Tutorial 1
DataBases

Exercise 1:

Suppose the file extension ***Student-Grade.xls*** (excel format) containing the students' marks for each registered module.

Student number	Surname and first name	Date of birth	Address	Module code	designation Module	coefficient	Day	Mark
M1	Ahmed Aissa Mohamed	15-07-2000	Algiers	IS	Information System	02	Monday	15
M1	Ahmed Aissa Mohamed	15-07-2000	Algiers	DB	DataBases	03	Tuesday	10
M1	Ahmed Aissa Mohamed	15-07-2000	Algiers	OOP	Object Oriented Programming	03	Sunday	11
M1	Ahmed Aissa Mohamed	15-07-2000	Algiers	Archi	Computers' Architecture	02	Wednesday	07
M1	Ahmed Aissa Mohamed	15-07-2000	Algiers	Logic	Mathematical Logic	02	Thursday	13
M1	Ahmed Aissa Mohamed	15-07-2000	Algiers	Eng	English	1	Saturday	14
M2	Rabhi Sara	22-09-2000	Blida	IS	Information System	02	Monday	16
M2	Rabhi Sara	22-09-2000	Blida	DB	DataBases	03	Tuesday	10
M2	Rabhi Sara	22-09-2000	Blida	OOP	Object Oriented Programming	03	Sunday	11
M2	Rabhi Sara	09-22-2000	Blida	Archi	Computers' Architecture	02	Wednesday	09
M2	Rabhi Sara	22-09-2000	Blida	Logic	Mathematical Logic	02	Thursday	14
M2	Rabhi Sara	22-09-2000	Blida	Eng	English	01	Saturday	16
M3	Saddeki Inesse	06-03-1999	Rouiba	DB	DataBases	03	Tuesday	12
M3	Saddeki Inesse	06-03-1999	Rouiba	OOP	Object Oriented Programming	03	Sunday	10
M3	Saddeki Inesse	06-03-1999	Rouiba	Archi	Computers' Architecture	02	Wednesday	08
M4	Bourasse Khaled	11-01-1998	Tizi ouzou	DS	Data structure	02	Sunday	09
M4	Bourasse Khaled	11-01-1998	Tizi ouzou	IS	Information System	02	Monday	07
M4	Bourasse Khaled	11-01-1998	Tizi ouzou	DB	DataBases	03	Tuesday	11
M4	Bourasse Khaled	11-01-1998	Tizi ouzou	OOP	Object Oriented Programming	03	Sunday	13

M4	Bourasse Khaled	11-01-1998	Tizi ouzou	Archi	Computers' Architecture	02	Wednesday	08
M4	Bourasse Khaled	11-01-1998	Tizi ouzou	Logic	Mathematical Logic	02	Thursday	09
M4	Bourasse Khaled	11-01-1998	Tizi ouzou	Eng	English	01	Saturday	14

Questions:

1. From this file, define all the data, instances, information and knowledge.
2. Can other information and/or knowledge be inferred from this file extension.
3. Discuss Update problems: input, modification, deletion in this file extension.
4. Propose a restructuring of the ***Student-Grade.xls*** file to overcome the update problems mentioned in question 3.

Exercise 2:

Given the following definitions:

1/ ***The management rules*** are a set of rules that govern the overall operation of an Information System, or how it should be structured. Business rules can be derived from a legal provision, a customer requirement, or an internal rule article of an organization. **For example**, the rule "*an employee can only belong to one division at a time*"

2/ The data dictionary is the set of all the data to be kept in the database. It can be schematized in the form of a table or document which groups together all the data handled. For each piece of data, it indicates:

The **coding** : this is a label designating a piece of data (for example "code_cl" for the code of a customer)

The **designation** : this is a statement describing what the data corresponds to (for example "customer code").

The **type of data** : the type of data can be: Alphabetical : when the data is only composed of alphabetic characters (from 'A' to 'Z'), Numeric: when the data is made up of numbers only (integer or real), Alphanumeric : when the data can be made up of both alphabetic and numeric characters, Date : when the data is a date (in YYYY-MM-DD format) or Boolean : True or False

The **size** : it is expressed in number of characters or digits. In the case of a date in YYYY-DD-MM format, the number of characters is also counted, i.e. 10 characters. As for the boolean type, there is no need to specify the size (this depends on the RDBMS implementation).

Let's take the example of a database for the management of borrowings from a library. We define the following information

- For each book, we must know the title, the year of publication, a summary and the type (novel, poetry, science fiction, etc.);
- A book can be written by one or more authors whose surname, first name, date of birth and country of origin are known;
- Each copy of a book is identified by a reference made up of letters and numbers and can only be published in one and only one edition;
- A borrower is identified by a number and we must memorize his name, first name, address, telephone and e-mail address;

- A borrower can make zero, one or more loans, each of which concerns one and only one copy. For each loan, we know the date and the time granted (in number of days).

Questions:

1. Establish the data dictionary of this database

2. Define all the management rules.