INDIVIDUAL HOMEWORK 2, CPSC 421/501, FALL 2020

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Please note:

(1) You must justify all answers; no credit is given for a correct answer without justification.
(2) Proofs should be written out formally.
(3) Homework that is difficult to read may not be graded.
(4) You may work together on homework in groups of up to four, **but you must write up your own solutions individually and must acknowledge with whom you worked.** You must also acknowledge any sources you have used beyond the textbook and two articles on the class website.

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(1) Show that if S is countable, and there exists a surjection $S \to T$, then T is countable.

(2) Assume Problem 1 is true. Show that if T is uncountable, and there exists a surjection $S \to T$, then S is uncountable.

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Bonus Question, Worth an Extra 10 out of 100 Points for Homework 2

[Solutions to this problem will not be released. Bonus questions tend to be more difficult than the usual course material and will not appear on any exam.]

(3) Give a bijection $f\colon [2]^{\mathbb{N}} \to [3]^{\mathbb{N}}$ (and explain/prove that f is a bijection). [Recall that if S, T are sets, T^S refers to the set of functions from S to T.]

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