CS461 AS3 Experiment

This experiment is made in the football field in UPEI. The football field is chosen because it is big enough. I tried to do this experiment in the basketball field of sport center and I set the power level to 1 but it still has a very high success rate. With the same distance, indoor environment seems to have a better receive rate than outdoor environment. For example, the receiver and sender are in a distance of 80 meters, in the sport center, the receive rate is 30% - 40% and in the football field, the rate drops to 0%. But in the sport center, the maximum distance is just around 80 meters so it is not chosen for the experiment.

One problem I met in this assignment is that, when the user pressed the user button twice, I initially let the receiver send the receive rate to Base Station for only once and this packet is not delivered to the Base Station every time. I found that if I reset the Base Station and then send this packet, it can receive it, otherwise it cannot. Since I am using my own Base Station program, I also test with the Base Station program provided in the tutorial. And then I wrote a simple Sender program which sends 10 packets (#0-#9) to Base Station. The Base Station could receive all 10 packets for the first time. Then I let the Sender program sends the #0 packet to Base Station then press the Reset button to stop it sending the rest packets, Base Station could receive #0 packet, then I release the Reset button, the Sender sends #0 packet again, but this time, the Base Station cannot receive that. So seems that there may be some cache strategy in TinyOS which cause it failed to receive the 1st and duplicated packet. To work around this, I let Receiver keeps sending to Base Station the same packet (with the rate) every second.

I collect the data every 10 meters with the maximum distance of 100 meters. In each distance, I test the rate for 3 times. Temperature is 8°C. Following diagram shows the relationship of reception rate and distance.

Effective communication range (PRR > 90%) : 0-50 meters  
Transitional communication range (30% <= PRR < 90%) : 50 – 55 meters  
Poor communication range (PRR < 30%): 55 meters - ∞