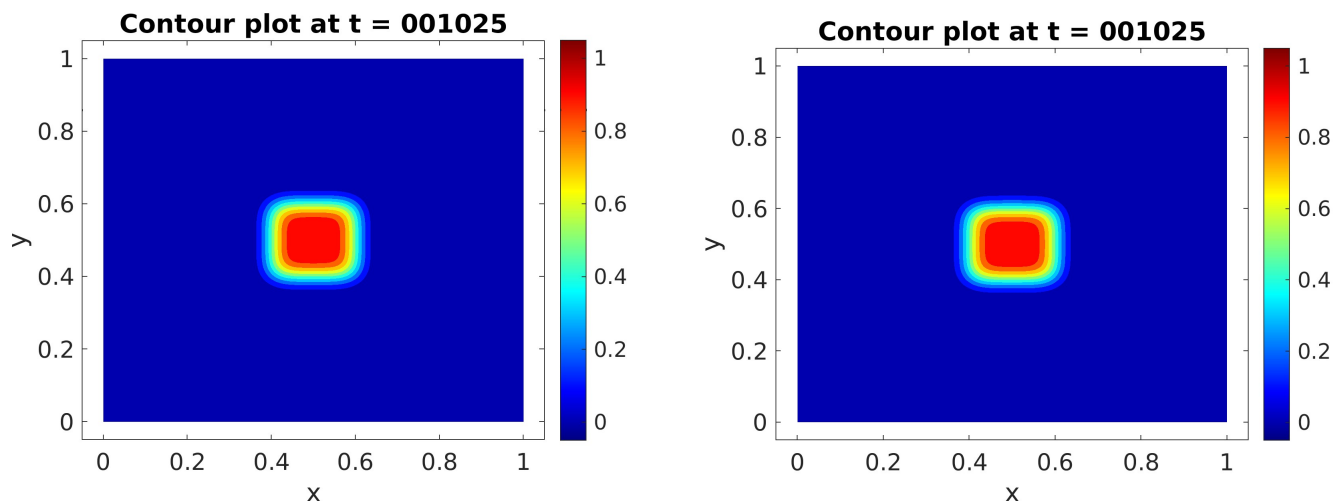


Figure 1: (a) Contour of $T = 1025$ for 1x1 (b) Contour of $T = 1025$ for 2x2

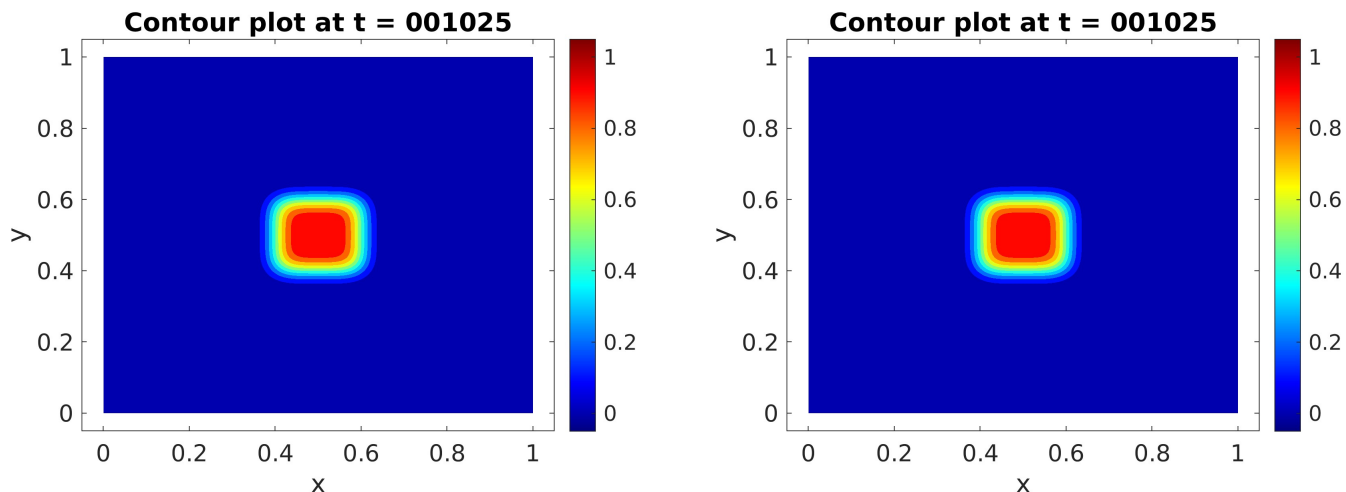


Figure 2: (a) Contour of $T = 1025$ for 2x4 (b) Contour of $T = 1025$ for 4x4

Q1(b). In figure. 9 we show the comparison of line plot of temperature at mid plane of domain between 1x1, 2x2, 2x4 and 4x4 processor grid at time = 10. It shows almost no difference between the results of different processor grids.

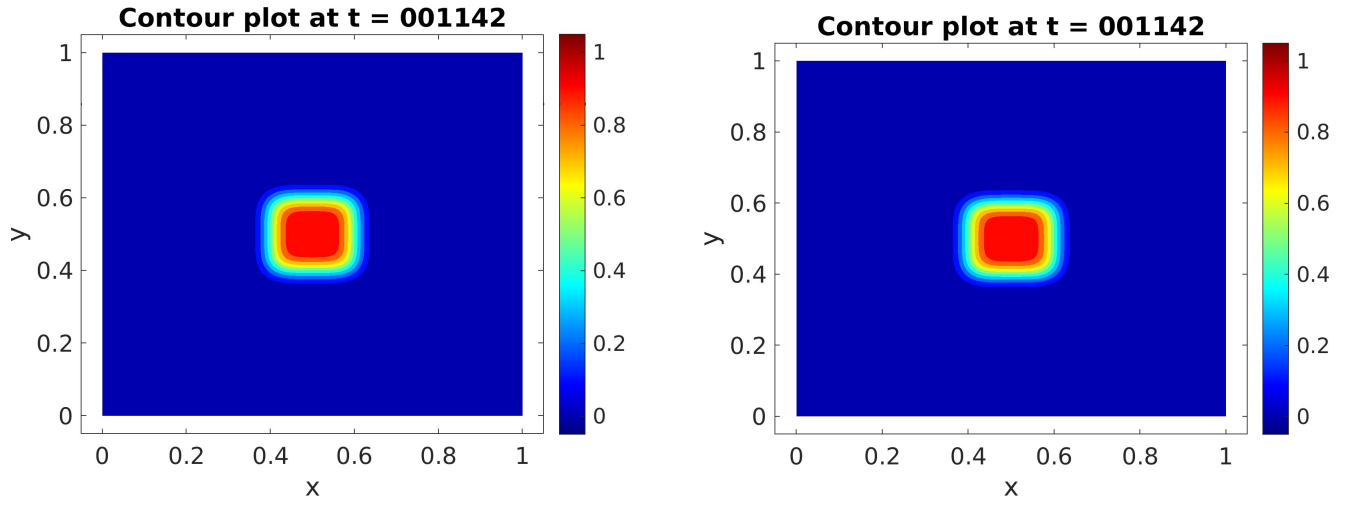


Figure 3: (a) Contour of $T = 1142$ for 1x1 (b) Contour of $T = 1142$ for 2x2

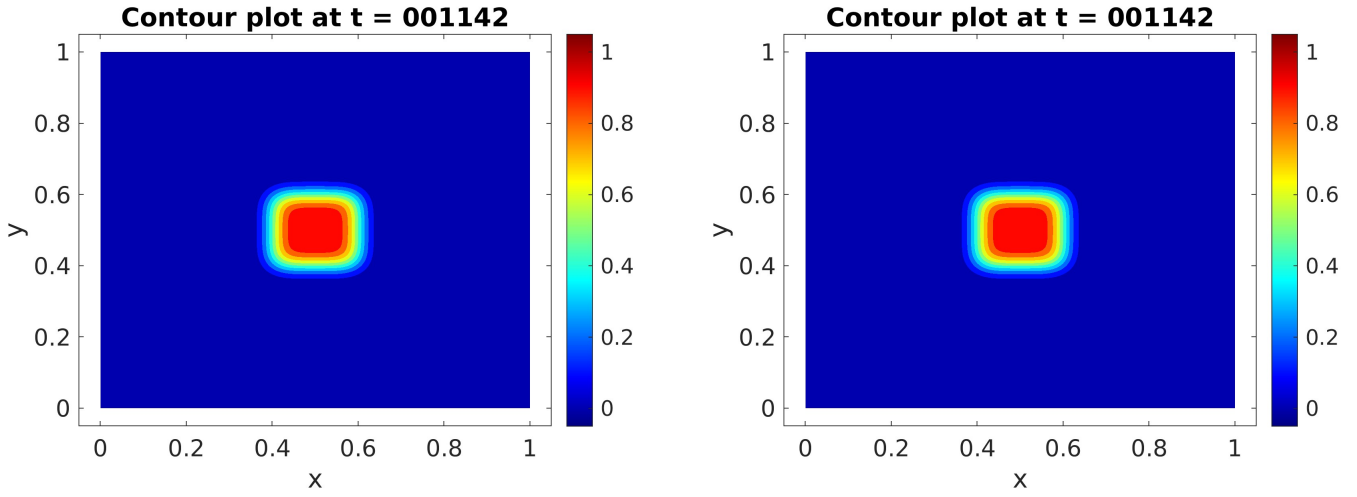


Figure 4: (a) Contour of $T = 1142$ for 2x4 (b) Contour of $T = 1142$ for 4x4

Q1(c). In table 1, we are showing computational time taken by different processor grids.

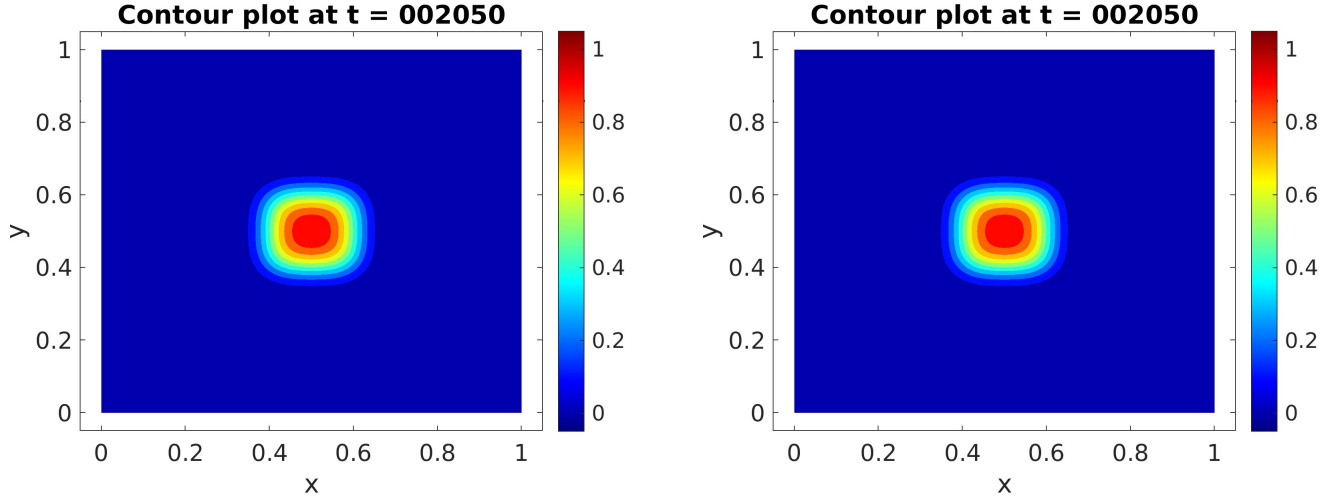


Figure 5: (a) Contour of $T = 2050$ for 1x1 (b) Contour of $T = 2050$ for 2x2

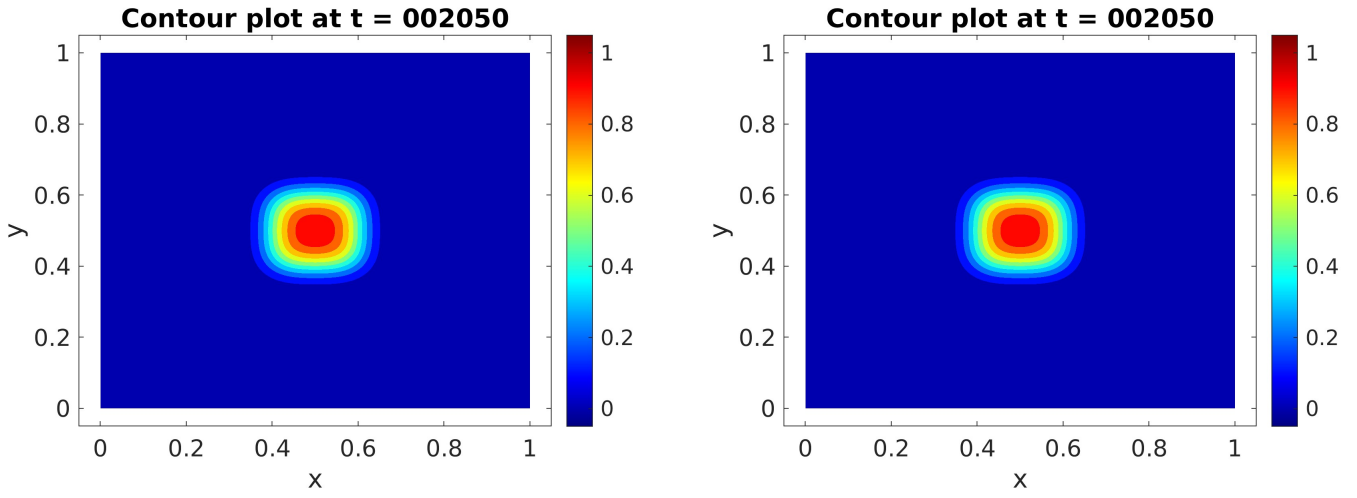


Figure 6: (a) Contour of $T = 2050$ for 2x4 (b) Contour of $T = 2050$ for 4x4

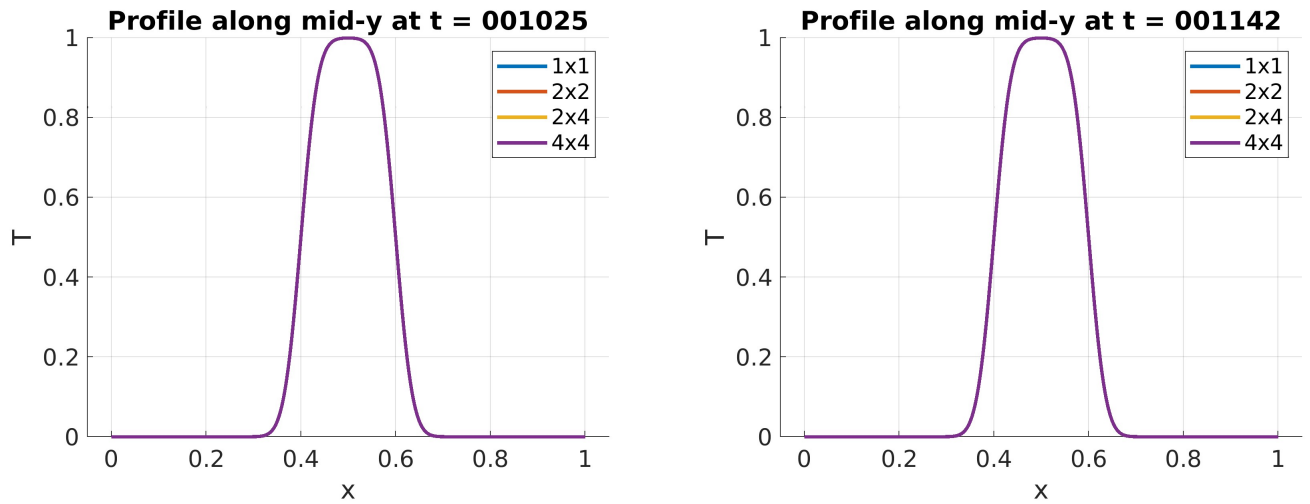


Figure 7: (a) comparison of line plot between serial and parallel at $t = 1025$ (b) comparison of line plot between serial and parallel at $t = 1142$

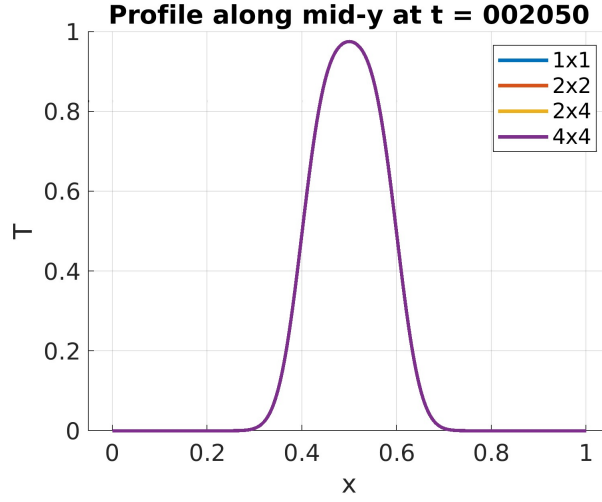


Figure 8: comparison of line plot between serial and parallel at $t = 2050$

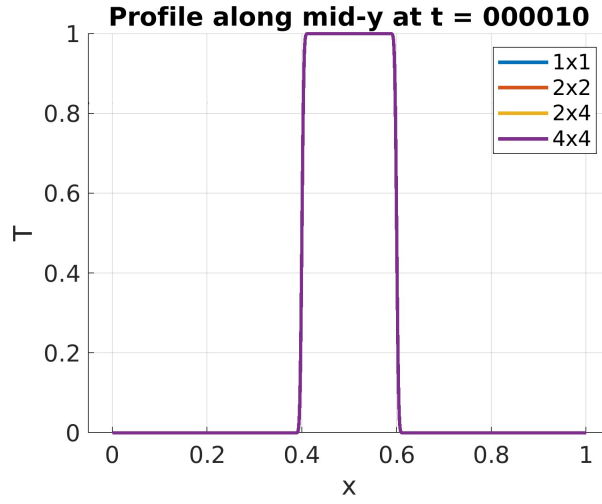


Figure 9: comparison of line plot between serial and parallel at $t = 10$

Table 1: Comparison of computational time between grid

Computational grid	Computation time
1x1	1.968543768 s
2x2	5.403643781 s
2x4	2.792441336 s
4x4	1.622887062 s