Networks (worksheet 1)

Definitions

### Draw either a graph with the given specification or explain why no such graph exists:

1. Graph with nine verticesand nine edges
2. **G**raphwith four vertices, seven edges. What is special about this graph?

### Is there anything you can say about the sum of all degrees in a graph? (Hint: give the result in terms of the number of edges)

Networks (worksheet 2)

Adjacency matrices, complete graphs, cycles

1. **Is there anything you can say about the adjacency matrix of a complete graph?**
2. **How many edges does a complete graph with “n” vertices have? Can you prove it? (Hint: induction!)**
3. **If a Hamiltonian cycle is a cycle that contains all vertices in a graph… do all graphs have a Hamiltonian cycles?**

Networks (worksheet 3)

Connectedness and depth first search

1. **Why do we need an algorithm for connectedness when you can tell straight away by looking at the graph?**
2. **Run depth-first search on this graph and provide the final list of vertices (assuming that neighbours are looked at in alphabetical order).**

A

B

D

F

C

E