

**ME759**  
**High Performance Computing for Engineering Applications**

In this problem, you will have to produce a version V5 and a version V6 of the 1D Stencil code that we discussed in class. To this end, start with the **testV4.cu** version provided in HW directory.

**testV5.cu:** Use shared memory to speed up your execution.

**testV6.cu:** Builds on top of V5 and reduces the run time by considering pinned host memory transactions.

What you will have to deliver:

- a) Run a scaling analysis using  $N=10^3, 10^4, 10^5, \dots, 10^8$  elements and generate a **png** plot that shows GPU-V5 performance against CPU performance. Upload this plot onto the Forum.
- b) The same as above, but shows GPU-V6 performance against CPU performance
- c) Generate a png plot that shows the GPU-V5 performance against GPU-V6 performance.
- d) What change has had more impact? Why is that the case?

**Grading.**

Your submission will be graded as follows:

*i)* Functionality: 40%

- Program runs on Euler, producing correct results.

*ii)* Report: 60%

- You provide correct results for a) through d) above.