NORTHEASTERN UNIVERSITY, BOSTON, MA

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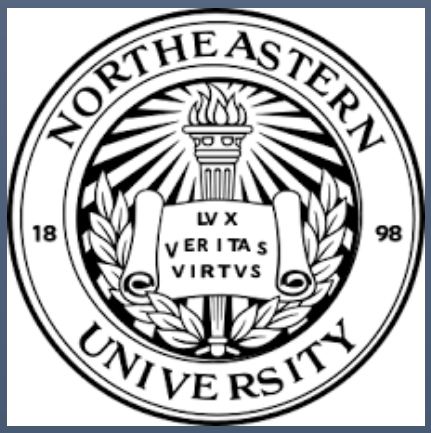

Data Management & Database Design

Under guidance of: Prof. Manuel Montrond

ASSIGNMENT NO 1

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Assignment No 1

CHAPTER 1: Problems and Exercises

2. Reread the definitions for data and database in this chapter. Database management systems only recently began to include the capability to store and retrieve more than numeric and textual data. What special data storage, retrieval, and maintenance capabilities do images, sound, video, and other advanced data types require that are not required or are simpler with numeric and textual data?

Solution:

1. **Insufficient Storage:**
   - Traditional Relational databases were designed to store data in structured format i.e., in numeric, character and dates format.
   - Storing multimedia objects like images, maps, audio and video clips, emails, etc. requires huge memory space.
2. **Complexity with data retrieval:**
   - As compared to structured data, extracting multimedia data requires more robust software. For e.g.: Salesforce, a CRM Cloud computing company, uses Data Loader for its all bigdata ETL processes.
3. **Maintenance:** Considering structured and unstructured data is stored in single database entity, maintenance of real-time multimedia data, which is required, becomes difficult for smooth running of businesses.

3. Table 1-1 shows example metadata for a set of data items. Identify three other columns for these data (i.e., three other metadata characteristics for the listed attributes) and complete the entries of the table in Table 1-1 for these three additional columns.

Data Item	Metadata								
Name	Type	Length	Min	Max	Description	Source	Primary key	DateTimeStamp	Is_nullable
Course	Alphanumeric	30			Course ID and name	Academic Unit		**1/24/2022 18:24**	**No**
Section	Integer	1	1	9	Section number	Registrar		**1/25/2022 18:25**	**No**
Semester	Alphanumeric	10			Semester and year	Registrar		**1/26/2022 18:25**	**No**
Name	Alphanumeric	30			Student name	Student IS		**1/27/2022 18:26**	**No**
ID	Integer	9			Student ID (SSN)	Student IS	**Yes**	**1/28/2022 18:26**	**No**
Major	Alphanumeric	4			Student major	Student IS		**1/29/2022 18:26**	**No**
GPA	Decimal	3	0	4	Student grade point average A	cademic Unit		**1/30/2022 18:26**	**No**

4. **In the section "Disadvantages of File Processing Systems," the statement is made that the disadvantages of file processing systems can also be limitations of databases, depending on how an organization manages its databases. First, why do organizations create multiple databases, not just one all-inclusive database supporting all data processing needs? Second, what organizational and personal factors are at work that might lead an organization to have multiple, independently managed databases (and, hence, not completely follow the database approach)?**

- Organizations create multiple databases instead of one all-inclusive data since it becomes easier to manage otherwise it becomes complex and time consuming to update a small change in the entire database multiple times.
- They can connect the database in a centralized form and give access to members of the group as per their roles in hierarchy.
- In this way, the confidentiality and security of the data is maintained.
- Creating multiple databases becomes cost effective from an information system's development perspective for a specific organization.

12. Consider your business school or other academic unit as a business enterprise.

a. Define several major data entity types and draw a preliminary enterprise data model (similar in notation to Figure 1-3a).

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