Exam 1

Exercise 1 (5 pts)

Select the correct answer (s) **(- 0.5 for incorrect selection)**

1- BDAM method disadvantage is **A-** The high cost of disk storage **B-** It's very slow method

2- ISAM uses index **A-** To speed data storage **B-** To speed data retrieval.

3- Recovery mechanism of incomplete transaction in a DBMS is called :

A- Rollback **B-** Roll forward.

4- Relational model is founded on **A-** Set theory **B-** First-order logic **C-** CODASYL model.

5- Integrity constrain is a **A-** Boolean expression **B-** Set of attributes

6- To define new classes, SQL is used in **A-** Object DB **B-** Object Relational DB.

7- Objects stored in an Object DB are called **A-** Persistent **B-** Transient.

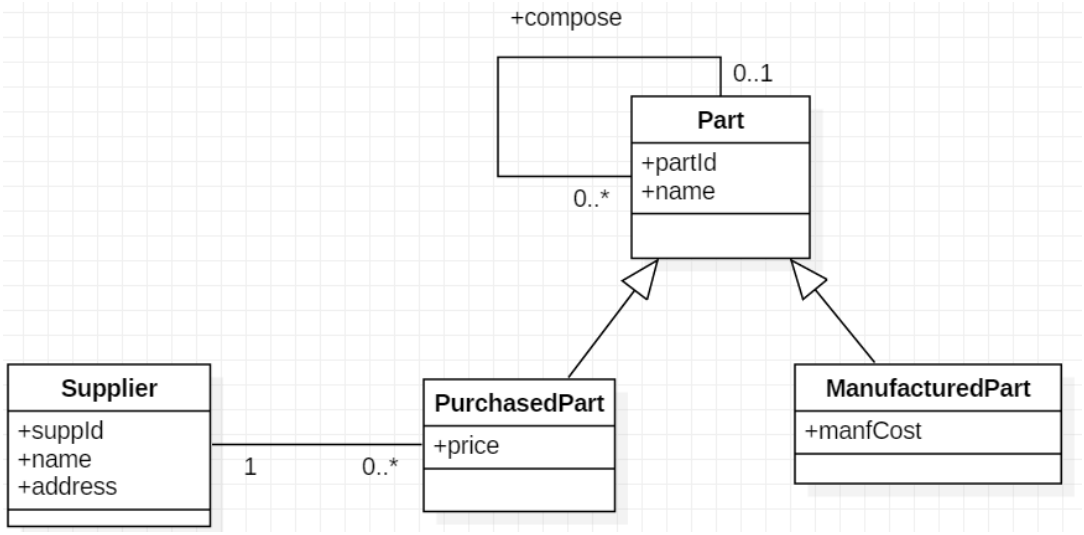
8- Extent objects are used **A-** To store persistent objects **B-** To create transient objects

Exercise 2 (5 pts)

Given the scheme R(ABCD) and the set of FDs $\mathbf{F = \{A \rightarrow BC,\ B \rightarrow C,\ AB \rightarrow D\}}$

1- Compute the minimal cover of **F**.
2- Compute the closure $\mathbf{\{A,B\}^+}$.
3- Compute a candidate key **CK.**

Exercise 3 (5 pts)



The "compose" relationship between **parts** denote that one **part** may be composed from 0 ore several **other** parts.

Question. Convert the previous class diagram into ***relations*** (in relational model)

N.B The relationship "compose" should be clearly putted in the obtained model

Exercise 4 - XQuery language (5 pts)

A- Give the returned results of the following queries

1-

```
for $s in //supplier
where $s/category = "A"
return $s/name
```

2-

```
for $s in //supplier
where  $s/category
return $s/number
```

B- Give the queries that return

1- The numbers of all products having the type "injector"

2- The names of all products purchased from the supplier number `762`

supplier.xml document

```
<suppliers>
<supplier>
<number>231</number>
<name>Shenzhen Metal Products</name>
<category>A</category>
</supplier>
<supplier>
<number>762</number>
<name>Guangdong Fluid Control</name>
</supplier>
<supplier>
<number>343</number>
<name>Jiangyin Golden MEC</name>
<category>B</category>
</supplier>
</suppliers>
```

product.xml document

```
<products>
<product type="injector">
<number>12</number>
<name>Fuel injector</name>
<purchased supplier="762"/>
</product>
<product type="camshaft">
<number>43</number>
<name>Car camshaft</name>
<purchased supplier="343"/>
</product>
<product type="injector">
<number>30</number>
<name>LPG Gas injector</name>
<purchased supplier="762"/>
</product>
<product type="camshaft">
<number>25</number>
<name>Camshaft for
Hilux</name>
<purchased supplier="343"/>
</product>
</products>
```

Answer of exam 1

Exercise 1 (5 pts)

Correct answer (s)

1- BDAM method disadvantage is **A** ..... **(0.5pt)**
2- ISAM uses index to **A, B** ..... **(1pt)**
3- Recovery mechanism of incomplete transaction in a DBMS is called. **A** ..... **(0.5pt)**
4- Relational model is founded on **A, B** ..... **(1pt)**
5- Integrity constrain is **A** ..... **(0.5pt)**
6- To define new classes, SQL is used in **B** ..... **(0.5pt)**
7- Objects stored in an Object DB are called **A** ..... **(0.5pt)**
8- Extent objects are used **A** ..... **(0.5pt)**

Exercise 2 (5 pts)

1- The minimal cover of **F = {A → B, B → C , A → D}**
Remove A→C and replace AB→D by A→D ..... **(1pt) and** A → B, B → C ..... **(1pt)**
2- The closure **{A,B}⁺ = {A,B,C,D}**. ..... **(1.5pt)**
3- The candidate key, **CK = {A}**. ..... **(1.5pt)**

Exercise 3 (5 pts)

Supplier(<u>suppId</u>, name, address) ..... **(1pt)**
PurchasedPart(<u>#idPart</u>, price) ..... **(1pt)**
ManufacturedPart(<u>#idPart</u>, manCost) ..... **(1.5pt)**
Part(<u>partId</u>, name, #compose) ..... **(1.5pt)**

N.B compose is a foreign key from part entity to itself.

Exercise 4 - XQuery language(5 pts)

A- The returned results of the following queries

1- (1pt)
```
<name>Shenzhen Metal Products</name>
```

2- (1pt)
```
<number>231</number>
<number>343</number>
```

B- queries

1- product numbers of all products having the type "injector"

```
for $p in //product            (0.5pt)
where  $p/@type = "injector"   (0.5pt)
return $p/number               (0.5pt)
```

2- product names of all products purchased from the supplier number **762**

```
for $p in //product                        (0.5pt)
where  $p/purchased/@supplier = 762        (0.5pt)
return $p/name                             (0.5pt)
```

Exam 2

Exercise 1 (7 pts)

A- Give the definition of the following concepts and terms

1- A File-based System
2- Flat file system.
3- BDAM method
4- Persistent Objects
5- Tuple (in RBD).
6- Object naming mechanism (in Object DB).

B- What is the difference between ORDB and ODB?

Exercise 2 (4.5 pts)

Question

- Extract all FDs from the relation **R1.**
- In what Normal Form are **R1** and **R2**.
- Normalize **R1** and **R2**.

R1

Sno	Sname	Status	City
S1	Smith	20	London
S2	Jones	10	Paris
S3	Black	30	Paris
S4	Clak	20	London
S5	Adams	30	Athens

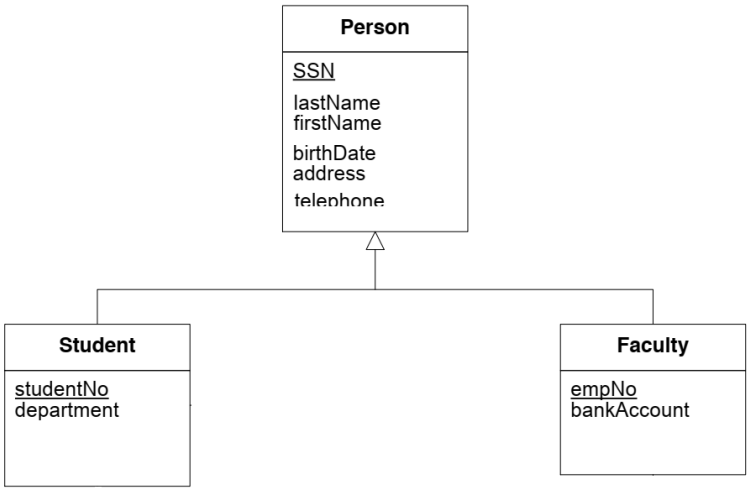
R2

NAME	SEXE
{John, Jean, Ivan}	Male
{Mary, Marie}	Female

Exercise 3 (3.5 pts)

1- Define in Caché Object the classes **Person**, **Student** and **Teacher**
2- Give in Terminal, the commands that add one student
3- Give SQL queries to

a) Insert a new person with SSN 123123123, with name Kamel Ahmed, born on 1/5/1988, living in City 270, Msila.
b) Give the **SSN** and **department** of the students



Exercise 4 - XQuery language (5 pts)

- Give the returned result of each query

1	`() = (1, 2)`
2	`(2, 5) > (1, 3)`
3	`(1, "a") = (2, "b")`
4	`<a>03</a> gt <z>2</z>`

5	`for $i in (1, 2)`
	`for $j in ("a", "b")`
	`return <oneEval>i is {$i} and j is {$j}</oneEval>`

Answer of exam 2

Exercise 1 (7 pts)

A- Give the definition of the following concepts and terms

1- A file-based system is a nondatabase system that uses loosely-linked files to manage, store and retrieve data. ……..**(1 Pt)**

2- Flat file system is a system that store data in files in a linear fashion. ……..**(1 Pt)**

3- BDAM stands for *Basic Direct Access Method* and it uses a hashing algorithm to determine the disk address of the target record. ……..**(1 Pt)**

4- Persistent Object is permanently stored objects and it continue exist after that program that instantiated it ends ……..**(1 Pt)**

5- A tuple is an ordered list of n values t =< v_1, v_2, ..., v_n > belonging respectively to n domains D1,..,Dn. ……..**(1 Pt)**

6- The naming mechanism involves giving an object a unique persistent name within a particular database ……..**(1 Pt)**

B- What is the difference between ORDB and ODB? ORDB uses SQL standard language ……..**(1 Pt)**

Exercise 2 (4.5 pts)

1- FDs in R2

Sno → Sname, Status, City ……..**(0.5 Pt)**

Status → City ……..**(0.5 Pt)**

2-

A- **R1** is not normalized (isn't in 1FN) ……..**(1 Pt)**

B- **R2** is in 1FN ……..**(1 Pt)**

3- Normalization

A- Normalization of R1 ……..**(0.5 Pt)**

NAME	SEXE
John	Male
Jean	Male
Ivan	Male
Mary	Female
Marie	Femal

B- Normalization of R1

R2_1(Sno, Sname, Status) ……..**(0.5 Pt)**

R2_2(#Status, City) ……..**(0.5 Pt)**

Exercise 3 (3.5 pts)

1- Three classes ……**0.5 X 3 = (1.5 Pt)**

2-

```
set student = ##class(PKG.Student).%New()…….(0.5 Pt)
set student.SSN = 123476543
…
do student.%Save()                          ……. (0.5 Pt)
```

3-

```
isert into Person(SSN, lastName, firstName, birthDate, address) values (123123123,
'Kamel", 'Ahmed", '1/5/1988', 'City 270, Msila')
```

4- ……**.(1 Pt)**

```
Select SSN, department
From student d, person p
Where d.id = p.id
```

Exercise 4 - XQuery language (5 pts)

1	false
2	true
3	error
4	false
5	<oneEval>i is 1 and j is a</oneEval> <oneEval>i is 1 and j is b</oneEval> <oneEval>i is 2 and j is a</oneEval> <oneEval>i is 2 and j is b</oneEval>

Exercise 3 (5 pts)

a- Define in Caché Object the classes **Person**, **Student** and **Teacher**
b- Give in Terminal, the commands that add one student
c- Give SQL queries to

c) Insert a new student with SSN 123123123, with name Kamel Ahmed, born on 1/5/1988, living in City 270, Msila.
d) Give the SSN and names of the students