

Interaction Diagramming

CSSE 374: Session 10

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Interaction Diagrams

❖ Used for dynamic object modeling

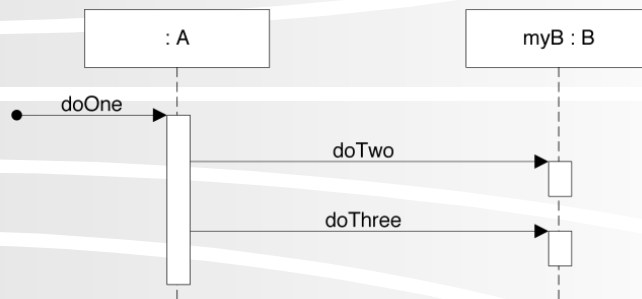
- Answer questions about behavior (i.e., events, sequencing)

❖ Two common types:

- Sequence diagrams
- Communication diagrams

Don't confuse with System Sequence Diagrams (SSDs), which use a subset of the notation

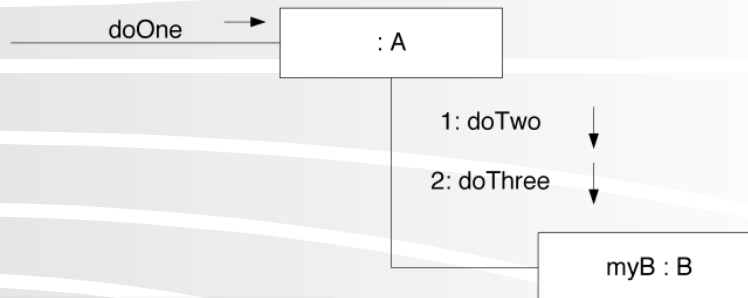
Sequence Diagram Example



```
public class A {
    private B myB = new B();
    public void doOne() {
        myB.doTwo();
        myB.doThree();
    }
}
```



Communication Diagram Example



```
public class A {
    private B myB = new B();
    public void doOne() {
        myB.doTwo();
        myB.doThree();
    }
}
```



Relative Strengths

- ❖ **Sequence Diagrams (SD)**
 - Clearer notation and semantics
 - Better tool support
 - Easier to follow
 - Excellent for documents
- ❖ **Communication Diagrams (CD)**
 - Much more space efficient
 - Easier to modify quickly
 - Excellent for UML as sketch

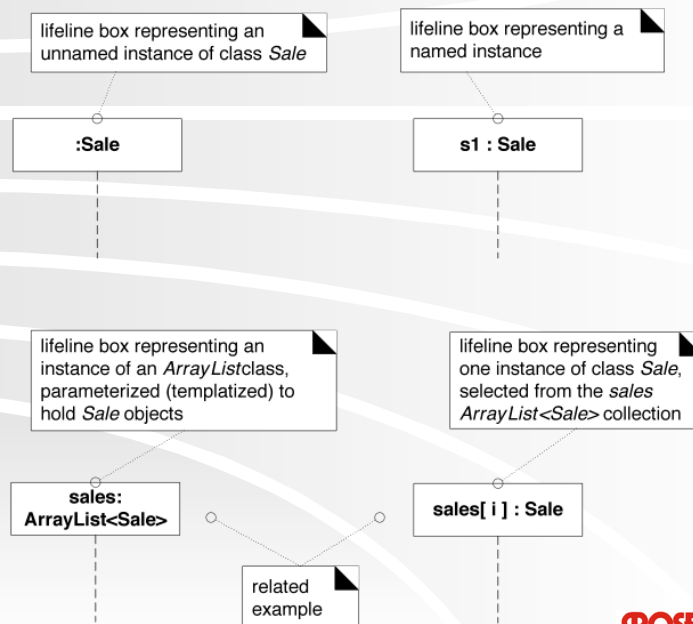
Why Bother with Interaction Diagrams?

- ❖ **Keep us from getting bogged down in syntax**
- ❖ **Can allocate responsibilities with minimal commitment**

Did I say, "don't get bogged down" ?

Common Notation

Lifeline Boxes



Basic Message Expression Syntax

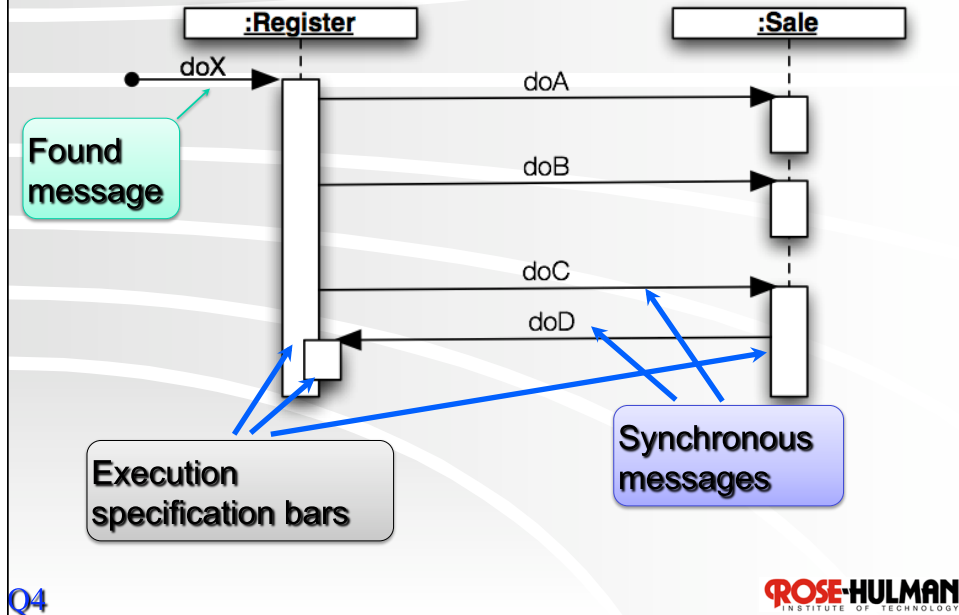
id = message(parameter : parameterType) : returnType

❖ Much is optional, for example:

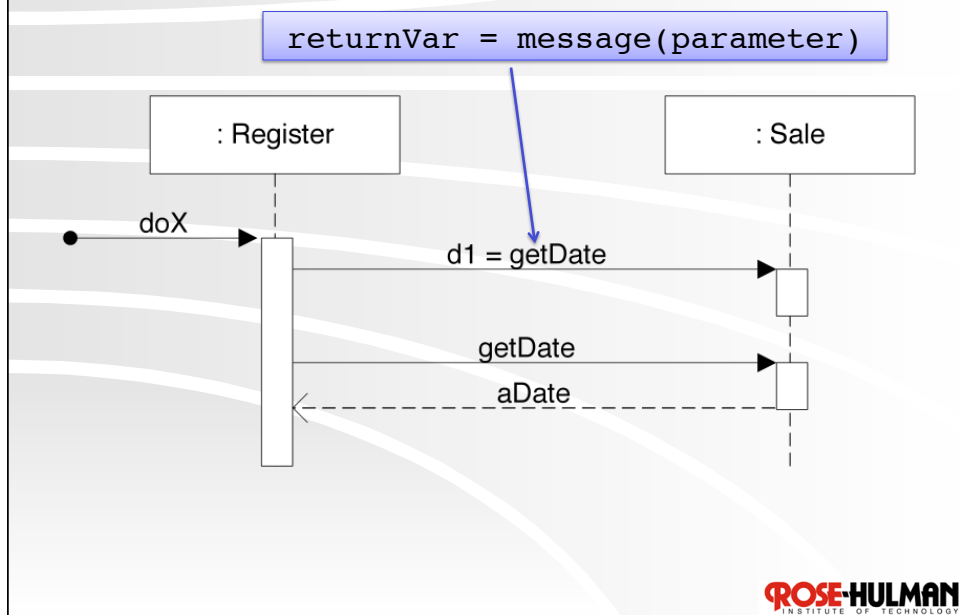
- **initialize(register)**
- **initialize**
- **d = getProductDescription(id)**
- **d = getProductDescription(id:ItemID)**
- **d = getProductDescription(id:ItemID) : ProductDesc**

Sequence Diagrams

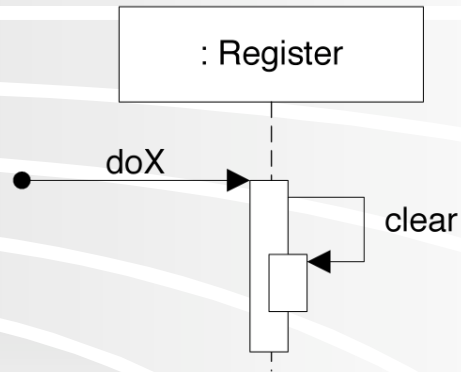
Some Terminology



Two Ways of Illustrating Return Values

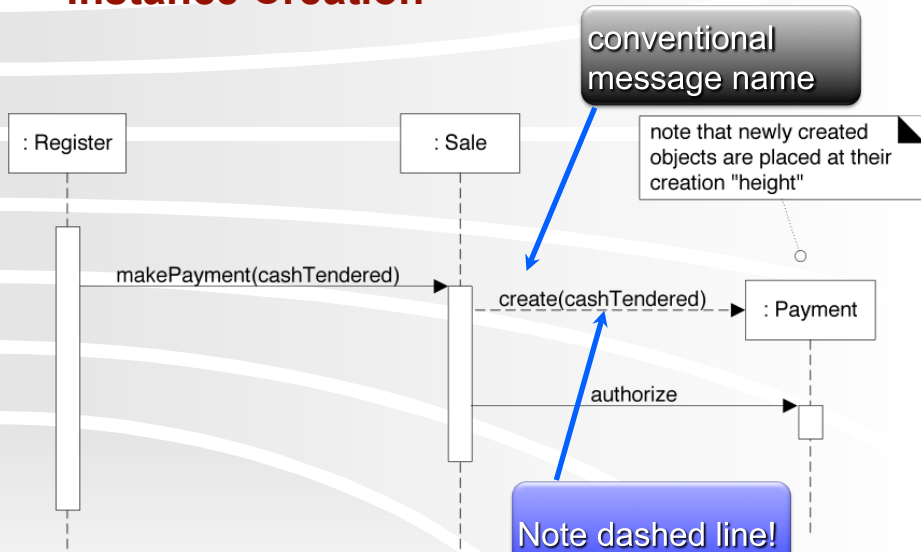


Messages to Self



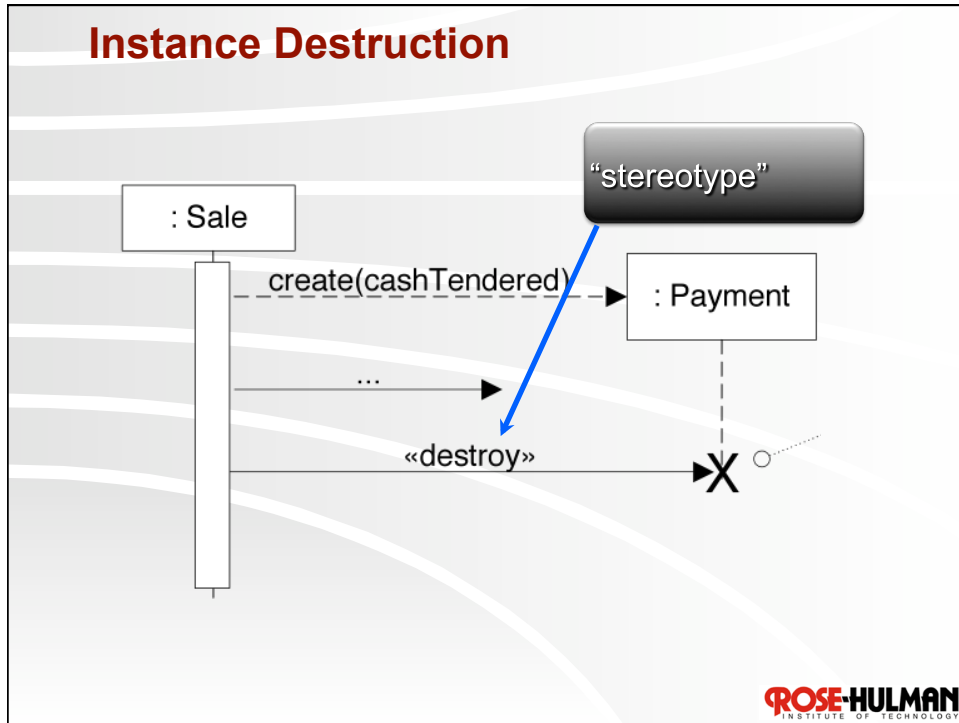
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Instance Creation



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Instance Destruction



Cartoon of the Day

MY HOBBY:
EMBEDDING NP-COMPLETE PROBLEMS IN RESTAURANT ORDERS

CHOTCHKIES RESTAURANT	
APPETIZERS	
MIXED FRUIT	2.15
FRENCH FRIES	2.75
SIDE SALAD	3.35
HOT WINGS	3.55
MOZZARELLA STICKS	4.20
SAMPLER PLATE	5.80
SANDWICHES	
BARBECUE	6.55

WE'D LIKE EXACTLY \$15.05 WORTH OF APPETIZERS, PLEASE.

... EXACTLY? UHH ...

HERE, THESE PAPERS ON THE KNAPSACK PROBLEM MIGHT HELP YOU OUT.

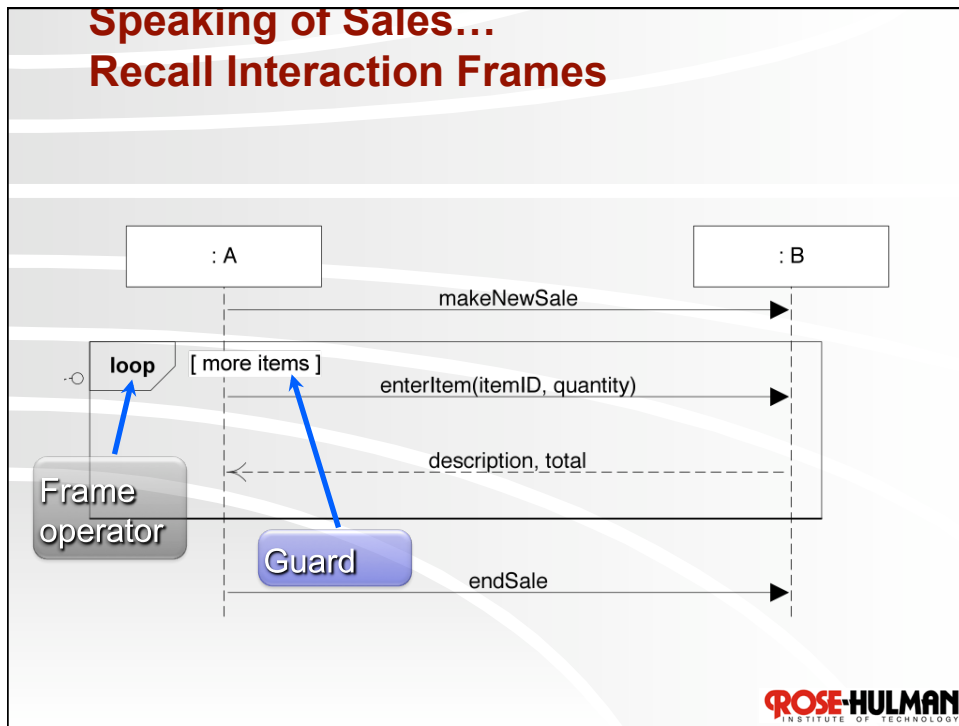
LISTEN, I HAVE SIX OTHER TABLES TO GET TO -

- AS FAST AS POSSIBLE, OF COURSE. WANT SOMETHING ON TRAVELING SALESMAN?

General solutions get you a 50% tip

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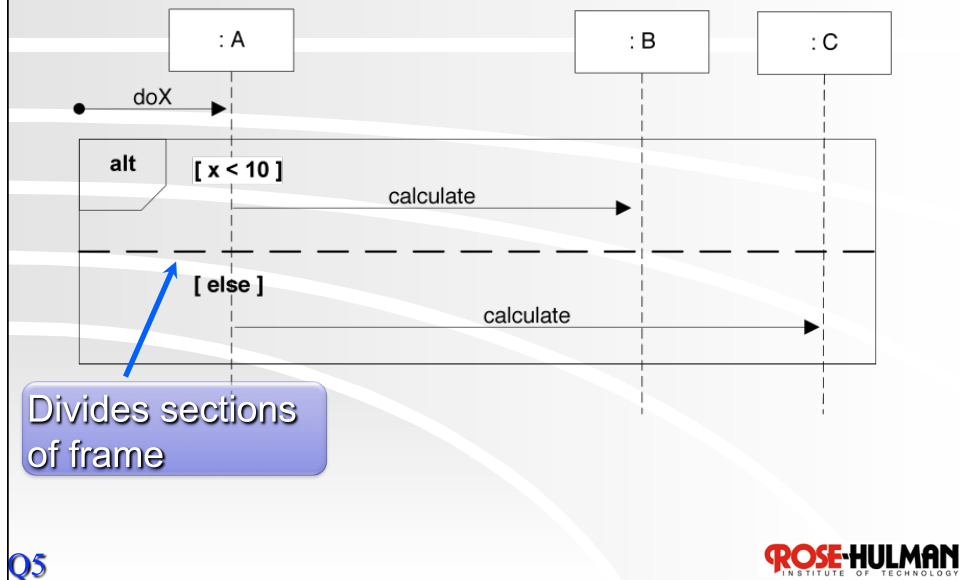
Speaking of Sales... Recall Interaction Frames



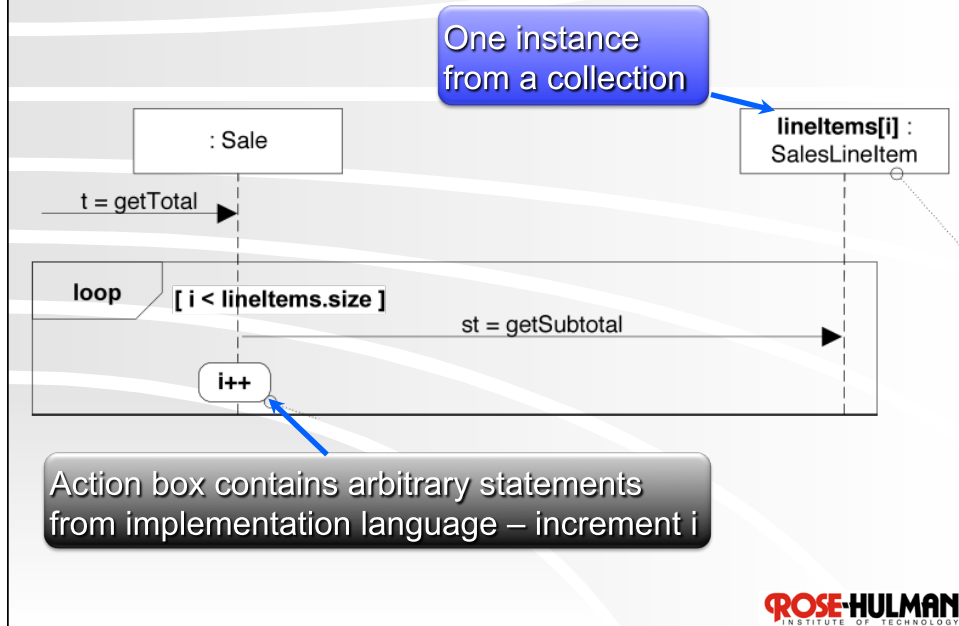
Common Frame Operators

Operator	Meaning
alt	“alternative”, if-then-else or switch
loop	loop while guard is true, or <i>loop(n)</i> times
opt	optional fragment executes if guard is true
par	parallel fragments
region	critical region (single threaded)
ref	a “call” to another sequence diagram
sd	a sequence diagram that can be “called”

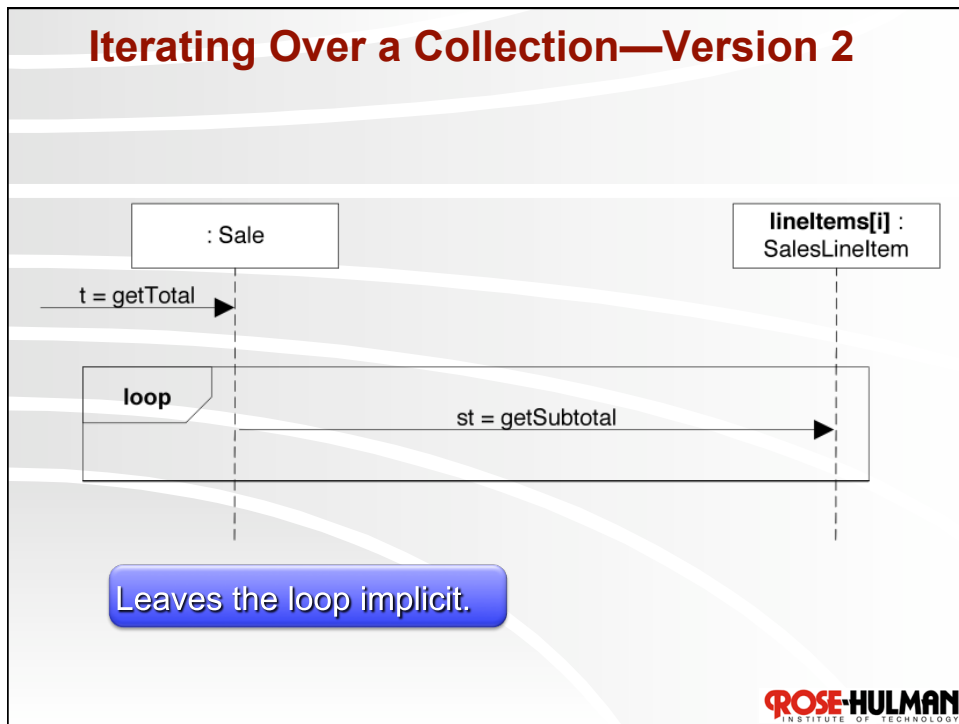
Mutual Exclusion “alt” Frame



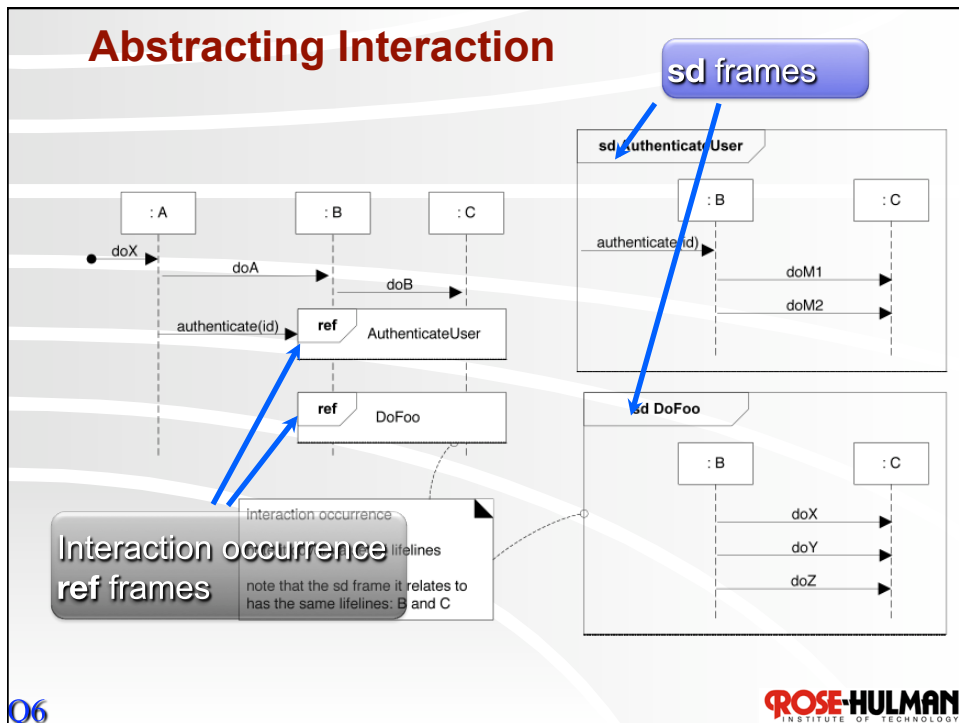
Iterating Over a Collection—Version 1



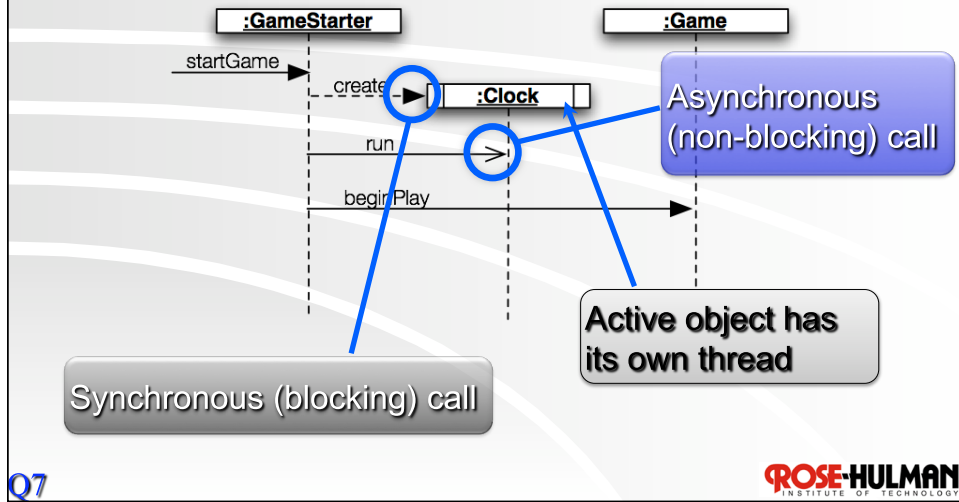
Iterating Over a Collection—Version 2



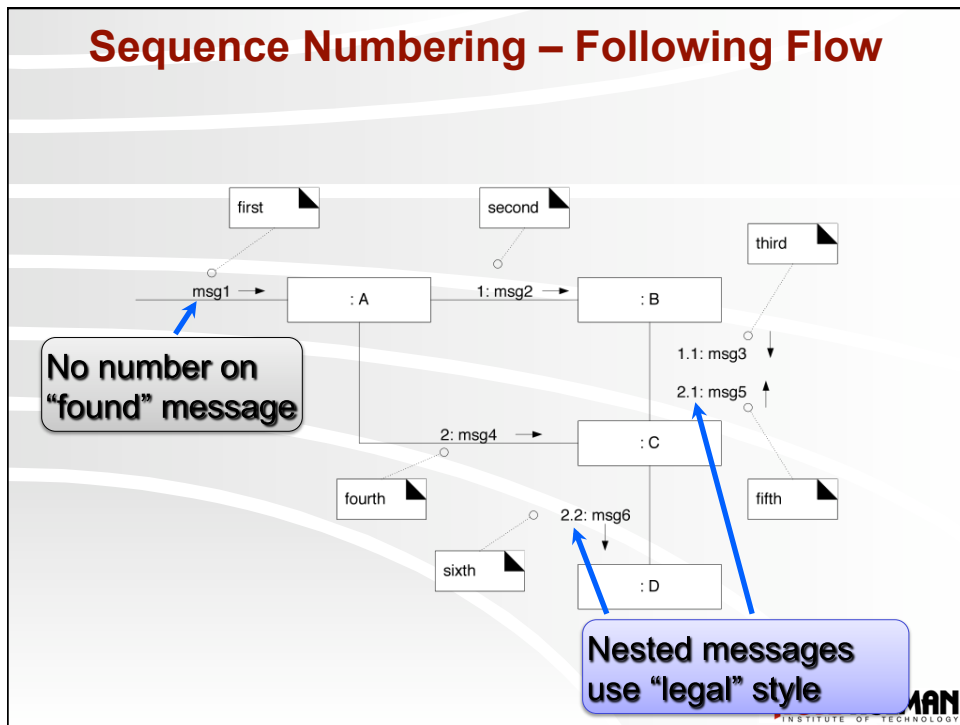
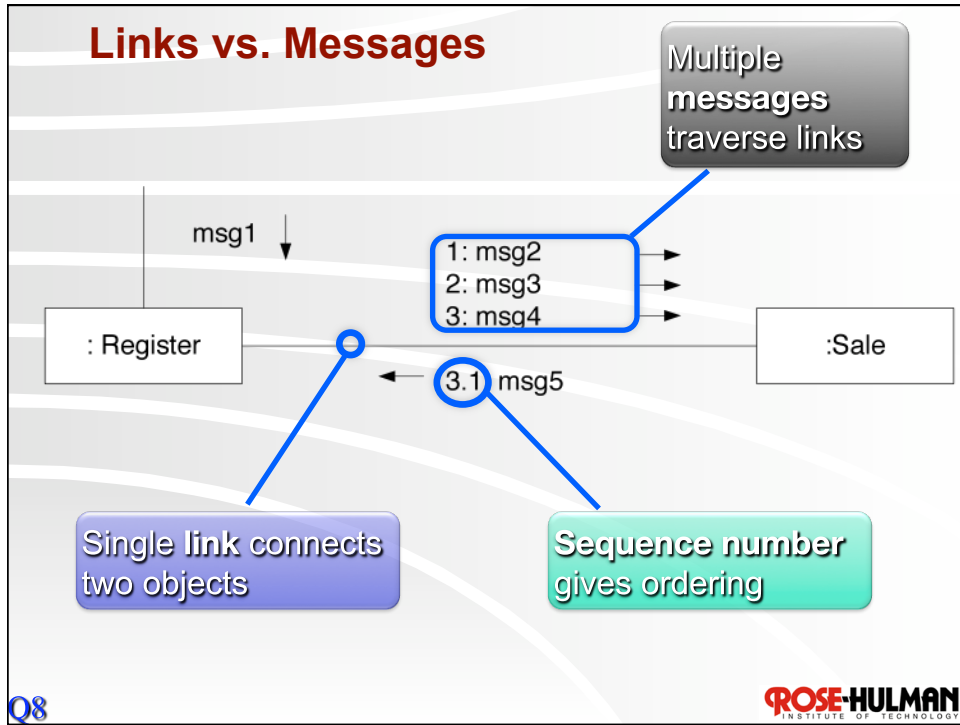
Abstracting Interaction



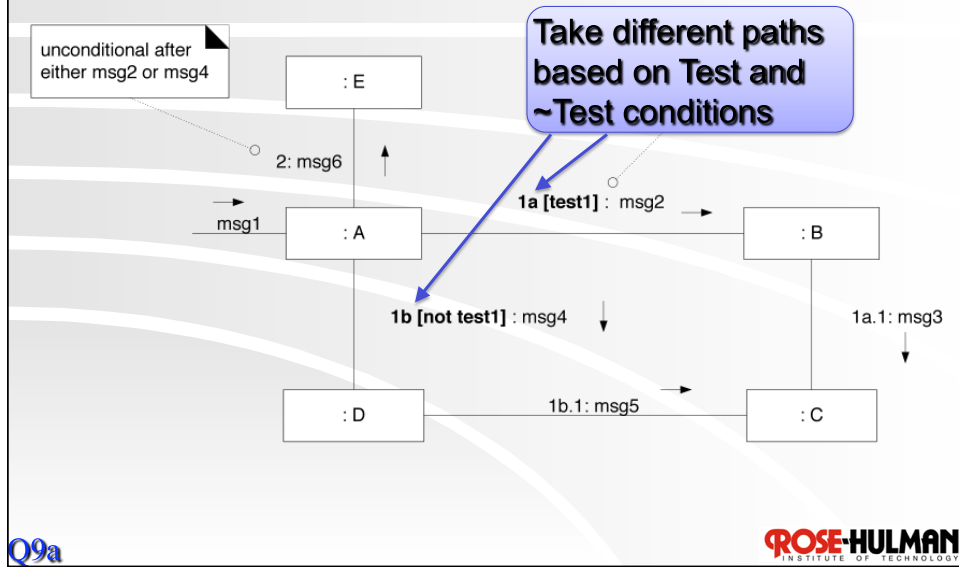
Asynchronous Calls



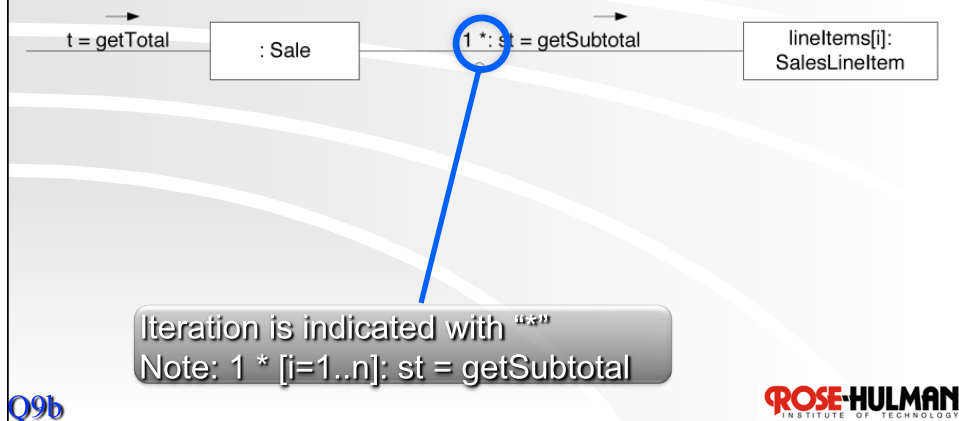
Communication Diagrams



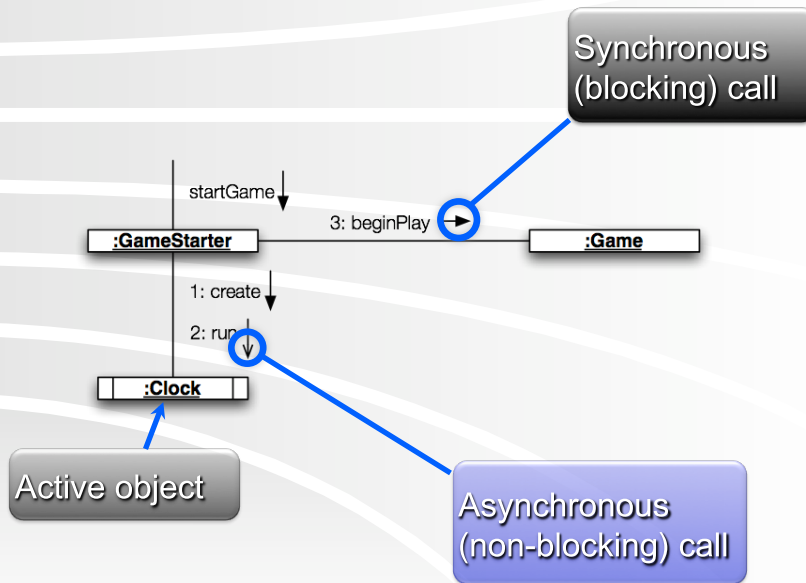
Conditional Messages Use Guards



Iteration Uses Stars (splats ☺)



Asynchronous Calls



Q10

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Homework and Milestone Reminders

- ❖ **Read Chapter 16 on Design Class Diagrams**
- ❖ **Homework 3 – Dog-eDoctor System SSDs and Operations Contracts**
 - Due by 5:00pm on Today, December 15th, 2009
- ❖ **Homework 4 – Dog-eDoctor System Preliminary Logical Architecture and Design**
 - Due by 5:00pm on Tuesday, January 5th, 2010
 - Extra credit if you get it in by 5:00pm this Friday!
- ❖ **Milestone 3 – Iteration 1: Junior Project**
 - Finish Analysis Model (SSDs, OCs)
 - Logical Architecture - Package Diagrams, and
 - 1st (initial) Version of System
 - Due by 11:59pm on Friday, January 8th, 2009

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