Flight Paths

A new airline wants to connect all the UK's cities to one-another. To reduce costs, the airline would like to have as few flight paths as possible. Flight paths can only go between two cities. Two cities do not need to be connected by a direct flight (e. g. it is ok to fly from Edinburgh to Birmingham via London).

Here is a map of the UK, with dots representing major cities. **Can you help the airline to design a map of flight paths?**

HINT: You can draw a flight path as a line between two dots: try connecting all the dots on the map using as few joining lines as possible. (To make your map easier to read, it is better if you draw it in a way that no two flight paths cross).

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After you are done, try to answer the following questions

1. How many cities are there on this map? (Can you name them?)
2. What is the fewest number of lines it takes to join all the dots? (Does this relate to the first question?)
3. On your map, can you ever take a journey in a loop? Why?/Why not?
4. Do you think there is only one way to draw a map that fulfils what the flight company wants?
5. Try adding another town to the map. What is your answer to the first two questions now?
6. Add one more town and answer the first two questions again. Can you spot a pattern?