CIS 410/510: Project #3
Due October 17th, 2015
(which means submitted by 6am on October 18th, 2015)
Worth 6% of your grade

Please read steps (4) and (5) closely ... they are dense and have a lot of instructions. If you miss part of their meaning, you will likely get the wrong answer.
Assignment:

1) Download skeleton file proj3.cxx and file data_proj3.vtk and put them in a new directory.
   a. proj3.cxx has an empty implementation for EvaluateFieldAtLocation ... copy your implementation from proj2.
2) Re-use your CMakeLists.txt from the last project ... copy it to the new directory and reXname as appropriate to reflect proj3.
3) Run cmake, compile the program and run the program. It will generate incorrect output. It generates three outputs ... “bluehot.png”, “difference.png”, and “hsv.png”. If you open them, they will be all black.
4) Look for the comment with “ITERATE OVER PIXELS”. You need to implement code here. Your code should map the physical space X=-9→9, Y=-9→9 to an image of size nx by ny. Specifically, map i==0, j==0 to X=-9, Y=-9 and i==nx-1, j==ny-1 to X=+9, Y=+9. Each of the nx times ny pixels will get mapped to a two-dimensional location. Once you know that two-dimensional location, interpolate the field to that location. Once you have done that, the pre-existing code (“I TAKE OVER HERE”) will call a function to map the field value to a scalar.
5) Implement the following functions (all functions defined in function header in the source code):
   a. ApplyBlueHotColorMap
   b. ApplyDifferenceColorMap
   c. ApplyHSVColorMap
      Note that the scalar field has a minimum value of 1.2 and a maximum value of 5.02. You should take this into account when you do your color mapping. For example, field values of 3.11 (= 50% of the way between 1.2 and 5.02) should be mapped to the middle of the color map.
6) Upload your source code and the three images to Canvas when it is working. Make sure to cross-reference with the correct images posted on the website. (I expect the images to be correct, and will dock heavily for incorrect pictures.)