CS318 Assignment 5 – due Thursday April 25th at 11:59 PM.

Outline: in this assignment you will extend your work from assignment 4 to handle 4D images (functional MRI) as well as the 3D structural images you worked with in assignment 4. I have provided a video on moodle showing the expected result, please review it before starting the assignment. if you did not complete assignment 4, you must do so now.

Detailed specs:

1. **Load 4d images (separate thread)**
   a. Your program should load 4d nifti images (you can use the same code you used in assignment 4, it should work if you implemented the nifti format loader correctly). The difference between a 4d and a 3d image is 4d images are comprised of multiple 3d volumes (a 4d image is a time series of 3d volumes, see the explanation video for more details). Because the 4d image takes some time to load, it should be done on a separate thread (as with assignment 4).

2. **Three anatomical views with slice scrolling capability (main thread)**
   a. Once the 4d image has loaded on the separate thread, display the 0th volume (which is a 3d image) from the time series in three separate windows corresponding to coronal, sagittal, and axial anatomical views. Each view should have some type of slider or arrow icons to manipulate the current slice, so the user can scroll through the slices. This can take place on the main thread. Optionally, you can also give the user the ability to click somewhere in one of the 3 windows which will change the slices index in the other two windows (for example if they click in the middle of the brain in the sagittal slice window, this will change the index of both the axial and coronal slice windows, see video).

3. **Time series scrolling capability (main thread)**
   a. If the currently loaded image is 4d, give the user the option to select a button called 'graph' which will display the time series for the currently selected voxel in a separate window. The currently selected voxel is determined by the slice index that the user has selected by navigating through the coronal, sagittal, and axial anatomical views (see video for more details). The time series window must also support scrolling functionality. Scrolling through the time series will change the currently selected volume from the 0th volume (displayed by default when the image loads) to whichever volume has been scrolled to (see video for example of how this works).

Extra marks will be given for proper use of object oriented programming and inheritance (for example, the three anatomical windows should all be objects of the same class, and the time series window can extend the anatomical window class.