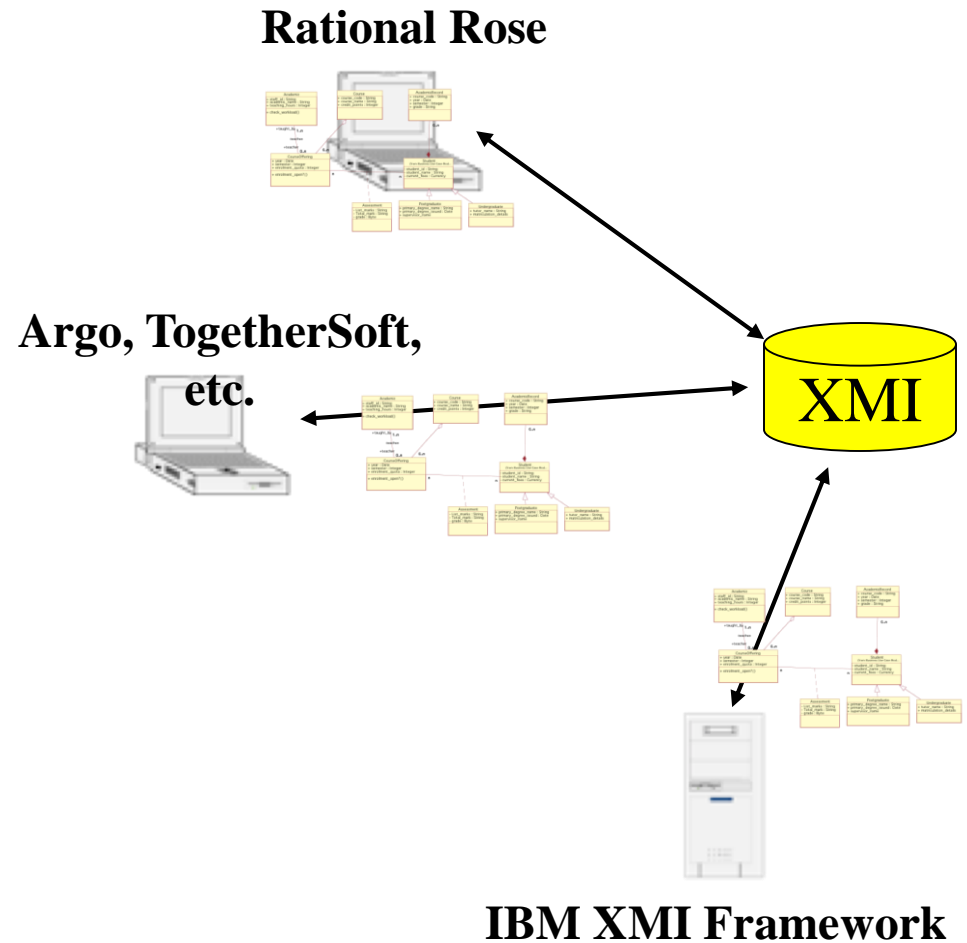


Generating XML Documents from UML Instances

Through Example

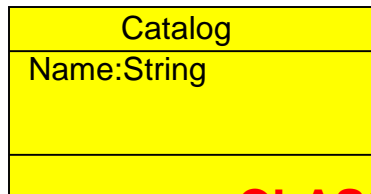
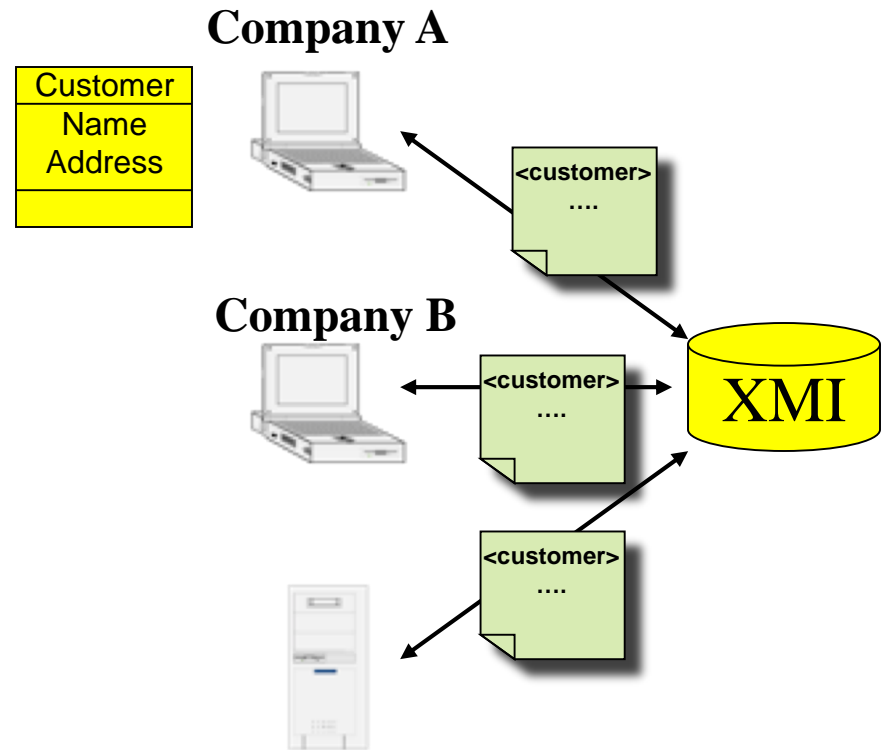
XML Data Interchange: XMI

- Standard sponsored by the OMG
- Originally for allowing interchange of UML models between UML editors

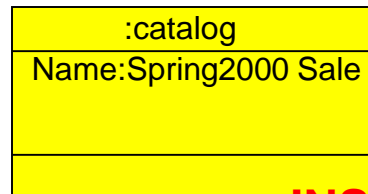


XML Data Interchange: XMI

- Now seen as sensible XML representation of UML for other purposes
 - E.g. XML representation of entities specified using UML
- Want to generate
 - XML document instance from UML **instance** model
 - Validating Schema/DTD from corresponding UML **class** model



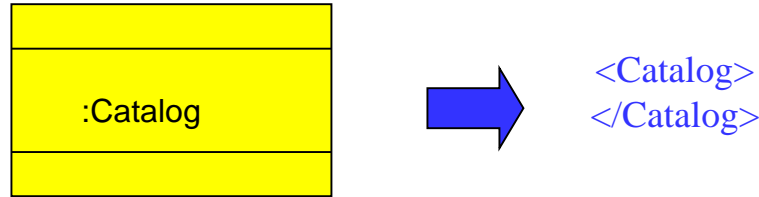
CLASS



INSTANCE

UML Class mapping

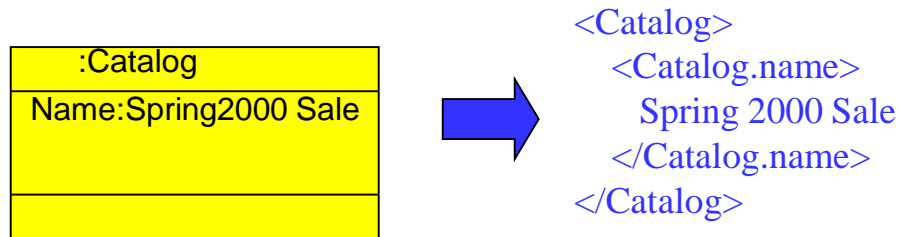
- Each instance of a UML class produces one XML element



- UML class name translates to XML tag name
- Be careful in naming your UML classes as XML has restrictions on valid tag names
 - Cannot contain spaces
 - Alpha or Number characters but also full stop, dash or underscore (. - _)
 - Can begin with letter or _
 - CANNOT begin with letters XML !!

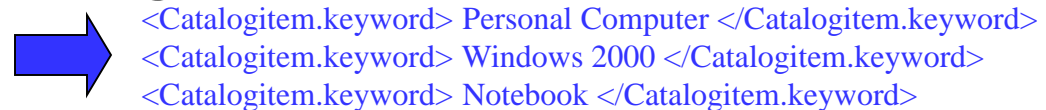
UML Attribute mapping

- Each attribute of a UML class produces a child XML element
- Element name is made unique by prepending with the class name



- XML has no representation for multivalued attributes of UML so these attributes are translated into individual XML elements

– E.g. `keyword[0..*]:String`



Over to you...

:Academic
Staff_id: 1234 Name: John Smith Teaching_hours: 500

Over to you...

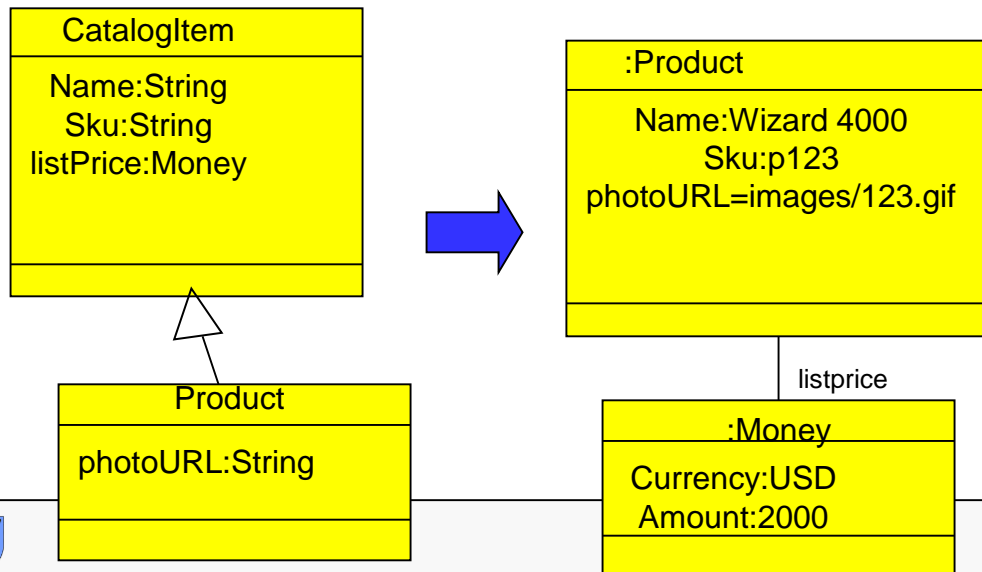
:Academic
Staff_id: 1234 Name: John Smith Teaching_hours: 500

```
<Academic>  
  <Academic.staff_id> 1234 </Academic.staff_id>  
  <Academic.name> John Smith </Academic.name>  
  <Academic.teaching_hours> 500 </Academic.teaching_hours>  
</Academic>
```

UML Inheritance mapping

- Current XML standards do not have built in mechanism for representation of inheritance
- The 'XMI standard' specifies use of "copy down" approach for generalisations, attributes, association refs and compositions
 - That is definitions from all superclasses are copied down to the class being translated into XML

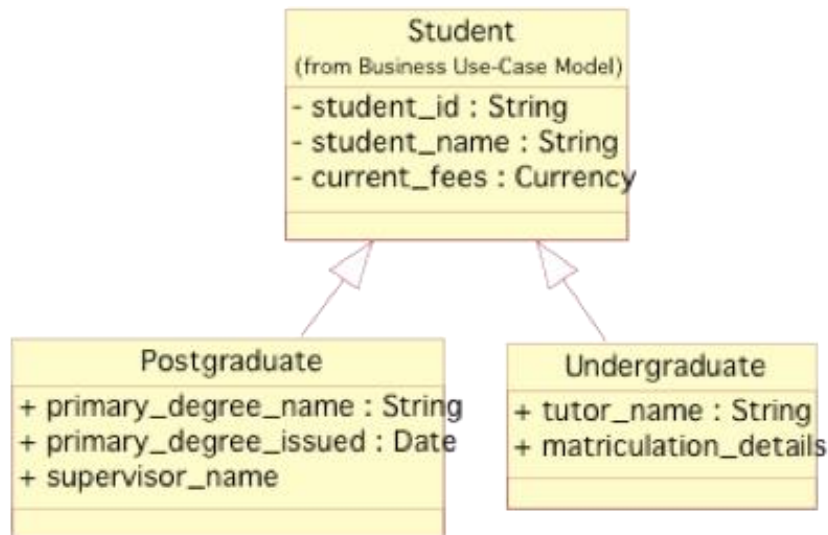
Note: element name due to copy down from superclass CatalogItem



```
<Product>
  <CatalogItem.name>
    Wizard 4000
  </CatalogItem.name>
  <CatalogItem.sku> p123
</CatalogItem.sku>
  <CatalogItem.listPrice>
    <Money>
      <Money.currency>USD</Money.currency>
      <Money.amount>2000</Money.amount>
    </Money>
  </CatalogItem.listPrice>
  <Product.photoURL> images/123.gif
</Product.photoURL>
</Product>
```

Money is a class so its attributes copied in

Over to you...



:Student
Student_id: 99124 Student_name: Frank Clarke Current_fees: 6500

:Postgraduate
Primary_degree_name:BA Primary_degree_issued:12 Nov 2003 Supervisor_name: John Smith

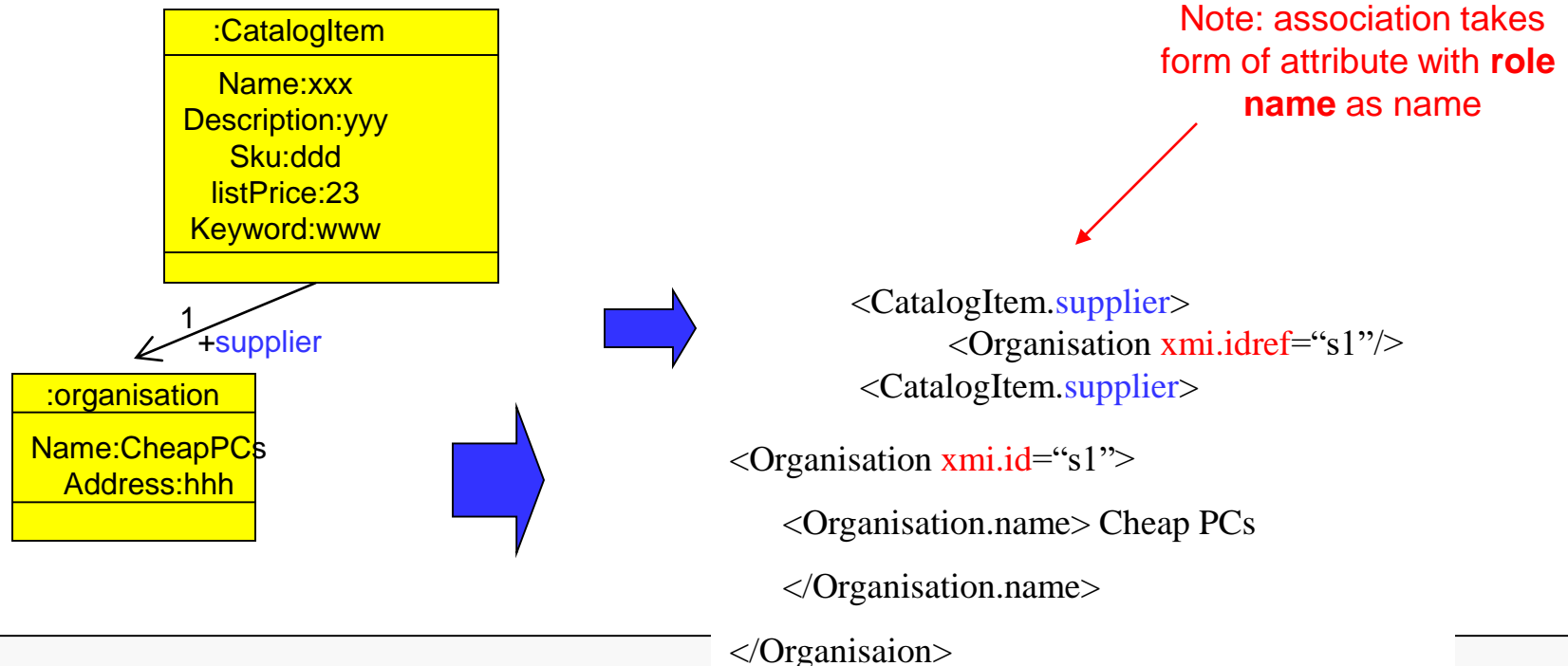
```
<Postgraduate>
  <Student.student_id> 99124 </Student.student_id>
  <Student.student_name> Frank Clarke </Student.student_name>
  <Student.current_fees> 6500 </Student.current_fees>
  <Postgraduate.primary_degree_name> BA </Postgraduate.primary_degree_name>
  <Postgraduate.primary_degree_issued > 12 November 2003 </Postgraduate.primary_degree_issued>
  <Postgraduate.supervisor_name > John Smith </Postgraduate.supervisor_name>
</Postgraduate>
```

UML Associations

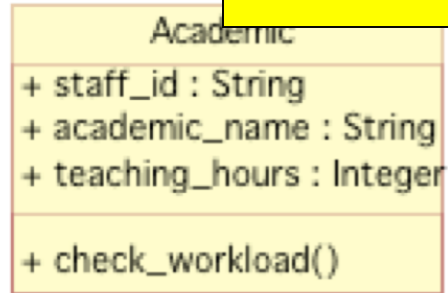
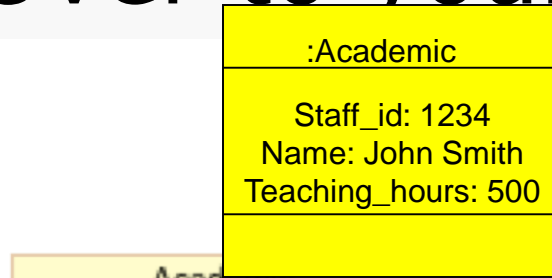
Simple approach

- A reference to the class of the associated class is included in the definition using the **xmi.idref** attribute

– **xmi.id** then used to label definition of class



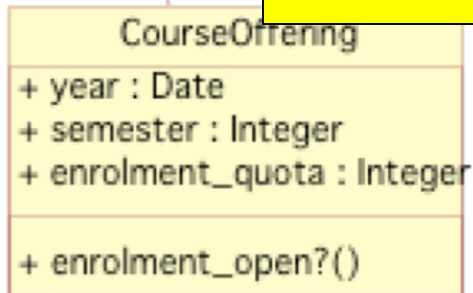
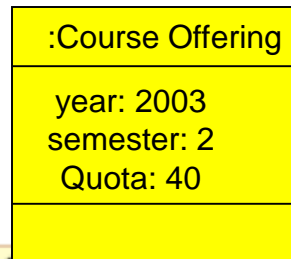
Over to you...



+taught_by^{1..n}

teaches

+teacher^{0..n}



```
<Academic xmi.id="22">  
  <Academic.staff_id> 1234 </Academic.staff_id>  
  <Academic.name> John Smith </Academic.name>  
  <Academic.teaching_hours> 500 </Academic.teaching_hours>  
  <Academic.teacher> <CourseOffering xmi.idref="4ba5"/>  
</Academic.teacher>  
</Academic>
```

```
<CourseOffering xmi.id="4ba5">  
  <CourseOffering.year> 2003 </CourseOffering.year>  
  <CourseOffering.semester> 2 </CourseOffering.semester>  
  <CourseOffering.enrolment_quota> 40 </CourseOffering.enrolment_quota>  
  <CourseOffering.taught_by> <Academic xmi.idref="22"/>  
</CourseOffering.taught_by>  
</CourseOffering>
```



Summary Example

