

## March 7, 2023 Outline

**Reading:** *text*, §18.2–18.3.2

**Assignments:** Homework #4, due March 14

1. Isolation: virtual machines
2. Isolation: non-virtual containers
  - (a) Library operating systems
  - (b) Sandboxes
3. Isolation: program modification
  - (a) Software fault isolation
  - (b) Compiling
  - (c) Loading
4. Covert channels
  - (a) Storage vs. timing
  - (b) Noise vs. noiseless
  - (c) Existence
  - (d) Bandwidth
5. Covert channel detection
  - (a) Shared Resource Matrix Model
  - (b) Information flow analysis
  - (c) Covert flow trees
6. Shared resource matrix methodology
  - (a) Identify shared resources, attributes
  - (b) Operations accessing those attributes
  - (c) Building the matrix
  - (d) Issues about the methodology
7. Information flow analysis
  - (a) Direct, indirect flows
8. Covert flow trees
  - (a) Goals, symbols
  - (b) Construction of covert flow trees
  - (c) Analysis
  - (d) Example
9. Capacity
  - (a) When is bandwidth of covert channel?
  - (b) Analysis
  - (c) Measuring capacity