**Faculty of Computers and Information**

**System Analysis Course-**

**Sheet-2 - Second Year-2020-2021**

**Case Study**

The stock supervisor of a large government department described the procedures carried out by his staff as follows:

“Customers (that is other sections within our department) can order items by completing a standard 3-part, multi-line customer demand form. When the customer demand form is received by Sue, she checks to ensure the form has been completed correctly. She then sequentially registers the customer demand on the demand register sheet as well as filling in details such as customer number and date received, on the sheet. Sue then fills out a demand receipt slip, which includes the demand registration number and date received, and returns the slip to the customer. The original copy of the customer demand is filed in the customer demand file.

The other 2 copies, or the customer demand set as they are called, are put into Sue’s out tray awaiting collection by Bill, the warehouse clerk, three times a day. For each item on a customer demand, Bill searches the stock cards to see if stocks exist in the warehouse to satisfy the demand line. He fills out the amount available for despatch column on the demand line with the amount available from stock. Bill creates a back order for any outstanding quantities and files these back orders awaiting receipt of a delivery from the manufacturer. Bill adjusts the balances on the stock cards by the amount noted for despatch. Also, he adds the remaining quantity demanded, if any, to the due out column on the stock card.

Each time the stock records are changed, the new stock item balance is compared to the reorder level on the stock card. If the item stock balance is below this level, a manufacturer’s order form is filled in and sent to the manufacturer.

Bill sends the customer demand set with completed despatch amounts to the delivery staff, who select, pack and deliver the goods to the customer. The customer signs the delivery copies of the customer demand set and retains the first copy for their records. The second signed copy is returned to Sue who matches the delivery copy with the original customer demand.”

**PART B - INSTRUCTIONS**

11. Draw a logical data flow diagram (DFD) of the procedures described above.

12. Complete data dictionary entries for…

i. Customer Demand ii. Stock Cards

13. Write structured english to describe the ‘Confirm Stock Availability’ process performed by Bill in the warehouse.

14.a) Draw an entity-relationship (E-R) diagram for the entities described in the narrative above.

(25 marks)

14.b) The following narrative describes a Company's Travel Expenses Policy:

“If speed is not critical, employees grade 3 and below should take a bus for both local and intercity travel, whereas if speed is critical all employees should take the company car for local travel and domestic airlines (economy class) for intercity travel. Employees who are grade 4 and above, should use domestic airlines (economy class) for intercity travel even if speed is not critical, and they should use a taxi locally”.

Using this narrative, produce **Process Descriptions** (or **Transform Descriptions**) using the following techniques:

i) Construct a Decision Table to model this policy. This must be a full decision table (not a condensed table) showing all possible condition columns.

ii) This narrative description may be considered slightly ambiguous. What question will you ask the policy makers to resolve this ambiguity?

iii) Use **either** Structured English **or** Action Diagrams to model this policy.

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1- A project has been defined to contain the following list of activities along with their completion time and dependencies:

|  |  |  |  |
| --- | --- | --- | --- |
| **Activity No** | **Activity** | **Completion Time (weeks)** | **Dependency** |
| 1. | Requirements gathering | 2 | -- |
| 2. | Requirements prioritization | 6 | 1 |
| 3. | Data analysis | 3 | 2 |
| 4. | Logical design | 7 | 2 |
| 5. | Physical design | 6 | 2 |
| 6. | Interface design | 1 | 3,4 |
| 7. | Report design | 5 | 4,6 |
| 8. | Coding | 4 | 6,7 |
| 9. | Testing and documenting | 8 | 5,7 |
| 10. | Installation and training | 2 | 8,9 |

  a. Draw a PERT chart for the project;  
  b. Calculate the earliest completion time for the project;  
  c. Show the critical path.

2. Draw the following *binary relationships*: (a) A hospital consists of different departments; each department provides services to only one hospital; (b) Each team member can work on several IT projects simultaneously; each IT project involves different team members; (c) Each invoice corresponds to a particular order; the invoice is created only if order is accepted and finalized. Indicate minimum and maximum cardinalities, degree and optional/mandatory nature of each relationship.

3. The purpose of the textbook inventory system at a campus bookstore is to supply students with textbooks for classes at a local university. At the beginning of each term, university's academic departments submit to the bookstore initial data about courses, sections, instructors, textbooks and projected enrollment on a textbook master list. Based on the master lists, the bookstore generates Purchase Orders which are sent to the publishing companies supplying texts. After ordered books arrived to the store, the system generates a confirmation for the publisher and updates the inventory. In order to buy a text, a student has to place on individual order. Using this business description, develop an *event table* for major events in the system

4. Based on the following description, draw an *ER diagram* of a walk-in clinic information system that will keep track of patients, doctors, appointments and medications.  A patient comes to the doctor by appointment. Each patient has a unique number, name, address, date of birth, date and time of appointments with doctors. A patient may receive medications, which are assigned by a doctor. Each medication is described by unique number, name, and manufacturer name. Each doctor is characterized by employee id number, name, phone, and specialization.    
 a. Indicate minimum and maximum cardinalities and degree of each relationship;  
 b. Show the attributes of each data entity.   
 c. If required, present a solution to avoid many-to-many relationships.

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**1-Deduce the suitable use case to represent the following case study**

Consider a point of sale system. One of the actors is the customer and another is the sales clerk. Here is just one use case from this system:

**- Use Case : Sales Clerk checks out an item**

1. Customer sets item on counter.

2. Sales clerk swipes item bar code reader across item bar code on item

3. System looks up item bar code in database procuring item description and price

4. System emits audible beep.

5. System announces item description and price over voice output.

6. System adds price and item type to current invoice.

7. System adds price to correct tax subtotal

- **Error case 1**: item bar code unreadable

If after step 2, the item bar code was invalid or was not properly read, emit an audible sound.

- **Error case 2**: No item in database

If after step 3 no database entry is found for the item bar code flash the ‘manual entry’ button on the terminal. Accept key entry of price and tax code from Sales Clerk. Set Item description to “Unknown item”. Go to step 4.

2-Given the following data attributes and entities, indicate which attributes could be identifiers for each of the entities. You may have to combine attributes or even add some attributes that are not listed. Map all of the attributes to their appropriate entity. Remember, each attribute should describe one and only one entity. Draw a rough draft entity relationship diagram.

**Green Acres Real Estate System**

Entities:

Seller House Closing

Buyer Offer Showing

Listing Property Room

Attributes:

Seller name Square foot size Seller address

House style closing location Listing price

Number of bathrooms Garage size Showing date

Garage location Buyer name Basement size

House heating method Offer amount Listing date

Property description Offer date Room type

Property size Showing time Room size

Elementary school zone Buyer phone number Closing date

Sales terms

**3- Draw an entity relationship diagram for the following bakery system:**

Based on the following description, draw an *ER diagram* of a walk-in clinic information system that will keep track of patients, doctors, appointments and medications.  A patient comes to the doctor by appointment. Each patient has a unique number, name, address, date of birth, date and time of appointments with doctors. A patient may receive medications, which are assigned by a doctor. Each medication is described by unique number, name, and manufacturer name. Each doctor is characterized by employee id number, name,phone,and specialization.    
 a. Indicate minimum and maximum cardinalities and degree of each relationship;  
 b. Show the attributes of each data entity.   
 c. If required, present a solution to avoid many-to-many relationships.

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