Things to think about

**approximately 8000** and no longer than 8800 words including references and table/figure captions   
**excluding any Appendices**.

**Uploaded to Canvas, by 27 Mar by 17:00**

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| Title page: Remember to include your name and your student ID number  Abstract: A concise description of the project and its main results (a few hundred words).  Statement of word length: (mandatory, but invariably an estimate)  If you use LaTeX, try using texcount - built into many systems, or see http://app.uio.no/ifi/texcount/  If you use Word (...), you get word count directly (what it means is less clear).  You can always convert from PDF to .rtf and use Word/LibreOffice to count words.  There are also many online sites that invite you to upload your content as PDF for a word count.  Contents page  Background to the project: Motivation and previous relevant work.  Methods: Make clear what you have developed yourself, what was previously available and what was done by others. Your report should include a description of apparatus designed, built or used and, for theoretical projects, techniques learnt or used.  Results Do not make this a mindless "data dump". If you have a large amount similar data, be selective in what you present. Use graphs where possible. All results presented should be properly discussed. Consider using an Appendix to include additional information for completeness.  Interpretation: It is essential that this receives plenty of attention. Weak interpretation is the most common deficiency in project reports. Give yourself plenty of time to interpret your results and to make the interpretation clear in your report. Do not rely on taking results at the last minute.  Conclusions: What are your main scientific conclusions about what you have done, and what is the outlook? Do not simply judge the project as 'successful' or not. The outlook could include a discussion of the limitations of your work and how they could be overcome, or a description of the next logical steps.  References: All papers, text books, other people’s work and online material must be properly referenced. This includes 'borrowed' images!  Appendices: These are useful to include additional information for completeness, but you should not assume that material in an Appendix will be read. Therefore, do not use this as a way to subvert the word count limit. |

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| Hin sent an image before to me that was of the locations of the stars used for the HBM but where they are on different diagrams compared to the grid data the neural net being used to run the HBM, which I think is good for showing the stars sampled in the HBM are within the grid so that we can be confident that the neural network does a good job approximating them  This was the graph:    first is HR, second is x:Teff, y:delnu, third is x:delnu, y:luminosity |
| Cell 8 is cool at visualizing MCMC  <https://github.com/markdregan/Bayesian-Modelling-in-Python/blob/master/Section%201.%20Estimating%20model%20parameters.ipynb?fbclid=IwAR1xEF1u_PApkX8fs0XN5Krl8c-tr-HjN1C2o_zNFSMqpSgZkUpDJig0SeM> |
| In our report we should talk about:  correlations between parameters shown in the corner plots from the HBMs.  The grid of stellar models we’ve used is just one set of physics, which is okay on the scale of the year 4 project. |
| Use HBM that uses simulated data in the write up |
| With the cluster members extracted from GAIA using SIMBAD, we ensured whether they were in the main sequence by classifying them using the same “cut” used to separate the subgiant and RGB in the grid data i.e. using the star’s Teff and Luminosity we can see where it falls on the HR diagram and determine whether if falls on the RGB on subgaint side of the “cut”. |
| Where we got all the cluster memberships  <https://www.aanda.org/articles/aa/abs/2018/10/aa33476-18/aa33476-18.html>  <http://cdsarc.u-strasbg.fr/viz-bin/qcat?J/A+A/618/A93> = for the actual data location |
| APOGEE TEFFs = <https://www.sdss.org/dr12/irspec/spectro_data/>  From: allStar-RESULTS\_VERS.fits |
| Using GAIA DR2 parallaxes to calculate distances (using Bayesian methods)  Whose data we used  <https://www.aanda.org/articles/aa/pdf/2018/08/aa32964-18.pdf> |
| Mention that we ignored “reddening” when handling extinction  And I think “zero-points” which we are also ignoring I think |
| Solar bolometric correction = 4.75  <https://ui.adsabs.harvard.edu/abs/1999Obs...119..289A/abstract>  which I found in: <https://www.aanda.org/articles/aa/full_html/2010/15/aa15441-10/aa15441-10.html>  which is also quote in: <https://academic-oup-com.ezproxye.bham.ac.uk/mnras/article/475/4/5023/4816746> |
| Dust maps for extinction: includes data citation  <https://dataverse.harvard.edu/file.xhtml?persistentId=doi:10.7910/DVN/LCYHJG/HEYCGO&version=2.0> |
| We need to mention that we removed some stars for being anomalous from the data and the other for being binaries and blue stragglers whose temperatures have been effected. |
| Bolometric correction estimation  <http://www.mpia.de/~calj/gdr2_apsis.pdf> |
| Think about whether our distance moduli lies within the reliable range given by green |
| GAIA G-band R(λeff) = 2.294 = GAIA\_g\_band\_extinction\_coeff  Which we combine with green’s dustmaps for extinction calculations form redenning  By calculating our distance moduli, and doing a linear interpolation between the distance moduli in the dustmap, to give a redenning which we then multiply by this GAIA G-band extinction coefficient to get the extinction  Paper with GAIA G-band extinction coefficient = <https://arxiv.org/pdf/1806.02324.pdf>  Green et al 2019: <https://iopscience-iop-org.ezproxye.bham.ac.uk/article/10.3847/1538-4357/ab5362/pdf>  This map covers the sky north of a decl. of −30°, out to a distance of a few  kiloparsecs. MEANING WE SHOULD BE COVERED.  Green dustmap query tool = <http://argonaut.skymaps.info/query> |
| Graphical comparison of our calculated luminosities to GAIA luminosities for M67 |
| We assume the error on the extinction is 0 |
| There is a non-zero probability of stars not being in the open cluster, which we have selected and as a result inference on these stars might be dubious. |
| Do we want to say we looked up NGC1817 but all of their stars were about the neural net trained region? |
| A big issue is that the step size of Fe/H is not fine enough for the neural net to approximate what happens in the middle |

What would we need to say in the final report about how we got the grid data?