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## 8.9. Exercises

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**1:** Draw the lattice described in the first example in [Section 8.1.1](#).

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**2:** Prove Lemma 8–2.

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**3:** Consider the systems Louie and Dewey in [Section 8.2.4](#).

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a. Suppose the sends and receives for the buffers are nonblocking. Is the composition of Hughie, Dewey, and Louie still noninterference-secure? Justify your answer.

b. Suppose all buffers are unbounded. Is the composition of Hughie, Dewey, and Louie still noninterference-secure? Justify your answer.

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**4:** Modify the two-bit system in the first example in [Section 8.3](#) as follows. Whenever a **High** operation is performed, the **High** state bit is output. Whenever a **Low** operation is performed, the **Low** state bit is output. The initial state is **not** output (in contrast to the example). Is this version of the two-bit system noninterference-secure with respect to Lucy? Why or why not?

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**5:** In the second example in [Section 8.3](#), Lucy sees the output sequence as 011011. Given that she knows the low-level input sequence, list all possible input sequences that match the known low-level input sequence and produce the desired output.

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**6:** Prove that a system that meets the definition of generalized noninterference security also meets the definition of deducible security.

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**7:** Suppose composite machine **catdog** (see [Section 8.4.1](#)) emits the same value from the left and the right. Show that it has received no inputs from the left.

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**8:** Prove Theorem 8–5.

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