Theory and Algorithms of Wireless Networking, Fall 1391/2012
Assignment 3: Hidden Node problem

Overview. In this assignment you will face with the hidden node problem and see the effect of RTS-CTS on the packet loss and other parameters. Some result files from a number of execution of ping command in linux is provided in various situations, you must extract the packet loss, throughtput and average RTT and plot them and explain how and why these parameters differ in these situations.

We have 4 wireless nodes numbered from 1 to 4, in some experiments node 1 sends ping packets to node 2 in such a way that the channel is fully occupied and in the others node 1 and 2 are disconnected. We placed these nodes in three arrangements:

1- DataRange : where all 4 nodes are located nearby each other and hence in the data range of each other(See Figure 1).
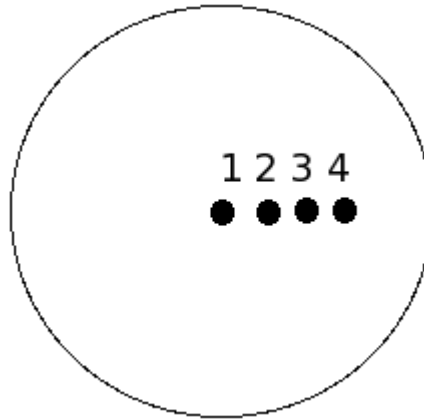

Figure 1: Data Range arrangement

2- InterferenceRange: where nodes 3 and 4 are located in the interference range of nodes 1 and 2(See Figure 2).

3- HiddenNode: where node 3 is located in the interference range of nodes 1 and 2 and node 4 is located far from nodes 1 and 2 and in the data range of node 3(See Figure 3).

We repeated the ping command when primary connection(connection between nodes 1 and 2) is on and off, when the retry limit is 0 and 7 and with slow data rate(8000bps) and fast data rate(fully occupied channel). For each situation we have 10 result files.
For this assignment do the following:

1. For the first arrangement plot loss, throughtput and average RTT when pc(primary connection)is on and off for various situations and explain them. Also take an average of the parameters from all 10
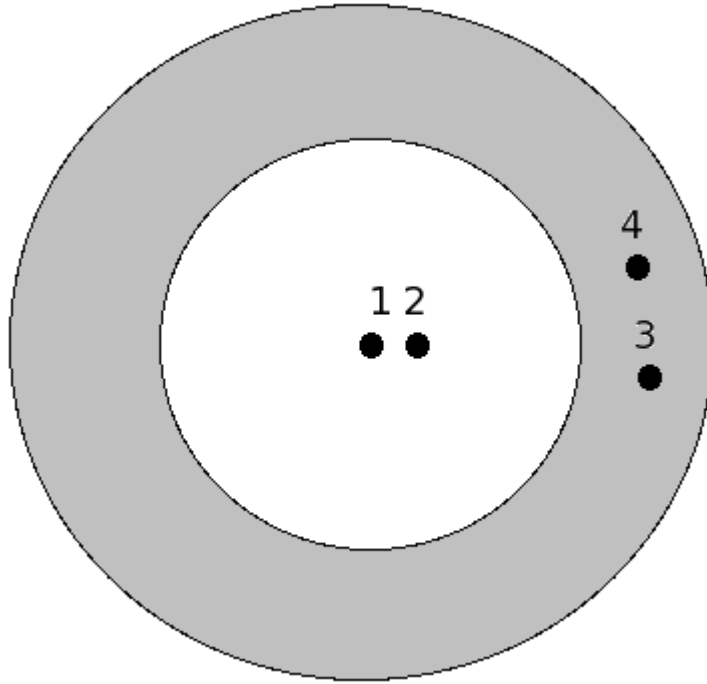
Figure 2: Interference Range arrangement

result files for each situation by removing the outlying samples and compare related situations and explain them, especially answer such questions:

Is packet loss greater when pc is on or not? Is packet loss greater when retry limit is 0 with respect to 7 or not? Is packet loss greater when data rate is fast with respect to slow or not? why? what about other parameters?

2. Do the same for second arrangement.

3. For third arrangement plot loss, throughtput and average RTT when pc is off and when pc is on with rts on and off in the same figure for various situations and explain them. Also take an average of the parameters from all 10 result files for each situation by removing the outlying samples and compare related situations and explain them. Answer such questions noticed in previous part, also compare parameters when rts is on and off.
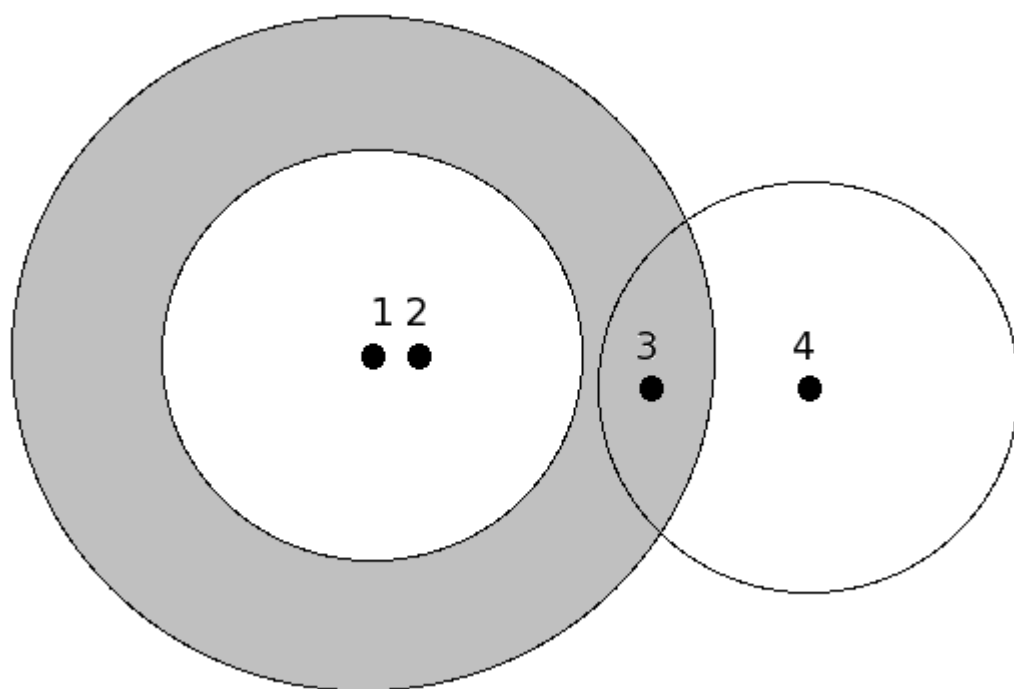
Figure 3: Hidden Node arrangement