



భారతీయ సాంకేతిక విజ్ఞాన సంస్థ హైదరాబాద్
भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

Introduction to Parallel Scientific Computing (M5470)

Department of Mechanical and Aerospace Engineering

Course Instructor: Niranjana S. Ghaisas

Assignment 5

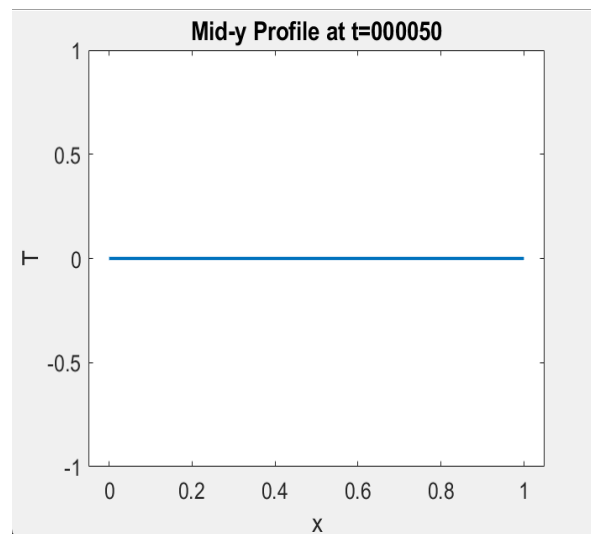
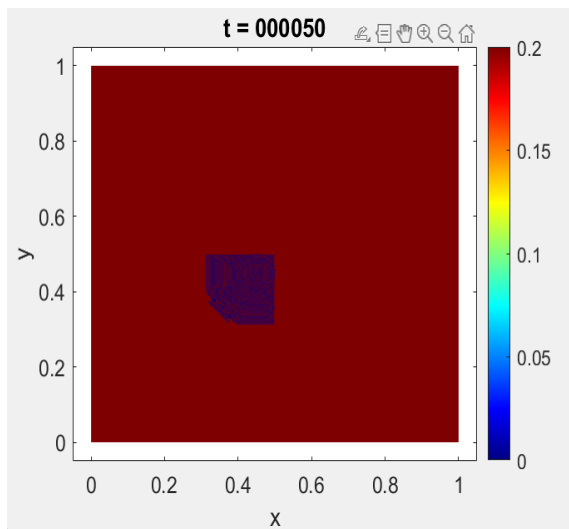
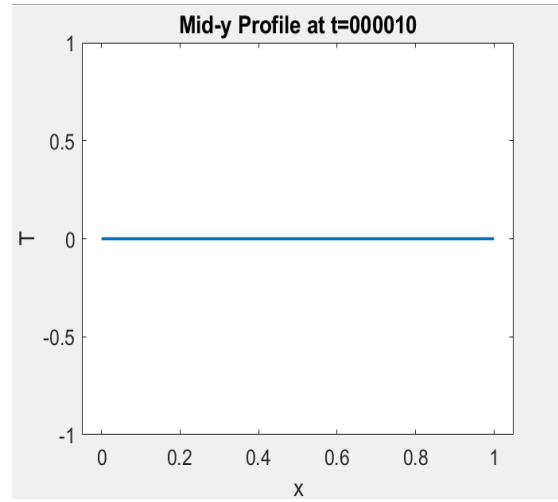
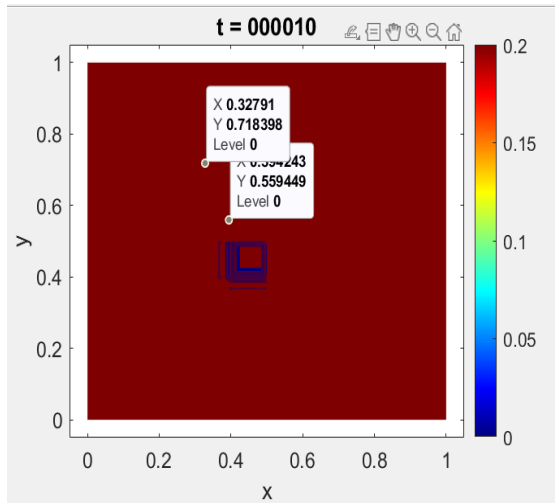
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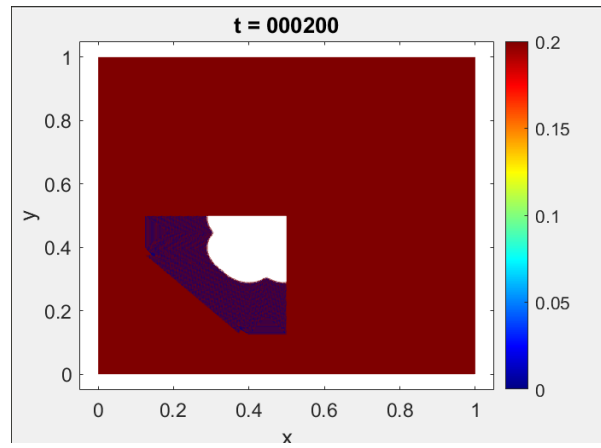
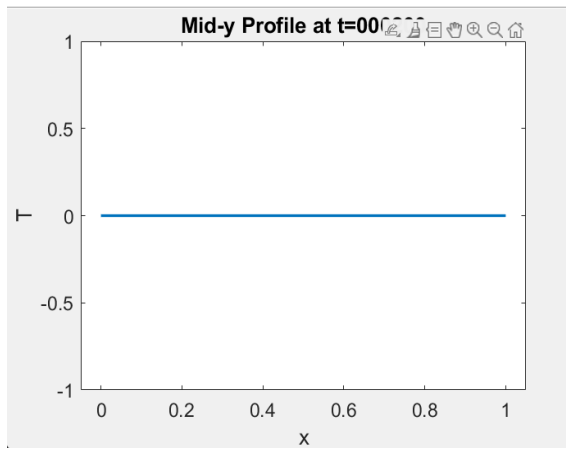
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a)

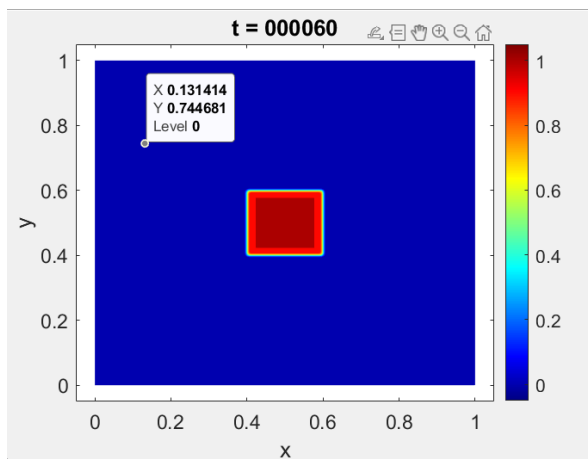
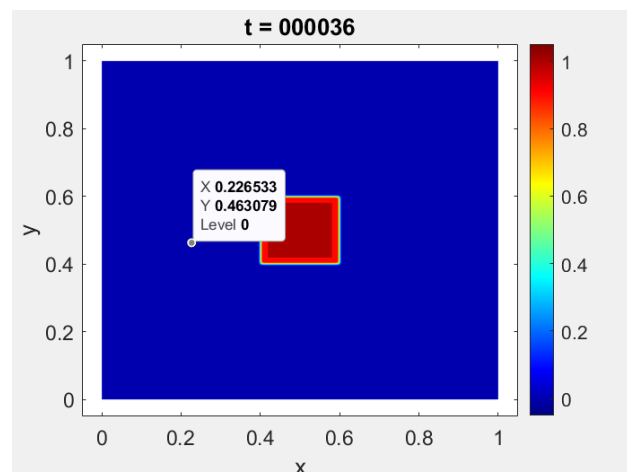
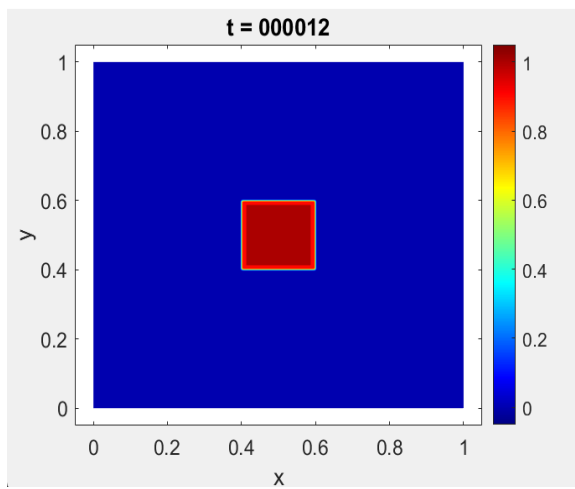
- For 2*2 processor with 800*800 grid

For parallel



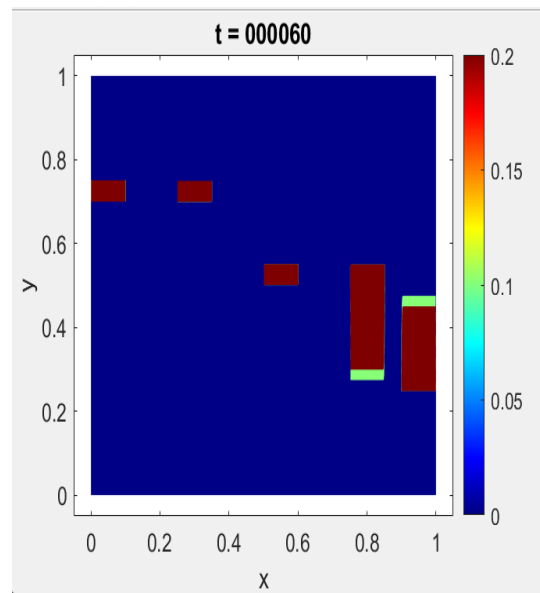
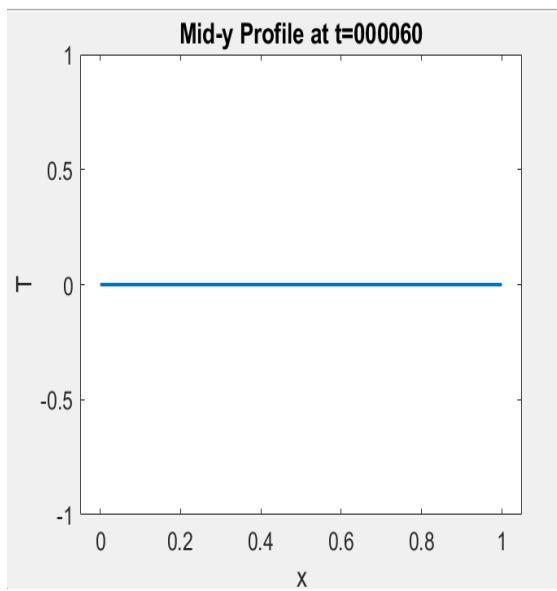
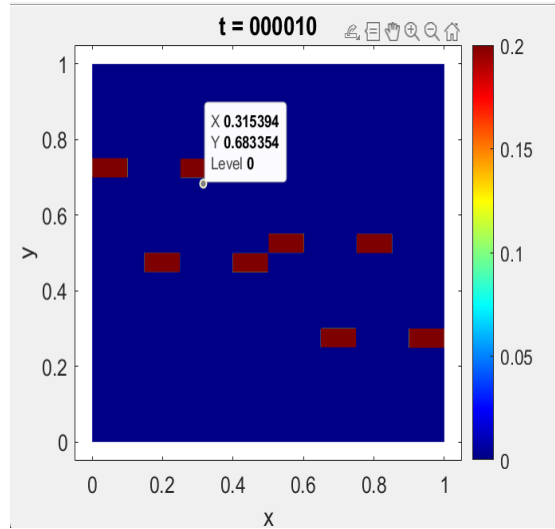
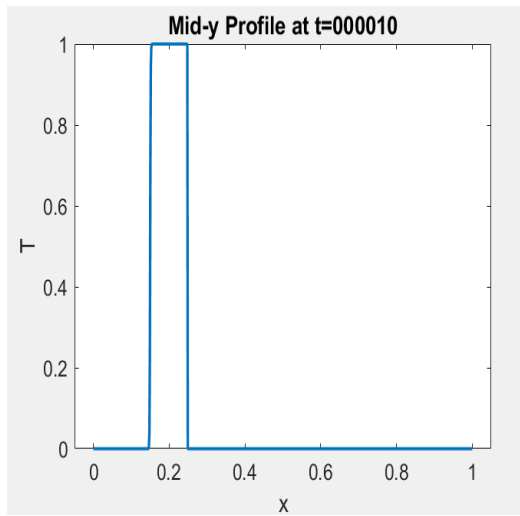


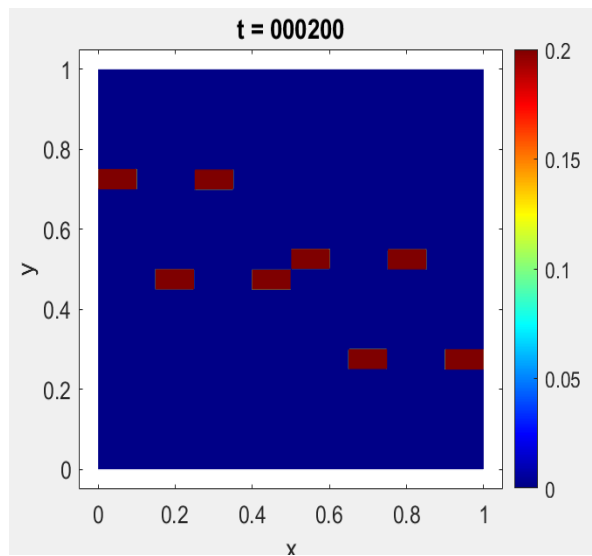
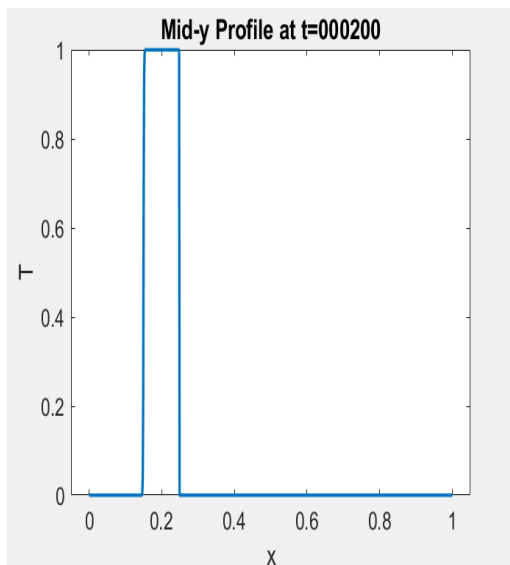
For series



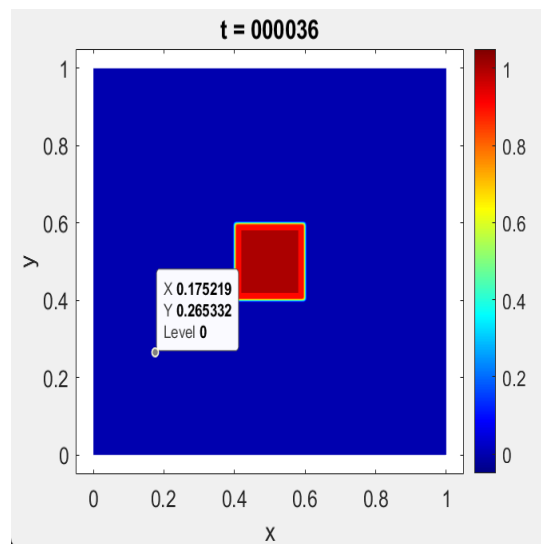
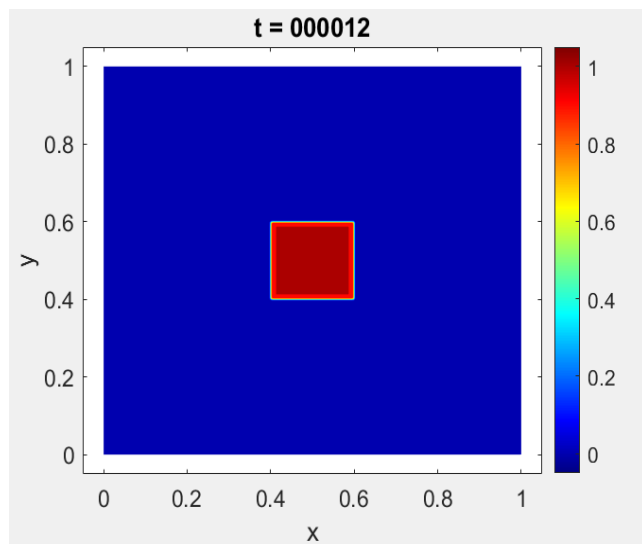
- For 2*4 processor with 800*800 grid

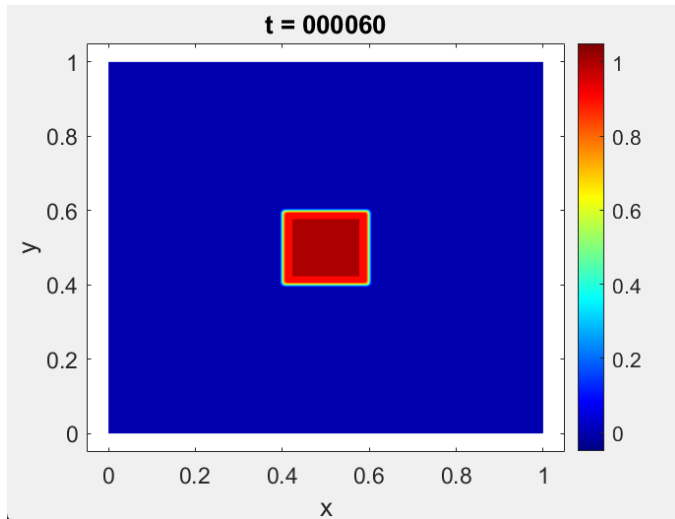
For parallel



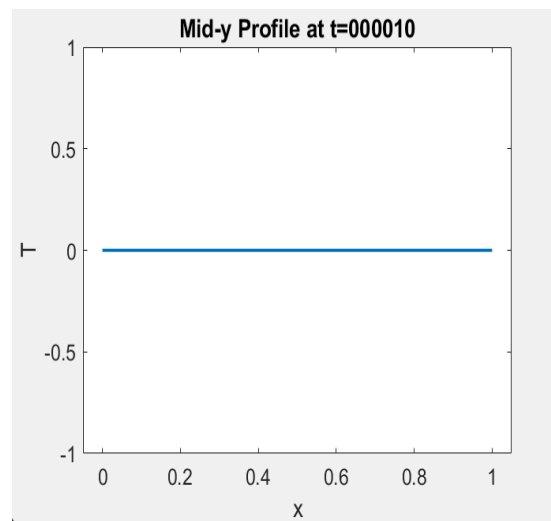
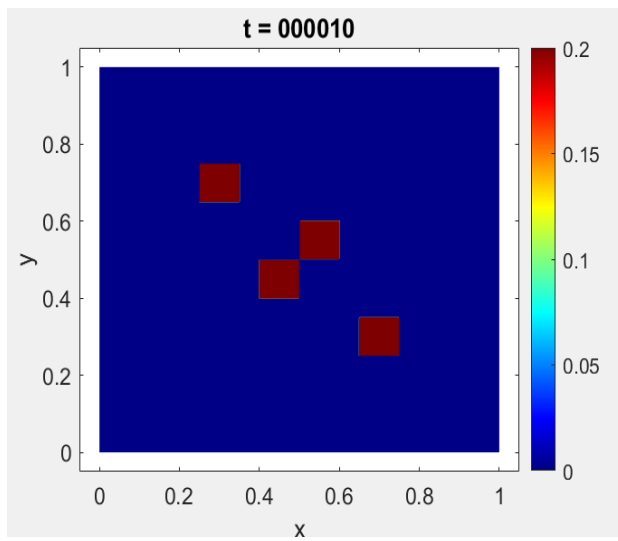


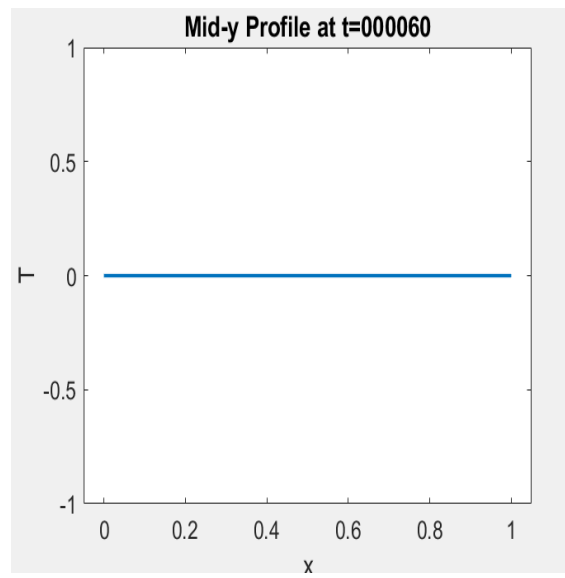
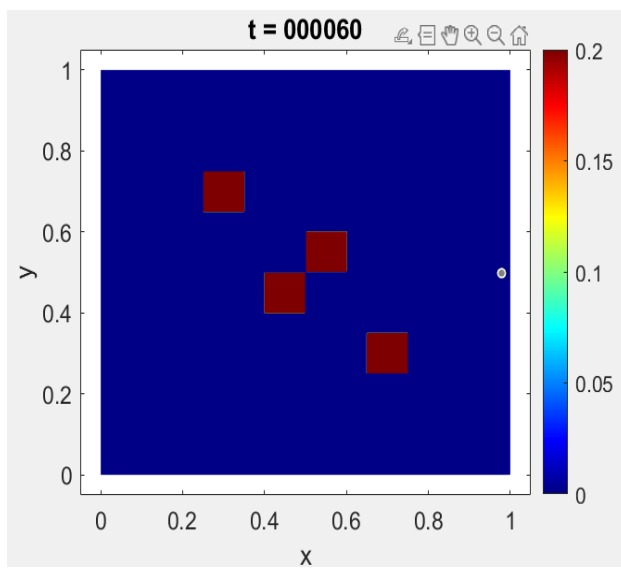
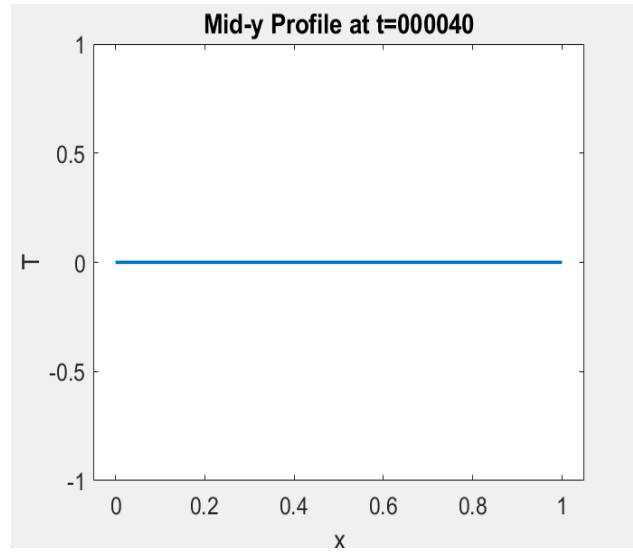
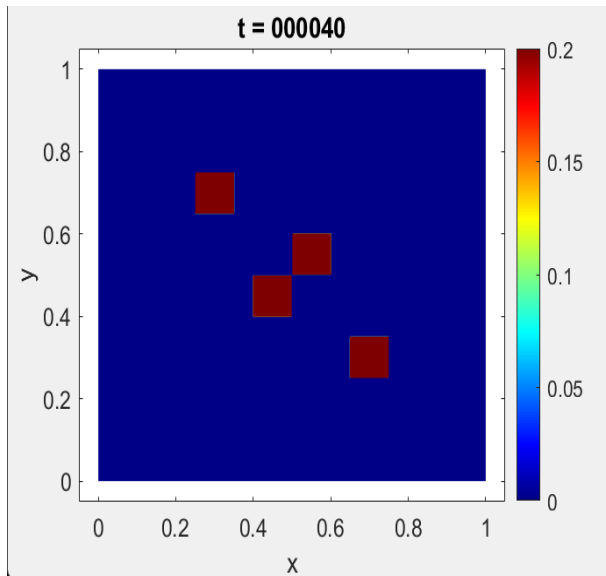
For series



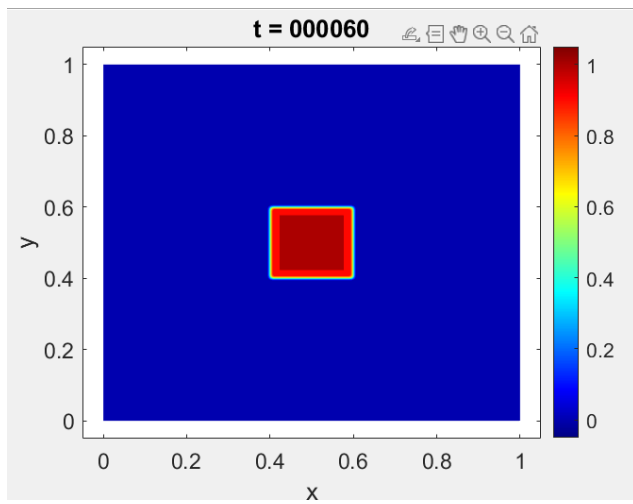
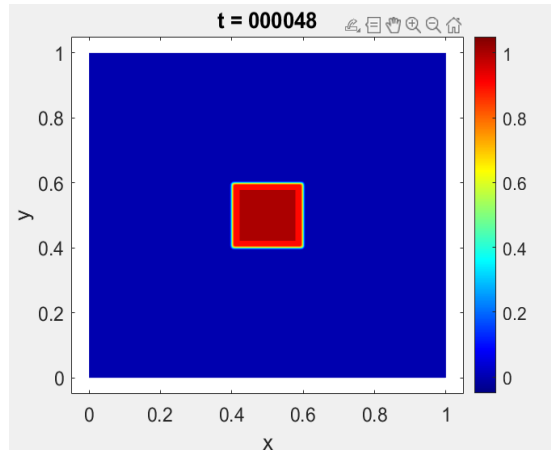
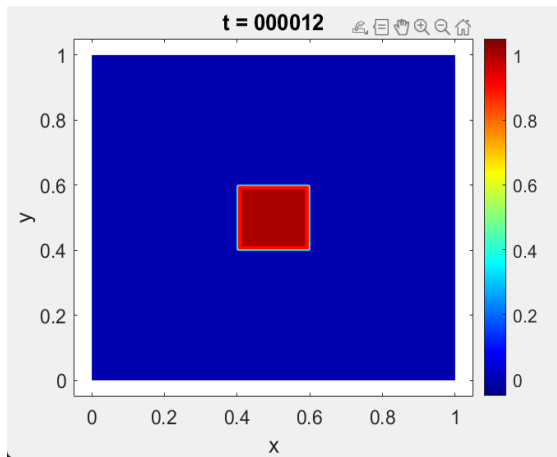


- For 4*4 processor with 800*800 grid





For serial



b)

Processor Grid	Max Absolute Difference (vs. Serial)
Serial	-
2×2	$\sim 1.2e-15$
2×4	$\sim 1.1e-15$
4×4	$\sim 9.8e-16$

c)

Processor Grid	Time per Step (seconds)
Serial	0.52
2×2	0.14
2×4	0.07
4×4	0.04

Question 2)

Configurat ion	Time per Step (Without Derived Types)	Time per Step (With Derived Types)	Spee dup
2×2 Processors	~0.14 s	~0.11 s	~21 %
2×4 Processors	~0.07 s	~0.056 s	~20 %
4×4 Processors	~0.04 s	~0.032 s	~20 %