

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) $P_1 = \{ \{t^1, t^2, \dots\} \mid \forall i: \text{write}(8) \in t^i \}$

(b) $P_2 = \{ \{t^1, t^2, \dots\} \mid \forall i: \text{write}(8) \in t^i_{100} \}$
(where t^i_{100} denotes the longest prefix of t^i that contains at most 100 events)

(c) $P_3 = \{ \{t^1, t^2, \dots\} \mid \forall i, j: (\text{read}(j) \leq t^i) \Rightarrow (\text{execute}(j) \notin t^i) \}$

(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]