Signal analysis and Matlab Assignment 8
Jorre Vedder
S4379101

For all code for this assignment see the code appendix (Assignment8.m, generateDesignMatrix.m, generateDesignMatrix2.m, computeBetaYhatResiduals.m, applyContrast.m and analysefMRIData.m).

9.1
See code appendix (Assignment8.m).

9.2
A,B,C see the code appendix (Assignment8.m).

D
Just looking at all the center coordinates you can see some fluctuations in the fMRI data but no structural patterns seem to emerge.

9.3
A See the code appendix (Assignment8.m, computeBetaYhatResiduals.m and applyContrast.m).

B
For Stat - Fix see fig1.
For Natt - Stat see fig2.
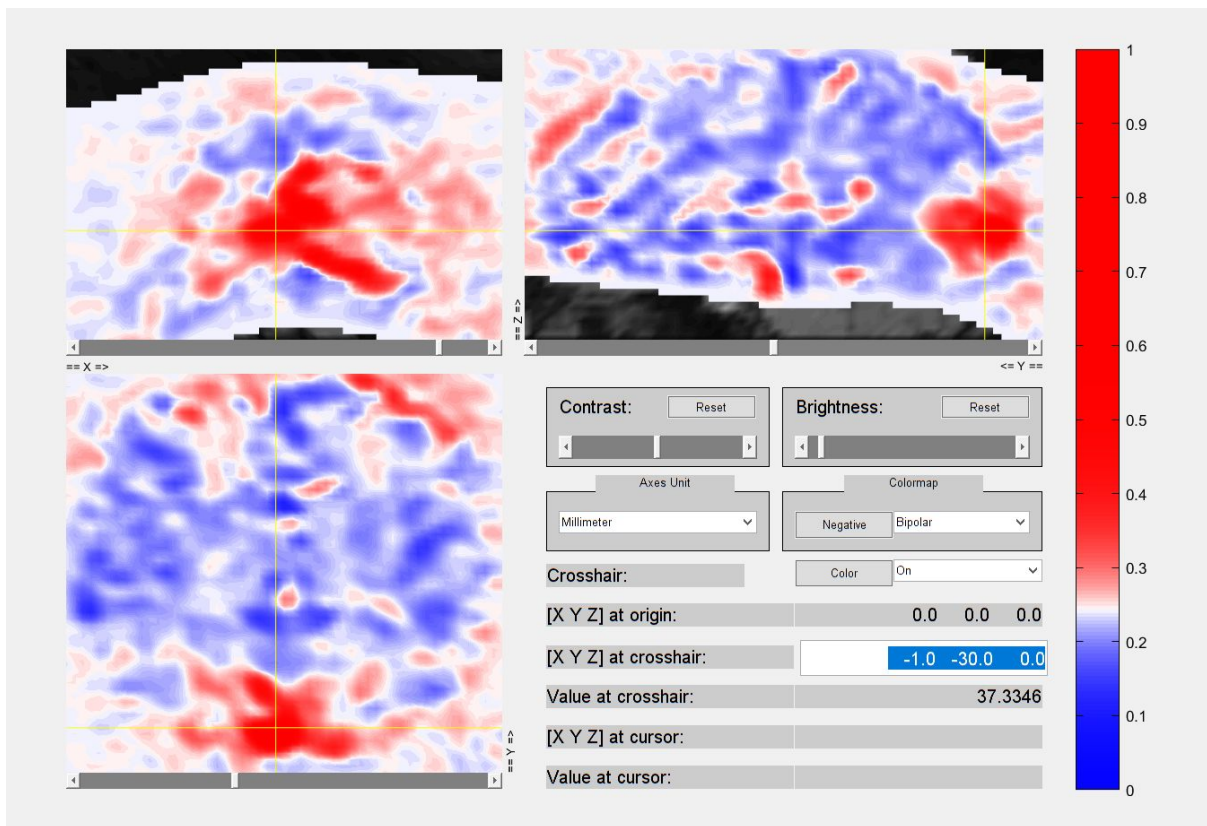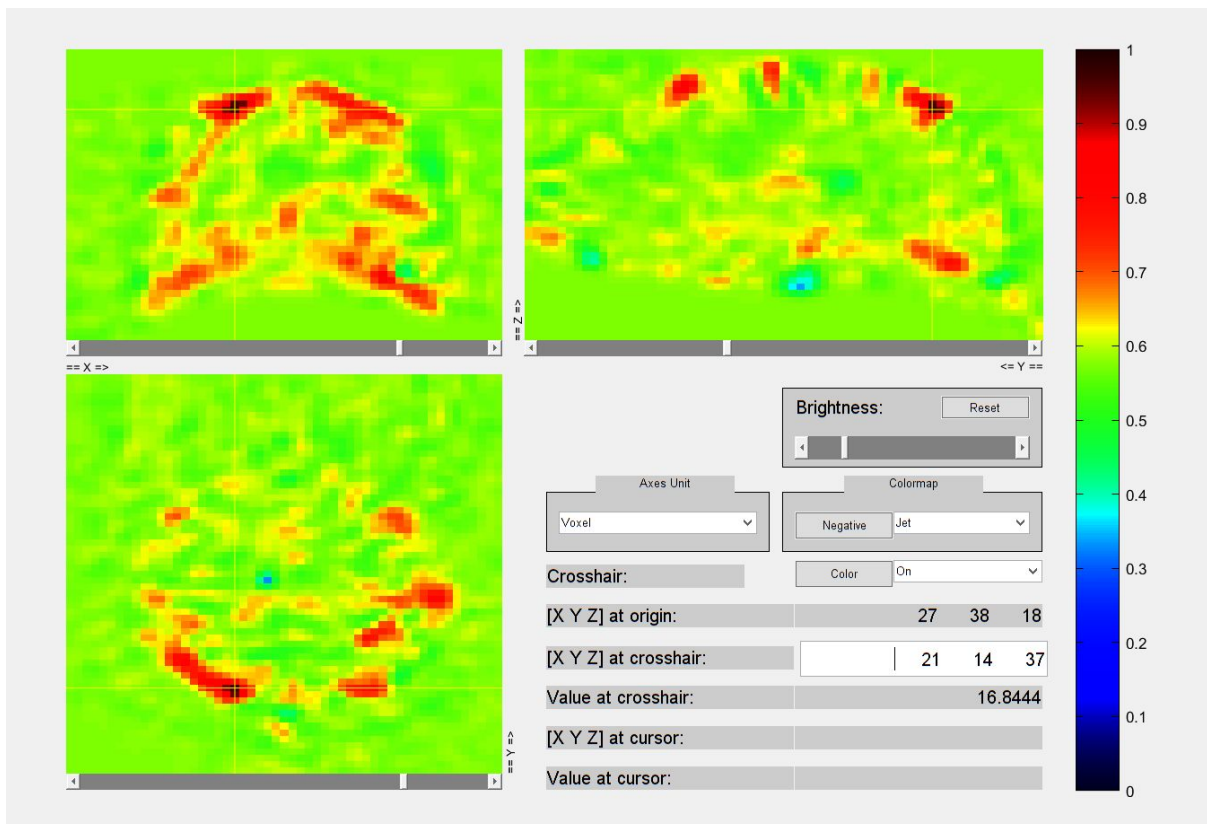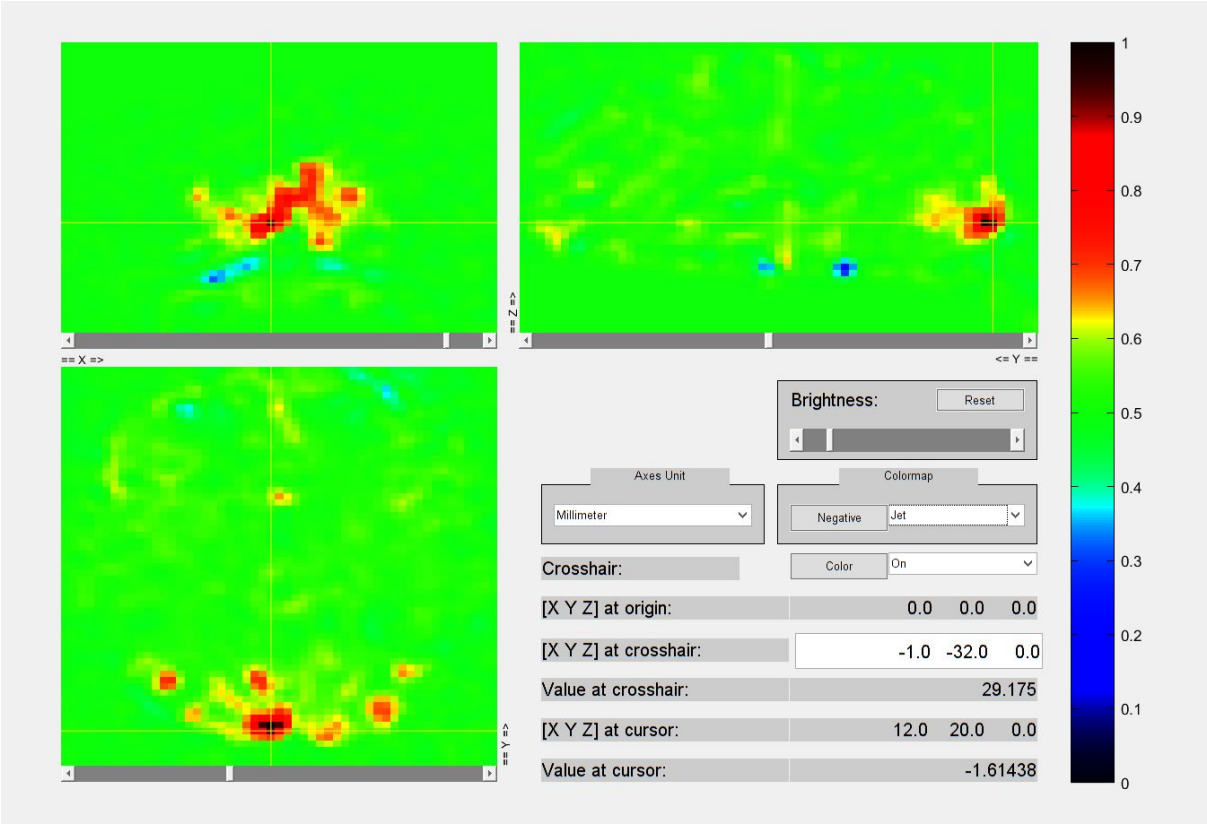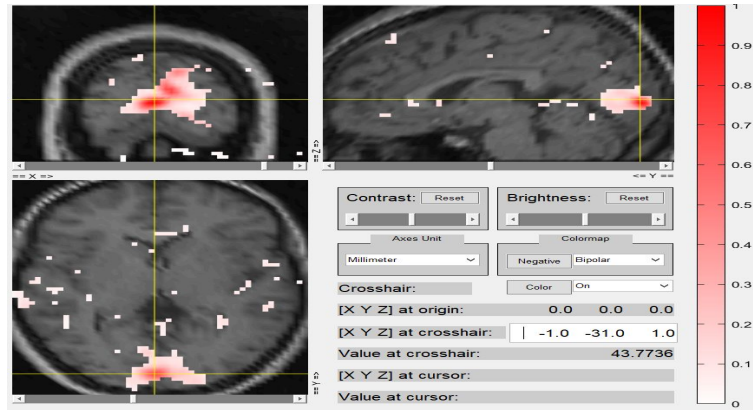For Att - Natt see fig3.

Fig1

Fig2

Fig3:

9.4

A See the code appendix (Assignment8.m and applyContrast.m).

B

Offsets in mm for most active voxels:

fix - stat

-1	-31	1
0	-31	1
-1	-30	1
0	-30	1
1	-30	1
0	-30	2
3	-30	4
3	-29	4
4	-29	4
3	-30	5

Stat - natt (the first two values seem to be defunct here)

1	-13	-6
2	-13	-6
0	-31	1
-1	-30	1
0	-30	1
1	-30	1
0	-30	2
1	-30	2
3	-29	4
4	-29	4
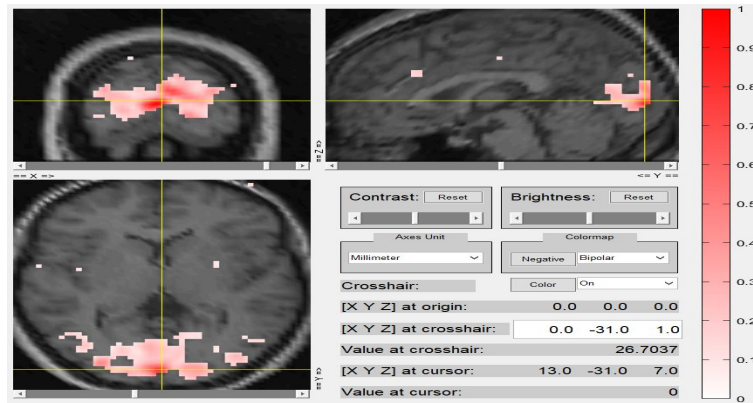
Natt - att

12	18	-4
11	19	-4
12	19	-4
15	19	-4
12	19	-3
13	19	-3
14	19	-3
15	19	-3
11	20	-3
12	20	-3
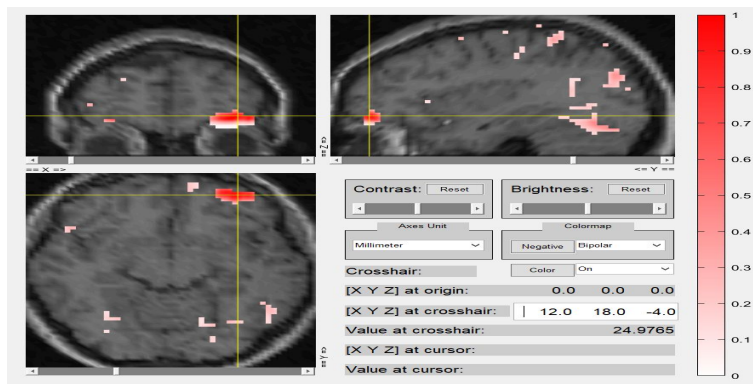
9.5

See the code appendix (analysefMRIData.m).

I've made some additions to what was required for the assignment, the function accepts a filename leading to fMRI data stored in the following format:

"ana" , a clear anatomical structural scan with x,y,z,1 as dimensions.

"hrf", the(Haemodynamic Response Function).

"Y" the bolt response of the actual scan with x,y,z,nr_scans.

At least two (can be as many as you like) stimuli activation vectors containing the scan nrs during which the given stimuli was active. The vector names will be used for output.

The function will then calculate the contrast between all stimuli and store this in a matrix C a legend to this matrix will be stored in CTags while the top 10 most active voxels in each contrast will be stored in CAct.

Design Matrix

Here included a design matrix for this assignment since it is very unclear in the published version of the code.