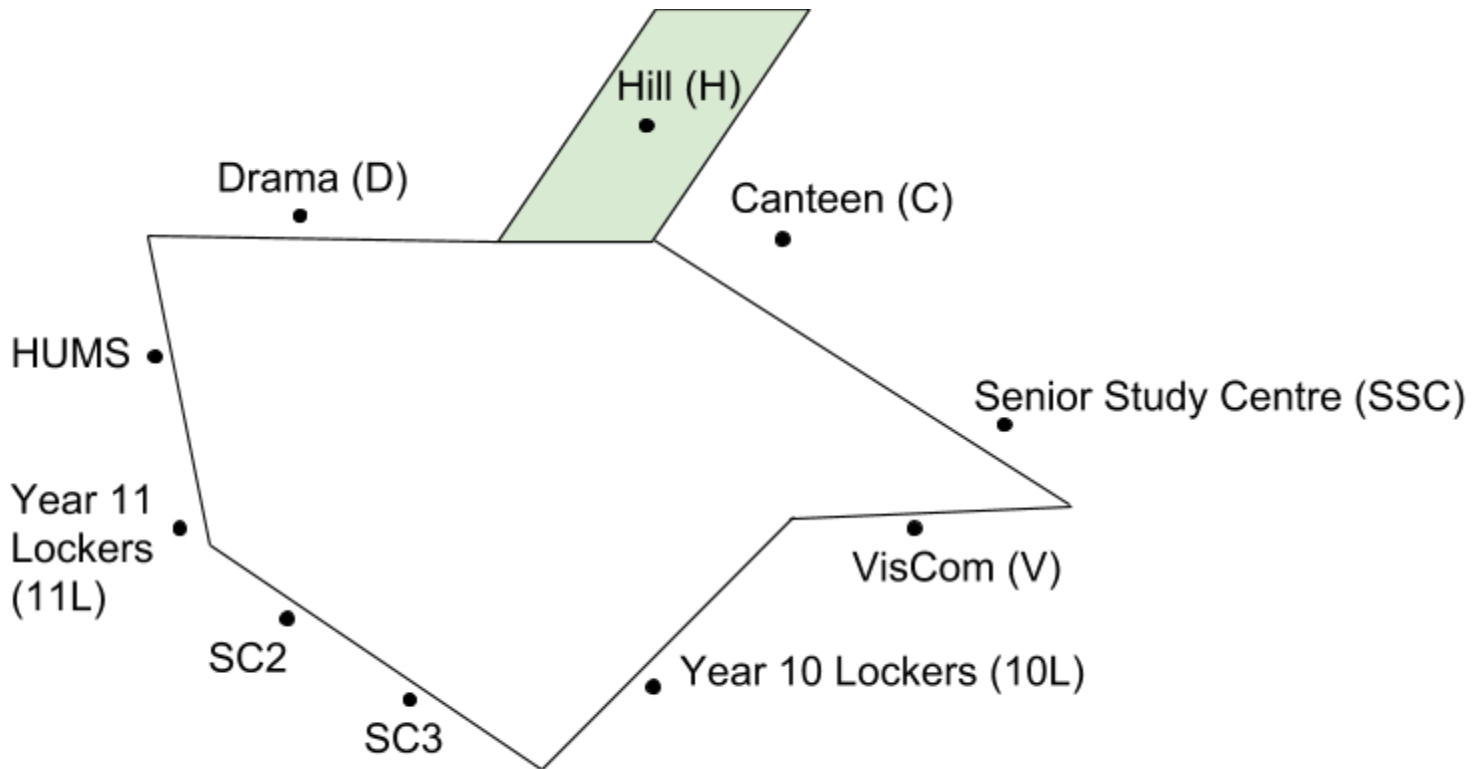


GENERAL MATHS NETWORKS APPLICATION TASK

NAME: _____

A diagram of the senior courtyard is shown below, with vertices labeled with dots and named.



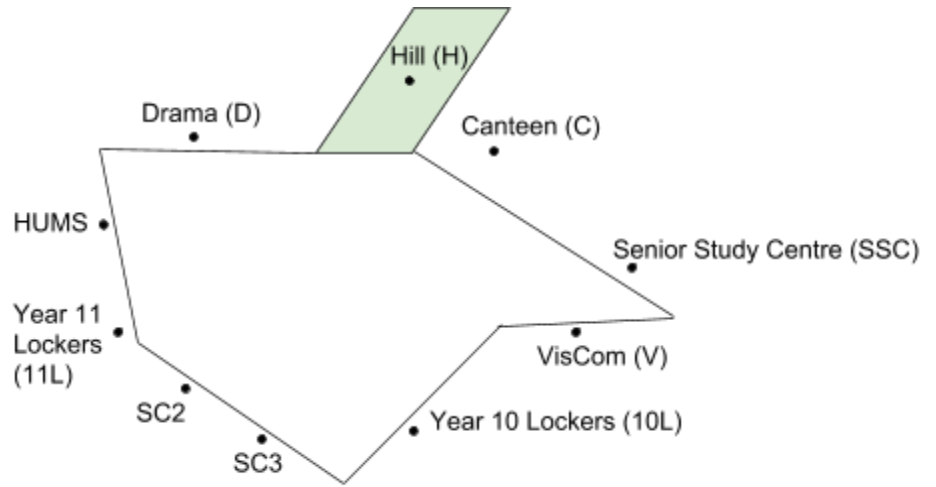
1.
 - a. How many vertices are there in this diagram? _____
 - b. If a graph is drawn in the courtyard and each of the garden beds is a face, how many faces are there? Add these to the diagram above.

2. Assuming that Euler's law holds for a network drawn in the senior courtyard, how many edges will there be in a connected planar graph with this many faces and vertices.

3. Add this number of edges to the diagram above. Can you make a connected planar graph with the vertices positioned as they are? If not draw an isomorphic graph meeting all criteria.

4. The adjacency matrix for a different graph is shown below. Using this matrix draw the graph.

	D	HUMS	11L	SC2	SC3	10L	V	SSC	C	H
D	0	1	0	0	0	0	0	0	0	0
HUMS	1	0	1	0	0	0	0	0	0	0
11L	0	1	0	1	0	0	0	0	0	1
SC2	0	0	1	0	0	0	1	0	1	1
SC3	0	0	0	0	0	2	0	0	0	0
10L	0	0	0	0	2	0	2	0	0	0
V	0	0	0	1	0	2	0	1	0	0
SSC	0	0	0	0	0	0	1	0	1	0
C	0	0	0	1	0	0	0	1	0	0
H	0	0	1	1	0	0	0	0	0	0



5.

a. This graph will have an Eulerian trail but not an Eulerian circuit. Explain why with reference to the degrees of vertices and identify this trail.

b. Will this graph have an Hamiltonian path, Hamiltonian cycle or neither? Explain your answer with reference to the degrees of vertices.

c. Add the number of steps required to walk each edge of the graph you have drawn to the diagram above.

6. Identify the minimum spanning tree for this graph using a different colour above and calculate the minimum number of steps required to visit all the vertices in the senior courtyard.
