CIS 4930: Secure Coding [Fall 2018]
Test II

NAME: ______________________________________________________

Instructions:

1) This test is 5 pages in length.

2) You have 40 minutes to complete and turn in this test.

3) Short answer questions include a guideline for how many sentences to write. Respond in complete English sentences. Responses will be graded as described on the syllabus.

4) This test is closed books, notes, papers, friends, neighbors, etc.

5) Use the backs of pages in this test packet for scratch work. If you write more than a final answer in the area next to a question, circle your final answer.
1. [10 points]
What are CIA policies? Explain each of these types of policies. [2-4 sentences]

2. [12 points]
What is a confused-deputy attack? Include an example in your explanation. [2-3 sentences]

3. [12 points]
Explain why countability is relevant to software security. [2-4 sentences]
5. [18 points]
Prove that the set of pairs of real numbers \((r_1,r_2)\) is uncountable, at the level of detail used in class.
6. [18 points]
A bit-list is a finite list of bits, such as [0,1,0], [0,1], [0], and []. Is the set of all bit-lists countable? Prove your answer, at the level of detail used in class.
7. [30 points]
For each of the following policies, write “pol” if it is a non-property policy, “prop” if it is a non-safety and non-liveness property, “S” if it is a safety property, and “L” if it is a liveness property. Also write 1-2 sentences for each policy, explaining the intuition behind your answer.

(a) \( P_1 = \{ \{ t_1, t_2, \ldots \} \mid \forall i: \text{write}(8) \in t_i \} \)

(b) \( P_2 = \{ \{ t_1, t_2, \ldots \} \mid \forall i: \text{write}(8) \in t_{i100} \} \)
(where \( t_{i100} \) denotes the longest prefix of \( t_i \) that contains at most 100 events)

(c) \( P_3 = \{ \{ t_1, t_2, \ldots \} \mid \forall i, j: (\text{read}(j) \leq t_i) \Rightarrow (\text{execute}(j) \notin t_i) \} \)

(d) \( P_4 = \{ T \mid T \text{ is a set of traces} \} \)

(e) Of \( P_1 \) to \( P_4 \), which are the easiest and second easiest to enforce (precisely) in practice? How would the enforcement mechanisms work? [2-3 sentences]