|  |  |  |  |
| --- | --- | --- | --- |
| Instructor |  | Due Date |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Part** | 1 | 2 | 3 | 4 | **TOTAL** | **Score** |
| *Maximum Points* | 25 points | 25 points | 25 points | 25 points | **100**G101010 pointsG |  |

**Textbook Reading Assignment** Thoroughly read Week 1 - 4 course lecture notes and course textbook Chapter(s) 1 - 4 .

**Part 1 Concept Check - Advanced Topics in Data Management**

**(1) ( Data Models and Business Rules )**

Consider the following business facts that a retail company requires to represent in its data model:

• customers purchase products and goods

• products are subject to various types of sales / county taxes

• retail store members receive special discounts

• products are stored in both the retail stores and in the company warehouse

• products can be shipped from the retail warehouse directly to the customer

Based on the above business rules, construct a data model in the form of a database table that can be used to provide information as to the transactional operation of the company.

|  |
| --- |
|  |

**(2) ( Sources of Business Rules )**

Business rules are essential to create an accurate data model.

Within an enterprise, the sources of business rules include these categories:

­

• Company Managers

• Department Managers

• Direct interviews with End Users

• Written documentation Policy Makers

Reflect on the business rules of a typical employee staffing agency. Choose one of the above business rule sources and, from the point of view of your source, discuss five important business rules that would be critical for the agency’s data model.

|  |
| --- |
|  |

**Part 2 DBMS Concepts - Advanced Topics in Data Management**

**(1) ( Business Rules )**

Business rules define one or more of the following modeling components:

• entities

• relationships

• attributes

• connectivity

• cardinalities

Some examples of business rules are:

• An invoice contains one or more invoice lines.

• Each invoice line is associated with a single invoice.

• A store employs many employees.

List FIVE other examples of business rules from various forms of businesses.

|  |
| --- |
|  |

**(2) ( Types of Relationships )**

Give an example of each of the three types of relationships: 1:1 , 1:M , M:N

Why is an M:N relationships not appropriate in a relational model?

|  |
| --- |
|  |

**Part 3 Data Models / Analytics - Advanced Topics in Data Management**

**(1) ( Data Modeling )**

Given the following group of tables, list FIVE written business rules that are reflected in the tables and their contents.

**Artists**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| ArtistNum | LName | FName | MI |  |
|  |  |  |  |  |
| 100 | Jennings | Joyce | D |  |
| 101 | Matthews | Shruti | F |  |
| 102 | Sims | Silas |  |  |
| 103 | Dean | Daisy | H |  |

**Galleries**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| GalleryNum | GalleryName | ZipCode |  |  |
|  |  |  |  |  |
| 22 | Lawrence ArtWorks | 60625 |  |  |
| 25 | Cragin Corners | 60651 |  |  |
| 27 | Bronzeville Galleries | 60616 |  |  |
| 28 | Harlem HangUps | 60634 |  |  |

**Paintings**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| PaintNum | Title | ArtistNum | GalleryNum |  |
|  |  |  |  |  |
| 100 | Morning | 100 | 22 |  |
| 101 | Outer Space | 100 | 25 |  |
| 102 | The Poet | 101 | 28 |  |
| 103 | Jane | 102 | 28 |  |

|  |
| --- |
|  |

**(2) ( Data Analytics / Predictive Analytics: The Standard Deviation )**

In Oracle and SQL the standard deviation is used as an aggregate group   
 function as well as an analytical function. The following data illustrates company sales for the first half of the year. For the data below, compute both the   
 population standard deviation and the sample standard deviation.

|  |  |  |
| --- | --- | --- |
| **tblValues Table** | |  |
|  |  |  |
| index | month | values |
|  |  |  |
| 1 | January | $20 |
| 2 | February | $26 |
| 3 | March | $28 |
| 4 | April | $31 |
| 5 | May | $35 |
| 6 | June | $30 |

Hints: examine the MS Access SQL statements given below or use equivalent Oracle statements.

Sample Standard Deviation

**SELECT STDEV(values) FROM tblValues;**

Population Standard Deviation

**SELECT STDEVP(values) FROM tblValues;**

|  |
| --- |
|  |

**Part 4 Data Design Concepts - Advanced Topics in Data Management**

**(1) ( Database Models )**

Compare and contrast the hierarchical and network database models.

Which of these database models was historically implemented first?

List some advantages and disadvantages of each of these models.

Provide some examples of types of enterprises that would favor hierarchical database models as well as some types of enterprises that are best suited for network database models.

|  |
| --- |
|  |

**(2) ( Data Models and eCommerce )**

Design a Data Model for a database application on behalf of an Office Administrative Services enterprise. This type of enterprise forms the backbone of business operations across a variety of industries, such as

physicians’ offices, rental equipment firms, food services by providing them the day - to - day administrative services including record keeping, financial planning and billing.

|  |
| --- |
|  |