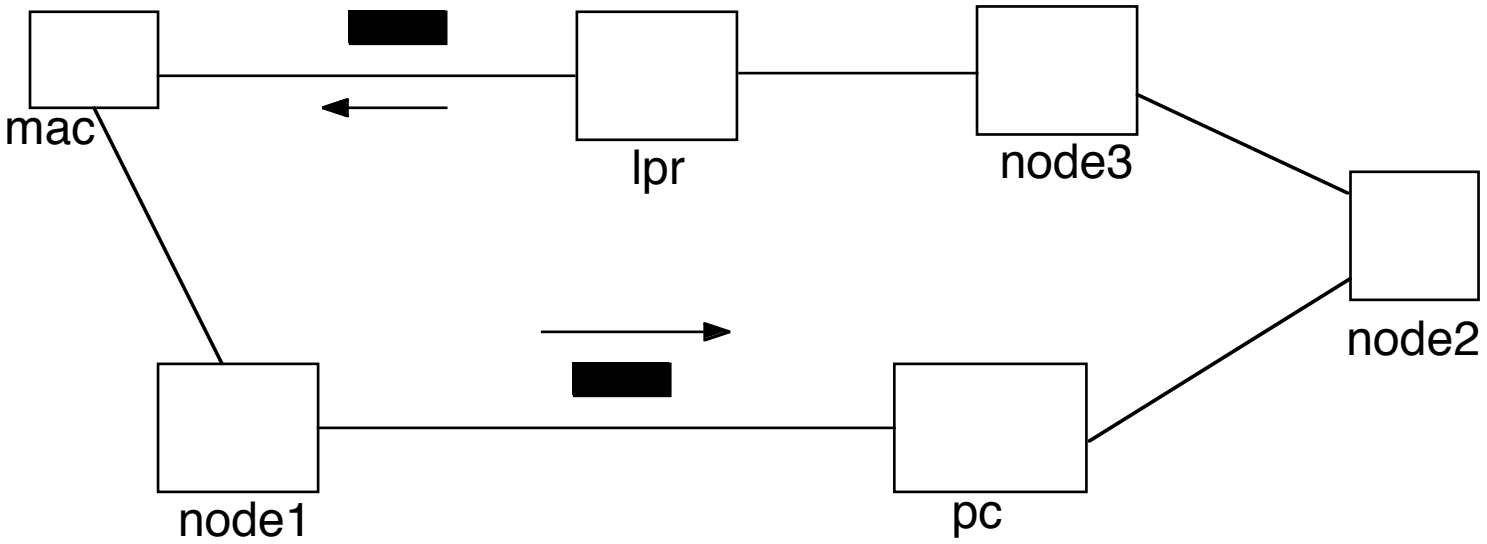
Let's Play Objects

- Simulate a LAN physically
- Set up a context for
  - future chapters
  - Exercises
- Some forward references to intriguate you

A LAN Simulator

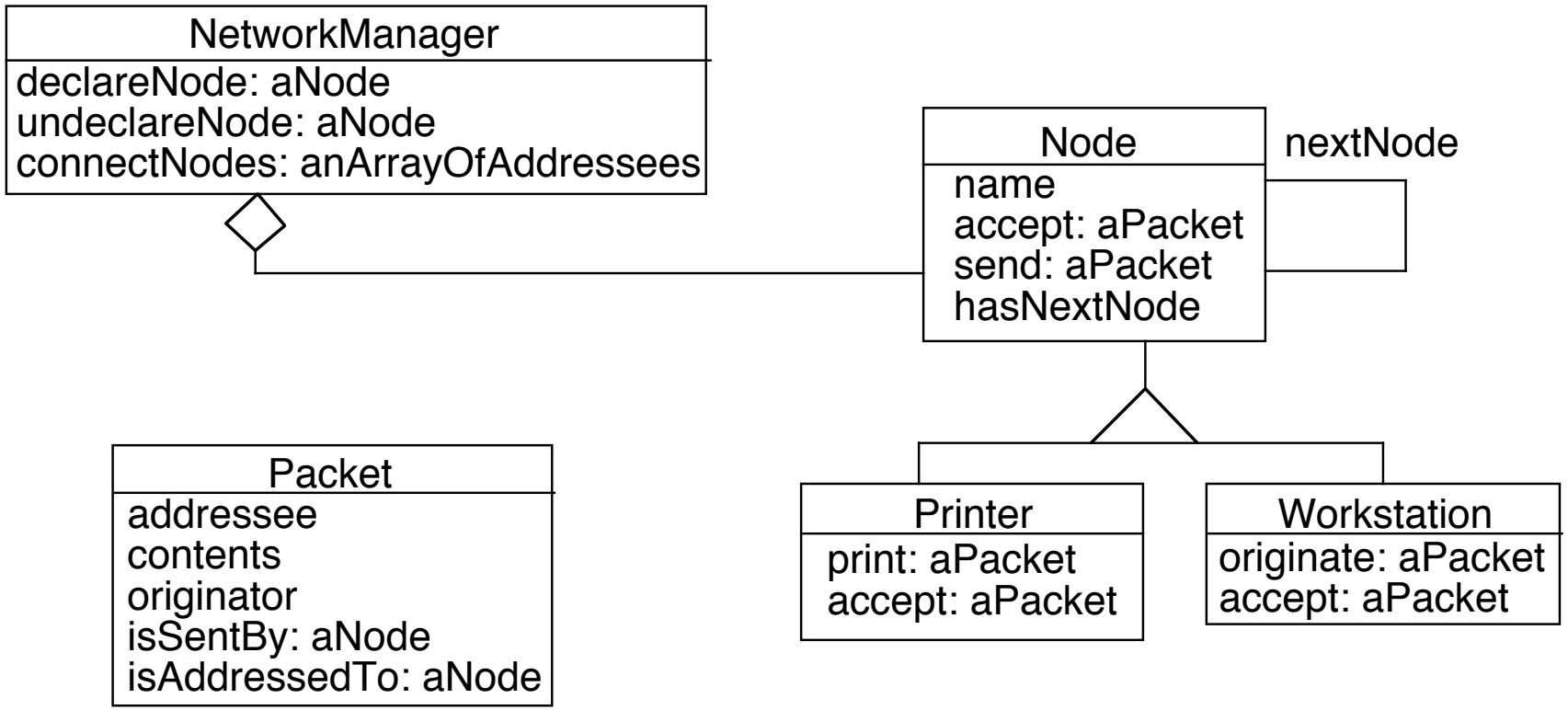
- A LAN contains nodes, workstations, printers, file servers. Packets are sent in a LAN and each node treats them differently.



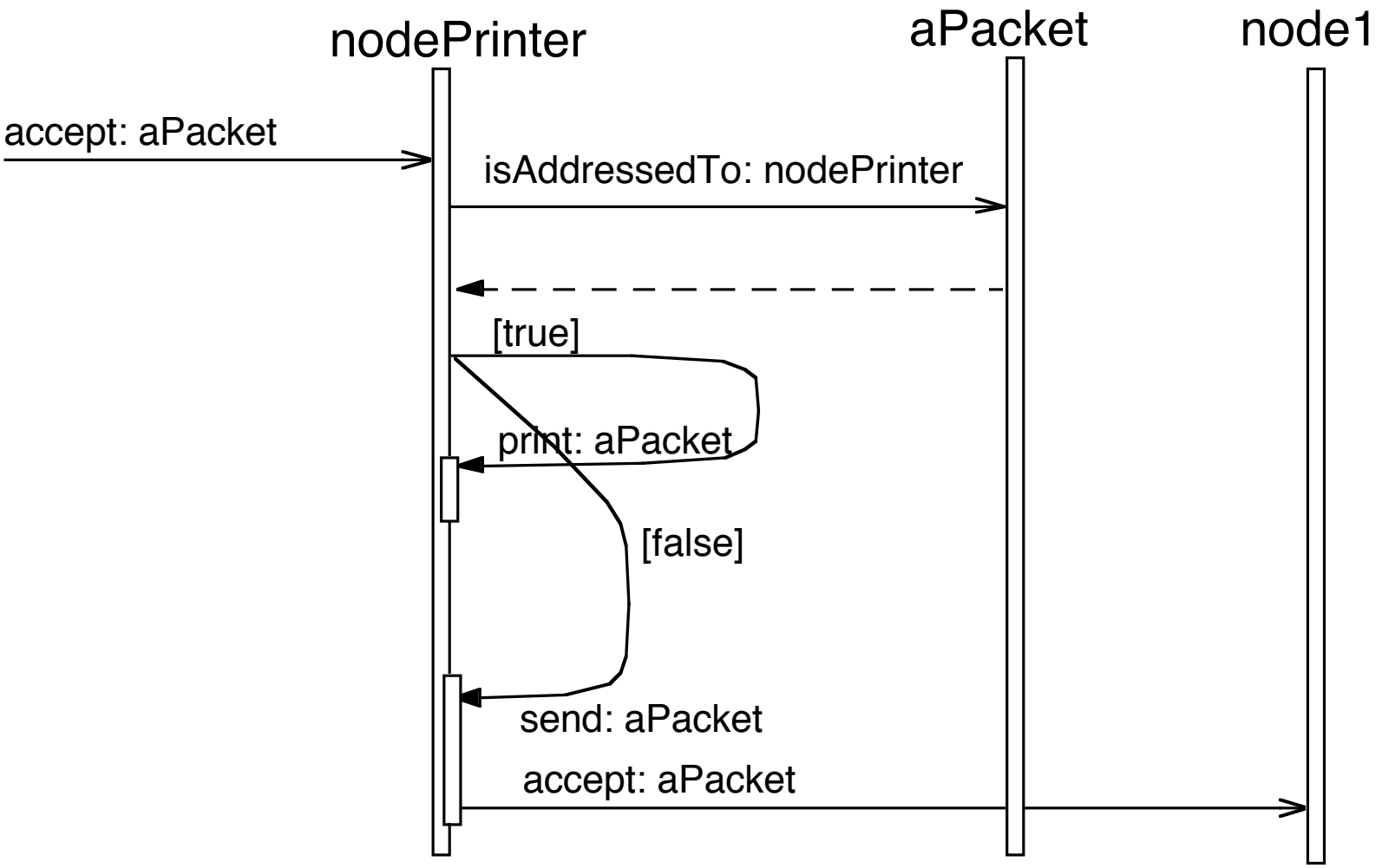
Three Kinds of Objects

- Node and its subclasses represent the entities that are connected to form a LAN.
- Packet represents the information that flows between Nodes.
- NetworkManager manages how the nodes are connected

LAN Design


NetworkManager
declareNode: aNode
undeclareNode: aNode
connectNodes: anArrayOfAddressees
Node
name
accept: aPacket
send: aPacket
hasNextNode
nextNode
Packet
addressee
contents
originator
isSentBy: aNode
isAddressedTo: aNode
Printer
print: aPacket
accept: aPacket
Workstation
originate: aPacket
accept: aPacket

Interactions Between Nodes



Node and Packet Creation

```
|macNode pcNode node1 printerNode node2 node3 packet|
macNode := Workstation withName: #mac.
pcNode := Workstation withName: #pc.
node1 := Node withName: #node1.
node2 := Node withName: #node2.
node3 := Node withName: #node2.
printerNode := Printer withName: #lpr.
macNode nextNode: node1.
node1 nextNode: pcNode.
pcNode nextNode: node2.
node3 nextNode: printerNode.
lpr nextNode: macNode.

packet := Packet send: 'This packet travelled to' to: #lpr.
```

Objects communicate via Messages (II)

- Message: 1 + 2
  - receiver : 1 (an instance of SmallInteger)
  - selector: #+
  - arguments: 2
- Message: lpr nextNode: macNode
  - receiver lpr (an instance of LanPrinter)
  - selector: #nextNode:
  - arguments: macNode (an instance of Workstation)
- Message: Packet send: 'This packet travelled to' to: #lpr
  - receiver: Packet (a class)
  - selector: #send:to:
  - arguments: 'This packet travelled to' and #lpr

The Definition of a LAN

- To simplify the creation and the manipulation of a LAN:

```
| aLan |
aLan := NetworkManager new.
aLan createAndDeclareNodesFromAddresses: #(node1node2 node3)
  ofKind: Node.
aLan createAndDeclareNodesFromAddresses: #(mac pc) ofKind:
  Workstation.
aLan createAndDeclareNodesFromAddresses: #(lpr) ofKind:
  LanPrinter.
aLan connectNodesFromAddresses: #(mac node1 pc node2 node3
  lpr)
```

- Now we can query the LAN to get some nodes:

```
aLan findNodeWithAddress: #mac
```

Transmitting a Packet

```
| aLan packet macNode|
...
macNode := aLan findNodeWithAddress: #mac.
packet := Packet send: 'This packet travelled to the
printer' to: #lpr.
macNode originate: packet.
```

-> mac sends a packet to pc
-> pc sends a packet to node1
-> node1 sends a packet to node2
-> node2 sends a packet to node3
-> node3 sends a packet to lpr
-> lpr is printing
-> this packet travelled to lpr

How to Define a Class

Fill the template:

```
NameOfSuperclass subclass: #NameOfClass
instanceVariableNames: 'instVarName1'
classVariableNames: 'ClassVarName1 ClassVarName2'
poolDictionaries: ''
category: 'LAN'
```

For example to create the class Packet

```
Object subclass: #Packet
instanceVariableNames: 'addressee originator contents '
classVariableNames: ''
poolDictionaries: ''
category: 'LAN'
```

How to define a method?

```
message selector and argument names
  "comment stating purpose of message"
  | temporary variable names |
  statements
```

```
LanPrinter>>accept: thePacket
    "If the packet is addressed to me, print it.
     Otherwise just behave like a normal node."
    (thePacket isAddressedTo: self)
        ifTrue: [self print: thePacket]
        ifFalse: [super accept: thePacket]
```

In Java

In Java we would write

```
void accept(thePacket Packet)
/*If the packet is addressed to me, print it.
Otherwise just behave like a normal node.*/
if (thePacket.isAddressedTo(this)){
        this.print(thePacket)}
        else super.accept(thePacket)}
```