

**CS561: Advanced Topics In Database Systems
Spring-2012**

Solution of Homework 1

Question 1

Class Plane

```
(extent Planes key( Id)){  
    Attribute int Id;  
    Attribute float Capacity ;  
    Attribute String Model;  
    Attribute int year;  
    Attribute float weight;  
    Relationship set<Flight> Make inverse Flight::Makeby  
}
```

Class war-craft extends Plane

```
(extent War-Crafts ){  
    Attribute int Missile_Number;  
    Attribute string Missile_Type;  
}
```

Class Flight

```
(extent Flights key(FNum)){  
    Attribute int Fnum;  
    Attribute int NumStops;  
    Attribute int NumPassagers;  
    Attribute datetime ArrivalDate;  
    Attribute datetime departureDate;  
    Relationship City FlightArrival inverse City::CityArrival;  
    Relationship City FlightDeparture inverse City::CityDeparture  
    Relationship Plane Makeby inverse Plane::Make  
}
```

Class City

```
(extent cities key (CityID)){  
    Attribute int CityID;  
    Attribute string name;  
    Attribute string country;  
    Relationship set<Flight> CityDeparture inverse Flight::FlightDeparture  
    Relationship set<Flight> CityArrival inverse Flight::FlightArrival  
}
```

Class Transit (extent Transits){

```
    Attribute datetime TransitTime;  
    Attribute float Duration;  
    Relationship Flight FTransit inverse Flight::FlightTransit  
    Relationship City CTransit inverse City::CityTransit  
}
```

Question 2

```
Create Type PlaneType As(  
    ID integer,  
    Capacity float,  
    Weight float,  
    Year integer,  
    Model char(20)  
);
```

```
Create Table Planes of PlaneType(  
    REF IS PlaneID System Generated,  
    Primary key ( ID)  
);
```

```
Create Table war-craft of PlaneType(  
    REF IS War_CraftID System Generated,  
    Primary key ( ID),  
    Missile-Number integer,  
    Missile-Type char(20)  
);
```

```
Create Type FlightType AS(  
    Fnum integer,  
    NumPassagers integer ,  
    NumStops integer,  
    ArrivalDate Datetime,  
    DepartureDate DateTime  
    DeprtureCity REF(CityType) Scope City,  
    ArrivalCity REF(CityType) scope City,  
    PlaneMake REF(PlaneType) scope Plane  
);
```

```
Create Table Flight of FlightType(  
    REF IS FlightId system Generated,  
    Primary Key (Fnum)  
);
```

```
Create Type CityType AS(  
    CityID integer,  
    Name Char(50),  
    Country char(50));
```

```
Create Table City of CityType(  
    REF IS City_ID System Generated,  
    Primary key(cityID)  
);
```

```
Create Table Transit(  
    TransitFlight REF(FlightType) scope Flight,  
    TransitCity REF(CityType) scope city,  
    TransitDate dateTime,  
    Duration float  
);
```

Question 3

Q1:

Create ordering for FlightType Equals only by state
Create Ordering for CityType Equals only by state

```
select DREF(T.TransitFlight)
From Transit T
Group by DEREf(T.TransitFlight)
Having count(T. TransitFlight)>2
Order by T.duration;
```

Q2

```
select W
From War-craft W
Where W.weight>200;
```

Q3

```
Select TransitFlight->ArrivalTime, TransitFlight->Departuretime,TransitCity->City
From transit
Where TransitFlight->Fnum="FL230";
```

Q4

```
Select Count(F.Fnum), DEREf(F. DeprtureCity)
From Flight F
Where F. DepartureDate between (Jan 2011, Jan 2012)
Group by DEREf(F. DeprtureCity);
```