Name: _____
UCFID: _____
NID: _____

1) (10 pts) ANL (Algorithm Analysis)

There is a very long corridor of rooms, labeled 1 through n, from left to right. It is reputed that in the very last room, room *n*, there is the Treasure of the Golden Knight. Unfortunately, you don't know what *n* is equal to. Whenever you are in a particular room, you are allowed to ask questions of the form, "Is there a room 2^k slots to the right of my current location?", where k is a non-negative integer. For a fee, Knightro, an omnipresent, omnipotent, omniscient knight, will answer your question correctly, with either "yes" or "no." After you ask 1 or more questions from a single room, Knightro will move you, for free, to any of the rooms you asked a question about for which he replied "yes." Your goal is to get to room n by asking as few questions as possible, to reduce the fee that you pay Knightro. Devise a strategy to find the value of n and clearly outline this strategy. How many questions, in terms of n, will your strategy use, in the worst case? Answer, with proof, this last question with a Big-Oh bound in terms of n. **(Note: Any strategy that works will be given some credit. The amount of credit given will be based on how efficient your strategy is, in relation to the intended solution.)**