**DSE 250 HW 1**

1. **Here is a possible relational schema capturing the given ODL schema.**

Note: underlined words are primary keys

Person (string ssn,

String name,

Date dob)

Boat (string name,

Int tonnage)

Ownership (int id,

String ssn,

String boat\_name,

Date begin,

Date end)

Foreign key Ownership.ssn references Person.ssn

Foreign key Ownership.boat\_name references Boat.name

RacesWon (string boat\_name,

String race)

Foreign key RacesWon.boat\_name references Boat.name

1. **Express the following queries in OQL:**
2. 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}>.

SELECT struct{boat: b, person: p}

FROM b in Boat, p in b.belongedTo.coOwners

WHERE b.racesWon = ‘Americas Cup’

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

SELECT b

FROM o in Ownership, b in o.Boat

WHERE o.coOwners.name = ‘Jack Sparrow’

1. Now assume that the definition of class Person is enriched w/the declaration

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

And redo query II.2 exploiting this relationship

SELECTS b

FROM p in Person, b in p.ownerships.boat

WHERE p.name = ‘Jack Sparrow’

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

SELECT b

FROM p in Person, o in p.ownership

WHERE o.end = (

SELECT CASE o1.end WHERE null THEN o1.end ELSE MAX(o1.end)

FROM p1 in Person, o1 in p1.Ownership)

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

SELECT p

FROM p in Person

WHERE for all w in (

SELECT b

FROM b in Boats

WHERE b.racesWon = ‘Americas Cup’): p in

w.belongedTo.coOwners

1. **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.**

II.1 QBE

racesWon boat\_name race

| \_b | Americas Cup

ownership ssn boat\_name begin end

| P. | P.\_b | |

II.2 QBE

person ssn name dob

| \_s | Jack Sparrow |

ownership ssn boat\_name begin end

| \_s | P. | |

II.4 QBE

Phase I – Find end for all boats owned by Jack Sparrow, consider if end dates are Nulls

person ssn name dob

| \_s | Jack Sparrow |

ownership ssn boat\_name begin end

| \_s | \_bn | | Null

NULLS boat\_name ssn

1. | \_bn | \_s

Phase II - Find end for all boats owned by Jack Sparrow, get not maximum end dates

Ownership begin end boat\_name ssn

| | e1 | \_bn1 | \_ssn

| | e2 | \_bn2 | \_ssn

Condition

\_e1 > \_e2

\_e1 not null

\_e2 not null

NOTMAX boatname ssn

1. | \_bn2 | \_ssn

Phase III – Get a list of boats that do not fall in Phase I or Phase II, the maximum

person ssn name dob

| \_s | Jack Sparrow |

ownership ssn boat\_name begin end

| \_s | \_bn | |

NOTMAX boatname ssn

┐ | \_bn | \_s

NULLS boat\_name ssn

┐ | \_bn | \_s

MAX boat\_name ssn

1. | \_bn | \_s

Phase IV – Get list of boat names ever owned by Jack Sparrow

MAX boat\_name ssn

| \_bn | \_s

NULLS boat\_name ssn

┐ | | \_s

NULLS boat\_name ssn

| \_bn1 |

RESULT boat\_name

1. | P.\_bn

| P.\_bn1

II.5 QBE

Phase I – Find boats who did not win

racesWon boat\_name race

| \_bn | Americas Cup

Ownership ssn boat\_name begin end

┐ | \_s | \_bn | |

Losers ssn

I. | \_s

Phase II – Get owners of winning boats

Losers ssn

I. | \_s

Person ssn name dob

| P.\_s | |