Math 447: Homework 4[*]

1. *Application of the Nested Interval Theorem: the uncountability of* $\mathbb{R}$. The proof of the fact that the set of real numbers is uncountable is given in Theorem 2.5.4. (page 49). Understand the proof and rewrite it in your own words. You could copy the proof verbatim but make sure you understand the proof.

2. *Application of the Nested Interval Theorem: the binary representation* $\mathbb{R}$. Rewrite the discussion on binary representation of $\mathbb{R}$ that is given from page 49-50 in your own words. Along the way, make sure to answer exercise #11, in section 2.5.

3. Do exercise # 3 and # 10 in section 2.5.

4. Do exercise #4, #5 (a, d), #6(c, d), and #8 in section 3.1.

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[*]This homework covers section 2.5 and a little bit of section 3.1. Please do as many exercise as you can in the textbook on these section. And let me know if you have any question.