Exercise 1

1. Express in RDFS:
   • Mackenzie manages the New Business Development department
   • Mackenzie is a manager.
   • Departments are managed by managers.

2. Does “ex:TextBook rdfs:SubClassOf ex:Publication“ follow from these 2 triples?
   ex:TextBook rdfs:subClassOf ex:Book
   ex:Book rdfs:subClassOf ex:Publication

3. Of what type(s) is „ex:Manager“ given the triple below?
   ex:Mackenzie rdf:type ex:Manager
Solution 1.1
Solution 1.2 and 1.3

2. Does “ex:TextBook rdfs:SubClassOf ex:Publication“ follow from these 2 triples? **YES, rdfs:subClassOf is transitive**
   - ex:TextBook rdfs:subClassOf ex:Book
   - ex:Book rdfs:subClassOf ex:Publication

3. What is the type of “ex:Manager“ given the triple below?
   - ex:Mackenzie rdf:type ex:Manager
   It is **rdfs:Class** because of the RDFS axiomatic triple „rdf:type rdfs:range rdfs:Class“ **and rdfs:Resource** because rdfs:Class is a subclass of rdfs:Resource.
Exercise 2

1. What is the type of “ex:Grings” according to the following 3 triples?
   ex:companyStrange ex:produces ex:Grings
   ex:produces rdfs:range ex:SpaceSuit
   ex:produces rdfs:range ex:SpaceAccessory

2. How could we express, in RDFS, that “ex:Grings“ is an ex:SpaceSuit or an ex:SpaceAccessory but not necessarily both?

3. Is it a problem to say the following? What does it mean? What was intended?
   ex:produces rdfs:domain ex:Company
   ex:NBDDepartment ex:produces ex:Grings
Solutions 2.1 – 2.3

1. What is the type of "ex:Grings" according to the following 3 triples?
   ex:companyStrange ex:produces ex:Grings
   ex:produces rdfs:range ex:SpaceSuit
   ex:produces rdfs:range ex:SpaceAccessory
   Ex:Grings is of the type SpaceSuit AND SpaceAccessory

2. How could we express, in RDFS, that "ex:Grings" is an ex:SpaceSuit or an ex:SpaceAccessory but not necessarily both?
   Ex:produces rdfs:range ex:Product
   Ex:SpaceSuit rdfs:subClassOf ex:Product
   Ex:SpaceAccessory rdfs:subClassOf ex:Product

3. Is it a problem to say the following? What does it mean? What was intended?
   ex:produces rdfs:domain ex:Company
   ex:NBDDepartment ex:produces ex:Grings
   Problem – NO, it just means that the NBDDepartment is a company. This is (probably) not intended!
Exercise 3

Express in OWL 2 (use Protege 4.1)

• Mackenzie manages the New Business Development department
• Mackenzie is a manager.
• Departments are managed by managers (use domain and range restrictions)
  • A Department is managed by at least one and at most two managers (Use ObjectMin/MaxCardinality to express this)
• Managers work in some Department (use ObjectSomeValuesFrom to express this)
• strangeCompany is a Company
• strangeCompany produces SpaceSuits and SpaceAccessories
  • use a range restriction on „produces“ and think how to phrase the class that contains both SpaceSuits and SpaceAccessories (restricts the property „produces“ globally)
  • or define a type for strangeCompany that expresses the above