**COMP 1587 - CS1 - Wide Area Networks: Exercises**

1. Draw a network with 7 nodes (A, B, C, D, E, F, G) and the following duplex links: AB, AF, AE, BC, CF, CD, CG, DF, DG, EF, EG, FG

A

G

B

F

C

E

D

i) How many more links would you need to have a fully connected mesh?

It would need three more link as 15 links are needed for a fully mesh network to be fully connected.   
 ii) If there is a network hop limit of two, using flooding, will all nodes receive a copy of a packet sent from B?

Yes

2. Draw a network with four nodes (A, B, C and D) and five duplex links, each with the following weights (costs):

|  |  |
| --- | --- |
| AB | 2 |
| BC | 1 |
| CD | 5 |
| AC | 5 |
| BD | 7 |

Find the least-cost path from A to D using Dijkstra's algorithm. Show all steps you took in detail.

A to B to C to D costs 7 in total. This is the least-cost path that can be taken using Digkstra’s algorithm. By using the table and drawing out the diagram, this helped me solve this question. Also, by writing down all the other paths to get to D. For example, from A to C to D costs 10. Therefore, it would be not the least-cost path.   
3. In 2-3 sentences, describe a case where circuit switching is better than packet switching.

Circuit switching is better than packet switching, because there is no delays. Packet switching may take a different route to its destination, as this takes longer. Also, there might be delays.  
4. If the queuing delay is 12 ms, the processing delay is insignificant, the transmission delay is 60 ms, the link is 50 m and the propagation speed of the link is 1 km/s, what is the total packet transfer delay for one packet?

Packet transfer delay = transmission + propagation + queuing + processing

12+0+1+1 =14 ms