**AspectOCL Constraints- Case Study 1**

**AspectOCL Constraint 1:**

**mapping** mapNameUniqueness

**{**

**let** T:{ Branch, Branchtype, PerformanceIndicator, Country, CarModel, CarGroup, RentalDuration, ServiceDepot, Discount}

**}**

**aspect** NameUniqueness

{

**import\_mapping** mapNameUniqueness

**pointcut** uniqueNames   
**context** T :: nameIsKey () : Boolean

**intro**:

**post** uniqueNames   
 **result**= T.allInstances()-> **select**(t|t.name=self.name)->**size**()=1

}

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**AspectOCL Constraint 2:**

**mapping** mapPickUpDropOff

{

**let** T-> A: MakeRental::pickUpBranch():Branch->MakeRental ::pickUpId,

MakeRental::dropOffBranch():Branch->MakeRental ::dropOffId

}

**aspect** PickUpDropOffBranch

{

**import\_mapping** mapPickUpDropOff

**pointcut** PickDropBranch

**context** T

**intro:**

**post** PickDropBranch:

**let** branches:Set(Branch) = Branch.allInstances()-> **select**(name=self.A)

in

branches->size()=1 implies result=branches->**any()**

}

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**AspectOCL Constraint 3:**

**mapping** mapUniqueID

{

**let** T: {EU\_RentPerson, PendantCarOrder}

}

**aspect** UniqueAttributes

{

**import\_mapping** mapUniqueID

**pointcut** uniqueID

**context** T :: idIsKey () : Boolean

**intro:**

**post** uniqueID

result=T. allInstances()->**select**(t|t.id=self.id)->**size()**=1

}

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**AspectOCL Constraint 4:**

**mapping** mapReservationStatus

{

**let** T->{S,A}:DemandXModel:: demand() : Integer ->

{CarModel ::requestedModel , ExistingCarModel::carModel},

DemandXGroup :: demand() : Integer ->

{CarGroup ::requestedGroup , ExistingCarGroup::carGroup},

DemandXModel :: demand() : Integer ->

{BikeModel::requestedModel , ExistingBikModel::BikeModel},

DemandXGroup :: demand() : Integer ->

{BikeGroup::requestedGroup , ExistingBikeGroup::BikeGroup}

}

**aspect** ReservationStatus

{

**import\_mapping** mapReservationStatus

**pointcut** IntroduceNewConstraint:

**context** T

**intro:**

**post** IntroduceNewConstraint:

**let** pendantRes:Reservation= Reservation.allInstances()-> **select**(r|r.beginning.date()=tomorrow())->

**select**(r| r.pickUpBranch=self.branch and r.car-> **isEmpty()**)

in

result=pendantRes.S-> **select**(m|m=d.A)->**size()**

**AspectOCL Constraint 5:**

**mapping** mapOrder

{

**let** T: {CarGroup , RentalDuration}

}

**aspect** totalOrder

{

**import\_mapping** mapOrder

**pointcut** IntroduceNewConstraint

**context** T :: totalOrder (): Boolean

**intro:**

**post** IntroduceNewConstraint:

**let** firstValue(w,b:T):Boolean= b.first=w **or** firstValue(w,b.first)

**let** secondValue(b,w:T):Boolean=w.second=b **or** secondValue(b,w.second)

in

result= T.allInstances()-> **one**(t|t.first-> **isEmpty()**) **and**

result=T.allInstances()-> **one**(t |t.second-> **isEmpty()**) **and**

result= T.allInstances()-> **forall**(t1, t2| firstValue(t1, t2)

implies not secondValue(t1, t2) **and** secondValue(t1, t2) implies

notfirstValue(t1,t2))-> **size()** >0

}

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**AspectOCL Constraint 6:**

**mapping** mapDuration

{

**let** T ->{S,A,B}: ExistingRentalDuration::duration():RentalDuration ->

{RentalDuration , ExistingRentalDuration::durationName,

ExistingRentalDuration::durationLimit},

ExistingPerformanceIndicator::perfInd() : PerformanceIndicator ->

{PerformanceIndicator , ExistingPerformanceIndicator::name,

ExistingPerformanceIndicator:: performanceLevel }

}

**aspect** durationStatus

{

**import\_mapping** mapDuration

**pointcut** IntroduceNewConstraint:

**context** T

**intro:**

**post** IntroduceNewConstraint

**let** temp:Set (S)=S.allInstances()-> **select**(var | var.name=self.A)

in

temp->**notEmpty()** implies result= temp-> **any()**

**and** self. perf= B

}

**AspectOCL Constraint 7:**

**mapping** mapExisitngGroup

**{**

**let** S-> {A,B,TT} : ExistingCar :: car() : Car ->

{ Car :: registrationNumber , ExistingCar ::regNumber , Car}

ExistingCarGroup :: carG() : CarGroup ->

{ CarGroup ::name , ExistingCarGroup ::carGroup , CarGroup }

ExistingCarModel :: carM() : CarModel ->

{ CarModel ::name , ExistingCarModel ::carModel , CarModel}

ExistingDiscount :: discount(): Discount ->

{ Discount ::name , ExistingDiscount ::discountName , Discount}

ExistingRentalDuration:: duration() : RentalDuration ->

{RentalDuration:: name , ExisitngRentalDuration::

durationName , RentalDuration

ExistingPerformanceIndicator:: perfInd() : PerformanceIndicator ->

{PerformanceIndicator::name , ExistingPerformanceIndicator::name,

PerformanceIndicator}

**aspect** ExistingGroup

{

**import\_mapping** mapExisitngGroup

**pointcut** GroupConstraint

**context** S

**intro:**

**post** GroupConstraint:

**let** CarVal: Set(TT)=TT.allInstances()-> **select**(c|c.A = self.B )

in

CarVal ->**notEmpty()** implies result = CarVal ->**any()**

}

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**AspectOCL Constraint 8:**

**mapping** mapPrice

**{**

**let** T: NewCarGroupDurationPrice:: apply(): CarGroup,

NewCGDPForNewDuration :: apply() : CarGroup

}

**aspect** SetPrice

{

**import\_mapping** mapPrice

**pointcut** PriceConstraint

**context** T

**intro:**

**post** PriceConstraint:

cgdp.**oclIsNew()** and cgdp.**oclIsTypeOf**(CarGroupDurationPrice)

**and** cgdp.price=self.price **and** cgdp.carGroup=self.carG **and** cgdp.rentalDuration=duration

**}**

**AspectOCL Constraint 9:**

**mapping** mapCarMove

{

**let** T -> {A, B}: RequestTransfer :: apply() : Boolean ->

{Branch :: otherBranch, Branch :: askingBranch}

DoTransfer :: apply() : Boolean ->

{ Branch :: askingBranch, Branch :: otherBranch}

}

**aspect** CorrectCarMove

{

**pointcut** IntroduceNewConstraint:

**context** T

**intro:**

**post** IntroduceNewConstraint:

self.**oclIsTypeOf**(MoveCars ).^apply() **and** self.A.carsAvailable@pre-> intersection(self.otherBranch.car-> **select**(c|c.oclIsKindOf (BeingTransferredCar) **and**

c.**oclIsTypeOfType**(BeingTransferredCar ).destination= self.B))->size()= movedCars

}