Tutorial 7

Part 1

Please complete this bug hunt:

https://github.com/archembaud/NCKU-Parallel-GPU/tree/main/Tutorials/Tutorial_7_Bug_Hunt

- Find all the bugs and get this code compiled and running.
- Write down what you did to fix it in a file, and save it on the server – it could be useful during the final exam.

Part 2

Check your code from Tutorial 6. You should have a Cuda code which prepares memory on both GPU and CPU.

Using your Cuda file from last week:

- Save your code from last week (tutorial_6a.cu) to a new file called tutorial_7.cu
- Update the initial conditions to match the diagram below:
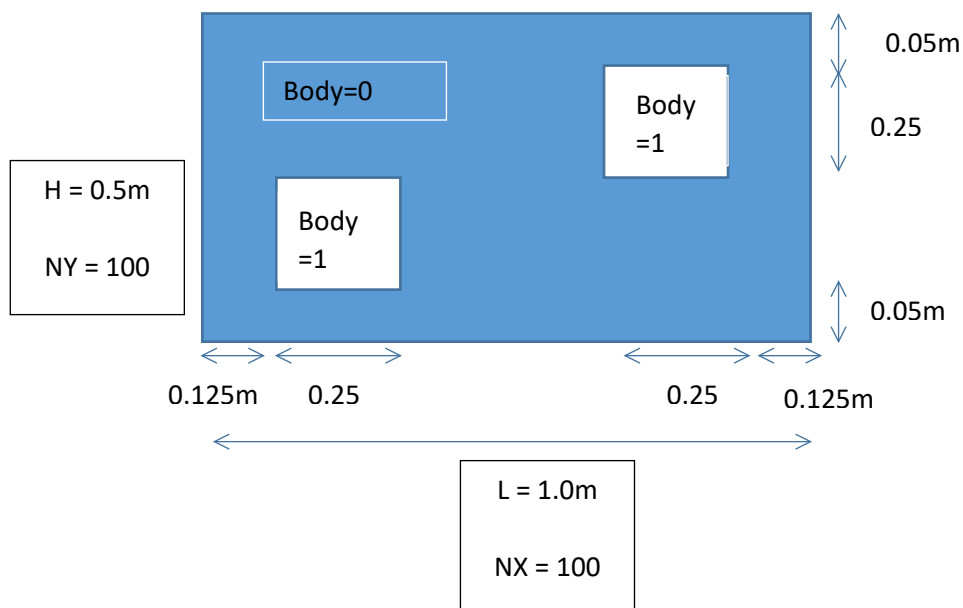
Where there are two square holes in your plate, located 0.125m away from the nearest edges of the plate (in x) and 0.05m (in y).

Our goal is to find the steady state temperature distribution through this plate when different parts of the plate have different values for thermal conductivity. We will complete this computation in the weeks to come.

For today:

- Update your save routine to include the x, y location of each cell. Don't forget – DX (the cell width in X) is not the same as DY (the cell width in Y).
- Once h_Body is defined using the figure above, copy the values to the GPU (to d_Body).
- Copy the initial values of h_T (temperature on the CPU) to d_T (temperature on the GPU).
- Copy the values of d_T to d_Tnew on the GPU.
- On the CPU, set the values of h_T to be all 0.
- Copy the values of d_Tnew to h_T on the CPU,
- Save the values of h_T to file (results.txt) which contain:
    - A column for x location,
    - A column for y location,
    - A column for the body variable (h_Body),
    - A column for temperature.

    Please **do not** put headers at the top of this file for each column.

- Using Excel, MATLAB or Matplotlib, create a 2D graph showing the body variable vs x and y.

    (Use a contour or surface plot)

Part 3

Follow these instructions so I can check your progress:

- Create a new folder called Tutorial_7 in your home directory.
    - I.e. mkdir ~/Tutorial_7
- Copy your makefile and cuda code(s) into this folder.
- Run make and then run your file.

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When you are sure this is complete, come and find me at the front of the class. I will:

- Log into your folder,
- Make and run your Tutorial_7 codes.