CIS 410/510: Project #4
Due Jan 31st, 2022 (which means submitted by 6am on February 1st, 2022)
Worth 7% of your grade

Scoring rubric:
- All steps completed correctly: 7 points
- All steps except for Step 5 completed correctly: 4.5 points

(In other words, you can skip doing RK4, but you will only get 4.5/7)

Assignment:
1) Download skeleton file proj4.cxx and data file proj4_data.vtk and put them in a new directory.
2) Re-use your CMakeLists.txt from the last project.
3) Compile the program and run the program. It will generate incorrect output.
4) You will need to implement two functions to make it generate the correct output (search for "IMPLEMENT ME")
   a. You should evaluate them in the following order:
      i. EvaluateVectorFieldAtLocation
         1. Note that the first print statements test this routine. (You can be testing this one before proceeding.)
      ii. AdvectWithEulerStep
5) Repeat Step 4 but implement an RK4 solver. There is no skeleton for this function, so you will need to start from scratch for this function.
6) The correct outputs are listed on the class website.
   a. If you are submitting an incorrect submission, please reference this as a comment at the top of your code.
   b. Please keep in mind that incorrect answers are likely to receive <50%. I would rather have a correct answer late than an incorrect answer on time.
   c. There is a possibility for floating-point error, but I do not think it will be greater than 0.0001. Please start early on the project. If you are encountering problems on the night of the deadline, then you will need to use a late pass to sort out any issues that you encounter.

Note: we have discussed vector fields that change over time. This is called "unsteady state" flow and is what occurs in the real world. We also discussed the notion of "steady state" flow … vector fields that don't change over time. For this assignment, we will use steady state flow. From the implementation perspective, it means you can drop the time component when doing velocity interpolation.