Service Oriented Architecture

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Stevens Institute of Technology

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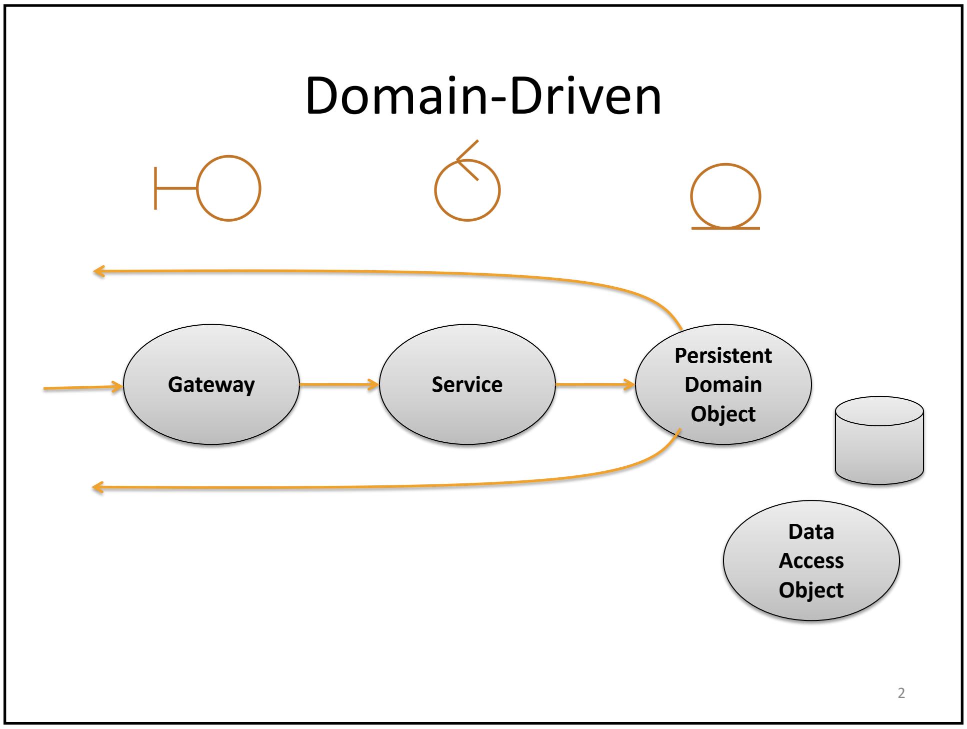

Domain-Driven

Gateway

Service

Persistent Domain Object

Data Access Object

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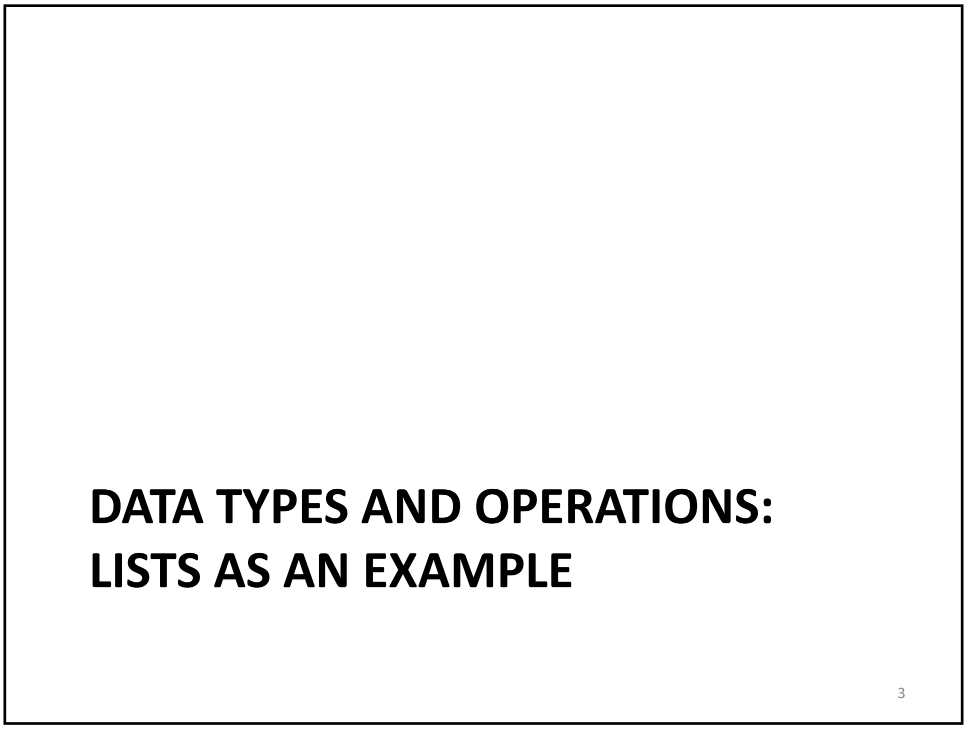

DATA TYPES AND OPERATIONS: LISTS AS AN EXAMPLE

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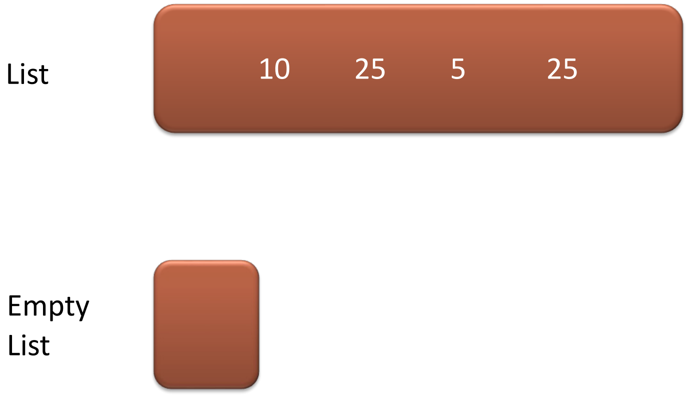
List == “Grocery list”

Apples
Oranges
Lettuce
Carrots
Bread
Wine
Eggs
Sausages
…

4

Lists



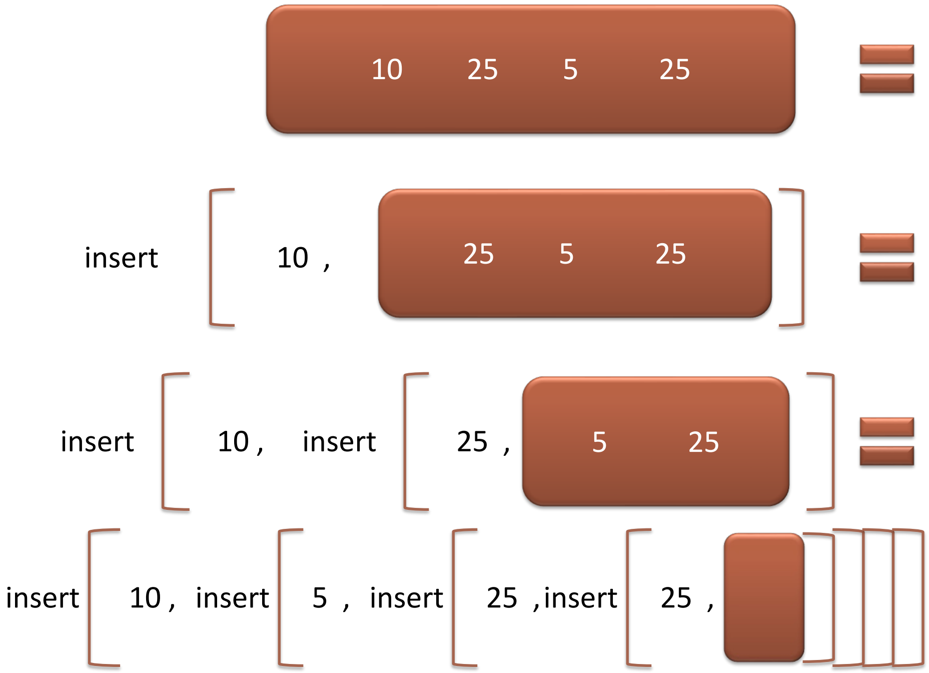
List

10 25 5 25

Empty List

5

5



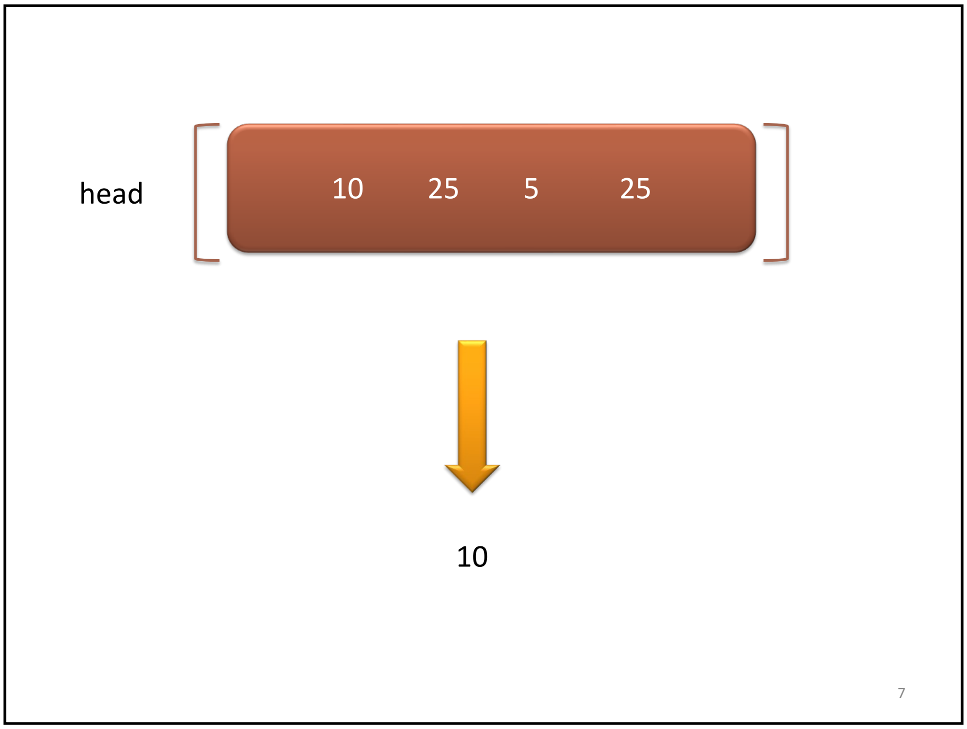
10 25 5 25

insert 10 , 25 5 25

insert 10 , insert 25 , 5 25

insert 10 , insert 5 , insert 25 ,insert 25 ,

6



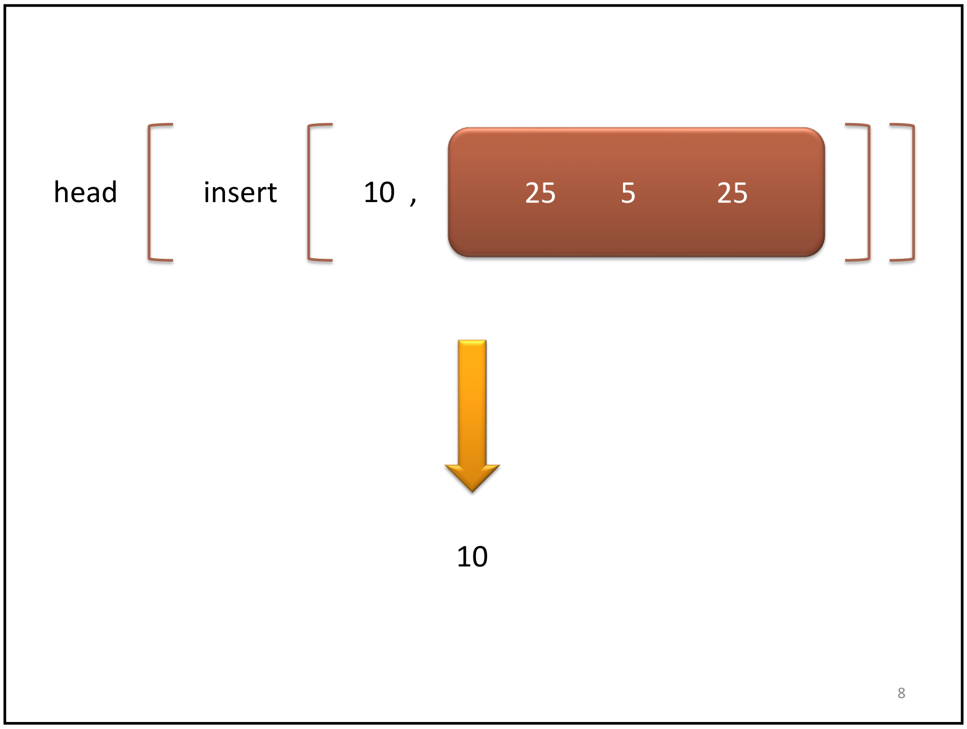
head

10 25 5 25

10

7

7



head

insert

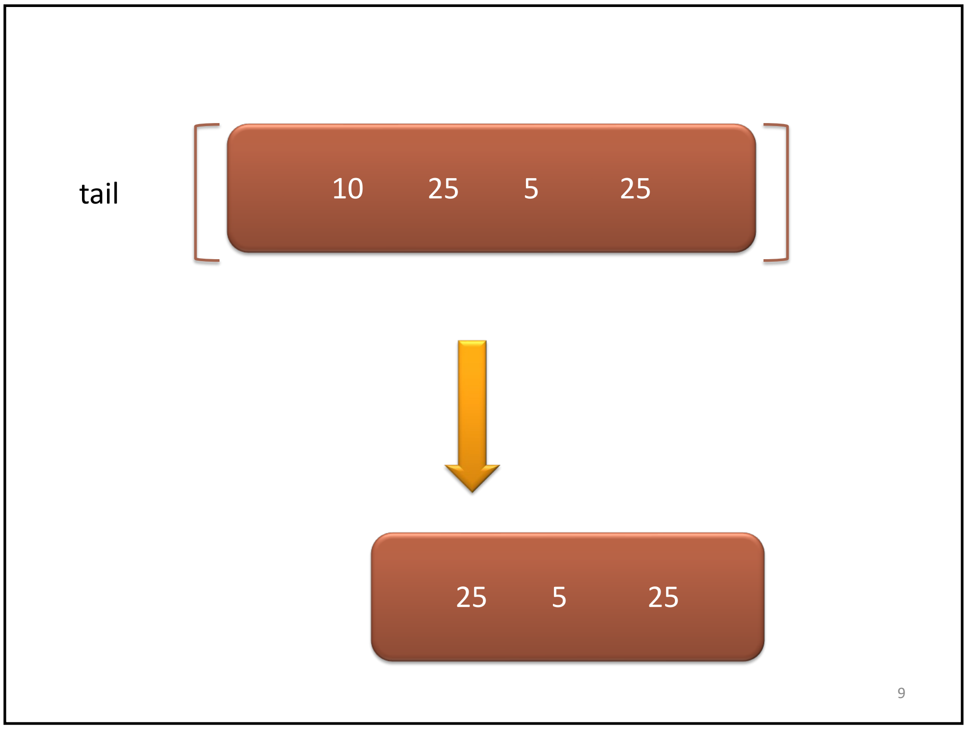
10 ,

25 5 25

10

8

8

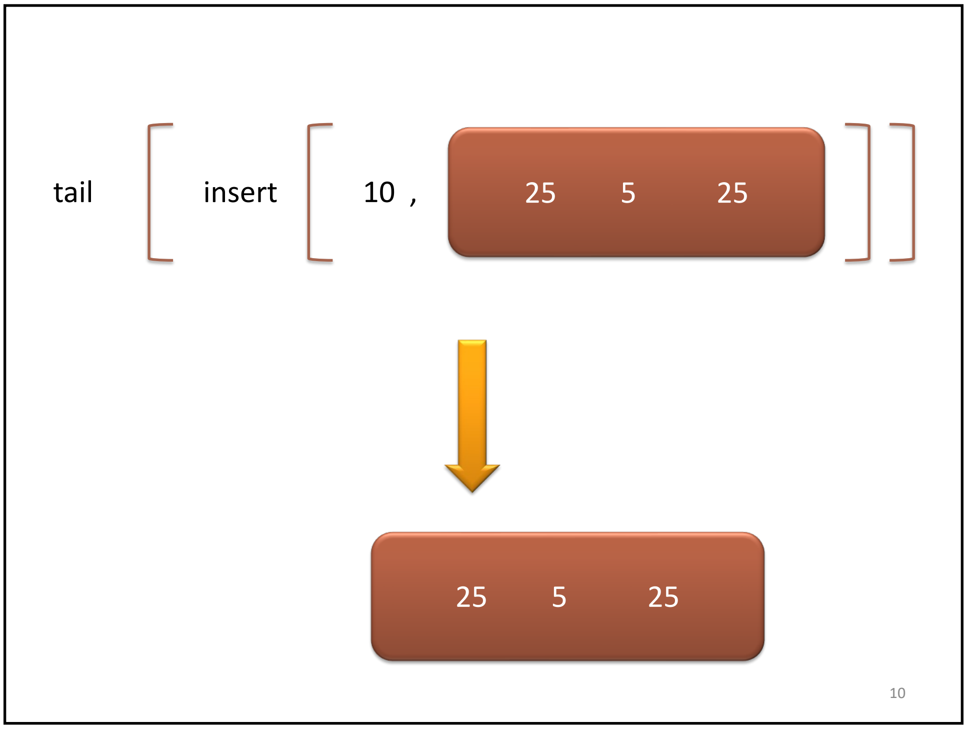


tail [10 25 5 25]

25 5 25

9

9

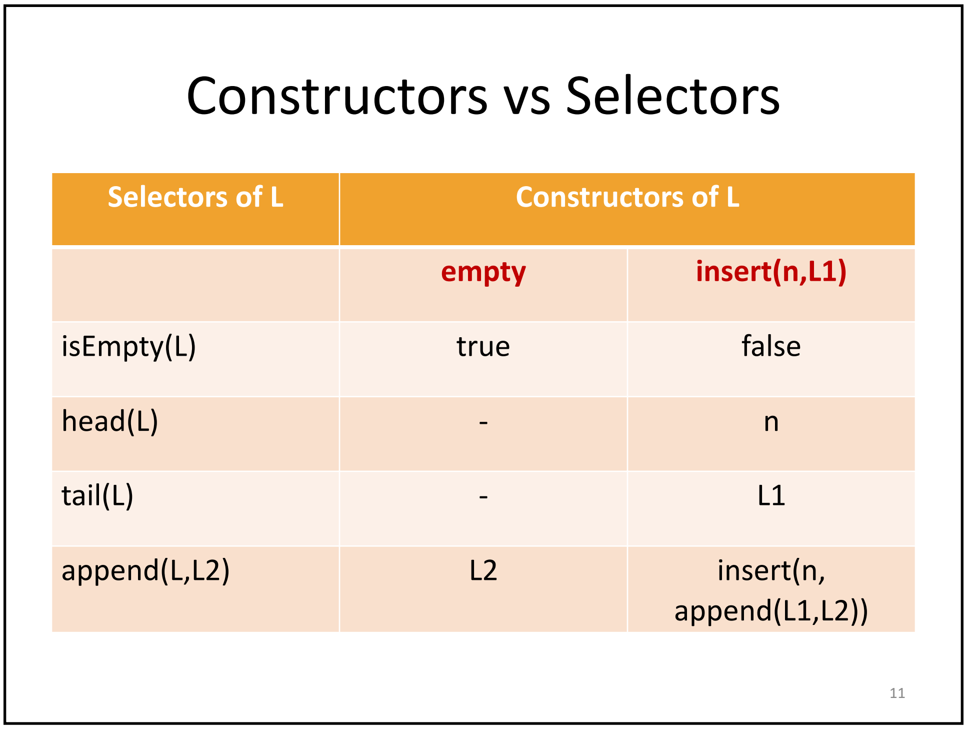


tail [insert [10 , 25 5 25]]

25 5 25

10

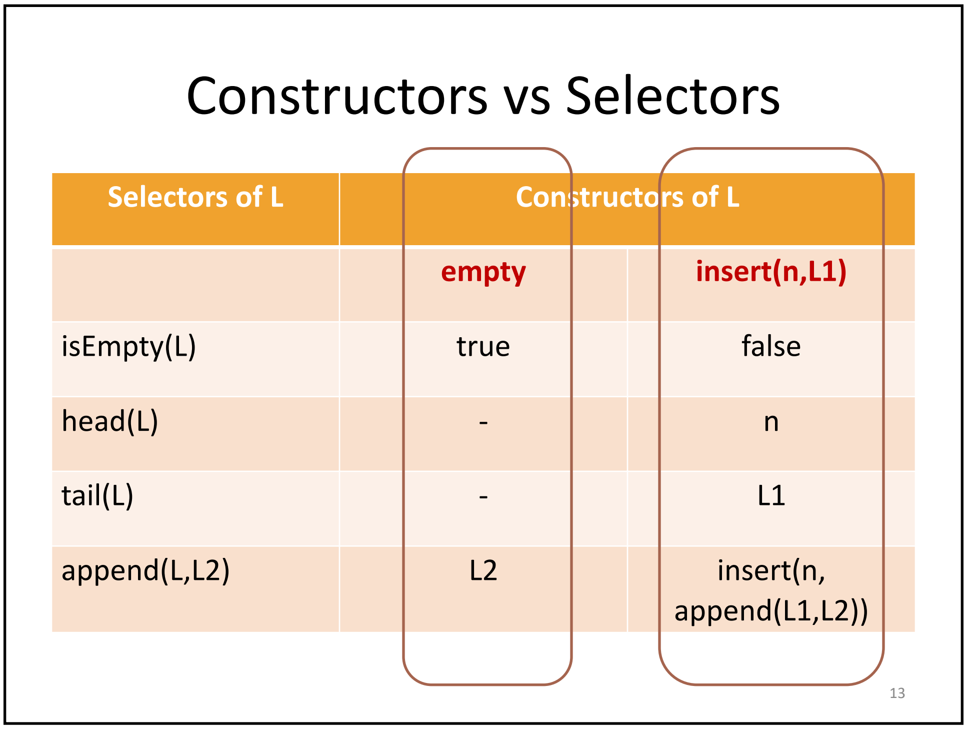
10



Constructors vs Selectors

Selectors of L	Constructors of L	
	empty	**insert(n,L1)**
isEmpty(L)	true	false
head(L)	-	n
tail(L)	-	L1
append(L,L2)	L2	insert(n, append(L1,L2))

CONSTRUCTOR-ORIENTED REPRESENTATION



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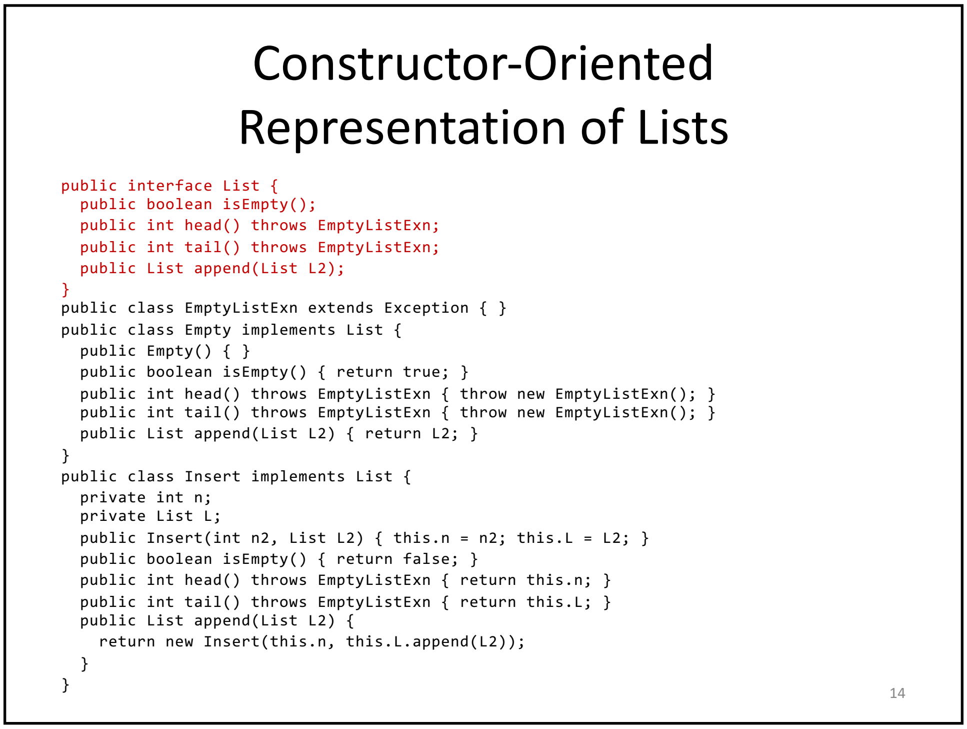
13



Constructor-Oriented Representation of Lists

```
public interface List {
  public boolean isEmpty();
  public int head() throws EmptyListExn;
  public int tail() throws EmptyListExn;
  public List append(List L2);
}
public class EmptyListExn extends Exception { }
public class Empty implements List {
  public Empty() { }
  public boolean isEmpty() { return true; }
  public int head() throws EmptyListExn { throw new EmptyListExn(); }
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public class Insert implements List {
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```
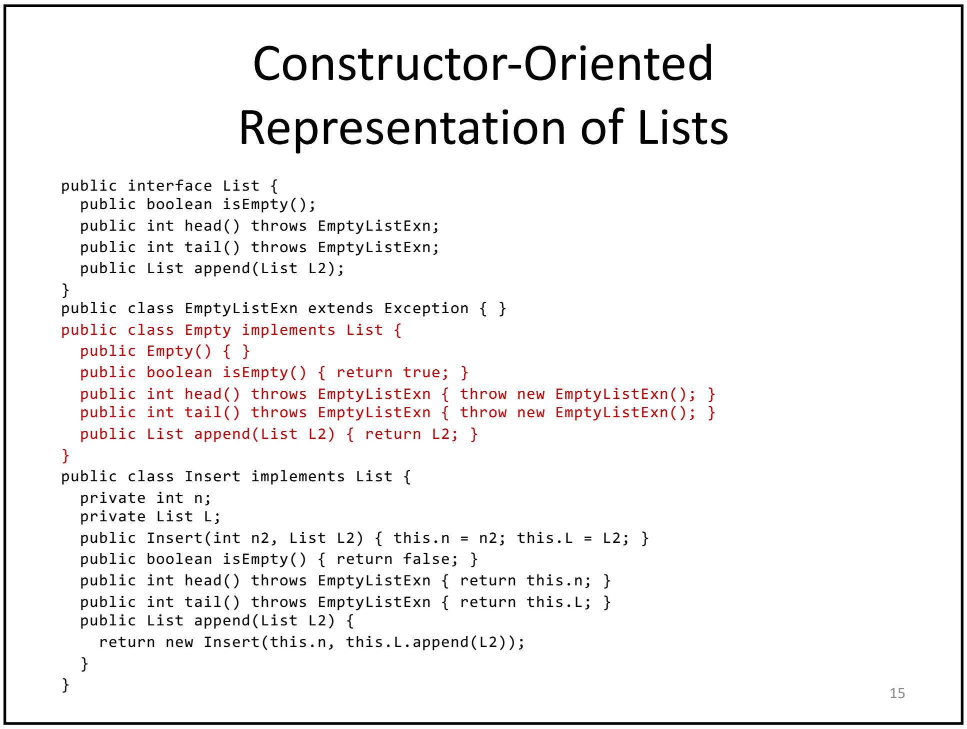

14

14



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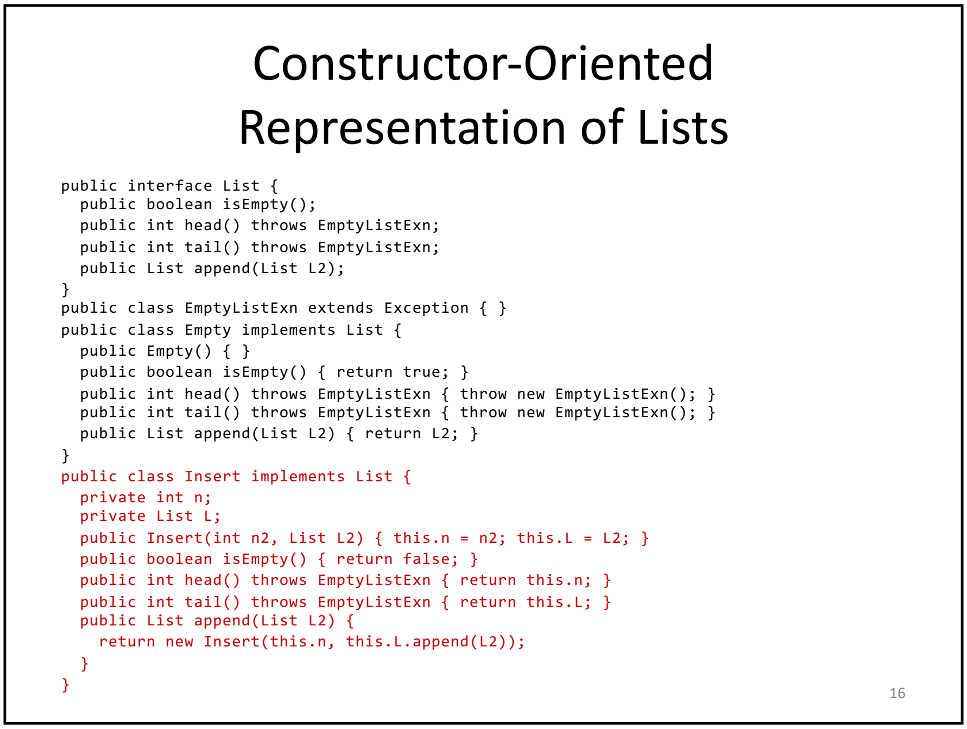

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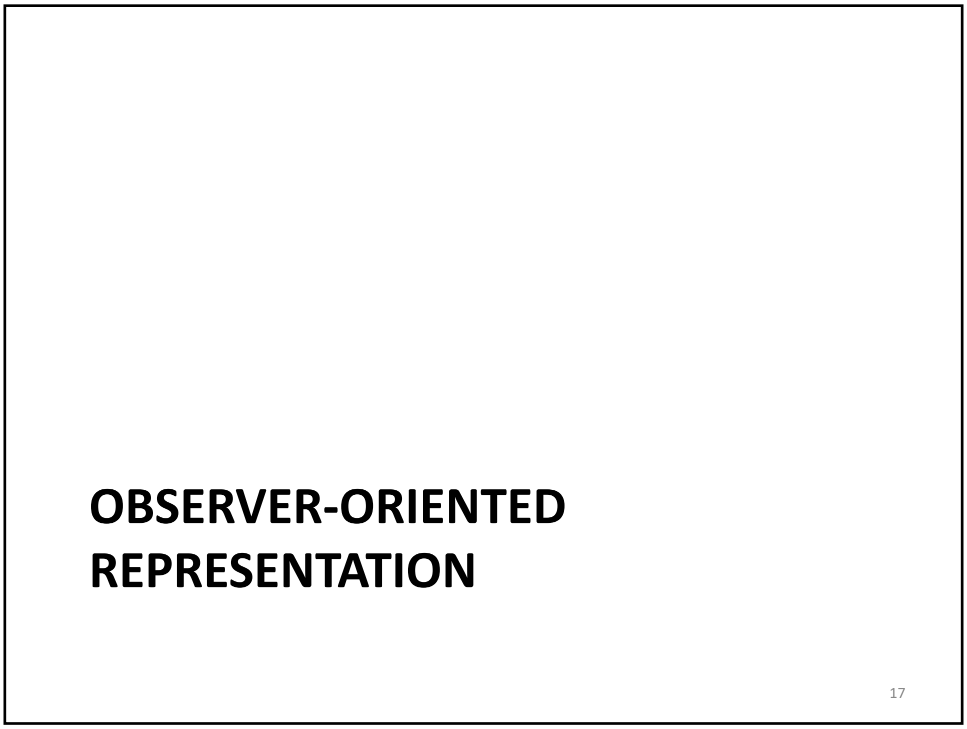
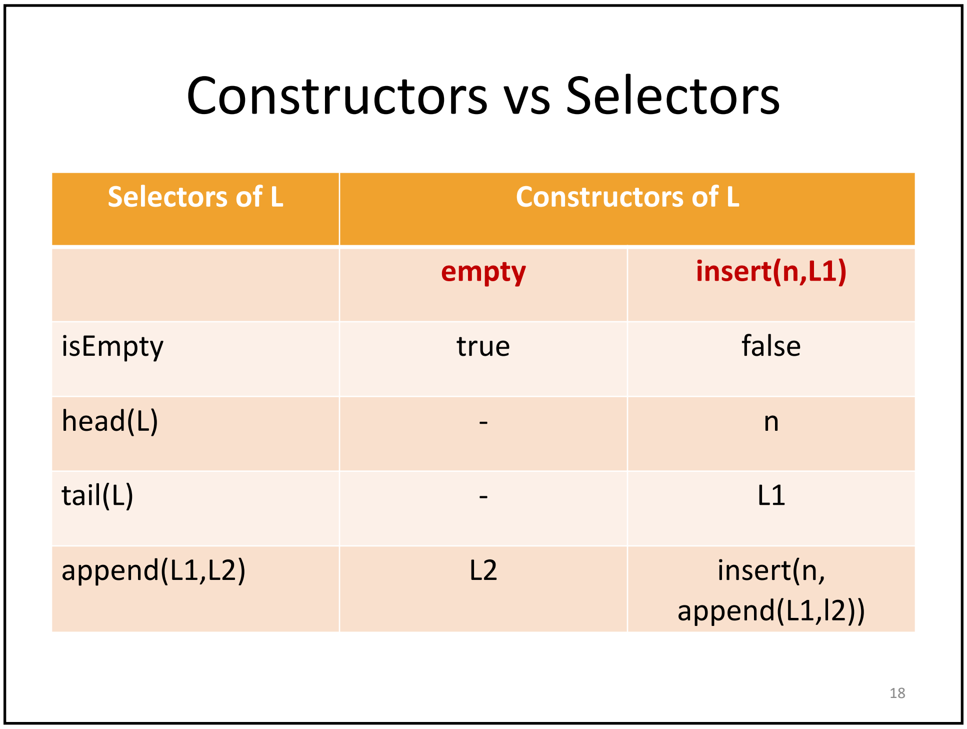


OBSERVER-ORIENTED REPRESENTATION



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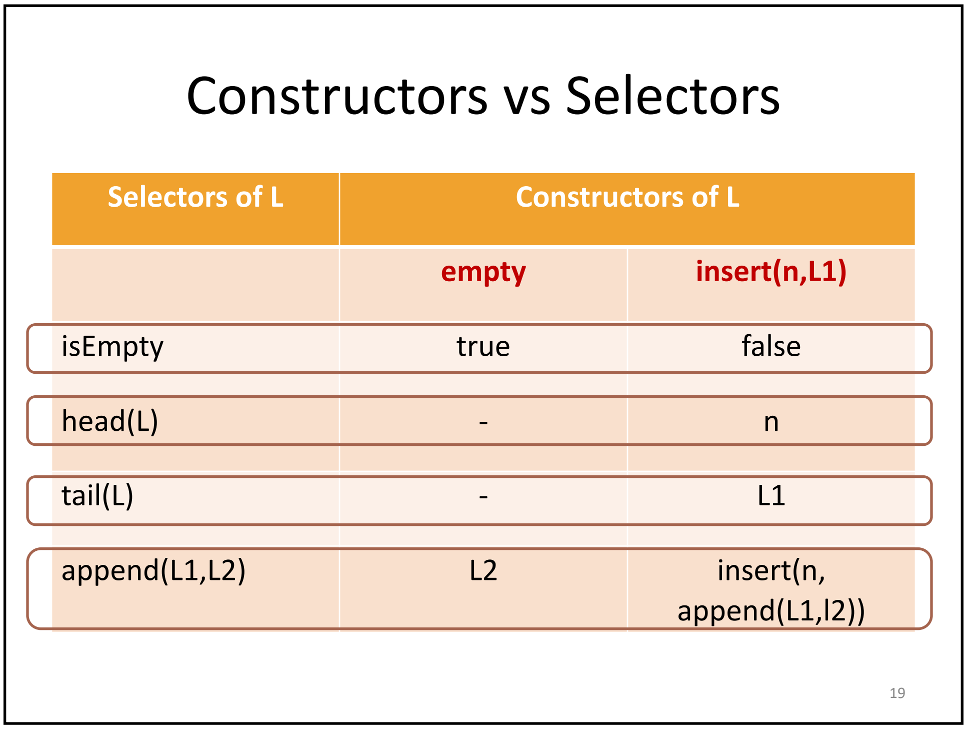

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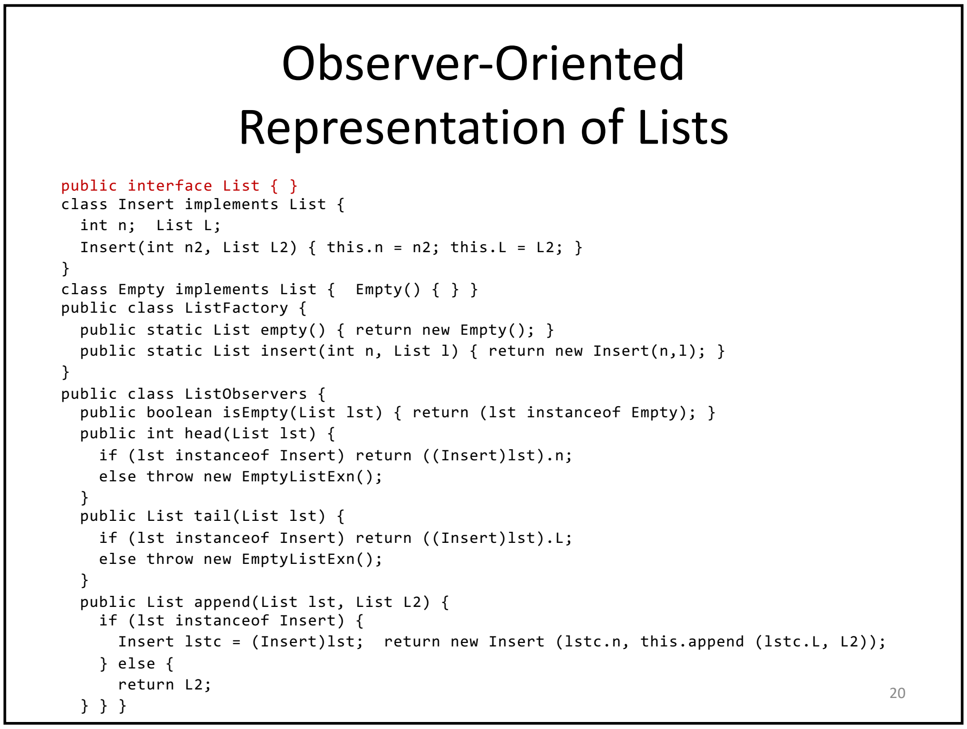

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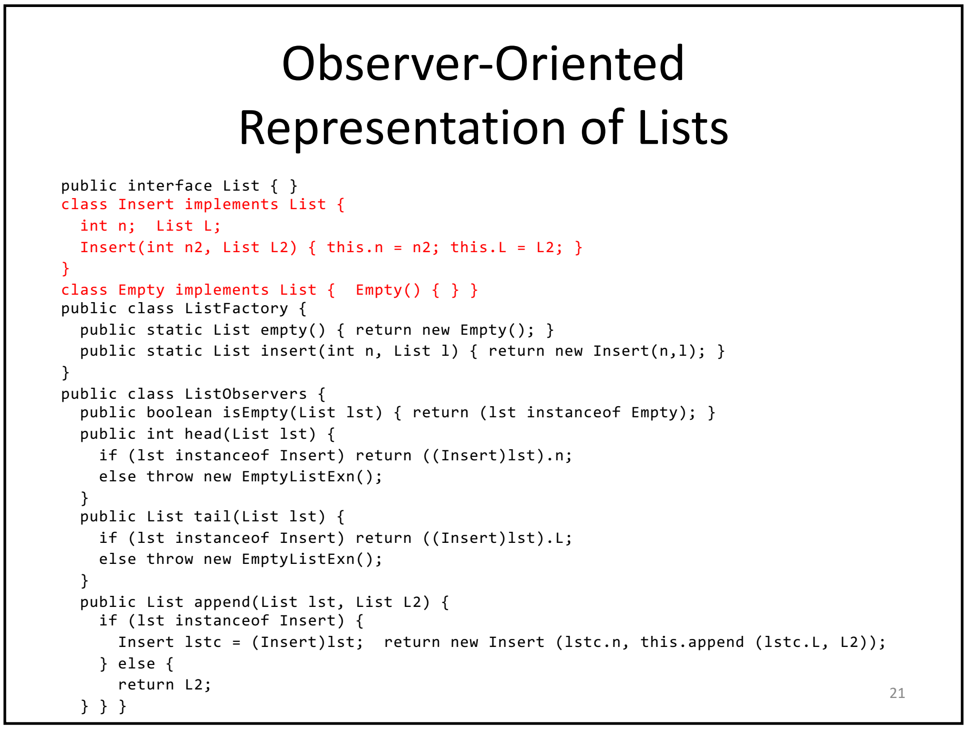

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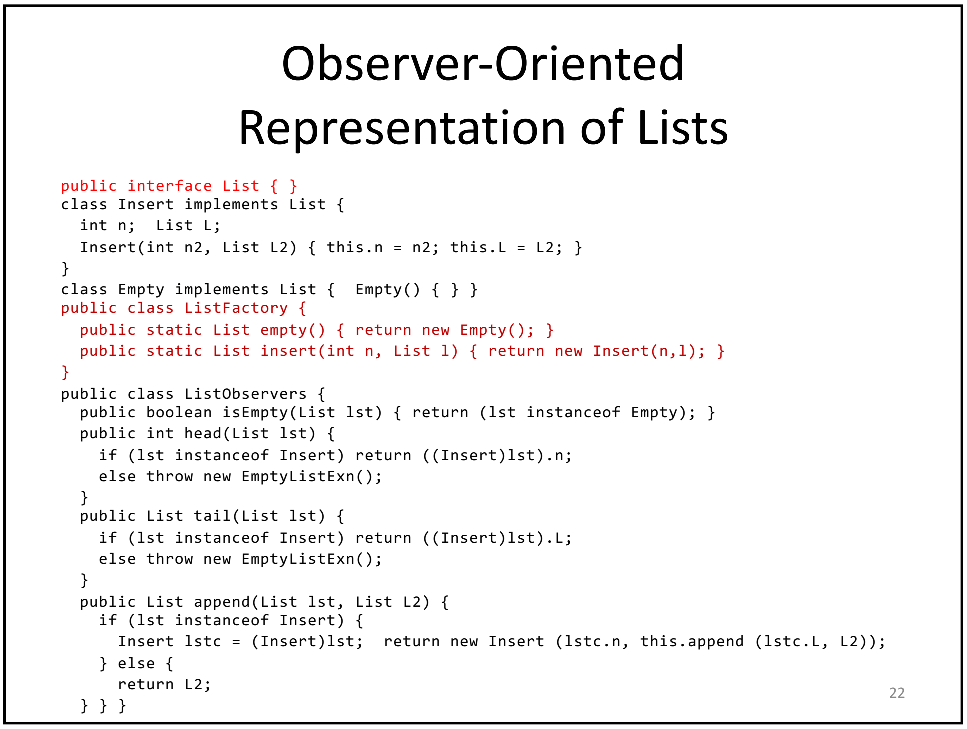

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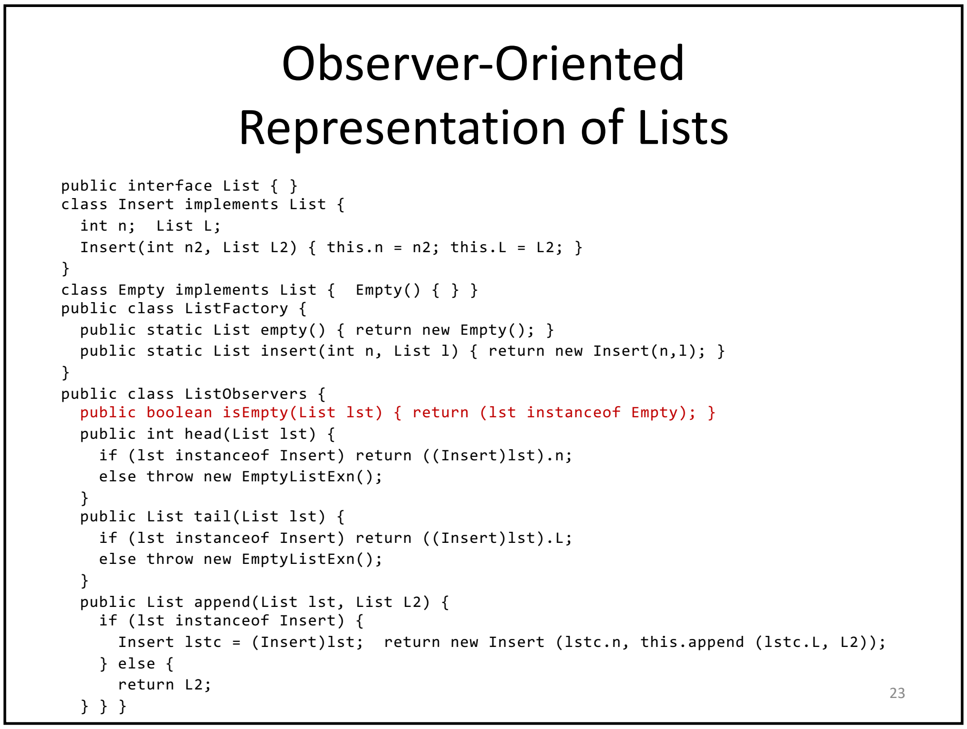

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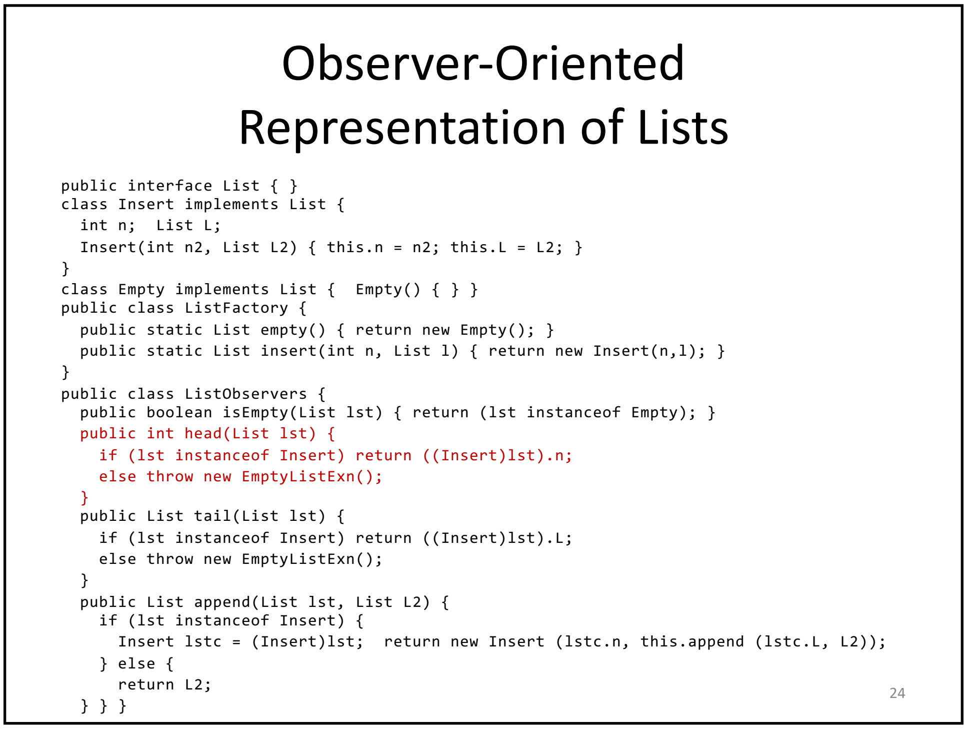

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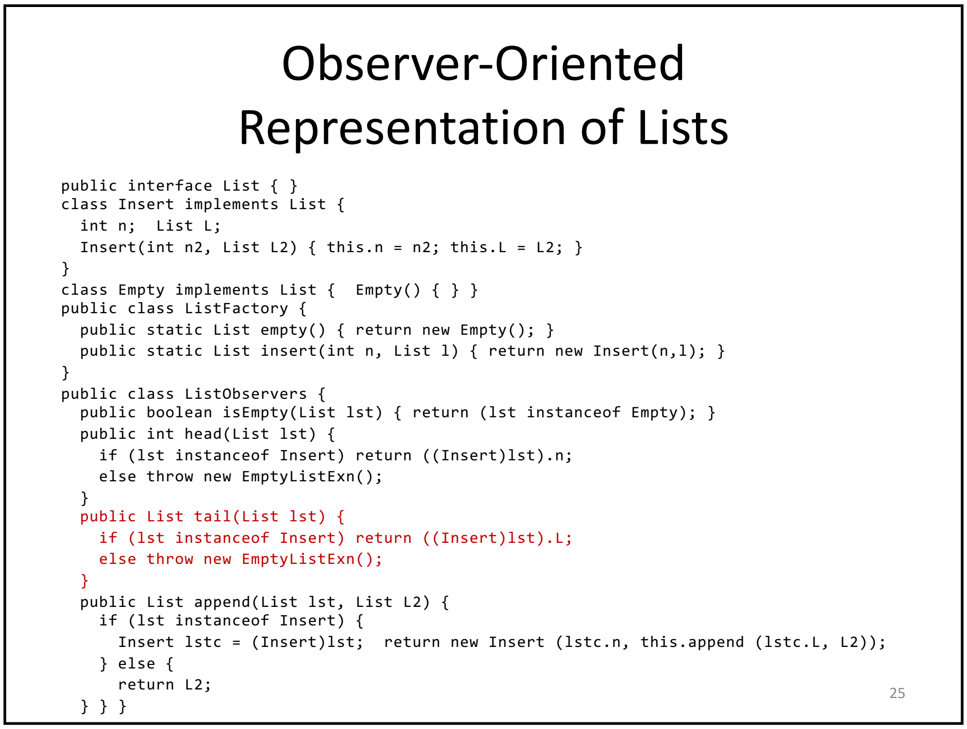

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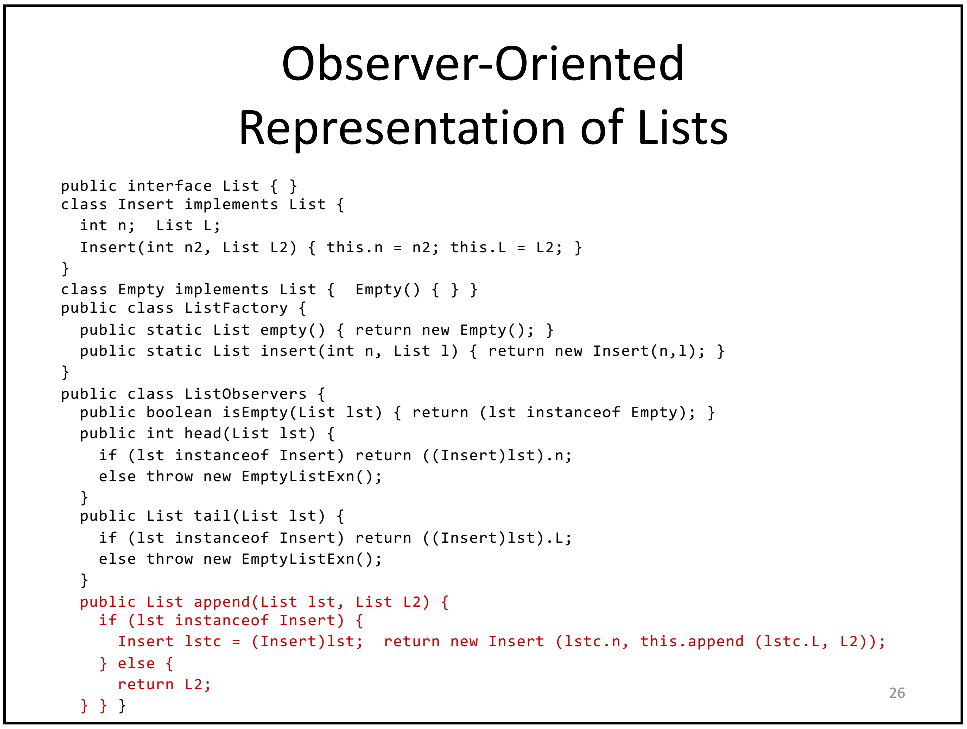

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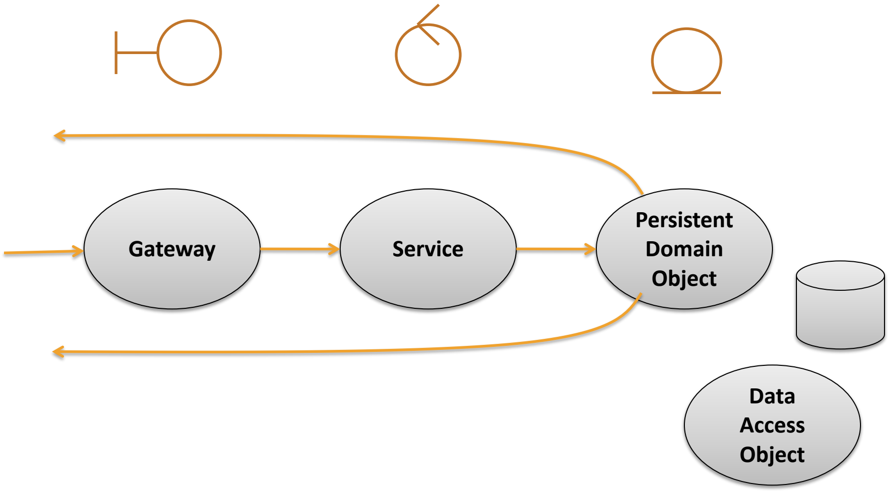
SERVICE-ORIENTED ARCHITECTURE

Domain-Driven



Gateway

Service

Persistent Domain Object

Data Access Object

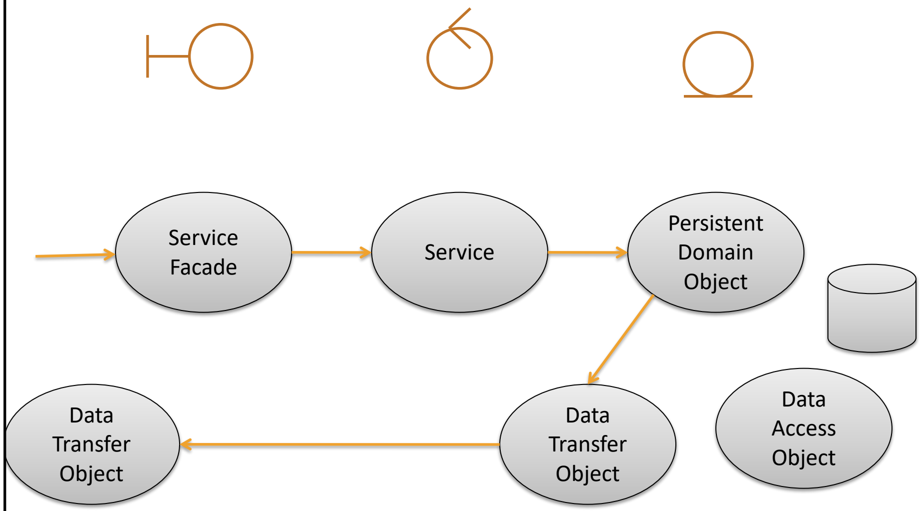
Patterns

- Data Access Object (DAO)
  - Encapsulates and abstracts logic for data access and storage
- Persistence Domain Object (PDO)
  - Used to persist a domain entity object in the database
- **Data Transfer Object (DTO)**
  - Container for entity state to be transferred
  - Not the same as a value object

Service Oriented Architecture

- Move domain logic out of the entity objects
  - Out of the PDOs
- Entity object becomes data transfer object (DTO)
- Logic is enshrined (as use case logic) in **services**
- **Service Façade Pattern:** Collection of procedures encapsulates resources and domain logic, abstracts domain details

Service-Oriented



DDA vs SOA

- DDA
  - Key pattern: Gateway
  - Expose domain objects
  - Data in PDOs
  - Domain logic in PDOs
- SOA
  - Key pattern: Service Façade
  - Encapsulate & abstract domain objects
  - Data in DTOs
  - Domain logic in services