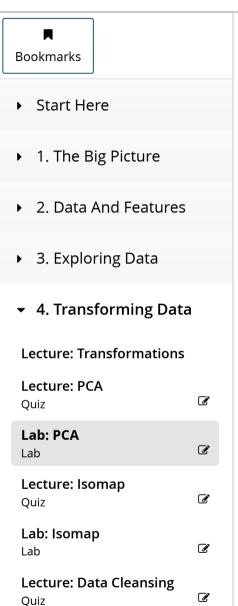**edX** | **Microsoft:** DAT210x Programming with Python for Data Science

Help

4. Transforming Data > Lab: PCA > Assignment 1

Assignment 1

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Lab Assignment 1

In this assignment, you're going to experiment with a real life armadillo sculpture scanned using a Cyberware 3030 MS 3D scanner at Stanford University. The sculpture is available as part of their 3D Scanning Repository, and is a *very dense* 3D mesh consisting of 172974 vertices! The mesh is available for you, located at /Module4/Datasets/**stanford_armadillo.ply**. It is *not* a Python file, so don't attempt to load it with a text editor!

Open up the Module4/**assignment1.py** starter code and read through it carefully. You will notice the use of a new library, Plyfile. This library loads up the 3D binary mesh for you. The mesh is further converted into a Pandas dataframe for your ease of manipulation. Complete the following tasks:

1. Before changing any of the code, go ahead and execute assignment1.py. You should see the 3D armadillo. Your goal is to reduce its dimensionality from three to two using PCA to cast a shadow of the data onto its two most important principal components. Then render the resulting 2D scatter plot.

2. Fill out the proper code in the do_PCA() and do_RandomizedPCA() methods. Be sure to **return** the result of your transformation! You may even want to read the SciKit-Learn documentation on `.transform()`, just for future reference so you know what data type comes out of it.

3. Re-run the application! Then, answer the questions below:

Lab Question 1

1 point possible (graded)
The first time you see the armadillo in 3D, what direction was its face pointing towards?

○ Left, Towards the negative X-Axis

○ Up, Towards the positive Z-Axis

○ Right, Towards the positive X-Axis

○ Down, Towards the negative Z-Axis

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Lab Question 2

2 points possible (graded)

Were you able to discern any **visual** differences between the transformed PCA results and the transformed RandomizedPCA results?

○ Yes, the RandomizedPCA version was no longer even recognizable as an armadillo

○ Yes, the RandomizedPCA version was a lot less true to the original than the regular PCA version

○ Yes, but it wasn't a lot... just minor differences

○ No, they pretty much looked the same to me

Which executed faster, RandomizedPCA or PCA?

○ PCA

○ RandomizedPCA

| Submit | You have used 0 of 2 attempts |

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