Exercise 3

Question 1: Derive the formulas for (i) number of comparisons, and (ii) average-case number of swaps for bubble sort [0.4 pts].

(i) Let's suppose that n is the number of elements in the list. Then $\frac{n(n-1)}{2}$ would be the number of comparisons made.

(ii) The formula for the average number of swaps is $\frac{n(n-1)}{4}$

Question 4: Separately plot the results of #comparisons and #swaps by input size, together with appropriate interpolating functions. Discuss your results: do they match your complexity analysis?

Yes, the results matched our complexity analysis. From the results obtained from the graph, the complexity is quadratic for both. This matches what is shown in our derived formulas which also have a quadratic relationship.