1. Write a program to solve the following problem. You are in charge of n chain stores spread across the world. Because of economic problems in your company, you need to cut costs. You have been asked to work out which stores can share some resources such as couriers. You decide to find the two best candidates for merging by choosing the closest pair of stores.

   Assume that your program is given n and the location of each store in terms of latitude and longitude. Report the closest pair of stores (in alphabetical order) and the distance between them to the nearest 0.1km.

   Note: computing the exact distance between two points on the surface of the Earth is a difficult problem. For the purposes of this assignment, you must use the approximate method presented here:

   https://www.movable-type.co.uk/scripts/latlong.html.

   See the sample input and output for more details.

Dates and Marks

This assignment is worth 5% of your course grade. You should submit, via the automarker at `www.cs.auckland.ac.nz/automated-marker`, the following:

- A source file for each instance of each problem.

Questions involving programming

- Java, Python, C, C++ or C# may be used (other languages may be available).

- Your answer to each question should be a single file (containing all nonstandard classes you use). You can assume that input will come from standard input in a stream that represents one string per line, and may include several input instances one after the other. Output should be sent to standard out. You may assume that the markers have access to all standard libraries.

- A sample input and output file for each question will be available. The markers may check the output with a text comparison program, so it must be in EXACTLY the right format. Pay attention to line breaks and beware of nonstandard software such as anything made by Microsoft. For best results, use a Linux/Unix environment (the automarker does).

- The automated feedback and submission system ("automarker") is available. You must submit your answer via this system. You may take account of the feedback given by the automarker, and resubmit before the deadline without penalty. There is a limit of 10 submissions per person for each question. Of course, you should thoroughly test your own code before submitting — the automarker is not a debugger. You are allowed to share test input and output files with the class.

- Your program(s) may be tested on randomly generated input files, some of which may be very large. Marks will be allocated for correctness and speed of the programs. Simply "passing" the largest input on the automarker may not always guarantee maximum marks, because there may be hidden test cases, but it will guarantee full marks for correctness. If full marks for correctness are not obtained, then the marks for speed may automatically be set to zero. Thus it is very important to first ensure your algorithm and implementation are correct, and then work on algorithmic efficiency in order to get maximum marks.

- No marks will be awarded for comments, but you must at least include comments with the name of the author, UPI, and the purpose of the code. Marks may be subtracted for unusually poor coding style.