1.Document oriented modeling with JSON

We want to create a document-oriented database to manage <u>courses</u> and <u>students</u>, given the following information:

➢ A course is described by the attributes code, title, description, credits and prerequisite.

➢ The prerequisites are other courses.

➢ A student is described by the attributes name, first name, address.

➢ Addresses are made up of a house number, street, city and postal code.

➢ A student takes several courses and the courses are taken by several students.

1. Make the entity relationship diagram (ERD) in UML.
2. Suggest a JSON example equivalent to what we would have done in relational model.

Example:

Representation of a course by a JSON object.

```
1 {
2 "code": "api04",
3 "title": "DW et NOSQL"
4 ...
5 }
```

3. Provide a JSON example based on embedded data modeling.

☐ What is the main feature of this solution?
☐ Is it always possible to have a solution based only on embedded?

4. Provide a JSON example based on the references.

☐ What are the main differences with a relational system?

5. Knowing that the objective of the application is to visualize a list of students with the courses enrolled in, and access to course details only when you click on its code or title.

Propose a solution adapted to this data base by using both reference and embedded.

2.SQL VS NoSQL

You run an e-commerce site and expect a million users (or more).

1. which database do you prefer to use: relational or NoSQL?

The following two tables represent the relational modeling for the users and page visits.

User's table

id	email	nom
1	s@cnam.fr	Serge
2	b@cnam.fr	Benoît

Visit's table

idUtil	page	nbVisites
1	http://cnam.fr/A	2
2	http://cnam.fr/A	1
1	http://cnam.fr/B	1

2. Propose a representation of this information in document form.

- by giving priority to user access.

- by giving priority to access through the pages visited.

3.Cnam's IT department has decided to represent its data under form of structured documents to facilitate analytical processes. Here is an example of student-centered documents including Course Units (CU) followed by each student.

```
{
"_id": 978,
"name": "Jean Dujardin",
"CU": [{"id": "ce:11", "title": "Java", "grade": 12},
{"id": "ce:27", "title": "data base", "grade": 17},
{"id": "ce:37", "title": "Network", "grade": 14}
```

]
}

{
"_id": 476,
"name": "Vanessa Paradis",
"CE": [{"id": "ce:13", "title": "Methodology", "grade": 17,
{"id": "ce:27", "title": "Data base", "grade": 10},
{"id": "ce:76", "title": "Project", "grade": 11}
]
}

Knowing that these documents are produced from a relational data base, create the schema of relational database and indicate the content of the tables.