Second term assessment – to be set on the 11th March

Choose one of the following projects. Datasets are provided on ultra. You should return a 1000 word report on your approach and results, providing suitable figures and data visualisation. You may use any coding language or software you prefer but your code should be supplied in an executable format. The hand in date is as posted on learn ultra.

i)   Using the daily temperature record from the Durham observatory (for the period 1900 to end of 2019) predict the daily temperature for 2020. You may use any technique you prefer.

ii)   You have been supplied approx.. 50 days of MODIS satellite data. The MODIS data records daytime land surface temperature (LST) every day at 10am for every $1km^2$ of the Earth's surface: you are provided for the tile that covers Great Britain. Using spatial statistics estimate how many and what spacing should weather stations be placed across the UK. You have also been provide with a 1 km2 digital elevation model (DEM) of the UK.

iii)   The crustal structure under Iceland is complex. In some locations, there are three distinct layers within the crust, but in other places there are only two. You are provided with a datafile containing (x,y,z)-locations where an interface between two layers has been observed. Use this data to construct a model for the crustal layers. Where is the boundary/transition between two and three layers? Your report should include North-South and East-West cross-sections that highlight the key features of your model.

iv)   Perform a spatial analysis of worldwide mineral deposits to investigate their relationship to lithology, active faults and sedimentary basins (use data from the ArGIS Living Atlas).

v)   The origin of placental mammals has been linked to the extinction of dinosaurs 66 million years ago. Use a molecular clock to evaluate whether this timing is plausible. Demonstrate the extent to which your results are influenced by prior assumptions.

Marking criteria
The project will be marked 50% on the code and 50% on the written report. The code will be assessed on:
  i)   Effectiveness on the task, eg.how well it fits or predicts the data (25% marks)
  ii)   Efficiency on the task (25% marks)

The report should cover:
  i)   Why you chose the approach that you did? (20% marks)
  ii)   What are the limitations of your approach? (20% marks)
  iii)   What could you do differently with more time and resources? (10%marks)