

AFNI Jazzercise Hints

Below are some hints that should help you answer the AFNI Jazzercise Questions.

1. See examples of input sub-brick selection in **3dbucket -help**, and consider the **-**prefix option.
2. Use program **3dMean**. Check out the **3dMean -help** menu for further assistance.
3. The **-help** menus for **3dAutomask** and **3dSkullStrip** will help you type the correct commands. The best way to view the 2 output files simultaneously is to open two separate AFNI viewers.
4. Creating and Playing with ROI Masks:
 - a. Use **3dinfo** (or the AFNI GUI) to find out that sub-bricks 2 and 4 have the desired t-statistic values we need to answer this question. In **3dcalc**, use the **'ispositive'** or **'step'** function to create a mask for values where $(a-4.2) > 0$, say. Multiply those mask values by the same expression for dataset 'b'.
 - b. Note that $3 = 1 + 2$. Add mask 'a' plus two times mask 'b'.
 - c. In AFNI, set **VA_mask_4+orig** as the overlay. Display only 4 positive color ranges.
 - d. Use **VA_mask+orig** as the mask, and apply the **-quiet** option. Redirect the output to **VA_mean.1D**.
5. Fun with 1D files:
 - a. First, run the AFNI program **count** to create 3 rows of these numbers. Second, run the AFNI program **1dtranspose** to convert each of these 3 rows to a column. Alternatively, there is an option to do this only using **count**.
 - b. Now combine the 3 columns into one column with the AFNI program **1dcat**.
 - c. See **1dcat -help** for assistance in combining separate 1D files into one big 1D file.
 - d. Do arithmetic on the 1D files with AFNI program **1deval**. See **1deval -help** for further assistance. Note **3dTstat** can do this particular exercise too with a simpler command line. It is sometimes useful to have "3d" programs operate on "1d" files.
6. Fun with the AFNI GUI
 - a. If you right-click on the gray-scale bar of any viewing plane (e.g., sagittal), you will find a hidden pop-up menu with several options. One of those options can be used to answer this question.
 - b. All of the answers can be found in the Define OverLay control panel in the AFNI GUI. Hunt around for hidden popup menus by left-clicking in the color bar. Also place your cursor over the color bar panels to see what appears.
 - c. The answer can be found in one of the buttons located at the bottom of the sagittal viewing plane (e.g., Disp, Sav1.ppm, Mont, etc...)
 - d. Remember what we learned in the Talairach hands-on? Right-click in an image window.

- e. The answer can be found in one of the buttons located at the bottom of the sagittal viewing plane (e.g., Disp, Sav1.ppm, Mont, etc...)
 - f. Right- and Left-click anywhere you can in the afni GUI in search of this hidden Mission Statement. There is one particularly large open space.
7. Doing Calculations in AFNI:
- a. Use **3dinfo** to find information about a dataset.
 - b. **ccalc** is a simple calculator program in AFNI
 - c. **1deval** is a simple 1D file calculator program; **1dplot** is a simple graphing program
8. Aligning data:
The default is to align “anat2epi”. The @AddEdge script is called by the –AddEdge option. Remember the @AddEdge script needs to be used to drive AFNI.
9. Image Filtering:
- a. The AFNI program **3dmerge** can be used for a variety of tasks, including smoothing. For this question, the Gaussian filter may be a good choice. The program 3dBlurInMask can also be used.
 - b. The AFNI program **3dLocalstat** looks in “neighborhoods” around each voxel. To get it to use voxels units for the neighborhood instead of mm, use a negative number.
 - c. The AFNI program **3danisosmooth** sharpens edges and smoothes images. It usually shows 10 iterations (default), but that may be too much for this example. Use the **–viewer** option to pick something lower and try it again with the new option.
10. Random Exercises with AFNI Datasets:
- a. First, use **3dinfo** to determine the xyz-orientation of the dataset. Then run **3dresample** or **3daxialize** to re-orient the dataset.
 - b. Use **3dbucket** or **3dcalc** to create 2 separate datasets from **func_slim+orig**. Remember that in AFNI, sub-bricks begin at 0, not 1.
 - c. Program **3dbucket** can also be used to combine datasets together.
 - d. The AFNI program **adwarp** can be used to transfer the Talairach transformation of an anatomical dataset to a “follower” dataset like **func_slim+orig**. Pay special attention to the **–dxyz** option available in **adwarp** (see **adwarp –help**).
 - e. Find the maximum voxels with **3dmaxima** and use **whereami** to find the atlas position of the maximum voxel.
 - f. Use program **3dZcutup**. This program cuts up volumes in the z-direction. Check out the **3dZcutup –help** menu for further assistance.
11. Volume Rendering:
- a. Find the Volume Renderer in the Datamode, Plugins menu. (It’s the “new” renderer).
 - b. You will need to create the func_slim+tlrc dataset if you didn’t do this in question 10d (easiest from the Datamode menu).

- c. If you didn't get the location from the 10e exercise, use the Interactive clusterize feature to find maxima, or just eyeball it and then right-click to show atlas regions. You will need to turn on show TT regions in both the overlay and the render overlay regions to see them in both viewers. Right-clicking on the image window accesses both Where Am I and Show Atlas Colors menus.

12. Simple statistics:

- a. Info is available in the GUI and from the command line with 3dinfo.
- b. Same as a, but ranges are also available in the Overlay panel
- c. The threshold slider is easiest, but the **cdf** and **fdrval** programs can be used on the command line and in scripts.
- d. Same as a.