

Homework #2: RDF and RDF Schema

The following exercises are due at the beginning of class on February 9. This will count for 5% of your overall grade.

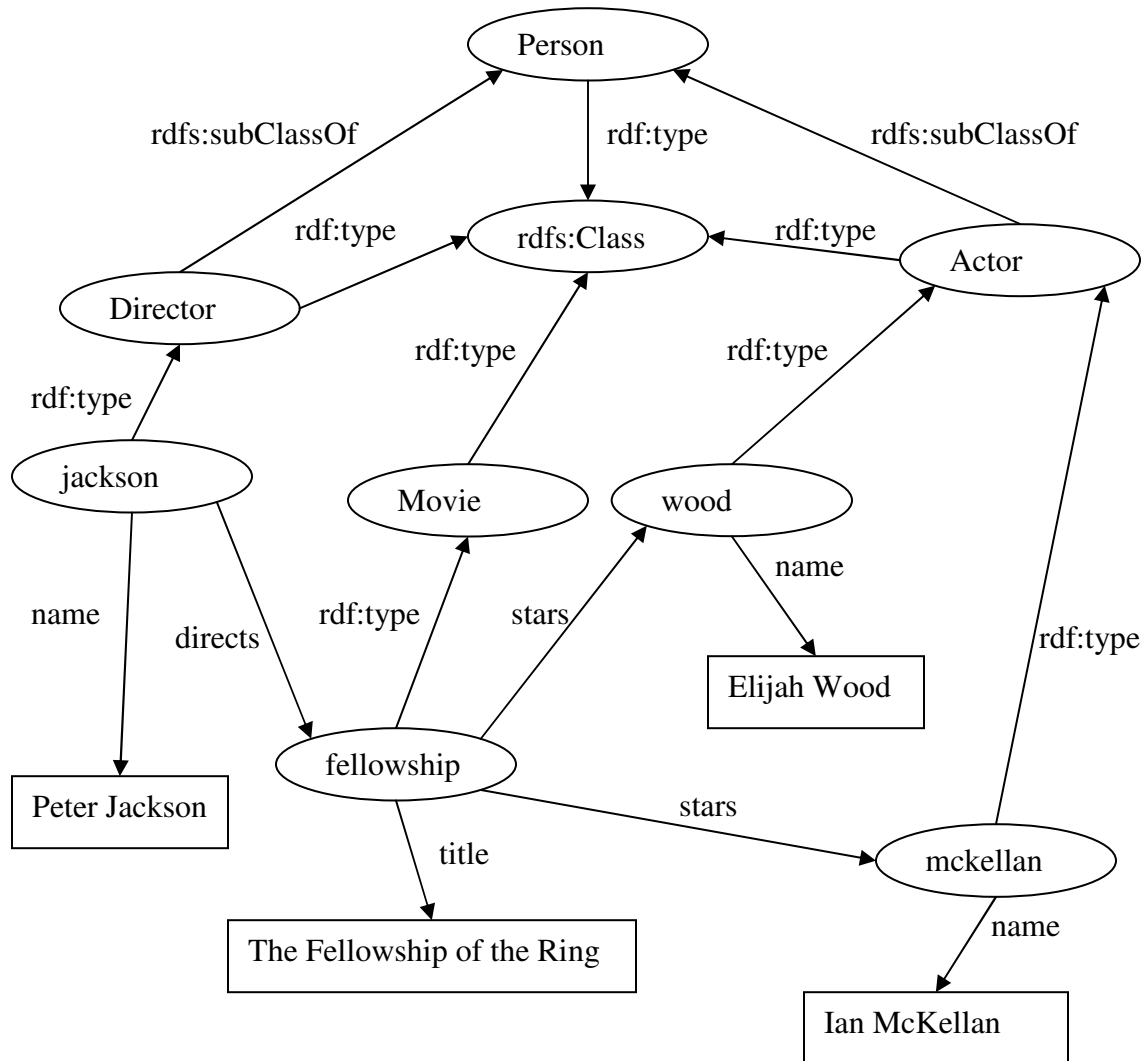
1. [30 points] Consider the following RDF document using the XML syntax. Draw the equivalent graph. For convenience, you may use QNames for your node and edge labels.

```

<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
        xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
        xmlns:u="http://www.example.org/uni#"
        xml:base="http://www.example.org/uni">
  <rdfs:Class rdf:ID="Person" />
  <rdfs:Class rdf:ID="Student" />
    <rdfs:subClassOf="#Person" />
  </rdfs:Class>
  <rdfs:Class rdf:ID="Professor">
    <rdfs:subClassOf="#Person" />
  </rdfs:Class>
  <rdfs:Class rdf:ID="Course" />
  <rdf:Property rdf:ID="advises">
    <rdfs:domain rdf:resource="#Professor" />
    <rdfs:range rdf:resource="#Student" />
    <rdfs:subPropertyOf="#knows">
  </rdf:Property>
  <rdf:Property rdf:ID="takes">
    <rdfs:domain rdf:resource="#Student" />
    <rdfs:range rdf:resource="#Course" />
  </rdf:Property>
  <rdf:Property rdf:ID="teaches">
    <rdfs:domain rdf:resource="#Professor" />
    <rdfs:range rdf:resource="#Course" />
  </rdf:Property>
  <rdf:Property rdf:ID="knows" />
  <u:Professor rdf:ID="alan">
    <u:teaches rdf:resource="#cs100" />
    <u:advises rdf:resource="#rob" />
    <u:advises rdf:resource="#sarah" />
  </u:Professor>
  <u:Student rdf:ID="rob">
    <u:takes rdf:resource="#cs100" />
    <u:takes rdf:resource="#cs200" />
  </u:Student>
</rdf:RDF>

```

2. [30 points] Using the RDFS entailment rules rdfs2, rdfs3, rdfs5, rdfs7, rdfs9, and rdfs11 (see the RDF Semantics recommendation (<http://www.w3.org/TR/rdf-mt/>), Section 7), determine what triples can be inferred from the example in Problem #1. You may ignore the other entailment rules because they do not add anything particularly interesting. You may give your answer either via extending the graph (but use a different line color or style to indicate new triples) or by simply listing the triples.
3. [30 points] Translate the following RDF Graph into the RDF/XML syntax. For node and arcs labeled with QNames, assume the standard prefixes apply. For other names, assume they are all local to the document you are writing.



4. [10 points] According to the 2004 RDFS specification, a property can have multiple rdfs:range statements. When this occurs the range of the property is treated as the intersection of the individual ranges. What advantage does this have over using the union of the individual ranges to determine the actual range? Hint: Consider the distributed design of RDF and the inferences that are sanctioned by rdfs:range.