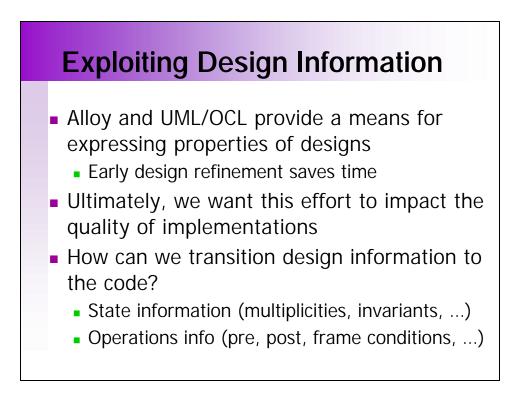
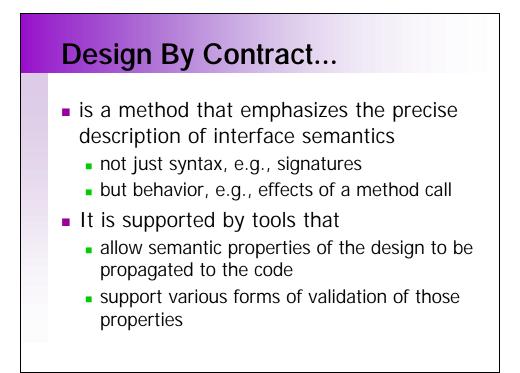
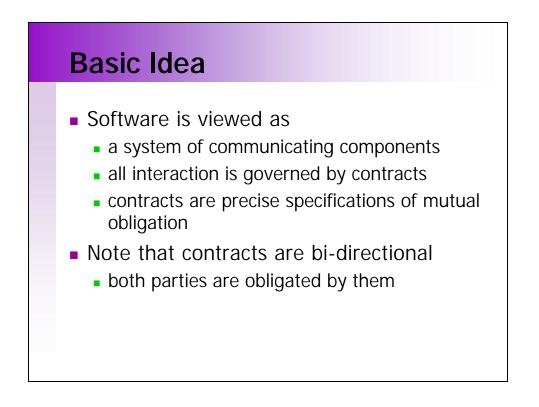
CIS 771: Software Specifications

Lecture -- Week 14: Design by Contract

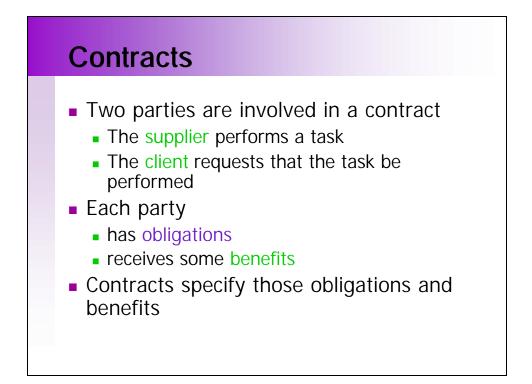
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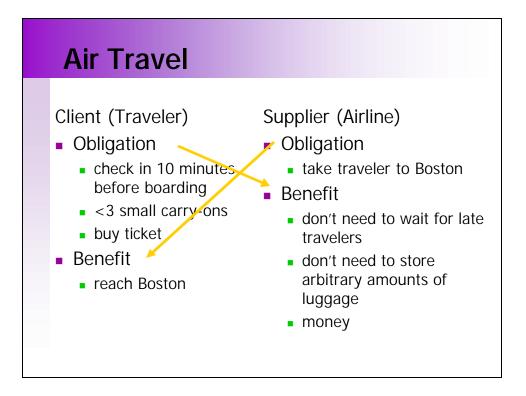


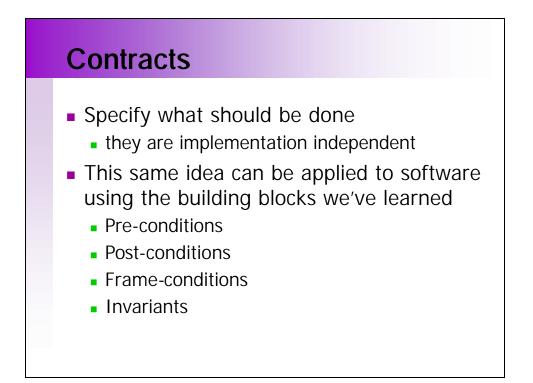




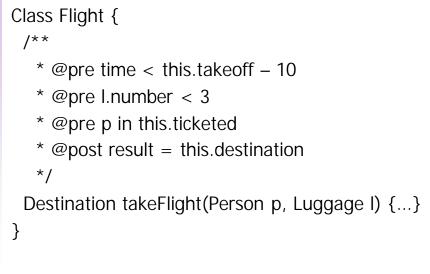


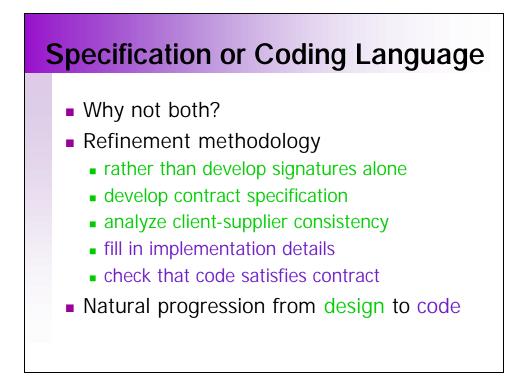












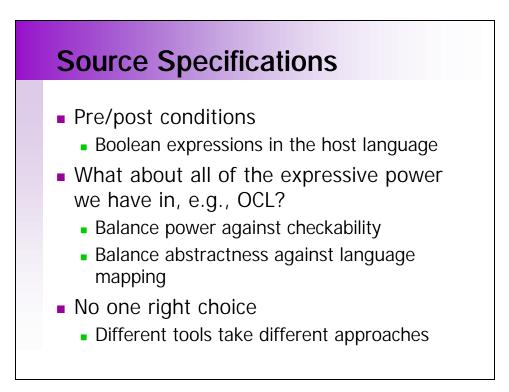
Java Example

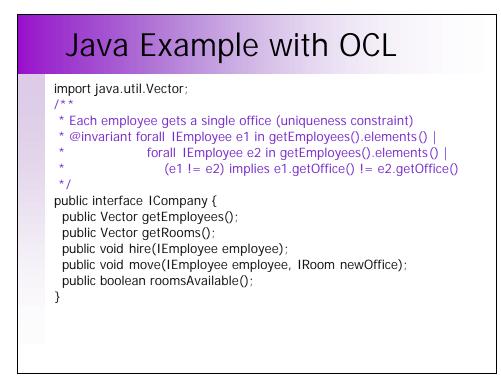
import java.util.Vector;

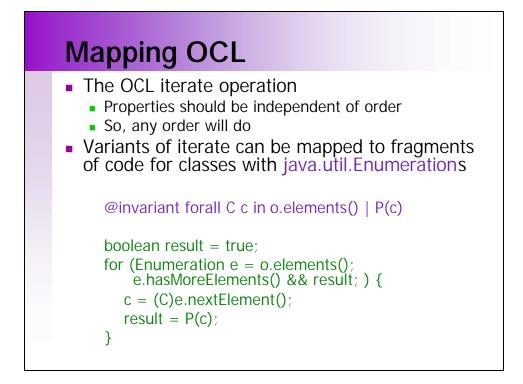
}

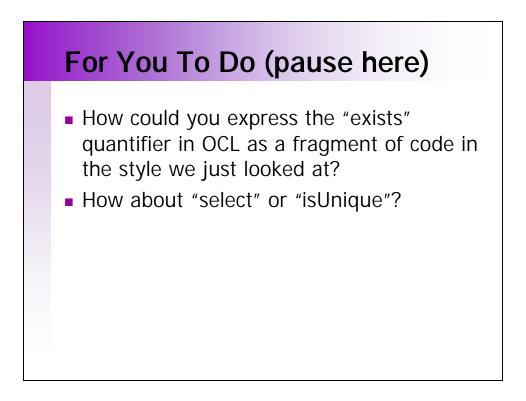
public interface ICompany { public Vector getEmployees(); public Vector getRooms(); public void hire(IEmployee employee); public void move(IEmployee employee, IRoom newOffice); public boolean roomsAvailable();

Java Example import java.util.Vector; public interface ICompany { public Vector getEmployees(); public Vector getRooms(); /** * @pre employee != null * @pre !getEmployees().contains(employee) // do not employ twice * @pre !employee.hasOffice() // does not own an office somewhere else * @pre roomsAvailable() // there must be an office left * @post getEmployees().contains(employee) // added to list of employees * @post getRooms().contains(employee.getOffice()) // assign one of our offices * @post employee.hasOffice() // office assigned * @post employee.getOffice().getOwner() == employee // correct office owner? */ public void hire(IEmployee employee); public void move(IEmployee employee, IRoom newOffice); public boolean roomsAvailable(); }









Important Issues

- Contract enforcement code is executed
 - It should be side-effect free
 - If not, then contracts change behavior!
- Frame conditions
 - Explicitly mention what can change
 - Anything can change
- Failed contract conditions
 - Most approaches will abort the execution
 - How can we continue?



- Inheritence in most OO languages
 - Sub-type can be used in place of super-type
 - Sub-type provides at least the capability of supertype
- Sub-types weaken the pre-condition
 - Require no more than the super-type
 - Implicit or of inherited pre-conditions
- Sub-types strengthen the post-condition
 - Guarantee at least as much the super-type
 - Implicit and of inherited post-conditions
 - Invariants are treated the same as post-conditions

