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I confirm that I understand my coursework needs to be submitted online via Google Classroom under the relevant module page before the deadline in order for my assignment to be accepted and marked. I am fully aware that late submissions will be treated as non-submission and a marks of zero will be awarded.

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1. Information System

1.1. Introduction

“An information system (IS) is a set of interrelated components that collect, manipulate, store, and disseminate data and information.” (Stair & Reynolds, 2017). Along with processing and managing data, an information system helps an organization to establish proper communication with their clients, enter in the market’s competition and promote themselves (Zwass, 2021).

1.2. Information System Data Processing Model

An Information System works on a basic mechanism i.e., Input, Process and Output.

1.2.1. Input

Input is the act of collecting data (Stair & Reynolds, 2012). For example, in a delivery service, customers order items to be delivered. The items ordered by the customers are the inputs.

1.2.2. Process

The input data needs to be converted into meaningful information so that it can be used. This is called processing (Stair & Reynolds, 2012). After the items have been ordered, they need to be collected and organized in proper package. Here, packing the products is an example of processing.

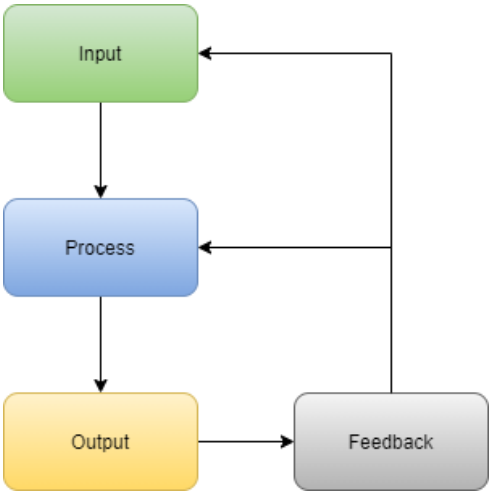

Figure 1 Information System Data Processing Model

1.2.3. Output

Output is the information that is produced and ready to be presented (Stair & Reynolds, 2012). In the above scenario, the items ordered by the customer will be delivered once it has been packed. The delivery is the output received by the customer.

1.2.4. Feedback

Once the output has been created, feedback will be given if there is a need to change any input or processing (Stair & Reynolds, 2012). Again, in the example of a delivery service, the wrong item might be delivered to the customer. In such cases the customer reports the issue and requests for an exchange or a refund. The system acts accordingly and fixes the issue.

1.3. Components of Information System

As mentioned earlier in the definition, an information system is a set of interrelated components. The components work together to make the system function efficiently.

1.3.1. Data

Data is an unstructured fact or evidence that is yet to be processed. Data does not have any meaning alone. It needs to be organized before use. Once the data has been organized and given a meaning, it becomes an information (R. Kelly Rainer, 2020). An information system requires relevant data so that it can process them into the necessary information and used when required. The data is usually stored and managed in a database (Zwass, 2021).

1.3.2. Processes

Processes or procedures are the stepwise guideline of an organization. It specifies the role of individuals or departments associated with the enterprise. Procedures are needed to operate an organization, and to maintain security in the system. An effective procedure helps to increase efficiency, save cost and utilize resources. (Stair & Reynolds, 2017).

1.3.3. People

People are the valuable assets of any organization. Technical professionals are needed to program the system, run the management, analyse data, design databases, and maintain integrity as well as security in the system (Zwass, 2021). The professionals include marketing representatives, financial executives, end users and operators (Stair & Reynolds, 2017)

1.3.4. Hardware

Hardware includes the physical components of a computer which performs input, process, storage and output functions. Computer hardware consists of processor,

memory and input/ output devices. Input devices are used to feed in instructions. Processors execute the commands given by the user. Memory provides space to store data and instructions. Output devices display the result generated by the computer. (Stair & Reynolds, 2017).

1.3.5. Software

Software is the program that controls the hardware. There are two types of software: system software and application software. Operating systems, middleware and utilities are some system software (Stair & Reynolds, 2017). Application software handles specific functions. It includes spreadsheets and word processing programs (Zwass, 2021).

1.4. Role of Information System in Business

The change in various social, political as well as economic factors affect a business environment, and cause pressure in business. Business pressures are created by competition in the market, globalization, change in work environment and manpower, demand of real time data, problems in security such as data breaching, and updating technology (R. Kelly Rainer, 2020).

With the growing pressures, businesses need to upgrade as well. For the same purpose, modern organizations use different information systems. The two information systems used by the organizations are Enterprise Resource Planning (ERP) System and Transaction Processing System (TPS). In ERP, any data recorded gets stored in a common database and is relayed over the system to different departments of the same organization. In TPS, data is collected in real time. TPS handles large data while trying to provide accurate information and maintain security. (R. Kelly Rainer, 2020)

Information system, along with its components, allows enterprises to function in a proper order. Business organizations depend upon the system for its operation. It supports to form an enterprise, compete with other organizations in business, and establish relationships with customers, manufacturers and suppliers. It provides quality information to the decision makers so that they can analyse and bring changes to their business model. (Zwass, 2021)

1.5. Conclusion

Information System consists of components working together to collect, store, process and manage data. The data is input by the users. It is then processed either manually or through a software to give an output. If the output is inaccurate, the user then gives a feedback and the data is either sent back for processing or a different input is given. This is the model for data processing. The components of information system are data, processes, people, hardware and software. These components work together to operate, manage and maintain order in an organization.

2. Database

2.1. Introduction

“A database is any logically coherent collection of data organized for storage and retrieval by computers, as a single, possibly large, repository of data that can be used simultaneously by multi-users” (Eze, et al., 2014). A database contains all sorts of data required in any organization in a structured manner. The data might be as simple as a person’s name or complicated such as an image (Silberschatz, et al., 2019). Users can search for data in any pattern with the help of syntax (Britannica, 2020).

Database is managed by a software called Database Management System (DBMS). DBMS interacts with the user to create a database, and to retrieve, edit or delete data from the database. DBMS may vary according to the systems requirement. Relational DBMS shows the database relationship in tabular form where the data are organized in rows and columns. Network DBMS are presented in a graphical form, and the database has many to many relationships. Object oriented DBMS has more advanced features such as data types for graphics, audio and video. (Eze, et al., 2014)

2.2. Importance of Database

Organizations collect data about their clients, employees, service, and many more to keep track of how they are operating. Previously, it would be difficult to retrieve data as it used to be recorded in paper forms. With the advent of technology, it has become easier to record, store, retrieve or even edit data (Silberschatz, et al., 2019). Database is a

convenient platform through which these functions can be performed efficiently. The user only requires to use some syntax and the task will be done immediately (Britannica, 2020). Databases are structured, so it helps to avoid the tedious task of manually organizing and saves the time of a user trying to search for data. It allows decision makers to analyse and update their business system when required (Oracle, 2021).

As compared to file-based approach, databases are a lot more efficient. Several copies of the same file may have been created over a period of time. This creates redundancy in the system. In some cases, the duplicate data might not even match the original. Databases help to avoid redundancy and store consistent data. It also allows only particular users to access particular data in order to maintain security in the system. (Silberschatz, et al., 2019).

2.3. Applicability of Database

An enterprise, related to any sector, needs data regarding their concerned field. For example, a business organization needs data regarding their sales, manufacturing details, customers, staffs and profit; an educational institute may need data about their students, grade, courses and teachers; a finance company may need data about their customers, loans, credit transactions, taxes, sales and holdings; hospitals need to record details about their patients, doctors, treatment and medicine. All these data need to be managed in a proper structure - database serves the exact purpose. (Silberschatz, et al., 2019) Large databases contain abstracts, reports, journals, bibliography, and indexes with location of different records (Britannica, 2020).

2.4. Conclusion

Databases are used in different sectors to store, retrieve, update or delete large amounts of data. They store data in a proper structure. Database is controlled by Database Management System (DBMS) (Oracle, 2021). The type of database varies according to their structures and relationships (Eze, et al., 2014). Database is a convenient approach to manage data. It is efficient and consistent as compared to the file – based approach (Silberschatz, et al., 2019). Large databases are used in different commercial organizations. Database provides a convenient way to manage any sorts of data in any sequence as desired by the user (Britannica, 2020).

3. Database Design

3.1. A Business Model

Suppose that there is a Ridesharing Service named Swish, which allows passengers to book a private vehicle such as cars, bikes or scooters to travel a short distance. Passengers can send a request through their phones mentioning their pickup point and destination. A rider accepts the request and picks up the passenger from the mentioned location. The rider then drops the passenger to the desired location. Ridesharing service saves time and drops people to the exact destination that they desire. They are convenient than the public vehicles in terms of traffic congestion and cost.

3.1.1. Business Rules:

A person can register to become a rider only if they own a vehicle and a driving license.
The amount to be paid will be auto generated by the ride sharing app according to the distance. Discounts will not be given on the cost.
A passenger may cancel the request only with a genuine reason.

3.2. Entities

The entities of the ride sharing apps are explained below:

Passenger: Passengers are the people who use the ride sharing service to travel to a particular destination. They choose a vehicle and send a request to the service. The passengers need to mention the location they want to be picked up from and the location they want to reach.

RideRequest: Passengers need to send a request through the company's app. The request appears on the vehicle owner's app if they are nearby. A rider accepts the request and calls the passenger to confirm.

VehicleType: A ride sharing company can have 3 types of vehicles. They are car, motorbike and scooter. The passengers are allowed to choose a desired vehicle.

Vehicle: The vehicles of a ride sharing company are owned by a rider. There are many vehicles registered along with their owners to the company. When a passenger sends a ride request, the vehicle owners who are in the same location as the passenger get a notification. Once they accept the request, they go to pick up the passenger from the allocates location and drop them to the desired destination.

OperatingArea: It is the area that a vehicle has been assigned. A vehicle can run only inside its assigned area.

3.3. Attributes

Entity	Column	Description	Type	Length
Passenger	PassengerID	An ID given to each passenger to identify them.	INT	
	Name	Name of the passenger.	VARCHAR	255
	Contact	The passenger's phone number	VARCHAR	255
RideRequest	RequestID	A code is given to each request sent by the passenger.	INT	
	Pickup	The location from where the passenger is picked up.	VARCHAR	255
	Destination	The location where the passenger is to be dropped.	VARCHAR	255
	Price	The cost that a passenger needs to pay.	FLOAT	
	Passenger	The ID of the passenger who sent the request.	INT	
	Vehicle	The vehicle that has been assigned.	INT	
Vehicle	VehicleNo	The number on the number plate of a vehicle.	INT	
	Type	The type of vehicle.	INT	
	RiderName	The name of the rider who owns the vehicle.	VARCHAR	255
	Area	The code of the area where the vehicle can operate.	VARCHAR	255
VehicleType	VehicleID	Each type of vehicle is given an ID to identify which one it is.	INT	

	VehicleType	The type of the vehicle. For example, car, motorbike and scooter.	VARCHAR	255
OperatingArea	AreaCode	A code given to a certain area.	INT	
	AreaName	The area's name.	VARCHAR	255

Table 1 Description of Attributes

3.4. Primary Keys

PassengerID: Passenger ID is the primary key of Passenger entity. Each passenger is given an ID. Each ID is different, so it helps to uniquely identify the passengers even if their other attributes are similar.

TypeID: It is the primary key of the entity VehicleType. VehicleType determines the type of vehicle. The vehicle can be of 3 types and all those types are given a different ID.

VehicleNo.: The primary key of the entity Vehicle is VehicleNo. Vehicle number is mentioned on a vehicle's number plate. Each vehicle number is different.

RequestID: It is the primary key of RideRequest entity. A request ID is generated each time a passenger sends a request. The ID is different for each request.

AreaCode: OperatingArea has the primary key AreaCode. The ride sharing company has different areas where its vehicles operate. Each area is assigned a unique code.

3.5. Foreign Keys

Type: Type is a foreign key of the entity Vehicle. Its reference is taken from the primary key of VehicleType – VehicleID. A vehicle can be either a two-wheeler or a four-wheeler. Type refers to the ID given to each type of vehicle.

Area: Area is the foreign key of the entity Vehicle. Its reference is taken from the primary key AreaCode of the entity OperatingArea. Area is the code given to the places where a group of vehicles can operate.

Vehicle: Vehicle is the foreign key of the entity RideRequest. Its reference is taken from the primary key VehicleNo of the entity Vehicle. Vehicle is the number assigned on the back of the vehicle.

Passenger: Passenger is the foreign key of the entity RideRequest. Its reference is taken from the primary key PassengerID of the entity Passenger. This foreign key represents the unique ID given to each passenger who have registered to take the service.

3.6. Relationship Between the Entities

One passenger can send many ride requests. So, the relationship between Passenger and RideRequest is one to many.

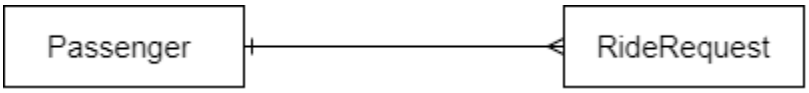

Figure 2 Relationship between Passenger and RideRequest

A particular vehicle may be assigned to a number of passengers when they send a ride request. So, the relationship between RideRequest and Vehicle is many to one.

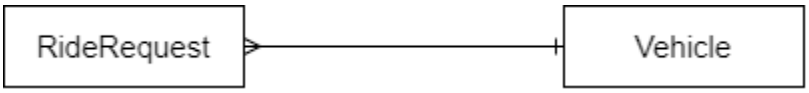

Figure 3 Relationship between RideRequest and Vehicle

There are two types of vehicles i.e., a two-wheeler and a four-wheeler. There can be many vehicles of the same type. Hence, the relationship between Vehicle and VehicleType is many to one.

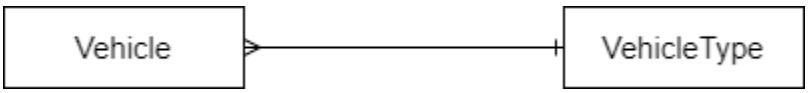

Figure 4 Relationship between Vehicle and VehicleType

A particular vehicle is assigned to only one area, but a number of vehicles operate in a single area. Thus, the relationship between Vehicle and OperatingArea is many to one.

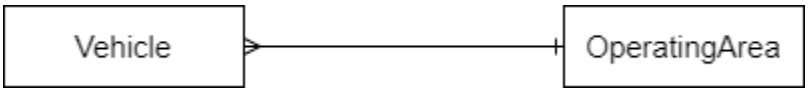

Figure 5 Relationship between Vehicle and OperatingArea

4. Entity Relationship Diagram

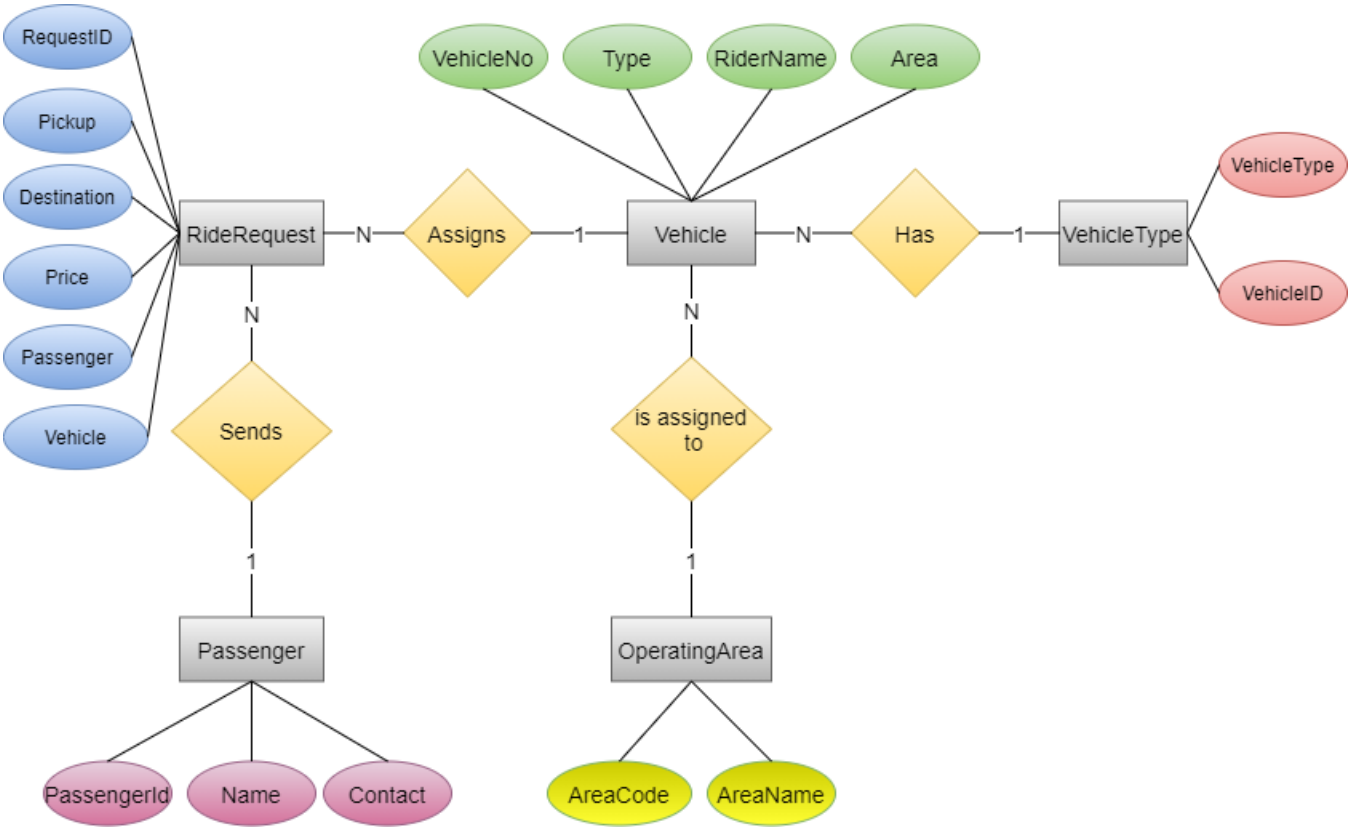

Figure 6 Entity Relationship Diagram of a Ride Sharing Service

5. Personal Learning Reflection

"AT THE HEART OF EVERY ORGANIZATION IS ITS INFORMATION SYSTEMS, and that is what this course is all about." This particular statement, mentioned on the first week's presentation of this module, fascinated me as soon as I saw it. I was there to study Computing, and I had heard the module would teach about databases; however, this sentence mentioned about organization – something related to business, as I understood. Then, our lecturer, Mr. Bibek Raj Joshi, explained that the world is getting digitized. That's when it occurred to me that online services have been rising, so this must be what the module is about. Obviously, the module covered more than what I had expected.

Information System is basically about the way data or information is handled. This module explains the role of information systems, process of data modelling, and different ways of

handling data. Before this module started, I had asked a senior about the syllabus. I was told that the course would cover databases and entity relationship diagrams. I was already familiar with the working mechanism of those topics as they were taught in high school. However, I did not know their practical use. I also knew about the data processing model. Although I had already learned some of the contents of this module, I did not know what information system meant. I was oblivious about its components as well.

As the module started, I started getting more curious about it. I was determined to learn everything possible – that was pretty much my goal. From the first week that this module began, I started to take notes, ask questions whenever there was a doubt, and review the notes after coming back home. For MySQL syntax, I refer to the class presentation and a website called W3schools. I have started to enjoy the module a lot than I thought I would. I am getting to learn more functions of MySQL than the ones I had already learned.

Currently, I do not have any issues related to academics of this module. It is a bit difficult to memorize the syntax; however, I am getting better at it with more practice. I used to hesitate to ask questions, but now it has been easier to talk to the teachers and my classmates. Recently, it has been challenging to manage time since we have been assigned with coursework and we also need to keep up with the syllabus alongside. It is an opportunity to learn multitasking and most importantly, time management. I am looking forward to learn more about this module. I am even curious about the next topics which covers about the internet and web technologies.

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