

Homework 1

Due Tuesday Oct 17, by email to TA, as PDF file

Consider an ODL schema modeling information about boats and their owners:

```
class Person (extent persons key ssn) {  
    attribute string name;  
    attribute string ssn;  
    attribute Date dob;  
}  
  
class Boat (extent boats key name) {  
    attribute string name;  
    attribute int tonnage;  
    attribute set<string> racesWon;  
    relationship set<Ownership> belongedTo;  
}  
  
class Ownership (extent ownerships) {  
    attribute Date begin;  
    attribute Date end;  
    relationship set<Person> coOwners;  
    relationship Boat boat inverse Boat::belongedTo;  
}
```

I.

Propose an SQL schema to model this data relationally. No need to provide SQL table declarations. Notation of the form

RelationName (type₁ attrib₁, ..., type_n attrib_n)

suffices, complemented by explicit key and foreign key declarations.
List features of the ODL schema that cannot be captured in this way (if any).

II.

Express the following queries in OQL:

1.

For the boats who won the “Americas Cup” title, return the (boat, owner) object pairs. The query result should have type **set<struct { Boat boat, Person owner }>**.

2.

Find the boat(s) *ever* owned by “Jack Sparrow”. The query result should have type **set<Boat>**.

3.

Now assume that the definition of class Person is enriched with the declaration

relationship set<Ownership> ownerships **inverse** Ownership::coOwners;

and redo query II.2 exploiting this relationship.

4.

Find the boat(s) *most recently* owned by “Jack Sparrow”. The query result should have type **set<Boat>**.

5.

Dropping the assumption of point 3., find the owners (return the objects themselves) of *all* “Americas Cup”-winning boats.

III.

Express the queries II.1, II.2, II.4 and II.5 in QBE, on the schema of point I. Instead of returning objects, return the key of the corresponding entities.