

Name: _____ Roll#: _____
 Start Time: _____ End Time: _____
 Maximum Time Allowed: 45 min

Questions - Case Study 1- OCL

1. Considering **OCL Constraints# 1- 9**, perform the following tasks. **(Make changes directly on constraints sheet for both parts)**
 - a. Change the constraints by replacing iterator “**select**” with iterator “**one**” and correspondingly removing size () =1.
 - b. Add uniqueness condition within the “**select**” iterator for one attribute of each class using “**and**” operator. List of the constraints corresponding to their context that are to be added is given below in table 1.

Table 1 Attributes List

Context	Constraints
Branch	b. BranchCode =self. BranchCode
BranchType	b. TypeCode =self. TypeCode
PerformanceIndicator	b. PerflInstrument =self. PerflInstrument
Country	b. CountryCode =self. CountryCode
CarModel	b. ModelNum =self. ModelNum
CarGroup	b. GroupLabel =self. GroupLabel
RentalDuration	b. DurationType =self. DurationType
ServiceDepot	b. DepotNumber =self. DepotNumber
Discount	b. DiscountType =self. DiscountType

2. Considering **OCL Constraints# 10-11** defined on functions **pickUpBranch()** and **dropOffBranch()**. Repeat the similar constraint (post-condition) for another function **maintenancebranch()** with the following changes only. **(Write constraint in the space provided on the constraints sheet)**
 - a. The context of the new constraint is “*context MakeRental:: maintenancebranch(): Branch*”.
 - b. Also “*name= self. maintenancelid*” in the “**select**” clause of the constraint. For example, “*select(name=self.pickUpId)*” will become “*select(name=self.maintenancelid)*”.
3. For the **OCL Constraints# 12-13**, append following constraints shown in table 2 using “**and**” operator in the “**select**” iterator clause. For example, the new select clause for context *PendantCarOrder* becomes,
(*select(b|b.id=self.id and t.carOrder.size()= 5)->size()=1*).....

(Make changes directly on constraints sheet)

Context	Constraint
PendantCarOrder :: idIsKey() : Boolean	t.carOrder.size()= 5
EU_RentPerson :: idIsKey() : Boolean	t.barCode.size()= 5

4. For **OCLE Constraints# 14-17**, append following constraint at the end of the constraint using “and” operator. **(Make changes directly on constraints sheet)**

Constraint in OCL to be added: *(self.CheckAvailability(self.A ->isEmpty())*

5. For the **OCLE Constraints# 18-19**, perform the following tasks.
- Change the constraints by replacing iterator “one” with iterator “select”. **(Make changes directly on constraints sheet)**
 - Combine the two clauses specified using “one” iterator into a single clause as:

$$\dots result = T.allInstances() \rightarrow one(t | t.first \rightarrow isEmpty()) \text{ and } t.second \rightarrow isEmpty() \dots$$
(Write constraint in the space provided on the constraints sheet)
 - Change the constraint by replacing the function “isEmpty()” with function “size()=0”. **(Write constraint in the space provided on the constraints sheet)**

6. For the **OCLE Constraints# 20-21**, reform these constraints by deleting following clause from them.

self.perf = B

(Make changes directly on constraints sheet)

7. For the **OCLE Constraints# 22-27**, perform following tasks. **(Make changes directly on constraints sheet for all three parts)**

- Update the let expression in all constraints by replacing the “select” iterator with “collect” iterator such that the new condition becomes; ”.

$\dots \dots \dots \text{“collect}(c | c.A = self.A)\text{”} \dots \dots \dots$

- For the constraints# 23-24 defined on context “ExistingCarGroup” and “ExistingCarModel”, update the iterator condition in the let expression by changing the equality sign “=” into greater than sign “>”.

8. For the **OCLE Constraints# 28-29**, update the **post** condition of the operations by appending following clause at the end of constraints using an “or” operator.

“cgdp.rentalduration.lastmodification = now()”

(Make changes directly on constraints sheet for both parts)

9. For the **OCLE Constraints# 36-37**, perform following tasks. **(Make changes directly on constraints sheet for both parts)**

- For constraint# 36, Replace the clause *oclIsTypeOf(MoveCars)* with *oclIsKindOf(RequestTransfer)*. For constraint# 37, Replace the clause *oclIsTypeOf(MoveCars)* with *oclIsKindOf(DoTransfer)*. ”.
- For function “intersection” in both constraints, *oclIsKindOf(BeingTransferredCar)* with *oclIsKindOf(OwnCar)*.