

Student Name **Sivaranjani Prabasankar**

Section \_\_\_\_\_

Instructor \_\_\_\_\_

Due Date **2/3/19**

Part	1	2	3	4	TOTAL	Score
Maximum Points	25 points	25 points	25 points	25 points	100 points	

**Textbook Reading Assignment** Thoroughly read chapter(s) 1 - 3 in the textbook as well as the course lecture notes for Week(s) 1 - 3 .

### Part 1 Concepts, Topics, Glossary Terms - Database Systems

Comment and expound, in detail, on each of the following questions. Use examples to support your comparisons and indicate when and / or where the individual concepts would apply.

#### (1) (Data, Information, Knowledge, Wisdom)

Data, information, knowledge and wisdom often provide for an important distinction. Provide five examples of categories of data that may be collected from a family restaurant chain. Provide five examples of information that could be gathered from your data.

What if we reverse the roles of data and information? Can information lead to data? Can knowledge lead to information? How does wisdom come into play? Explain your answers!

Data	Information
Customer Record	To Build guest profiles to identify VIP's, regular customers. To personalize communication and to market directly.
Staff Activities	To enhance customer experience and to evaluate/appraise staffs.
Purchase/Order History	To Personalize product recommendations.
Transaction History	To promote offers with bank/card details and to automate/ ease further payment process.
Food Taste/ Dining Experience	To enhance menu or promote the popular menu.
<ul style="list-style-type: none"> <li>➤ Information consists of Data, but Data will not have any information in it. Similarly, Knowledge consists of Information, which in turn is data.</li> <li>➤ Wisdom is the knowledge and experience needed to make sensible decisions.</li> <li>➤ So, Wisdom is the subset of knowledge, which is the subset of Information, which is the subset of data.</li> <li>➤ Hence reversing the role of data and information or knowledge and information would never help to solve any problem or to attain wisdom.</li> <li>➤ Tracing back to raw data from information can be challenging and would result in inaccuracy</li> </ul>	

#### (2) ( Structured Data versus Unstructured Data )

When we examine data received into an enterprise we often separate the data into two categories - structured data and unstructured data.

For example, in a customer service application we can differentiate incoming data as being structured ( customer feedback and time to resolve customer inquiries ) or unstructured ( images and illustrations ) .

Student Name Sivaranjani Prabasankar

Section \_\_\_\_\_

Provide some examples of transforming unstructured data into structured data.

Can structured data be transformed into unstructured data? Explain your answer!

**Structured Data:** Reviews/ratings - Required information includes name, price range, review count, and rating value. Optional data which includes URL, address, and telephone number.

**Unstructured Data:** Feedback - Receiving Good/Bad feedback/complaint from customer via Email, virtual assistant or through any social media.

**Transforming unstructured data into structured data:**

Transforming unstructured data into structured data is like gathering the raw set of information such as an individual reviews/comments/feedback using the virtual assistant or social media or Email and transforming into rows and columns. This includes segregating the data in respective label and categorize unstructured data removing errors and formatting issues.

**Transforming structured data into unstructured data:**

Structured data can be transformed to unstructured data by extracting raw information from it and then by converting it into plain text format as in the case of the above.

**(3) (Structural Dependence versus Structural Independence)**

Another important distinction in the realm of database management is that between structural dependence and structural independence.

Structural dependence arises when a change in the structure of a file requires the modification of all programs that refer to that file. Conversely, structural independence occurs when changes to the file structure can be performed without affecting the application program's ability to access the data.

From a management perspective, comment on how managers should understand the distinction between these two structural categories. Provide examples to support your claims.

**Structural Independence**

If the adding of the field of information to the database without affecting the ability to access the database.

**Structural Dependence**

If the adding of the field of information to the database, then the applications using the employee database would not be able to access it properly as the file structure is now changed.

Both Managers and DB Admin/Designer should be aware of Structural Dependency and Independency. Lack of DB Structural for Managers will lead to

- 1) Poor design of Database which are prone to future changes
- 2) Improper deliver plan
- 3) Additional Cost
- 4) Losing valuable Customer or Customer Dis-satisfaction
- 5) Inconsistent or ambiguous data

**(4) ( Data Consistency versus Data Inconsistency )**

Examine Web sites that offer data for financial markets, stocks and bonds, etc., such as: <https://finance.yahoo.com>

Student Name Sivaranjani Prabasankar

Section \_\_\_\_\_

What are some issues of data inconsistency that can occur when examining stock data for your favorite publicly traded companies?

For example, "**Falling Oil Prices Could Boost Spirit Airlines' Q4 Profits**"

This is a prediction about Q4 results. In case of any redundancy/inconsistency in oil prices then

- ❖ The analytics will use redundant and the rest of the business will drop in quality, in turn impacting the quality of business decisions made. **Here the decision is Q4 profits.**
- ❖ Huge amounts of time can be wasted shifting through data and attempting to piece together reports, meaning that many opportunities to add value are lost.
- ❖ Inconsistencies can creep into reports, with huge potential ramifications for the business.
- ❖ Huge risks can go unnoticed, leading to major problems for business in the future.
- ❖ Information gets lost and hidden at the edges of your data infrastructure, so the value it could deliver is always intangible.

### (5) ( Database Design versus Database Structure )

Consider designing an employee feedback application for a corporate firm that wishes to train their employees on a new system and then assess their knowledge of the subject. All employees will be required to take the employee feedback application training and afterwards take the application quiz.

Referring to the firm's attempts to design their quiz application, comment on some issues that could occur between the back - end database development team and the front - end design team.

#### Checkbox/ Radio button Issues:

The quiz application may ask employee to fill the details using checkbox which may allow more than one values. If backend developer hasn't handled more than one value, then it will cause an issue. Similarly, for drop down list, backend and frontend developer need to be in sync to handle the values.

#### Data Entry Issues:

The quiz application's front-end team may create fields to enter the employee's responses in text and these would have the acceptance of only alphabetic characters and not the special characters. Thus, entering special characters may cause the user an error as the backend developers may have designed the database in such a way that only alphabetical responses are accepted.

Sometimes the backend developer may have included certain functionalities which the frontend guys may not be aware of as to where it is present.

## Part 2 DBMS Concepts - Database Systems

- (1) Although the database system yields considerable advantages over previous data management approaches, database systems do impose significant costs. What are the potential costs of implementing a database system?

Things to be taken care while planning to implement database system

- 1) Hardware and Software purchase/update
- 2) Vendor dependence and Licensing for third party software
- 3) Compliance regulation or Taxation
- 4) Training personnel or Additional recruitment
- 5) Operating system charges and Database Maintenance.

Student Name **Sivaranjani Prabasankar**

Section \_\_\_\_\_

- (2) List the five types of users identified in a database system and describe their individual interactions with database systems. Use the course textbook(s) to support your descriptions of the types of users.

The five types of users identified in a database system are as follows:

**1: System administrators:** These users take care of the basic functionalities in the system. The installation, configuration and troubleshooting issues.

**Task:**

- To be report for any complexities in the computer, laptop or other devices.
- To maintain the servers and hubs.

**2: Database administrators:** The DBA's ensure that everything in the database system is working fine, managing the data in its entirety of the whole organization.

**Task:**

- To implementation of new database applications
- Bring changes to the already existing application

**3: Database designers:** These are the people who are the architects of the database structure. And the data is ever growing hence the responsibilities of the designer increases always.

**Task:**

- To design the database
- To re-design the whole structure or database if there are any discrepancies in the same then it might not result in an efficient database environment.

**4: System analysts and programmers:**

**Task:**

- To implementation of the application programs
- To design reports and forms through which the users can access
- To manipulate the database

**5: End users:** Clerks, staff, managers are all end users who need to access the database for information throughout the day are known as end users. The end users are the people who use the application program or database on a regular day to day basis.

**Task:**

- To use the application program or database
- To report in case of any issues

### **Part 3 Data Modeling Concepts - Advanced Topics in Data Management**

- (1) Consider these types of local businesses, and their individual system needs, that could be near or in your area of residence.

- Inez's Imports: inventory management system
- Madison Marketing and Merchandise: sales ordering system
- Vermont Venues: concert ticket reservation system

Choose one of these business and comment on how that particular business would benefit by using a database system for their particular needs? What data tables do you think would be important for their database? What analytics can be performed with the database?

Student Name **Sivaranjani Prabasankar**

Section \_\_\_\_\_

**Vermont Venues: Concert Ticket Reservation System**

Mandatory Tables which needs to be included in Database are as follows

- 1) **Program Details:** Holding program schedule, Genre, Venue and tickets available
- 2) **Customer Details:** Holding Customer details like first name, last name, contact details, interest, payment details. etc.,
- 3) **Ticket Details:** Holds Ticket fares for each program, ticket category. This table should be integrated with Program and Offer Details.
- 4) **Promotion or Offer Details:** Holding offers or coupon codes to people who are interested or eligible.
- 5) **Payment Details:** Payment table which has the applicable mode of payment, amount paid, offers or discounts if any.
- 6) **Reservation Details:** Holding venue details along with Total seats and seats available for reservation or seat map also provision for bulk booking
- 7) **Gallery:** Holding photos, videos of old programs.
- 8) **Amenities:** Holds extra offers or discount to avail amenities at concert venue like cafeteria.
- 9) **Cancellation Detail:** Holding penalty and refund details for ticket cancellation.
- 10) **Organizer Details:** Holding the organizer details and their previous performances.

**(2)** The general tasks that are required to form an RDBMS solution include:

- preliminary consultancy
- requirements analysis
- system specification
- database design
- programming procedures
- testing
- implementation
- training
- continual maintenance

Consider being given the task of designing and implementing a database system that would track business credit memos, which are issued by the seller of goods or services to the buyer, reducing the amount that the buyer owes to the seller due perhaps to a change of terms for a prior invoice. A sample credit memo follows.

Choose one of the above tasks and comment on what occurs during the achievement of the task as far as the contribution of the task to the completion of the database project.

**Credit Memo*****Damen Delivery Services ( DDS )***

Student Name **Sivaranjani Prabasankar**

Section

**JOB** [Job description]

TO

**Customer ID [ABC12345]**

**DATE: [ENTER DATE]**

**CREDIT NO. [100]**

[NAME]

**[COMPANY NAME]**

**[STREET ADDRESS]**

[CITY, ST ZIP CODE]

[PHONE]

Quantity	Item #	Description	Unit Price	Line Total
			Subtotal	
			Sales Tax	
			Total	

## Testing Steps

- Adding Multiple values
- Executing queries
- To analyze the output

**Example:** Return order as the customer not satisfied with product

- 1) While issuing next order credit memo existing refund amount should be deducted and new invoice should be issued to customer.
- 2) Testing can be done to check if the id is relating to the database and prior invoice would result the outstanding amount and then automatically deduct the credit which is due from the previous transaction.
- 3) Testing will accomplish that the credit memo's customer id is relating to the invoices database or not and then result in the subtractions.
- 4) Only after testing will the database proceed in completion of the tasks to other phases such as implementation and continual maintenance.

## Part 4 Data Design Concepts - Database Systems

## (1) ( File Structures )

Consider the File Structure for the XYZ Company Project Management data given below. Then, respond to each of the following questions related to the structure.

ProjectCode	ProjectManager	MgrTelephone	MgrLocation	ProjBidPrice
31-205A	Sami A. Allen	773-555-1216	2900 S. Federal St. Chicago, IL 60616	\$46,000
37-403B	Cecily D. Worth	773-555-1217	27 Beckley Rd. Battle Creek, MI 49015	\$1,342,000
33-906T	Daisy B. Burns	773-555-8821	2543 W. Foster Ave. Chicago, IL 60625	\$847,320

Student Name **Sivaranjani Prabasankar**

Section \_\_\_\_\_

29-107D	Alice M. Zane	773-555-1219	7202 Harrison Ave. Rockford, IL 61112	\$1,449,000
21-929A	Dean P. Pence	773-555-2222	6302 N. Northwest Hwy. Chicago, IL 60631	\$903,117
41-386C	Cecily D. Worth	773-555-1217	27 Beckley Rd. Battle Creek, MI 49015	\$1,805,000
26-903C	Sami A. Allen	773-555-1216	123 Lane St. Chicago, IL 60616	\$78,081
29-227A	Cecily D. Worth	773-555-1217	27 Beckley Rd. Battle Creek, MI 49015	\$2,550,273

- (a) If the XYZ Company wishes to display a listing of the Project Codes alphabetically by the right - most character, what problem(s), if any, would you encounter?  
Would it make any sense to solve this problem by altering the file structure?

If details are displayed by listing project codes alphabetically, then we have problem for multiple project ending with same letter. To avoid this problem, we can list rows by sorting project codes in ascending order. We can alter the file structure before that we need to analyze whether data is dependent or independent of file structure.

- (b) What problem would you encounter if you desire to produce a listing by state?  
How would you solve this problem by altering the file structure?

We need to alter the file structure by segregating city, state, pin code so that it won't interfere with manager's address. Similarly, zip codes can be arranged numerically by linking with state. But before that we need to analyze whether data is dependent or independent of file structure.

- (c) If you wanted to produce a listing of the file contents by last name, area code, city, state or zip code, how would you alter the file structure?

We need to alter the file structure by segregating First name, Last name, state, pin code so that it won't interfere with manager's address. Similarly, zip codes can be arranged numerically by linking with state. But before that we need to analyze whether data is dependent or independent of file structure.

- (d) What data redundancies do you detect? How could those redundancies lead to anomalies?

**Data Anomalies:**

Example: Project manager Sami A. Allen's details has been entered twice with different address and project code.

**Data Redundancy:**

Example: Project manager Cecily D. Worth's details including contact number and address details are repeated for different project.

Data redundancy will lead to data anomaly as there is no consistent data for some managers which leads to mis-interpretation.

- (e) The ProjBidPrice column, in the given table, appears to have a wide range of values. An XYZ Company database clerk suggests splitting the Project Management data into two file structures, as this may make it easier to search for values in this column. What issues, if any, could be resolved by proceeding with the clerk's suggestions? What issues, if any, could be resolved by proceeding with the clerk's suggestions?

Splitting or normalize the table is a wise idea to avoid or correct data anomaly and data redundancy. But before that we need to analyze whether data is dependent or independent of file structure. Also, we need to consider integrity constraint before split. But this split lead to ease data retrieval or even make sorting of any column in any order easier.



Student Name Sivaranjani Prabasankar

Section \_\_\_\_\_

**(2) ( Database File Structures: Data Redundancy )**

Consider the File Structure for the ABC Company Project Management data given below. Then, respond to each of the following questions related to the structure.

ProjectNum	ProjectName	EmpNum	EmpName	JobCode	Job_Chg_Hour	Proj_Hours	Emp_Phone
1001	Thunder	121	Daisy B. Burns	AB	80.00	14.2	773-555-1216
1001	Thunder	217	Alice M. Zane	CD	65.00	15.7	773-555-1216
1002	Chicago	821	Dean P. Pence	BD	95.00	14.4	773-555-1231
1002	Chicago	219	Cecily D. Worth	CD	80.00	17.2	773-555-1217
1003	Archimedes	222	Sami A. Allen	EH	65.00	24.9	773-555-8821
1003	Archimedes	121	Cecily D. Worth	AB	95.00	37.8	773-555-1219
1003	Archimedes	516	Denny T. Li	HW	80.00	22.2	773-555-2222
1004	Emerald	355	Danny T. Li	UG	65.00	19.7	773-555-2222
1005	Diamond	217	Alice M. Zane	CD	80.00	19.5	773-555-1216
1005	Diamond	222	Sami A. Allen	BD	95.00	22.3	773-555-8821

- (a)** List and discuss two additional fields that could or should appear on the above table structure.

Additional details to be added to enhance database are

- 1) **Project deadline** - To find out the total time it would possibly take to finish the project
- 2) **Project Priority** - Indicating if the project needs to be done on an immediate basis or are the client requirements flexible and have more time.
- 3) **Employee Availability or Release date** - To engage all the employees effectively and for proper resource utilization.
- 4) **Project & Employee Location** - To allocate employee from respective location

- (b)** Identify and discuss the serious data redundancy problems exhibited by the file structure shown in the given data sheet.

There are serious redundancies in

- 1) **EmpNum** → Employee number 121 has been repeated twice under different employee name
- 2) **ProjNum** → every project number has been repeated under different employee. To avoid this, we can have two table with Project and Employee details and can integrate both.
- 3) **Emp\_Phone** → Telephone number for the employees working under the same project and thus reaching out to an employee just by the telephone number would result in redundancy and would not result in a proper result as there are multiple employees on the same project.
- 4) **Job\_Charge** → Job charge is not same even for same job code. AB has been charged as 80 & 95 at different instant. This is not redundant data but its an inconsistent data which needs to be focused as serious problem.