Reminder: You may work in groups and use outside sources. But, you must write up solutions in your own words and properly reference your sources for each problem. This includes listing your collaborators and properly citing any sources you use. Solutions to each problem must be electronically typeset and submitted online via Gradescope. Instructions appear in the E-Homework Guide: http://www.cse.wustl.edu/~bjuba/cse347/s20/ehomework/

1. Kleinberg & Tardos Chapter 8, question 4

2. Kleinberg & Tardos Chapter 13, question 15

3. Recall the algorithm insertion sort:

\begin{verbatim}
input : Array A of n integers
begin
  for i = 1, \ldots, n do
    for j = i, \ldots, 1 until A[j - 1] \leq A[j] do
      Swap A[j - 1] and A[j].
  end
end
\end{verbatim}

Suppose A contains n integers in a uniformly chosen random order. What is the average (expected) running time of insertion sort?