

# Design for Testability

17-423/723 Designing Large-Scale Software Systems

Recitation 5  
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## Activity: Testability

Consider a feature in an online shopping site that allows a customer to pay for an item in multiple installments over a period of time. For example, an item that costs \$1000 can be paid in 4 installments of \$250, with payments being made 1 month apart (e.g., Feb 14, March 15, April 15, May 15). The following class, **InstallmentGenerate**, is used to generate a series of installments and store them into a database.

(See handout)

# Property-based Testing (PBT)

- A technique that automatically generates & runs tests
- Instead of specifying test cases, the developer specifies properties to be test
  - i.e., pre-conditions, post-conditions, invariants
  - Assertions written for a contract can be directly used for PBT
- For each property, a PBT tool randomly generates many inputs, with the goal of finding an input that violates the property
- In general, too many inputs to enumerate, so PBT does not guarantee that property is true, but is very effective at finding failing inputs
- Many PBT tools available (QuickCheck, hypothesis, jqwik...)