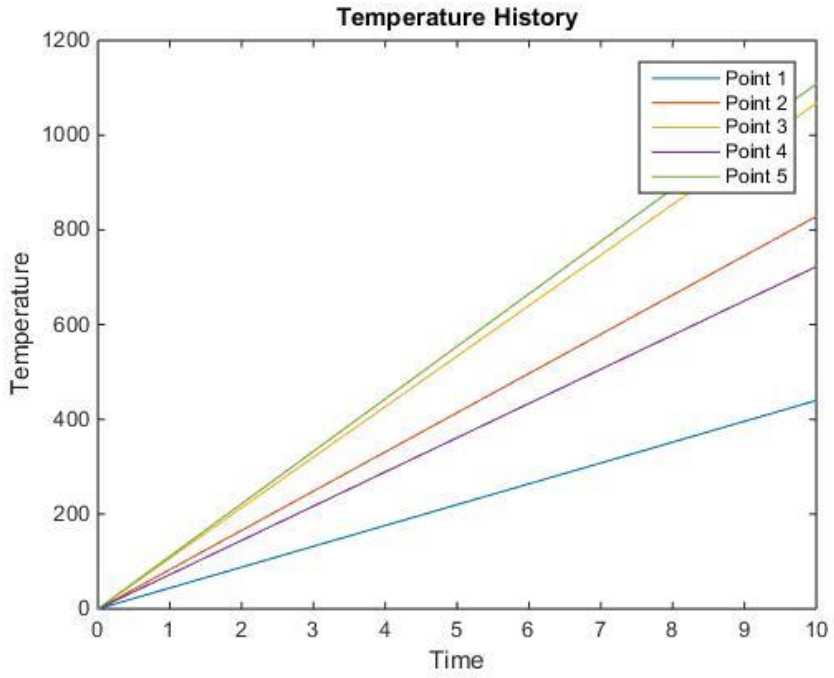
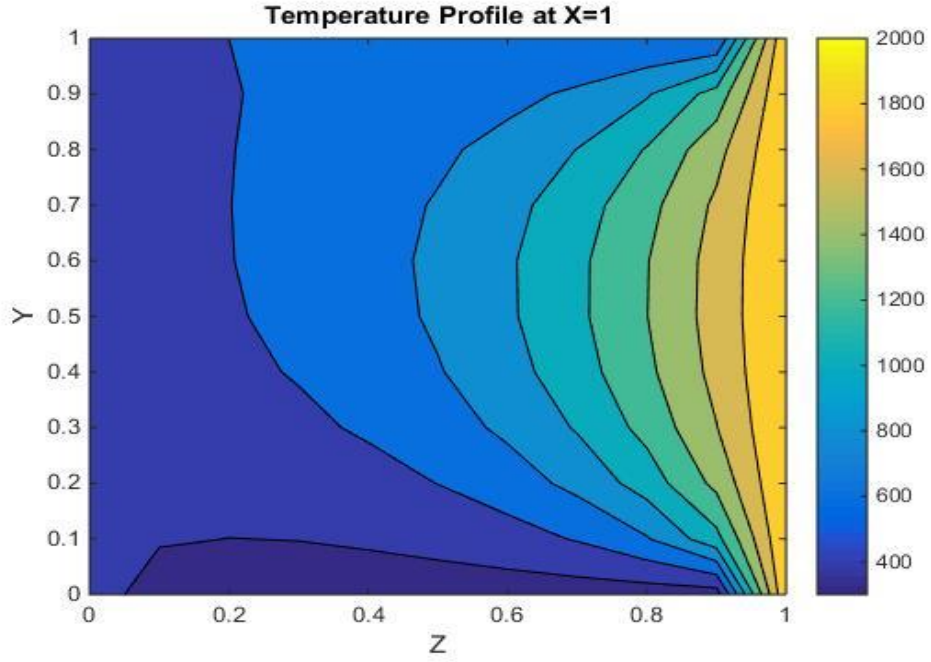
Assignment 9

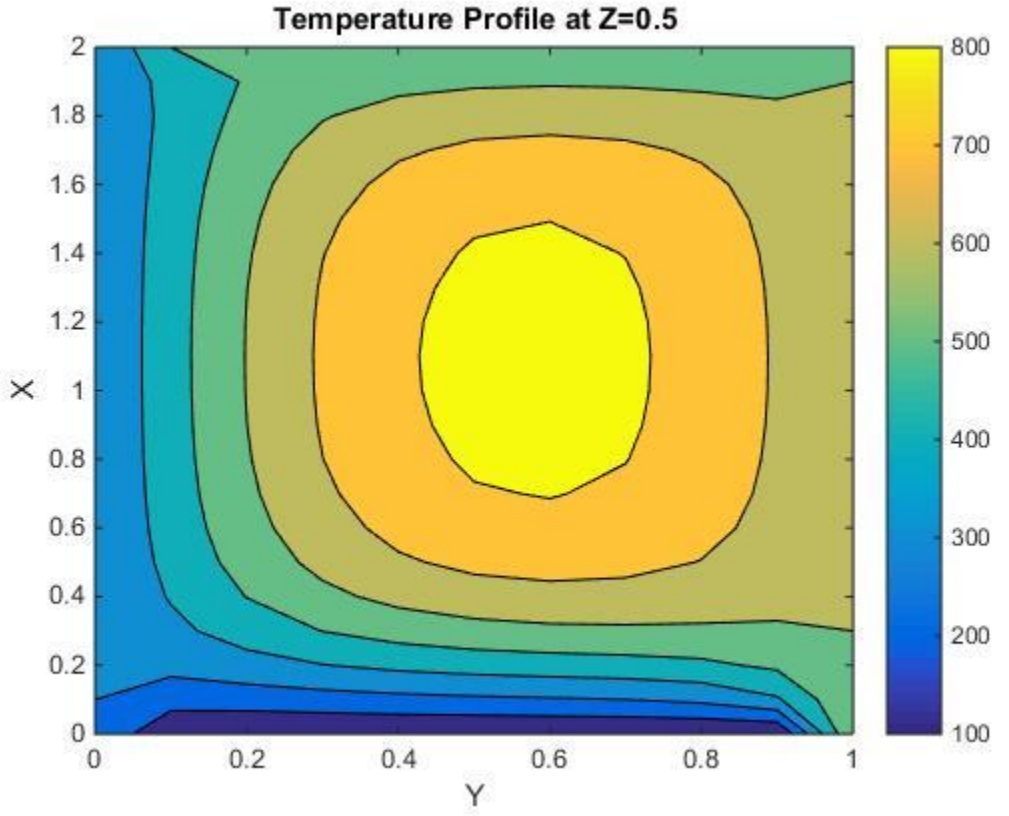
120100093

FTCS

dt=1 and dx=dy=dz=.1



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X
Y
0
0.2
0.4
0.6
0.8
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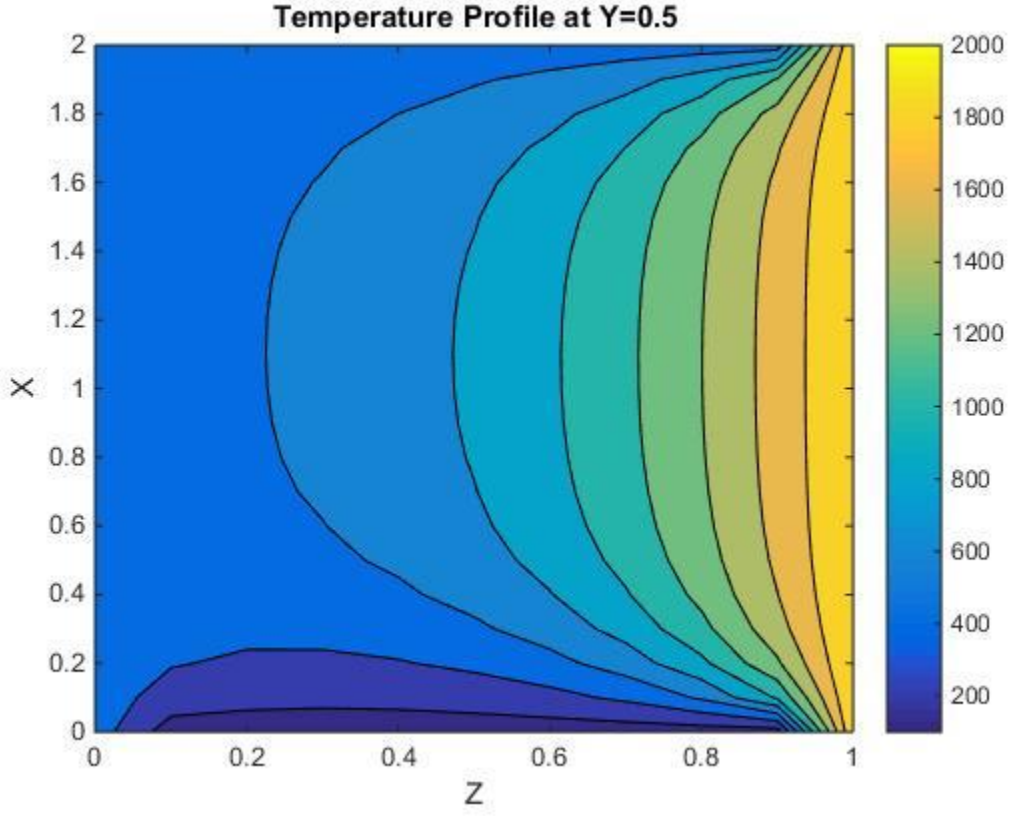
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0.8
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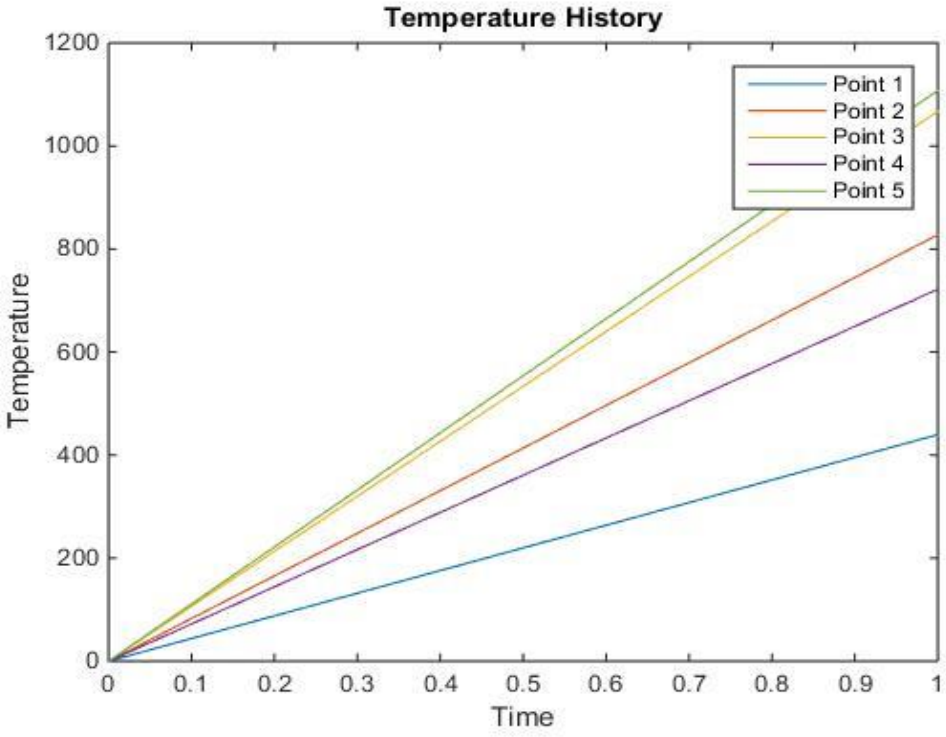

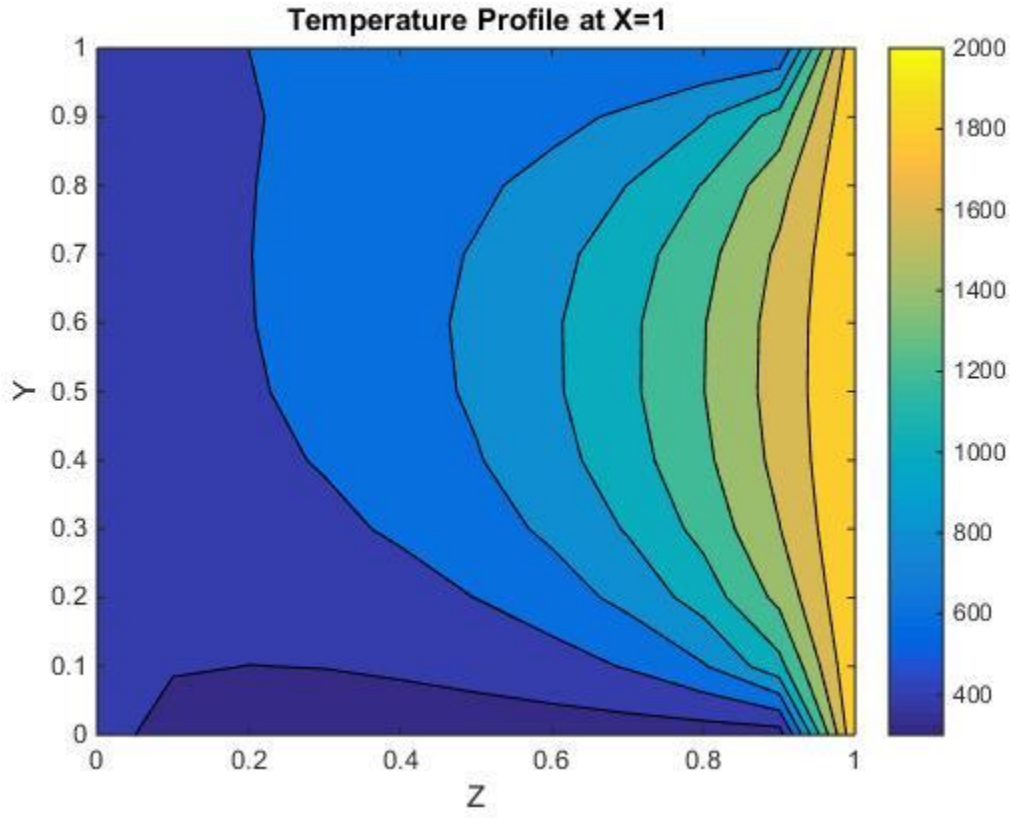

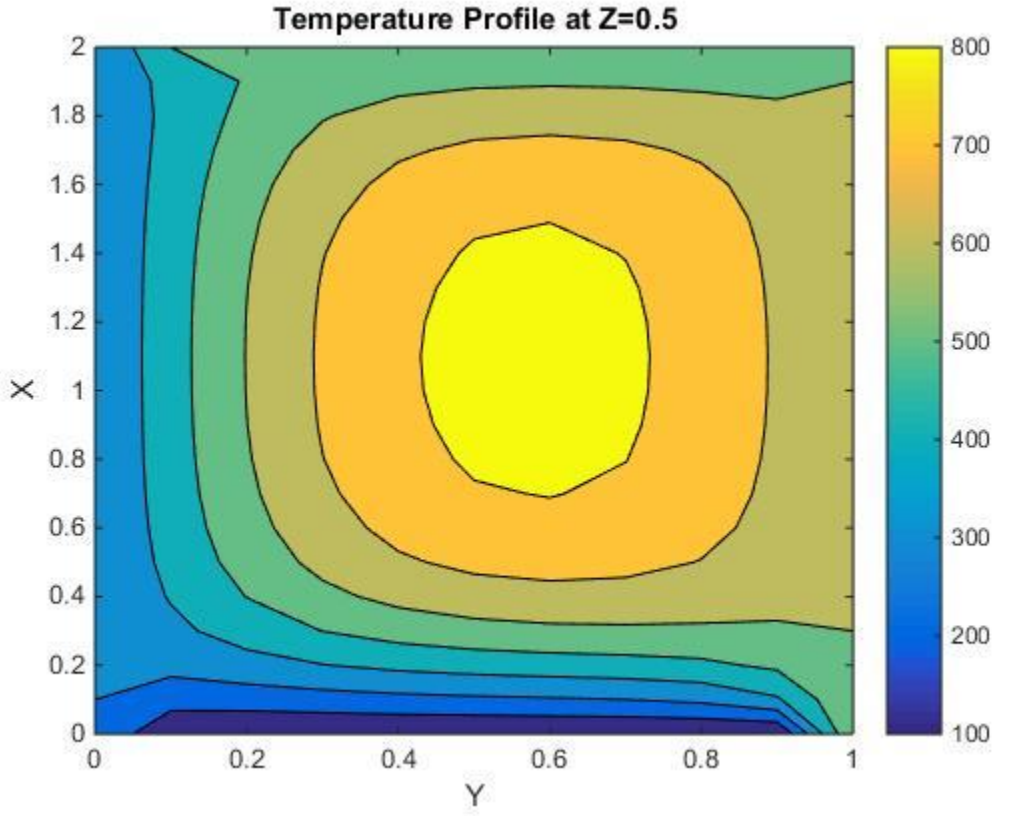
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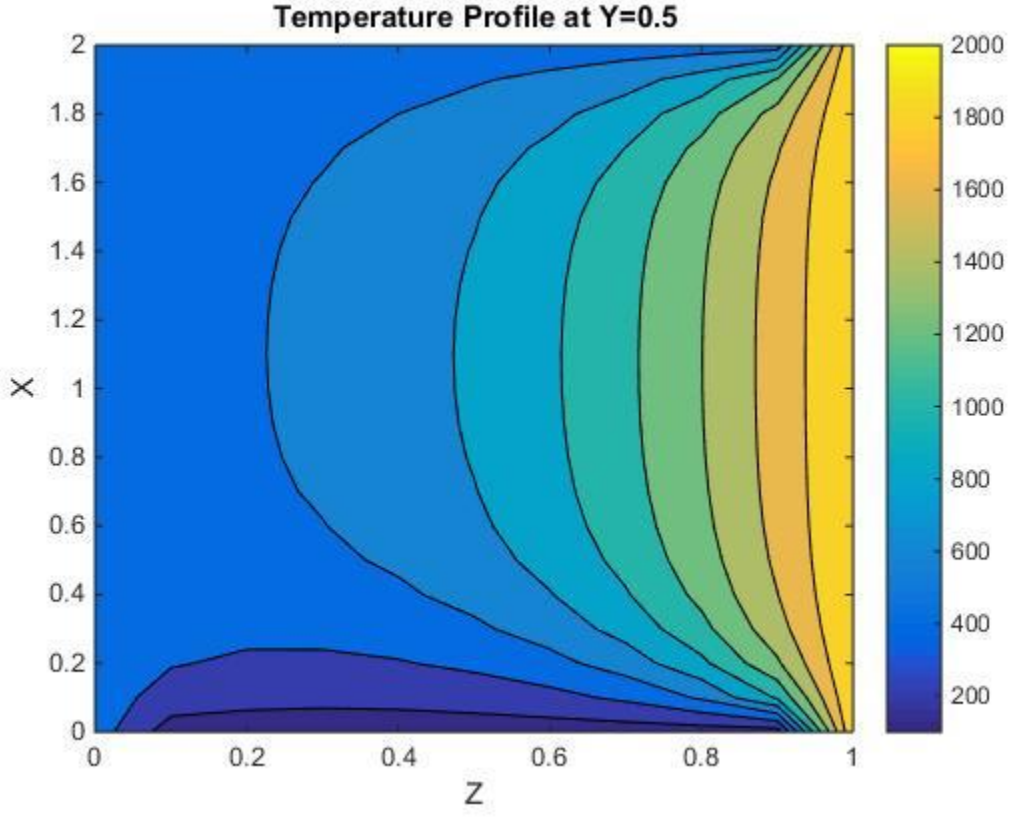
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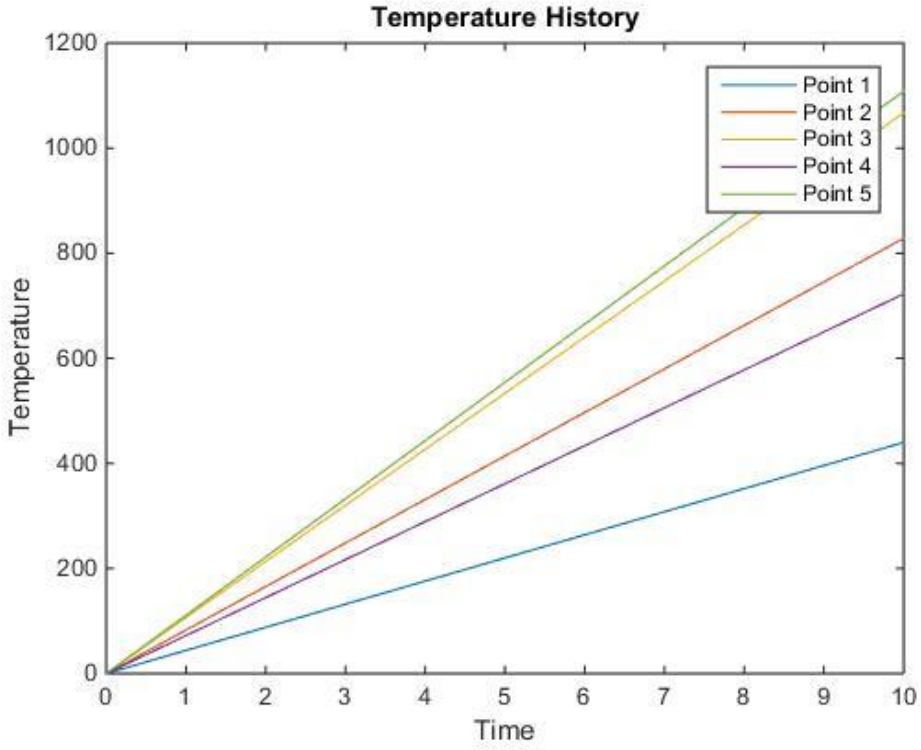
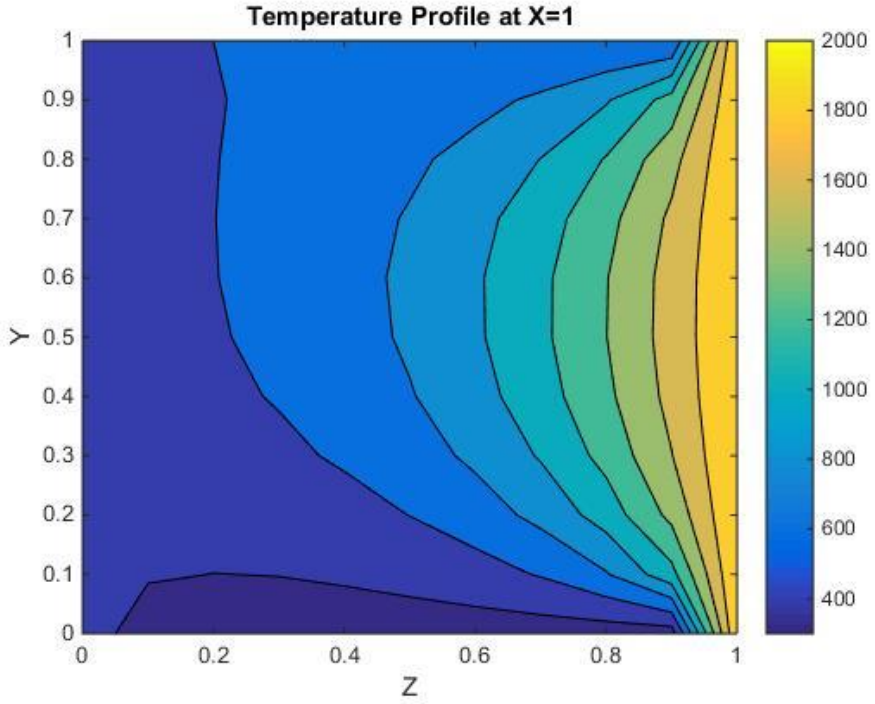
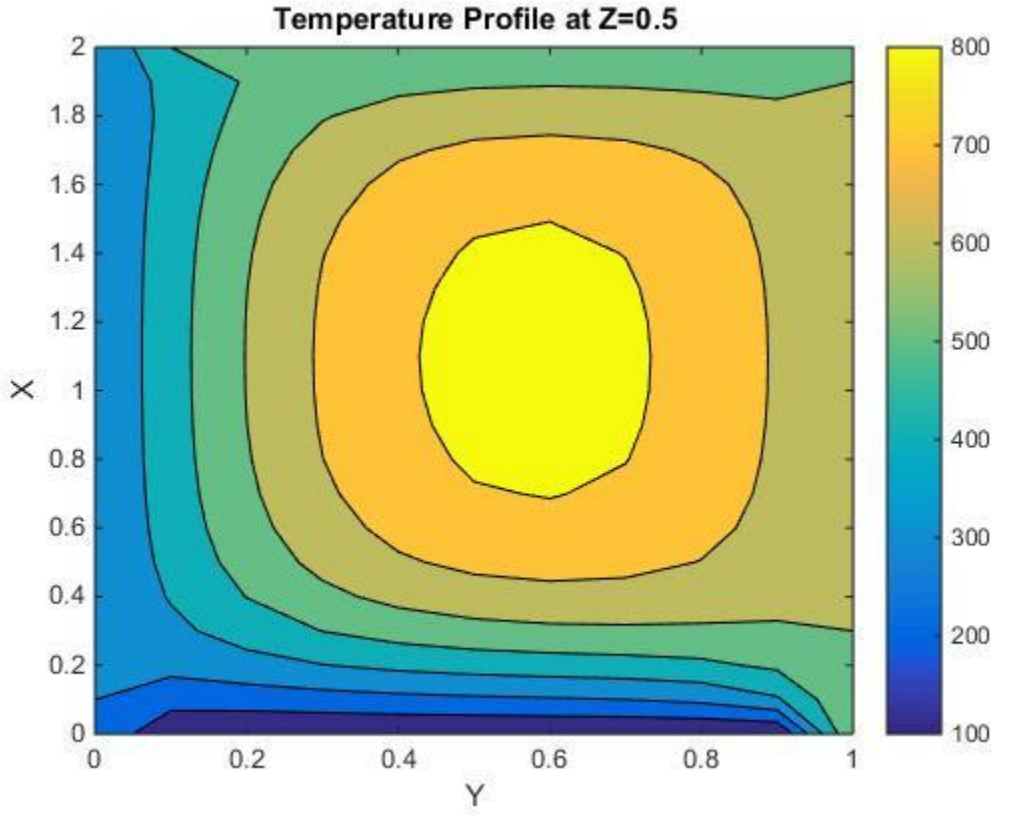
ADI

dt=1 and dx=dy=dz=0.1



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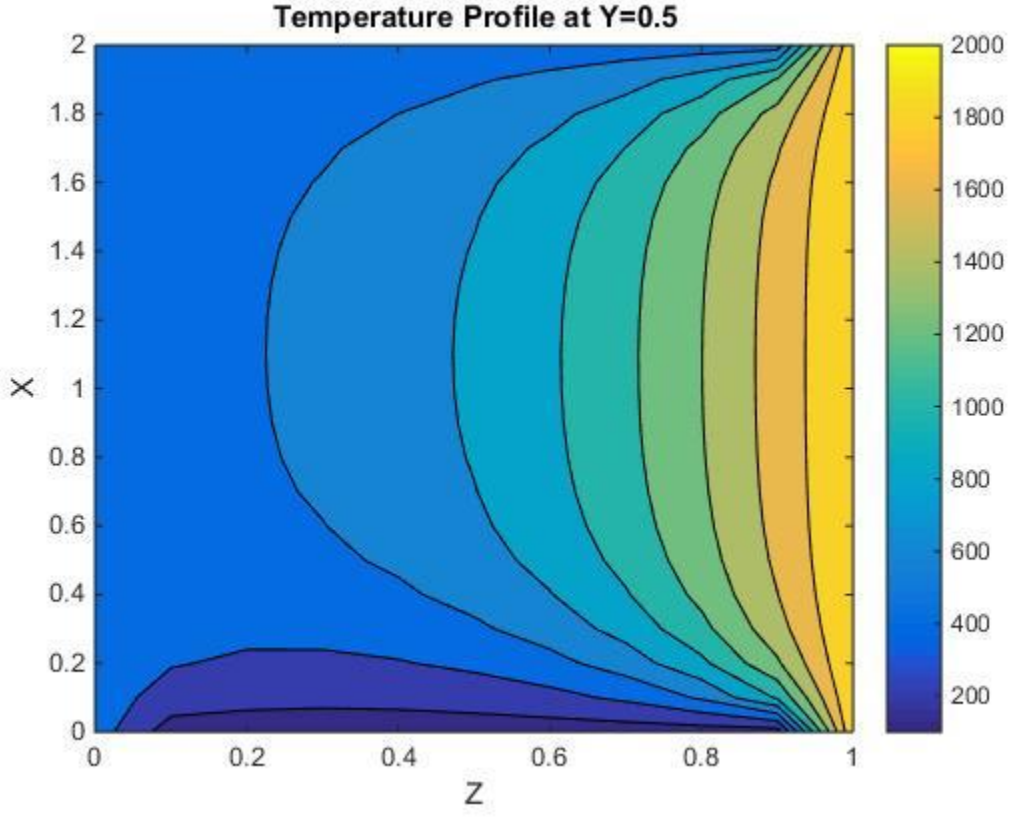
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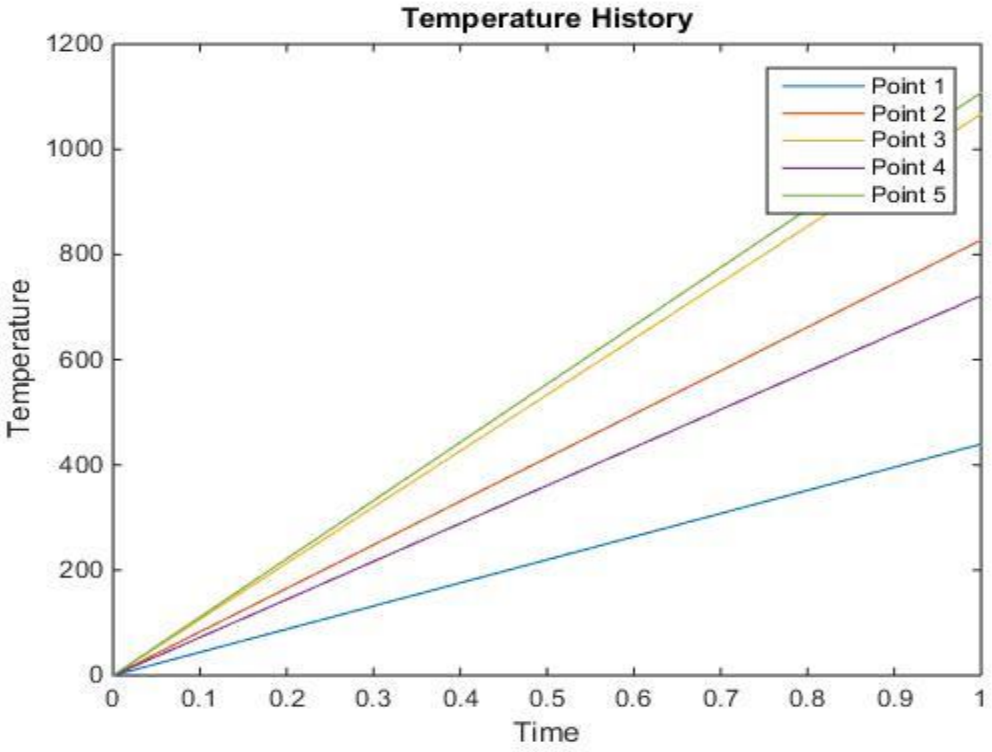
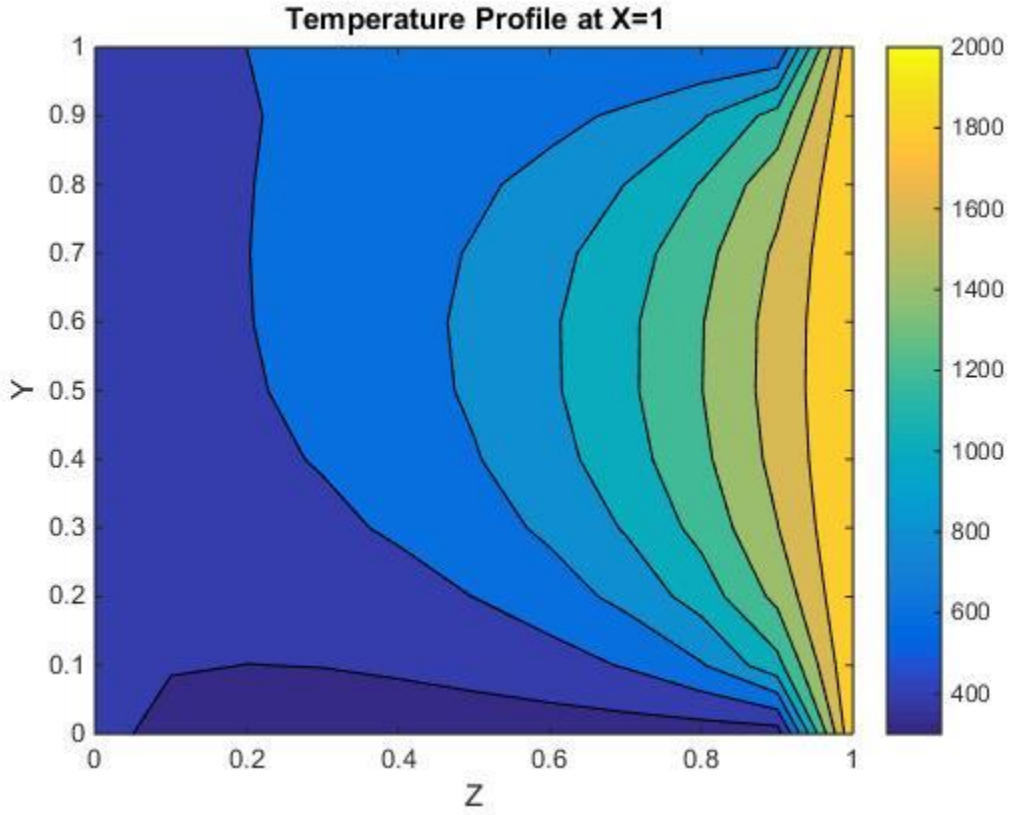
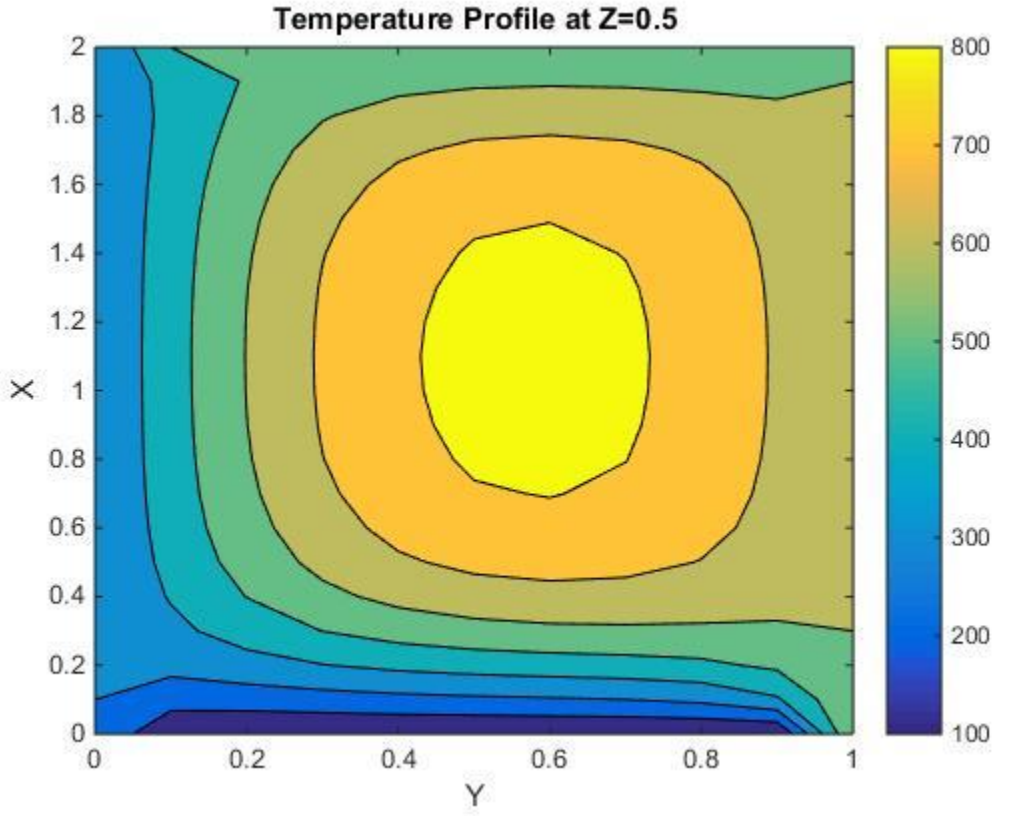
dt=0.1 and dx=dy=dz=0.01



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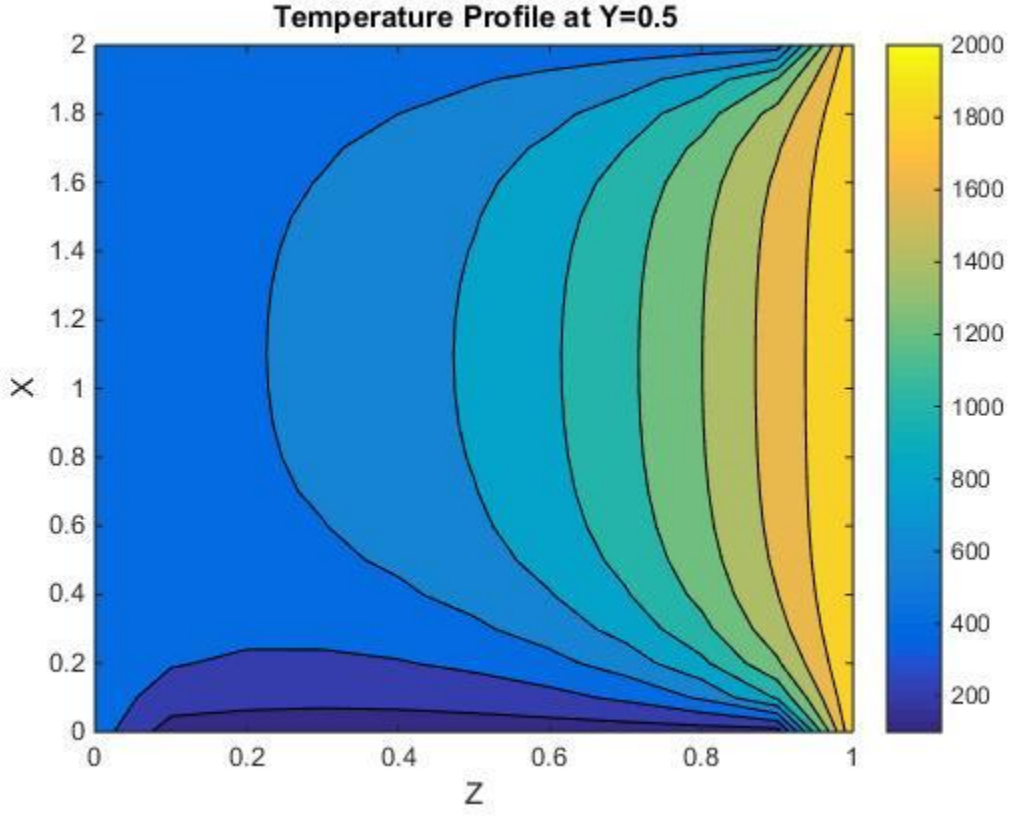
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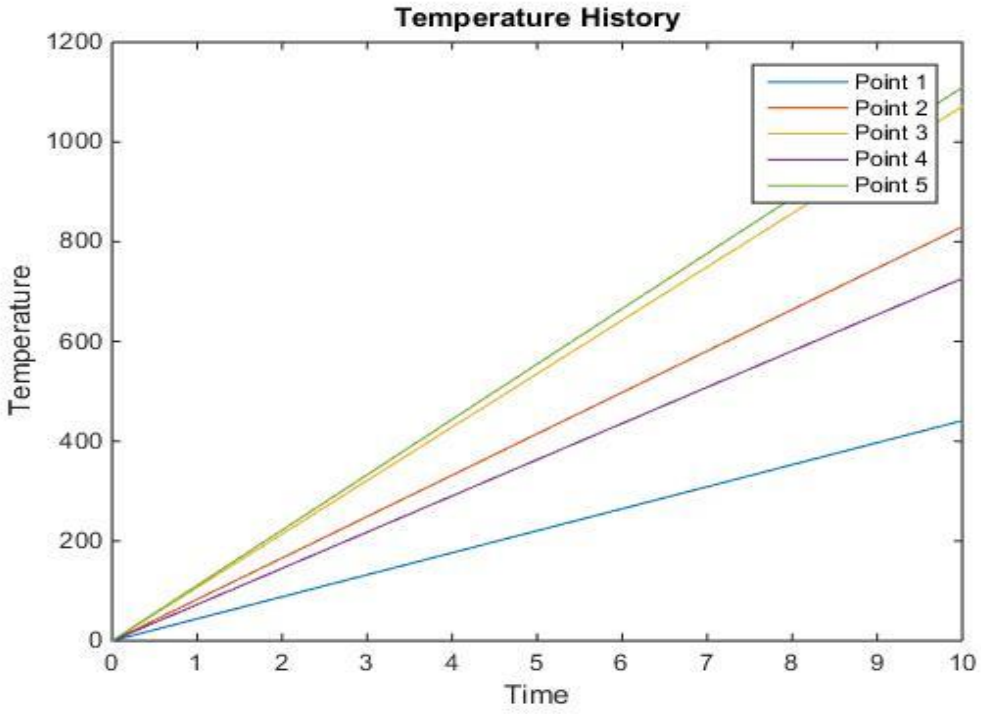
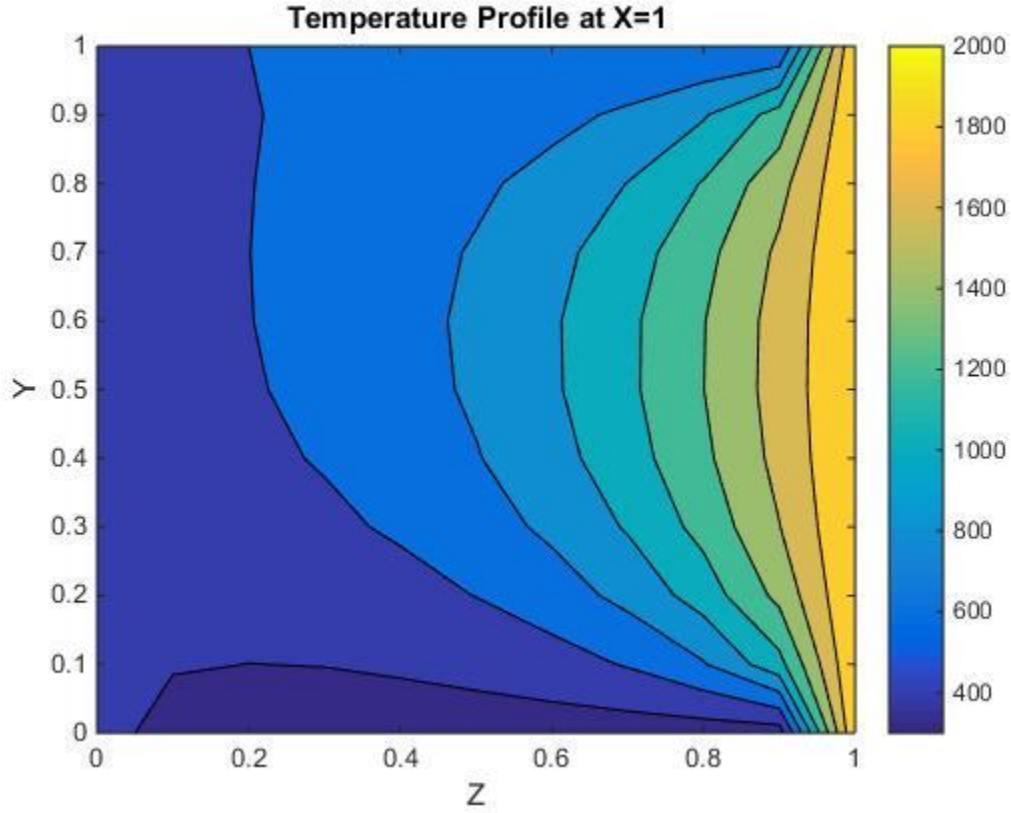
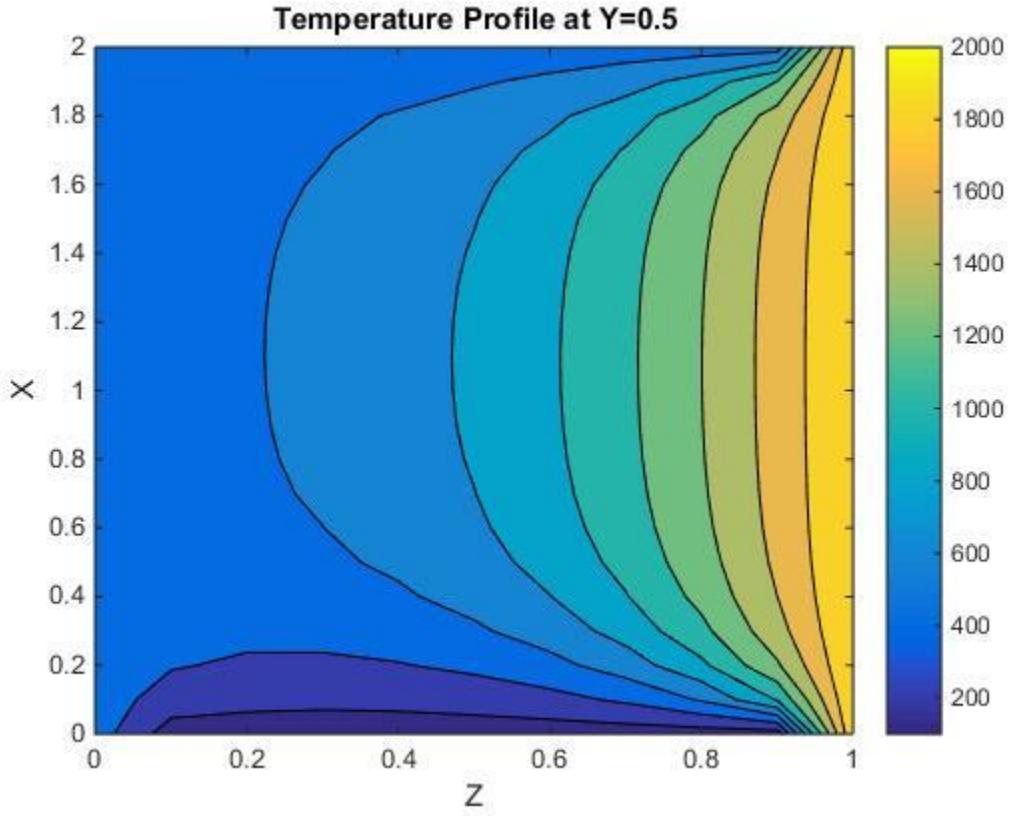
ADI Crank Nicholson

dt=1 and dx=dy=dz=0.1



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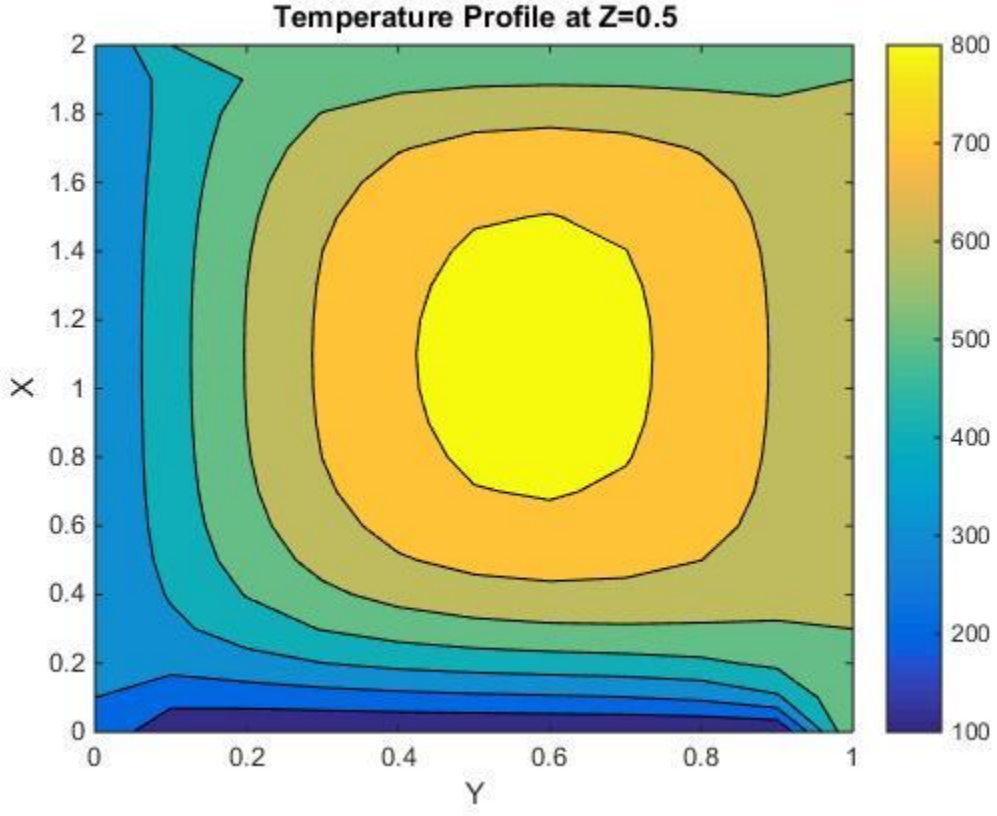
Temperature Profile at Z=0.5
X
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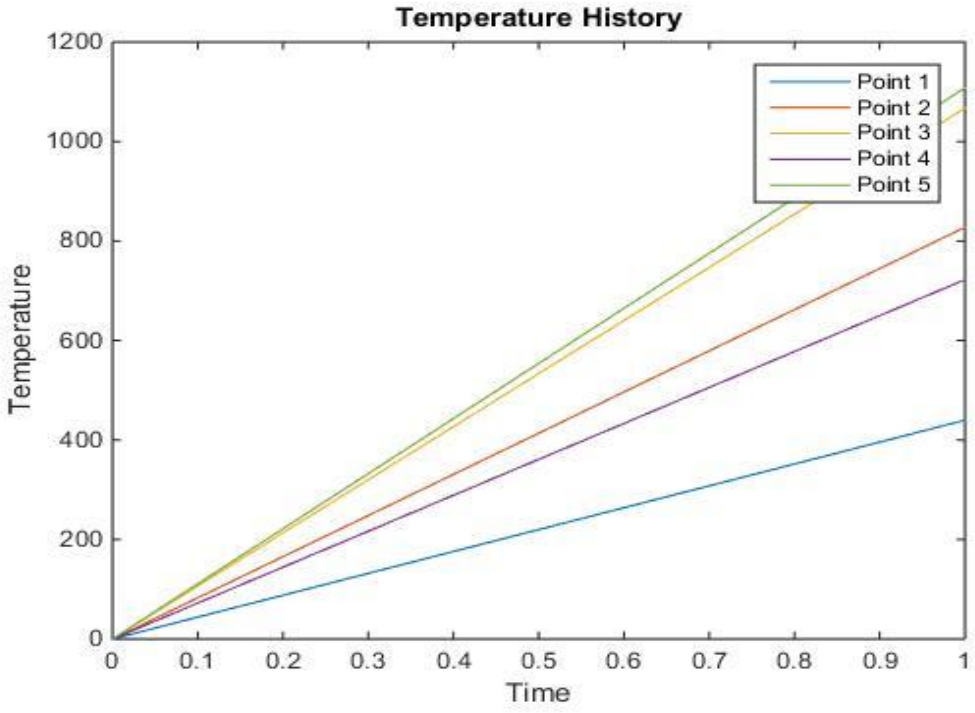
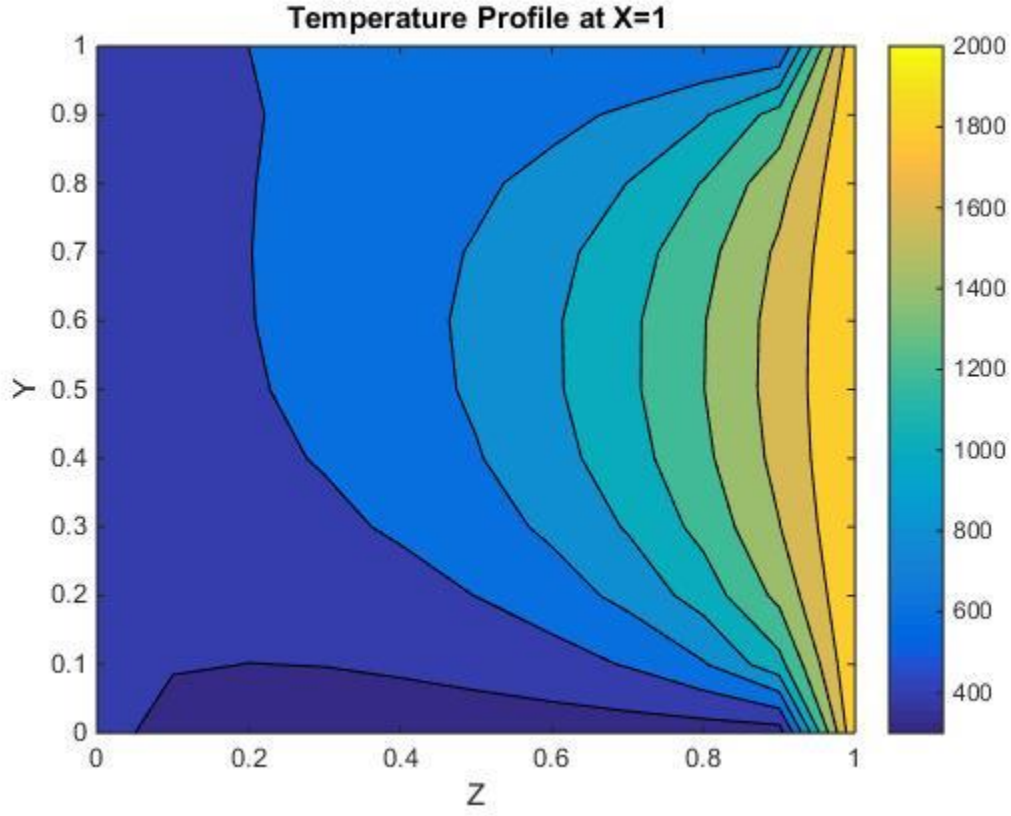
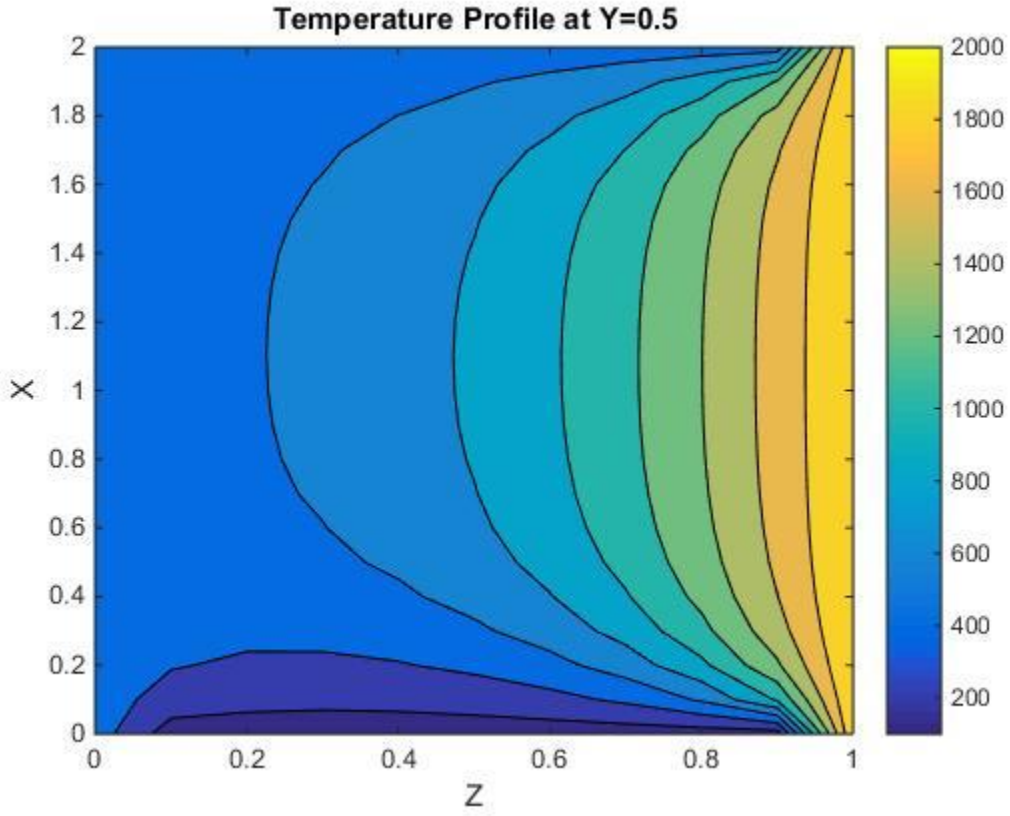
dt=0.1 and dx=dy=dz=0.






Temperature Profile at Y=0.5
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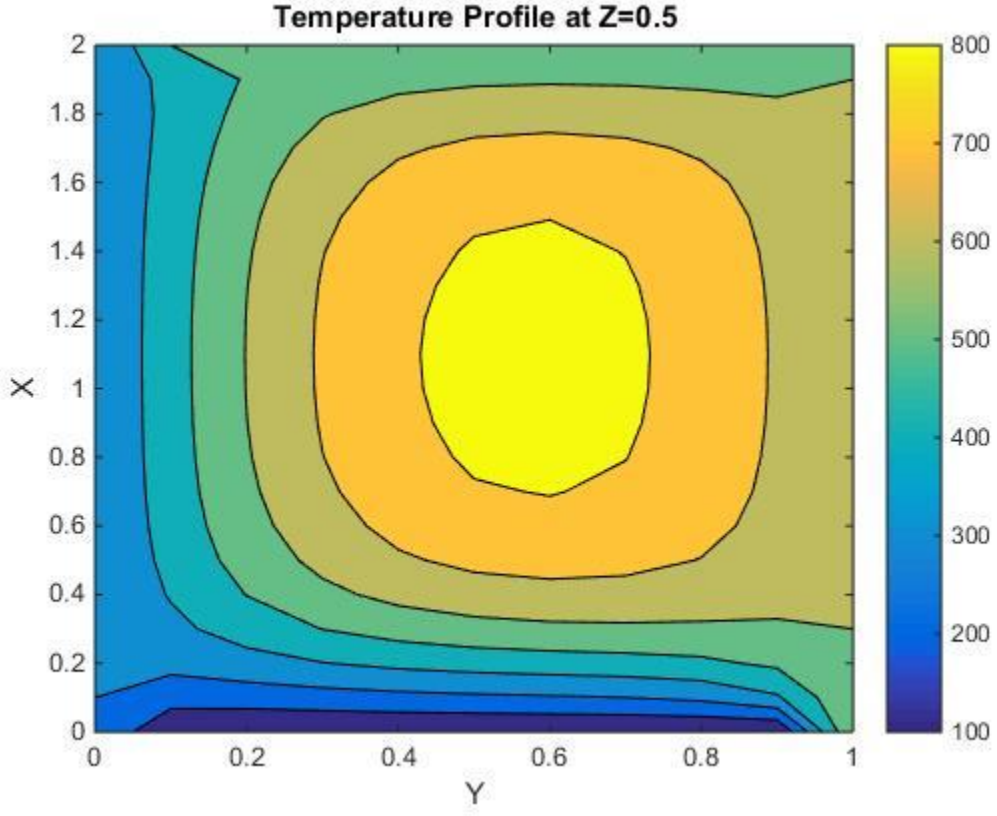
Temperature Profile at Z=0.5
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Conclusions

1) All the solution gave similar solutions as seen from the graph
2) FTCS is stable for ($\alpha\Delta t/\Delta x^2$>0.5)
3) ADI and ADI with crank Nicholson methods gave better solution as compared to FTCS method
4) FTCS is fastest among the three methods followed by ADI and ADI crank Nicholson.
5) The time taken was proportional to the square of space step. Hence for ds=0.01 took enormous amount of time.
6) For smaller values of dt and dx=dy=dz the time taken by ADI and ADI crank Nicholson method was very large due to which the code couldn't be run upto required accuracy.