Exercises for Statistical Analysis of Network Data - Sheet 9

1. Start from the graph S_4, i.e. a star with a hub node and three spokes.
   - Run the preferential attachment model with $m = 2$ and $\delta = 0.5$. Stop at $n = 50$. Plot the degree distribution. How many nodes are there in the graph? How many edges?
   - Run the preferential attachment model with $m = 4$ and $\delta = 0.5$. Stop at $n = 50$. Plot the degree distribution. How many nodes are there in the graph? How many edges?
2. Show that when $\delta = 0.9$, and $m = 1$ what the resultant graph is if the preferential attachment model is started with S_4.
3. Assume you have a multilayer network with $G_1 = S_5$ where the hub is numbered one, with $G_2 = K_6$, and $G_3 = P_6$ with one of the root nodes numbered as 1, and another as 6. Find the matrices provided in lectures and describe this as a multilayer network.
4. Describe snowball sampling on an ER graph, and discuss when the estimate of ρ is fine. Describe snowball sampling on S_n.