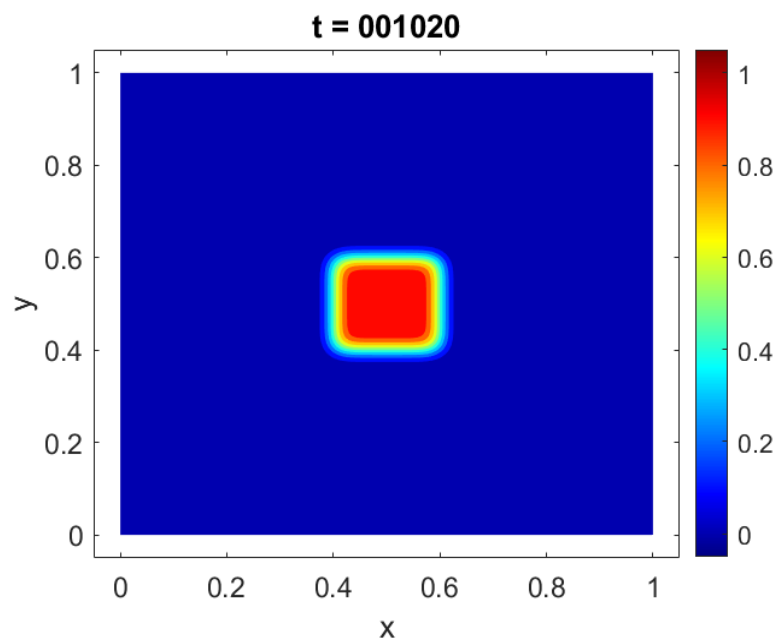


Homework 5

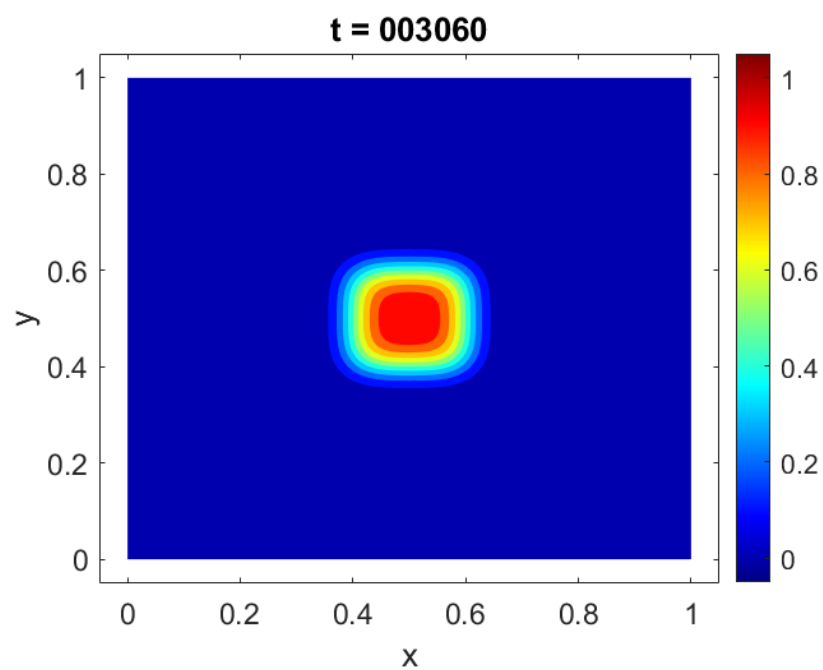
Question 1

Contours for Serial code:

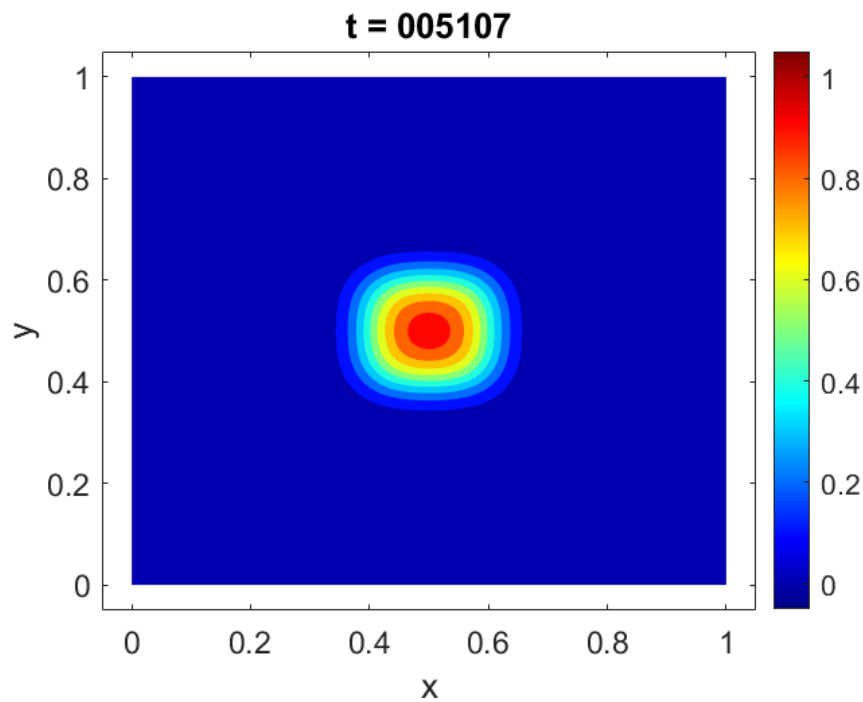
At time step 1020:



At time step 3060:



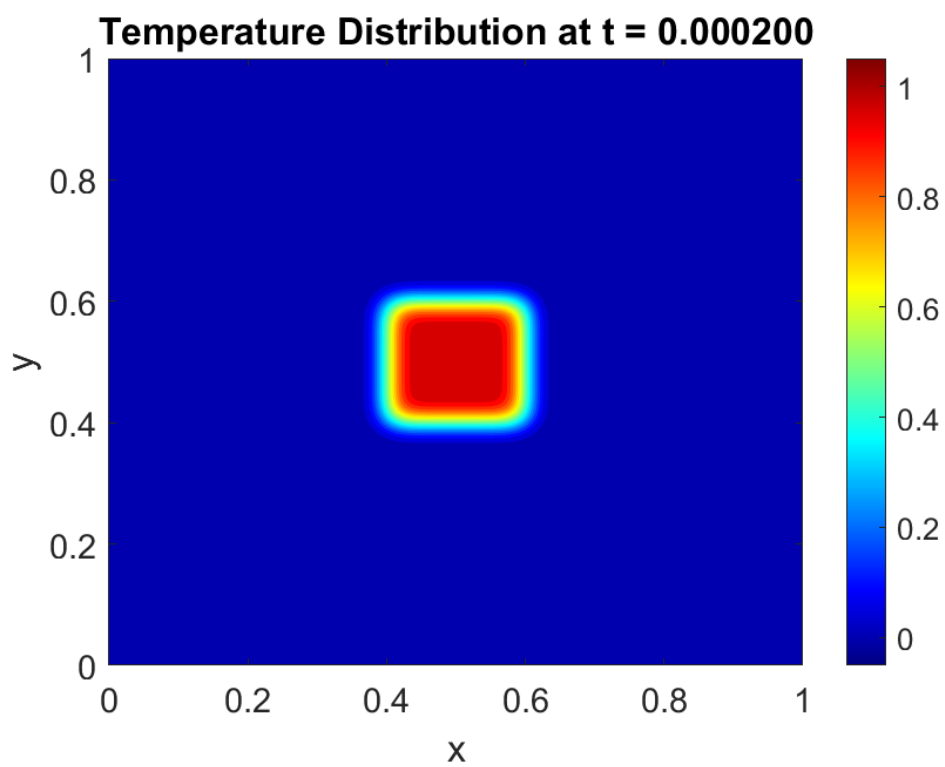
At time step 5107:



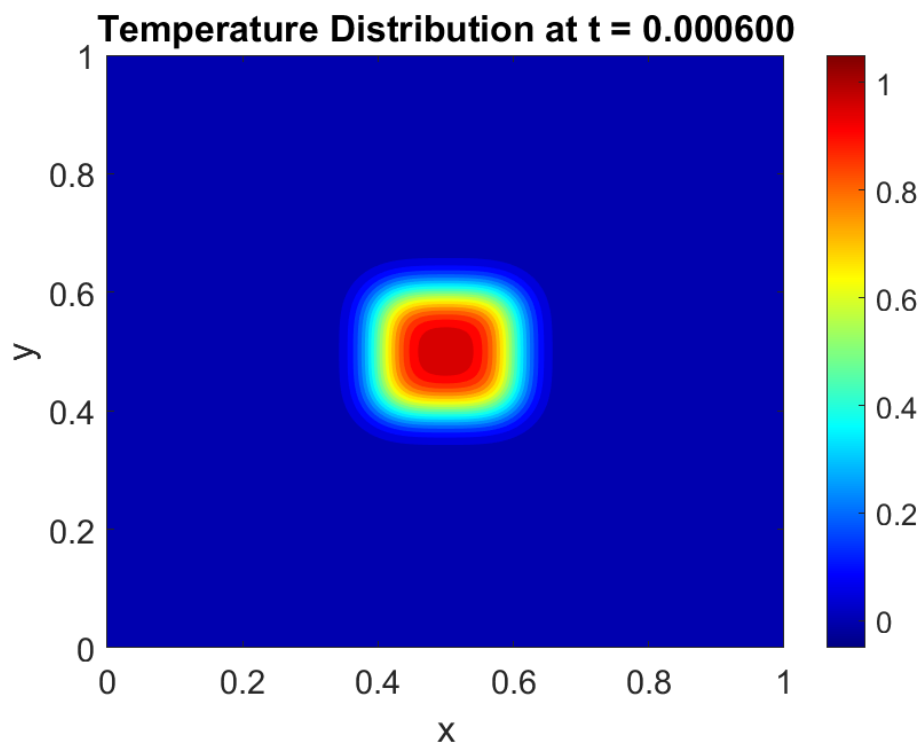
Parallel contours:

For 2x2

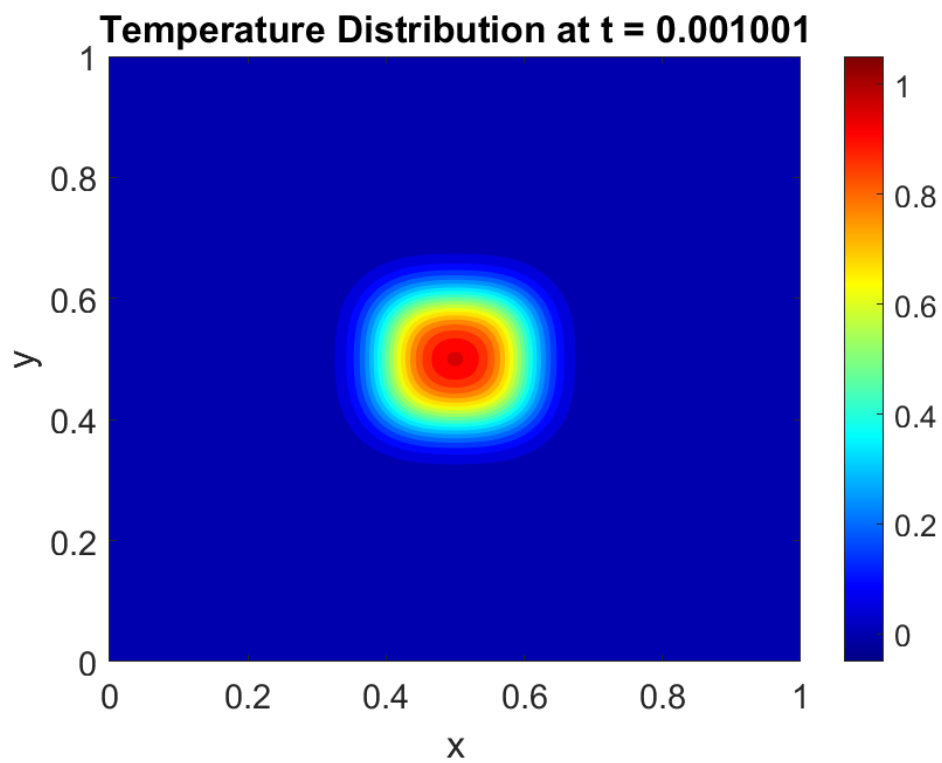
At time step 1020:



At time step 3060:

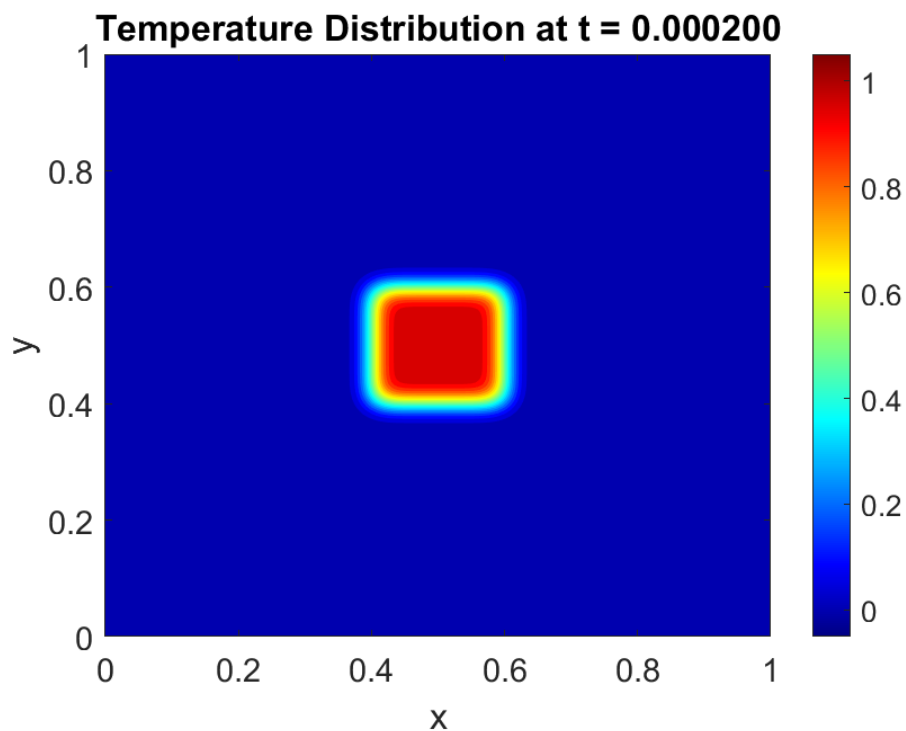


At time step 5107:

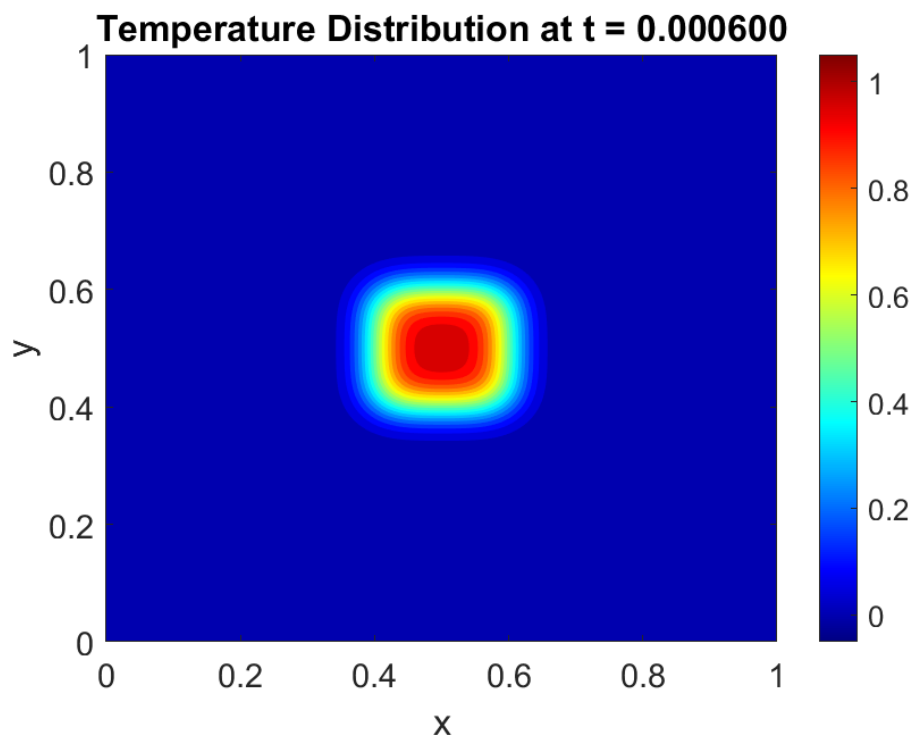


For 2x4:

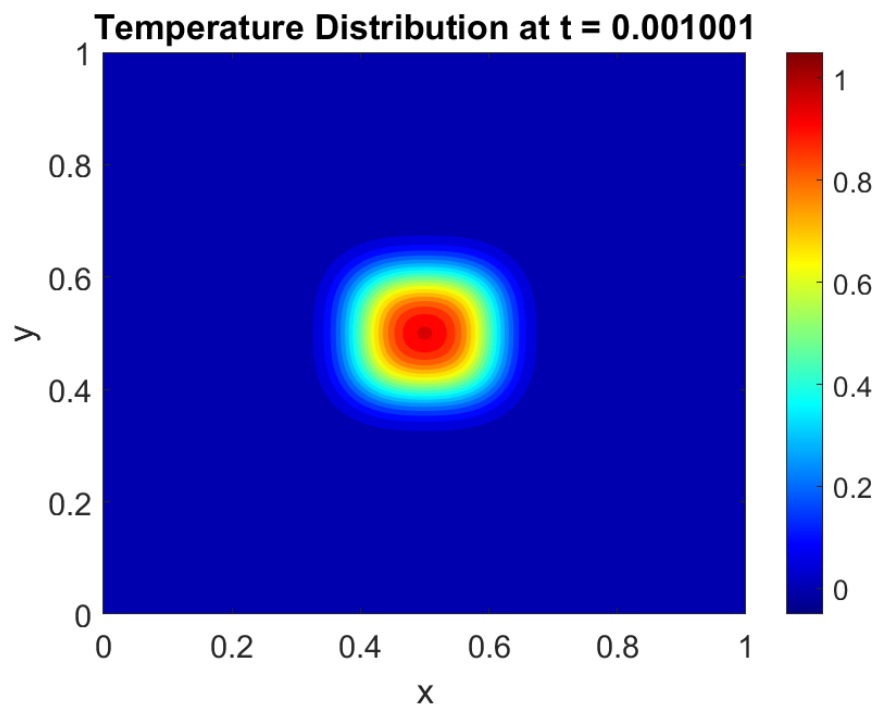
At time step 1020:



At time step 3060:

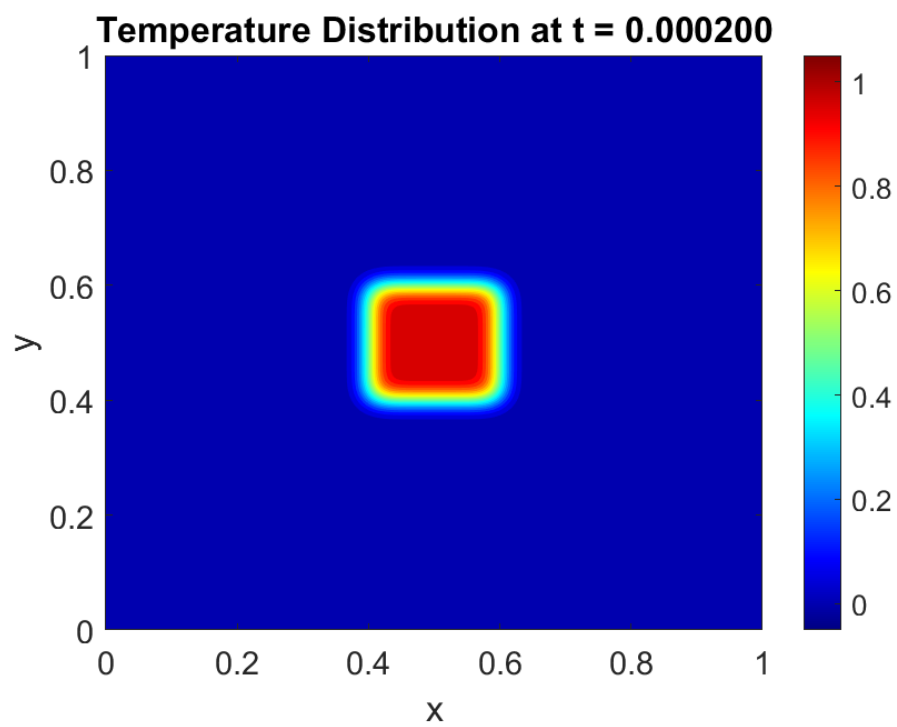


At time step 5107:

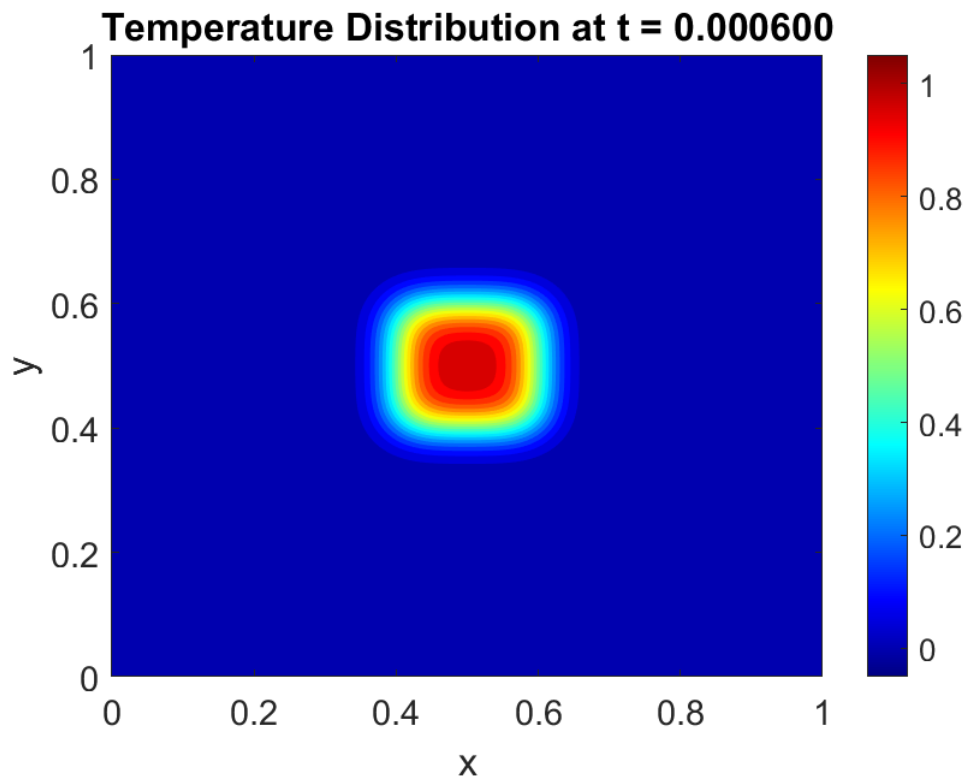


For 4x4:

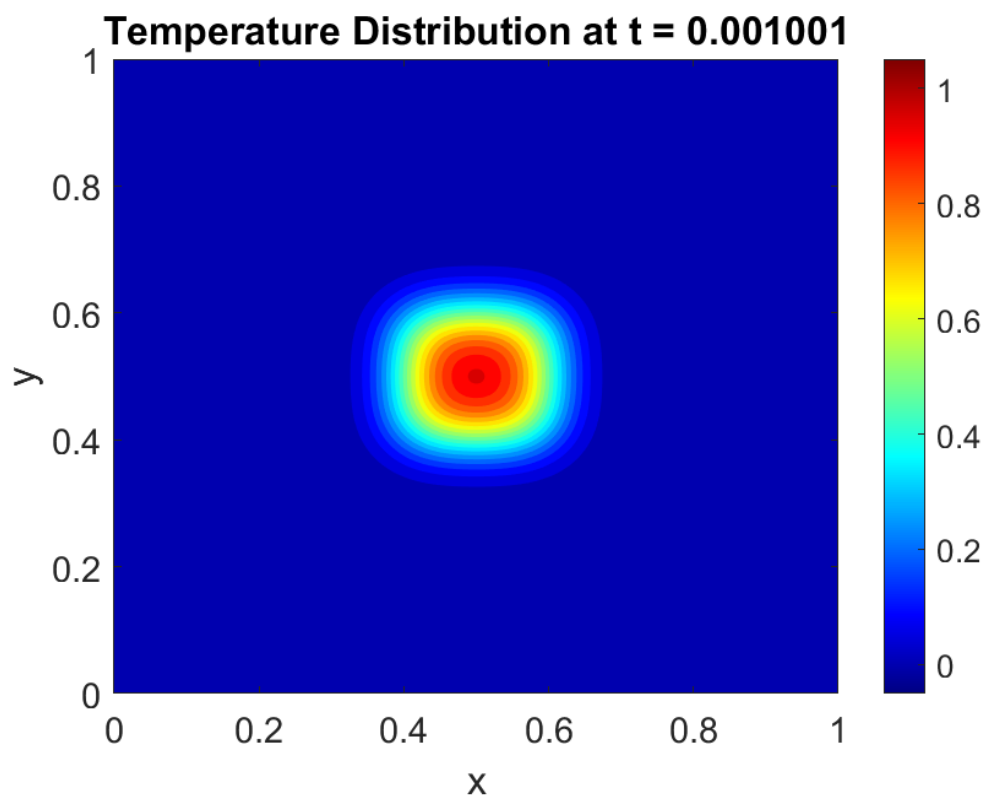
At time step 1020:



At time step 3060:

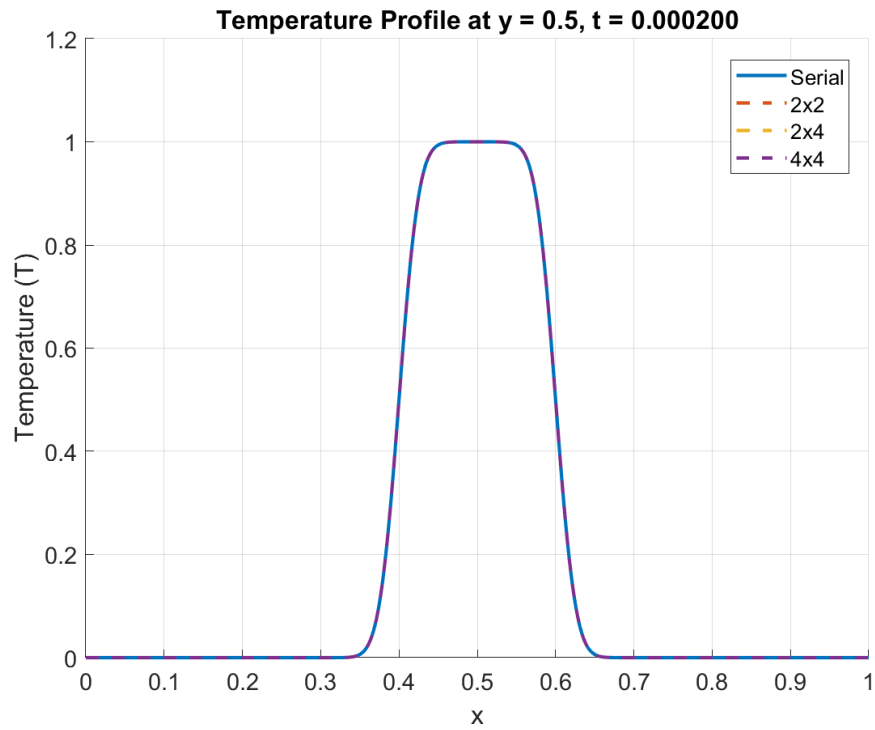


At time step 5107:

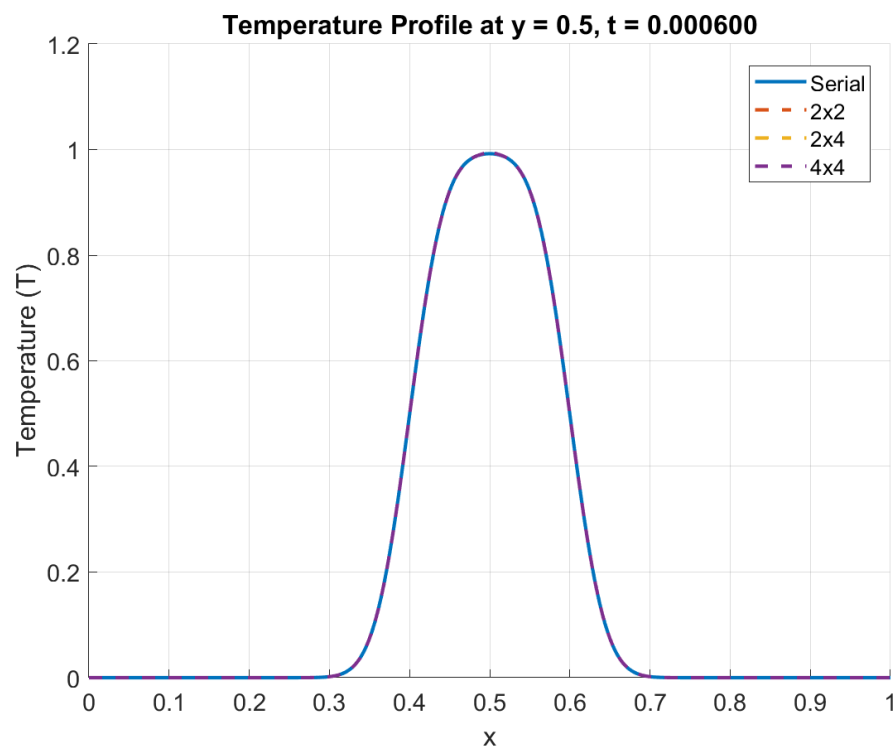


One line plots:

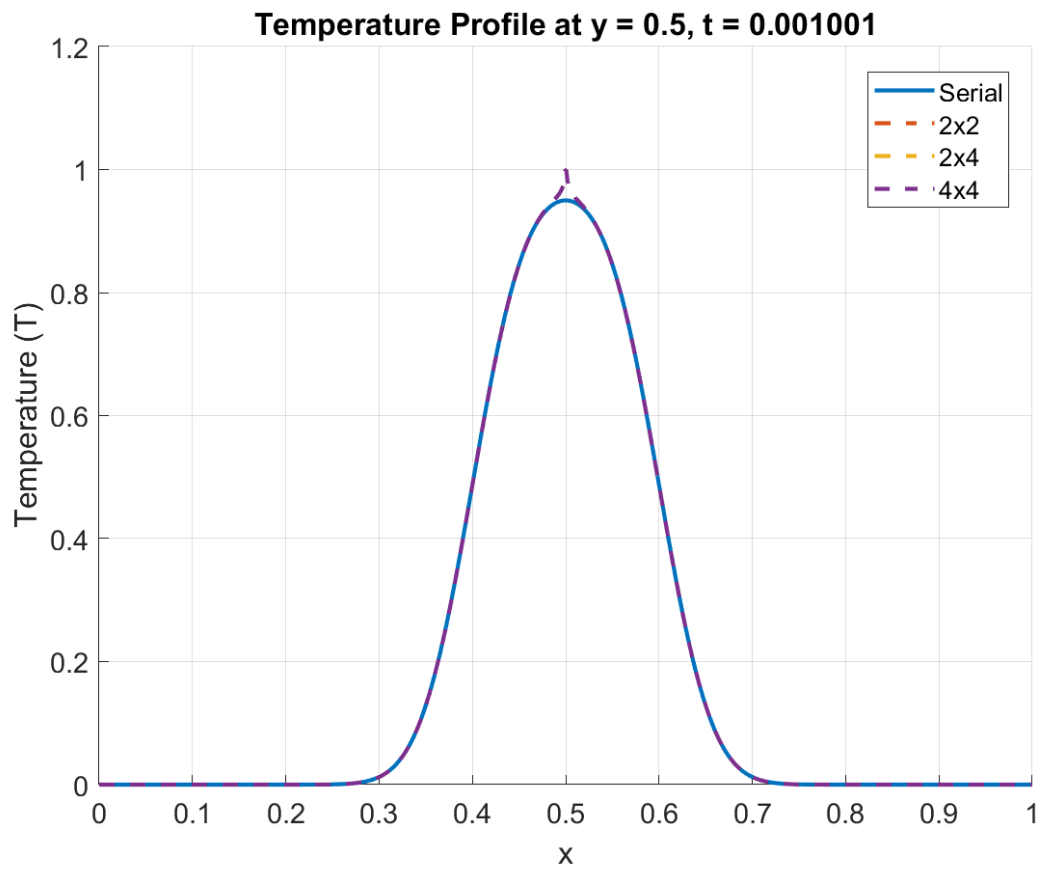
At time step 1020:



At time step 3060:



At time step 5107:



The differences between the serial and the parallel runs at the end of 10-time steps:

	Max Difference	Mean Difference	RMS Difference
2 x 2	0.050171	1.9788e-05	0.00034596
2 x 4	0.050171	2.0075e-05	0.00034598
4 x 4	0.050171	2.0361e-05	0.00034599

The time taken per time step for the serial and parallel runs:

	Time (sec)
Serial	1.089252 e-002
2 x 2	3.341012 e-003
2 x 4	2.338376 e-003
4 x 4	1.117452 e-002

```
OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  powershell + v [ ] [ ] ... ^ x
PS E:\6th SEMESTER\Intro to Parallel Scientific Computing\hw5\hw5-Mahesh-HMJT\hw5> ./a.exe
Serial: Average time per time step = 1.089252e-002 seconds
PS E:\6th SEMESTER\Intro to Parallel Scientific Computing\hw5\hw5-Mahesh-HMJT\hw5> 
```

Ln 86, Col 61 Spaces: 4 UTF-8 CRLF {} C [] [] Go Live [] Quokka Win32 [] Prettier []

```
OUTPUT  DEBUG CONSOLE  TERMINAL  PORTS  powershell + v [ ] [ ] ... ^ x
PS E:\6th SEMESTER\Intro to Parallel Scientific Computing\hw5\hw5-Mahesh-HMJT\hw5> mpiexec -n 4 q3_par_
t
2x2: Average time per time step = 3.341012e-003 seconds
PS E:\6th SEMESTER\Intro to Parallel Scientific Computing\hw5\hw5-Mahesh-HMJT\hw5> mpiexec -n 8 q3_par_
t
2x4: Average time per time step = 2.338376e-003 seconds
PS E:\6th SEMESTER\Intro to Parallel Scientific Computing\hw5\hw5-Mahesh-HMJT\hw5> mpiexec -n 16 q3_par_
t
4x4: Average time per time step = 1.117452e-002 seconds
PS E:\6th SEMESTER\Intro to Parallel Scientific Computing\hw5\hw5-Mahesh-HMJT\hw5> 
```

Ln 140, Col 42 Spaces: 4 UTF-8 CRLF {} C [] [] Go Live [] Quokka Win32 [] Prettier []

The One line plots are not clearly visible in this pdf because they are overlapping on each other. So I have added them to the Github repo for better visualisation.