PROJECT SPECIFICATIONS

The goal of this assignment is to assess your understanding of the use of the shell and open source tools to effectively report on and visualise data large datasets. You will be assessed on the clarity and quality of your shellscript(s) to examine and report on the data. While the efficiency of your shellscript will not be assessed, you should take care to avoid any excessive slow practices.

You are welcome to undertake the project on your home or laptop computers. Please note, however, that all materials submitted for marking must be working on a Linux computer by the due date.

Task 3:

1. Perth's Public Transport Authority (PTA) provides public access to its scheduled times, stop locations, and route information from its webpage www.transperth.wa.gov.au/About/Spatial-Data-Access. You may download your own copy of the data (about 90MB when uncompressed) by clicking on the first link "By downloading the data you are agreeing to the terms of the License…"

    - The data is released as a collection of inter-related textfiles following the Google Transit Feed Specification (GTFS), which is also used by many other public transport companies, worldwide.
    - Perth has a very good suburban train service. Unfortunately it is not very extensive and, if you need to a reach a destination via train, you often need to first catch a bus (or walk) to a train station. Perth also has a very attractive tourist destination, Rottnest Island. Unfortunately you cannot reach Rottnest Island by train, but you can travel to the last station on the Fremantle Train Line (Stop No: 99352), which is right next to the Rottnest Island B-shed ferry terminal! Perfect.
    - So, if you have an urge to visit Rottnest Island, and you live less than a kilometre or twenty minutes walkfrom a train station, you will walk from your current location to the nearest train station, and catch a train toward the ferry terminal. If you're not close to the Fremantle Train Line, you may first need to catch another train to Perth Station (Stop No: 99007) or Perth Underground Station (Stop number 99601) and then catch a Fremantle Line train from Perth Station.
    - This task asks you to write a shellscript accepting two command-line arguments representing the latitude and longitude of your current location. Using the Google

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Transit Feed Specification (GTFS) data, your shellscript should first determine if your location is within one kilometre of a train station, and then determine the sequence of times and train stations required to get you to the ferry terminal. You're ready to leave at the time you run the shellscript!

- The output of the shellscript will be an HTML (text) webpage, reporting whether your impulsive dash to Rottnest is possible, and the instructions/directions to get you there. Buses given you motion-sickness, so you can only travel by a combination of walking and train.
- Be warned that the last ferry to Rottnest Island leaves at 15:30pm, so you'll need to ensure that you can catch it!
- Embed a Google Map into your webpage, showing the locations and times of your starting location, and the train stations where you get on and off any trains.
- To calculate the distance, in metres, between a pair of latitude/longitude coordinates, you'll need to employ the haversine formula [Wikipedia].
- You may wish to perform the calculation by invoking a single program or, if using AWK, by calling an AWK function. Here's the code for each:
- haversine.c (which will require compiling - see comments in file), and haversine.awk (which should be embedded in a larger AWK script).