**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)**
   1. Change the constraints by replacing iterator **“select”** with iterator **“one”** and correspondingly removing size () =1.
   2. 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. PerfInstrument=self. PerfInstrument |
| 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 |

1. 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)**
   1. The context of the new constraint is *“context MakeRental:: maintenancebranch(): Branch”.*
   2. Also “*name= self. maintenanceId”* in the “**select”** clause of the constraint. For example, *“select(name=self.pickUpId)”* will become *“select(name=self.maintenanceId)”.*
2. 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 |

1. For **OCL 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.CheckAvailabilty(self.A ->isNotEmpty ())*

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

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

**(Write constraint in the space provided on the constraints sheet)**

* 1. Change the constraint by replacing the function **“isEmpty()”** with function **“size()=0”.** **(Write constraint in the space provided on the constraints sheet)**

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

*self. perf= B*

**(Make changes directly on constraints sheet)**

1. For the **OCL Constraints# 22-27,** perform following tasks. **(Make changes directly on constraints sheet for all three parts)**
   1. Update the let expression in all constraints by replacing the “**select**” iterator with “**collect**” iterator such that the new condition becomes; **”**.

…….*“collect(c|c.A = self.A)”….*

*……………………………………………..*

* 1. 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 “**>**”.

1. For the **OCL 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)**

1. For the **OCL Constraints# 36-37**, perform following tasks. **(Make changes directly on constraints sheet for both parts)**
   1. For constraint# 36, Replace the clause *oclIsTypeOf(MoveCars)* with *oclIsKindOf(RequestTransfer)*. For constraint# 37, Replace the clause *oclIsTypeOf(MoveCars)* with *oclIsKindOf(DoTransfer)*. **”**.
   2. For function **“intersection” in both constraints**, *oclIsKindOf(BeingTransferredCar)* with *oclIsKindOf(OwnCar).*