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IT-Software Application

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THE DEVELOPMENT OF ESEMKA TRAIN INFORMATION SYSTEM

ESEMKA Train is one of Indonesia state-owned companies who are moved in transportation sector. Being the only one of the train company in Indonesia, obviously ESEMKA Train has a very complex business process. This situation drives the Board of Director to develop an Information System (IS) to support their Business and give more competitive advantages to passengers.

The study below will concern the development of Information System to support ESEMKA Train core service, which is a commercial train, concerning critical process that corresponds to the commercial train, such as **Train Management, Route Management, Train Scheduling,** and **Ticketing**. Involved also in the business process of ESEMKA Train core service mentioned before, the department who will directly make use of the IS developed such as **Route and Schedule Department (RSDept)**, **Operation Department (OpDept)**, and **Sales Department (SDept)**.

Train Management

Operation Department (OpDept) is responsible to maintain and manage ESEMKA train data, such as train number, type of the train, passenger capacity of the train for each class (Executive, Business, and Economy), year of manufacture for the train, and also the average travel speed of the train.

This train data will be used in other ESEMKA Train business process such as the route management and scheduling process. When calculating the travel time needed from one station to other station, the train average travel speed will be calculated along the travel distance. The passenger capacity will also be used to determine number of ticket available for every schedule offered.

Usually every train should be repaired every 10.000 KM travel distance, and after 10 years of usage the train will not be used anymore.

Having so many trains to manage, ESEMKA Train faced a complicated problem to maintain the train record, which train needs to be repaired, and which train should not be used anymore. With the IS developed, hopefully this process would become simpler.

Route Management Process

Every train route in ESEMKA Train are managed by RSDept, when doing route management activity, RSDept will input the entire route ESEMKA Train offers to the passenger. RSDept will determine from which station the route begin and to which station the route ends, including all the stops that passed along the route. RSDept should also record the distance between every station, for example the distance from Jakarta to Bandung are 200 KM, and Bandung to Surabaya are 300 KM.

Using the manual process, the RSDept sometimes have problem to calculate the distance for the whole route from first station to the last station, because between every station, the distance are different. Using the IS developed, RSDept wish this distance calculation can be processed automatically. As example, if the route from Jakarta to Surabaya will pass the Bandung station, then the distance will be accumulated from Jakarta-Bandung which is 200 KM, and Bandung-Surabaya which is 300 KM, making a total of 500 KM distance.

Train Scheduling Process

RSDept will input the train schedule for the following month on the third week of current month to the system. Ensure the system can give the RSDept notification to entry the train schedule for the following month.

The details that will be inputted by the RSDept are:

Details	Explanation
Route (Departure – Arrival)	This will be determined by the RSDept. For example Jakarta-Bali
Transit Point	Transit Point will be determined using route available, ensure that all the transit point should be linked properly from First Station until Last Station. For Example: If the Route from Jakarta to Bali should be passed 3 transit point: a. Jakarta-Bandung b. Bandung-Surabaya c. Surabaya-Bali Noted that the second route should be started from Bandung, because on the first route, the first stop is Bandung. The same for the third route should be started from Surabaya, because the second stop is Surabaya.
Distance	The distance should be calculated using all the transit point listed above, and showed only the total distance traveled.
Travel Time	Travel time should be calculated using formula: [Distance] / [Average Train Speed]. Noted that the travel time should be showed in minutes and hours.
Departure Time	When will the train departure (time)

Arrival Time	Arrival Time should be determined by the system, using the formula [Departure Time] + [Travel Time]
Departure Date	When will the train departure (date)
Arrival Date	Arrival Date should be determined by the system automatically.
Train Class	Every train will have 3 classes with different price that can be update, which is: a. Executive Class (example: 500.000) b. Business Class (example: 300.000) c. Economy Class
Train Ticket Price	Ticket price will be calculated using formula: ([Distance] * 1000) + [Train Class Price].

Every day the RSDept also monitors the scheduled route for any change of schedule and also the route price. If there is any change of schedule for the route, the RSDept will inform the passenger who already book the route through e-mail and broadcast message using SMS.

Train Ticketing Process

Passenger who wants to buy ticket of ESEMKA Train can visit one of ESEMKA Train branches and will be served by Sales Department (SDept) in charge. The SDept then will inquire the detail of passenger route such the origin of route, destination of the route, the date of departure. Moreover, SDept will also ask how many tickets and cabin class desired by the passenger for that route.

After receiving all the information, Sales Department will check the availability of route schedule that can be selected by the passenger by the date of route, also giving information of transit point (if any) and the duration of the route to the passenger. If the route schedule agreed by the passenger, the Sales Department will confirm the price applied to the route to the passenger and they will be asked to provide details of the person participating in the route if they approve the price charged. These details include: full name, identity number, and phone number.

Every month, Sales Department will generate sales report for the tickets sold during that month

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Reviewing the case study above, you're required to develop Information system to support all of the business process explained for ESEMKA Train. Ensure your developed solutions can accommodate ESEMKA Train business case properly.

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train. The development will be conducted in 3 phases:

Phase 1: UML and Database Design

A good information system always comes from a good system design, in this development phase you are required to design the information system including the database to support the ESEMKA Train business process above using several UML tools required:

1. **Use-Case Diagram**
    a. Ensure all the key function of the system is illustrated in the diagram
    b. Ensure all the actors relate to their corresponding function in the system
    c. Identify the include, extends or depends relationship of the system function on the diagram
    d. Ensure all the component used to illustrate the diagram is using the appropriate component

2. **Entity Relationship Diagram**
    a. Ensure the ERD developed can store all the information required in the system
    b. Ensure the relationship between the entities in the diagram is connected properly.
    c. Identify all the primary key and the foreign key

d. Ensure all the component used to illustrate the diagram is using the appropriate component

3. Physical Model of the Database

a. Ensure all the entity in ERD is translated into a database object

b. Ensure all the relation between the translated database object is connected properly

c. Ensure all the constraint is implemented to support the system

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train. The development will be conducted in 3 phases:

Phase 2: User Interface design

From the information system design developed in the previous phase, you are required to develop the user interface of the system with the following criteria:

1. Ensure all the user interface developed, is concerning the 8 Golden Rules of User Interface Design, which is:
    a. Strive for consistency
    b. Enable frequent users to use shortcuts, develop a minimum 5 shortcut to open designed form to help the frequent user
    c. Offer informative feedback, ensure there's a minimum 5 feedback to responds the user action
    d. Design dialog to yield closure
    e. Offer simple error handling
    f. Permit easy reversal of actions
    g. Support internal locus of control
    h. Reduce short-term memory load, a simple breadcrumb navigation to help the user remember the form steps
2. Clear and neat layout or component positioning is a key points to be concerned when developing the user interface
3. Ensure all the information fields on the user interface are using the proper component. E.g. using a radio button for gender fields.

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train. The development will be conducted in 3 phases:

Phase 3: Application Development

On the third phase of the information system development project, you have to finalize your design and implement all the business logic function of the system. Please take notes to these following criteria when developing your application:

1. Ensure all the transaction processing function of the application is running properly. Concerning:
    a. The Train Data and Route Data should be used in the Scheduling Process
    b. Every train should have capacity for each Executive, Business and Economy class, note that the capacity cannot be lower than 0
    c. System should be able to notify the user if some train have reached the maintenance period which is after 10.000 KM travel distance
    d. A train that have age more than 10 years should not be used anymore
    e. Total ticket bought for every category cannot be greater than the capacity mentioned
    f. Travel distance should be calculated automatically by the system
    g. Transit Point will be determined using route available, ensure that all the transit point should be linked properly from First Station until Last Station. For Example:

        If the Route from Jakarta to Bali should be passed 3 transit points:

        A. Jakarta-Bandung

B. Bandung-Surabaya

C. Surabaya-Bali

Noted that the second route should be started from Bandung, because on the first route, the first stop is Bandung. The same for the third route should be started from Surabaya, because the second stop is Surabaya.

h. Travel time should be calculated using formula: [Distance] / [Average Train Speed]. Noted that the travel time should be showed in minutes and hours.

i. Arrival Time should be determined by the system, using the formula [Departure Time] + [Travel Time]

j. If travel time have passed the departure date, then the arrival date should be changed automatically

k. Ticket Price should be calculated automatically using the correct formula

l. Schedule can be changed by the Route and Schedule Department

m. Passenger route inquiry should be able to inputted to the system completely

n. Total price for the inquired ticket should be calculated correctly

o. Ensure the system can record all passenger details for every ticket purchased, and link the details with ticket purchase number.

2. Utilize the database developed on the first development phase when developing your application.
3. Ensure all the developed function should be able to insert and update related data.

4. Develop all validation needed in the application. With concern in the points below:
    a. Train seat capacity cannot be lower than 0
    b. Year of manufacture should be before the system date
    c. Average travel speed cannot be lower than 10 KM/hour
    d. Route distance cannot be lower than 30 KM
    e. Route for departure and arrival cannot be on the same station.
    f. Departure Time and Date cannot be before the system date
    g. Schedule that already have passenger cannot be changed
    h. Schedule that already passed the system date cannot be changed
    i. Executive class ticket price cannot be lower than the Business class ticket price
    j. All mandatory data mentioned in the case study must be filled.

From the ESEMKA Train studies above, you will act as a consultant to develop computerized information system to support the business process of ESEMKA Train and present the developed information system to your client

Phase 4: Application Presentation and Demonstration

On the last phase of the information system development project, you have to conduct presentation and application demonstration to your clients, showing all jobs that you already done. Please take notes to these following criteria to prepare your presentation:

1. Opening of Presentation should be clear and focused on what you going to present
2. Presentation content should be clear, precise, and detailed, to explain the function of information system developed
3. Application demonstration should able to solve sample business case
4. Communication skills, showing good presentation technique and conducted in Bahasa
5. Time management, you only given 15 minutes to present and demonstrate your application