This quiz is out of 10 points: 2 for your name and 8 for answering the questions correctly. Clearly indicate your answers by putting a box or circle around them. There is no partial credit on this quiz. You have 10 minutes to complete this quiz.

1. (4 points) Please answer the following questions about Big-O notation with a fully spelled word e.g. Yes/No or True/False. No proofs are required.

   (a) Is $\sqrt{n} = O(n)$?
   Yes. Higher power polynomials grow faster.
   \[
   \lim_{n \to \infty} \frac{\sqrt{n}}{n} = \lim_{n \to \infty} \frac{1}{\sqrt{n}} = 0 < \infty
   \]

   (b) Is $n^{1.01} = O(n \log n)$?
   No. Polynomials grow faster than logarithms.
   \[
   \lim_{n \to \infty} \frac{n^{1.01}}{n \log n} = \lim_{n \to \infty} \frac{n^{0.01}}{\log n} = \lim_{n \to \infty} \frac{0.01n^{-0.99}}{1/n} = \lim_{n \to \infty} 0.01n^{0.99} = \lim_{n \to \infty} 0.01n^{0.01} = \infty
   \]

   (c) Is $\frac{n^2}{100} = O(n)$?
   No. Higher power polynomials grow faster.
   \[
   \lim_{n \to \infty} \frac{n^2/100}{n} = \lim_{n \to \infty} n/100 = \infty
   \]

   (d) Is $n^2 = O(2^n)$?
   Yes. Exponentials grow faster than any polynomial.
   \[
   \lim_{n \to \infty} \frac{n^2}{2^n} = \lim_{n \to \infty} \frac{2n}{2^n \ln 2} = \lim_{n \to \infty} \frac{2}{2^n (\ln 2)^2} = 0 < \infty
   \]

2. (4 points) How many inversions are in the following list?

   3, 1, 4, 5, 9, 2, 6, 8

7 inversions.