DATA WAREHOUSE ASSIGNMENT 2

This problem set consists of two data modeling scenarios. You will be asked to analyze the strengths and weaknesses of some design alternatives for each scenario. Short answers are fine – one or two paragraphs per question would be an appropriate length.

Scenario I In this scenario, we are interested in modeling student enrollment in Stanford courses. We would like to answer questions such as:

Q1• Which courses are most popular? Which instructors are most popular?

Soln: Course- CS 276a is most popular.

Manning and Raghavan are most popular.

Q2• Which courses are most popular among graduate students? Undergraduates?
• Are there courses for which the assigned classrooms is too large or too small?

Soln: Course- CS 276a is most popular among graduate students and undergraduates students.

No there are not any courses for which the assigned classrooms is too large or too small.

Problem Statement:

We are planning to have a course enrollment fact table with the grain of one row per student per course enrollment.

In other words, if a student enrolls in 5 courses there will be 5 rows for that student in the fact table. We will use the

following dimensions: Course, Department, Student, Term, Classroom, and Instructor. There will be a single fact

measurement column, EnrollmentCount. Its value will always be equal to 1.

We are considering several options for dealing with the Instructor dimension. Interesting attributes of instructors
include FirstName, LastName, Title (e.g. Assistant Professor), Department, and TenuredFlag. The difficulty is that a

few courses (less than 5%) have multiple instructors. Thus it appears we cannot include the Instructor dimension in

the fact table because it doesn't match the intended grain. Here are the options under consideration:

OptionA

Option B

Option C

Soln: I have choosen option A

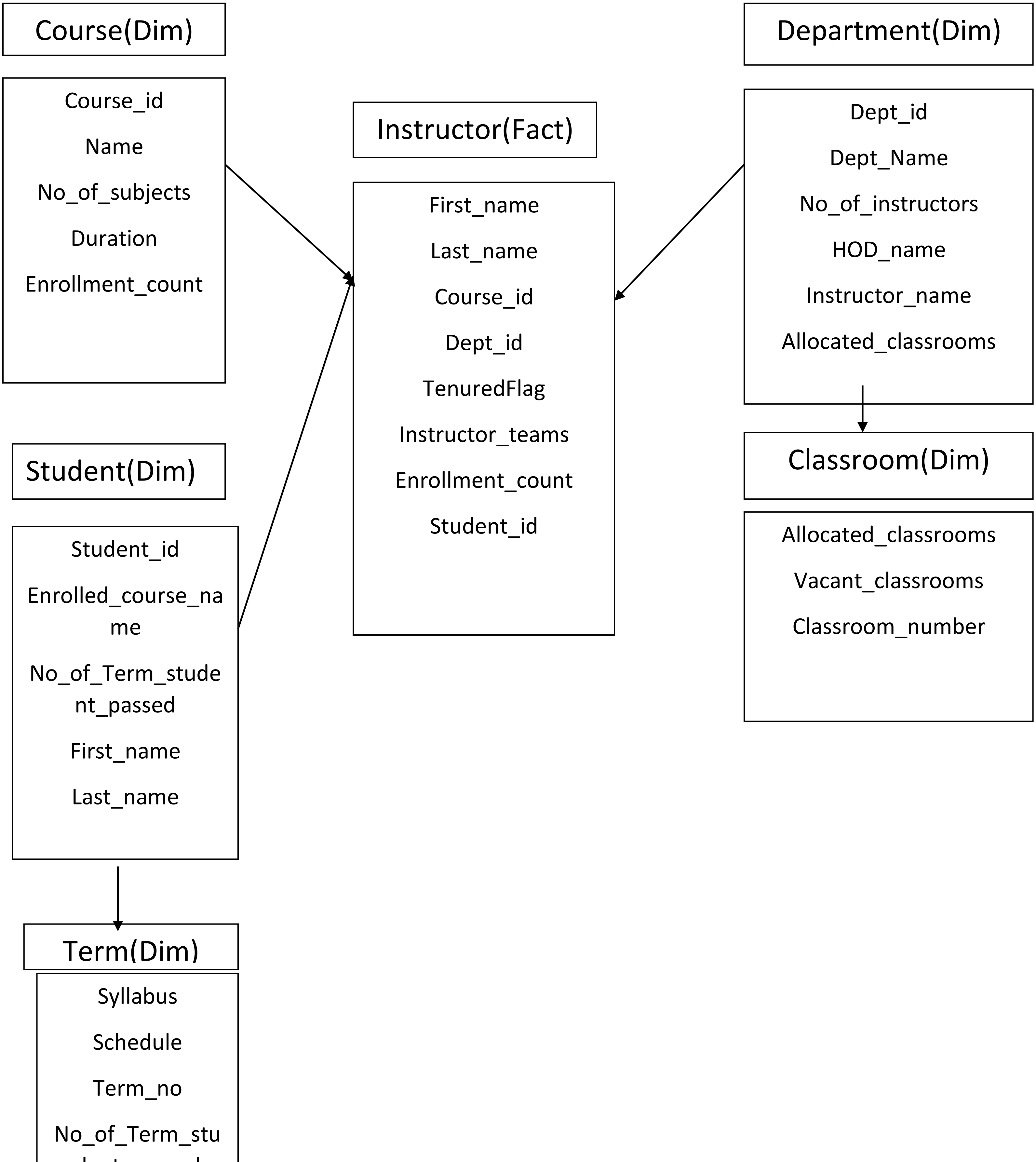
OptionA

Modify the Instructor dimension by adding special rows representing instructorteams. Forexample, CS276a is taught by Manning and Raghavan, so there will be an Instructor row representing "Manning/Raghavan" (as well as separate rows for Manning and Raghavan, assuming that they sometimes teach courses as sole instructors). In this way, the Instructor dimension becomes true to the grain and we can include it in the fact table.

Dimension tables: Course, Department, Student, Term, and Classroom

Fact table: Instructor

Snowflake schema of student enrollment in Stanford courses :



Course(Dim)

Course_id

Name

No_of_subjects

Duration

Enrollment_count

Instructor(Fact)

First_name

Last_name

Course_id

Dept_id

TenuredFlag

Instructor_teams

Enrollment_count

Student_id

Department(Dim)

Dept_id

Dept_Name

No_of_instructors

HOD_name

Instructor_name

Allocated_classrooms

Classroom(Dim)

Allocated_classrooms

Vacant_classrooms

Classroom_number

Student(Dim)

Student_id

Enrolled_course_name

No_of_Term_student_passed

First_name

Last_name

Term(Dim)

Syllabus

Schedule

Term_no

No_of_Term_stu

Question 1. *What are the strengths and weaknesses of each option?*

Ans:-

Option A

Strengths of option A are:-

- It makes the point clear that which all are dimension tables and which all are fact tables
- It has taken instructor dimension as a instructor fact by including instructorteams as one of the column of fact instructor

Weaknesses of option A are:-

- It cannot allocated enrollments equally among the multiple instructors.
- It cannot given equally chance to each and every instructor.

Option B

Strenghts of option B are:-

- It has allocated enrollments equally among the multiple instructors.
- It has given equally chance to each and every instructor.

Weaknesses of option B are :-

- It is not clear about what it is actually want to convey
- It has not mention about what should we do about instructor dimension that we should instructor dimension in fact table or not.

Option C

Strenghts of option C are :-

- It has divided the situations into two parts.
- It has giving two fact tables.

Weaknesses of option C are:-

- It has given the complete solution opposite to the scenario requirement.
- It cannot allocated enrollments equally among the multiple instructors.

Question 2. *Which option would you choose and why?*

Ans:-

- I choose option-A because this option is perfect solution and also completing the schema of student enrollment in Stanford courses.

Question 3. Would your answer to Question 2 be different if the majority of classes had multiple instructors? How about if only one or two classes had multiple instructors? (Explain your answer.)

Ans:-

No My answer to Question 2 is not different if the majority of classes had multiple instructors because I have made a instructorteams per course .If only one or two classes had multiple instructors than also not a problem because every single instructor is capable of taking each and every classes.

Question 4. [OPTIONAL] Can you think of another reasonable alternative design besides Options A, B, and C? If so, what are the advantages and disadvantages of your alternative design?

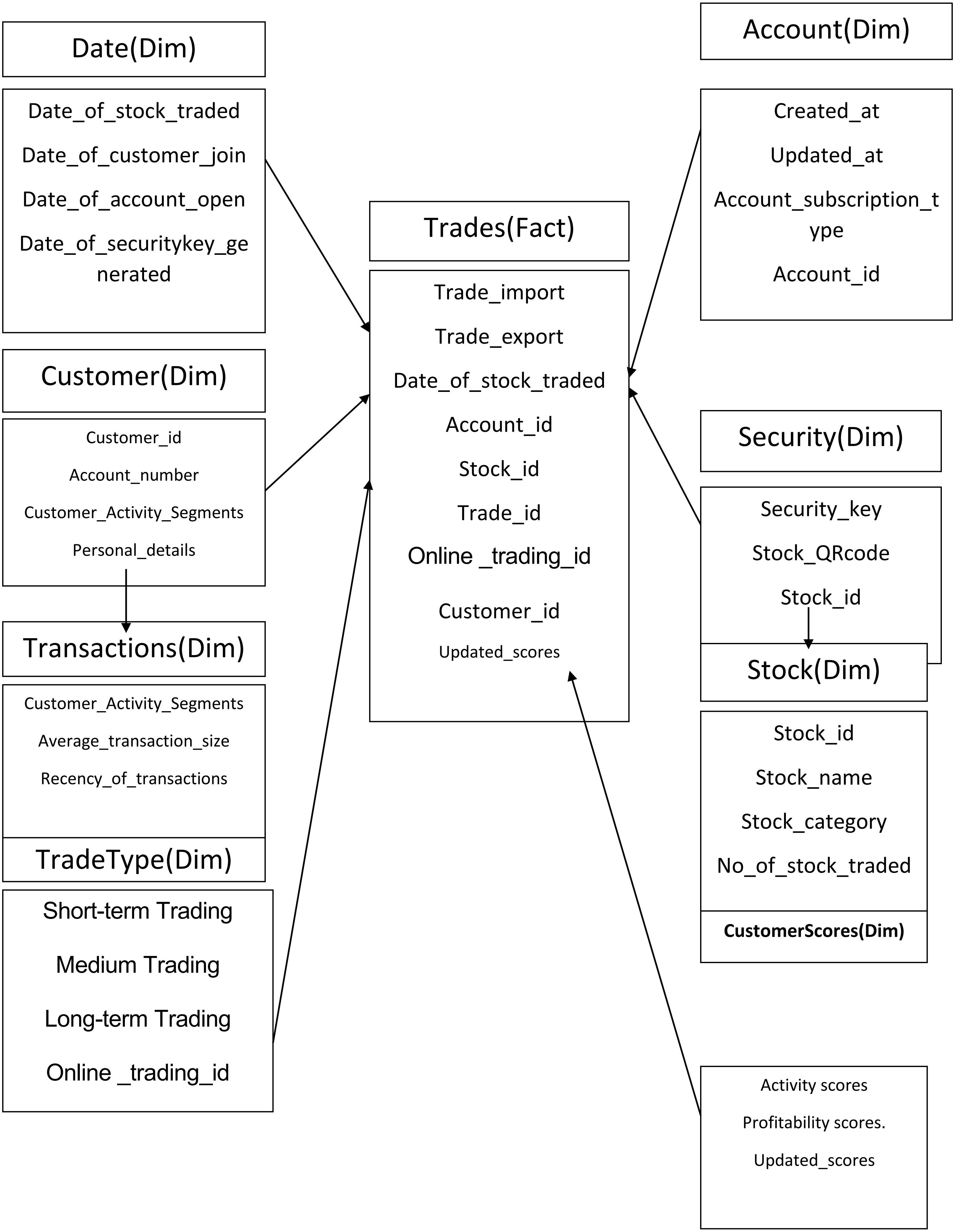
Scenario II In this scenario, we are building a data warehouse for an online brokerage company. The company makes money by charging commissions when customers buy and sell stocks. We are planning to have a Trades fact table with the grain of one row per stock trade. We will use the following dimensions: Date, Customer, Account, Security (i.e. which stock was traded), and TradeType.

Ans:- Dimension tables:-Date, Customer, Account,

Security (i.e. which stock was traded), and TradeType.

Fact table:- Trades

Snowflake schema of online brokerage company



Date(Dim)

Date_of_stock_traded

Date_of_customer_join

Date_of_account_open

Date_of_securitykey_generated

Customer(Dim)

Customer_id

Account_number

Customer_Activity_Segments

Personal_details

Transactions(Dim)

Customer_Activity_Segments

Average_transaction_size

Recency_of_transactions

TradeType(Dim)

Short-term Trading

Medium Trading

Long-term Trading

Online _trading_id

Trades(Fact)

Trade_import

Trade_export

Date_of_stock_traded

Account_id

Stock_id

Trade_id

Online _trading_id

Customer_id

Updated_scores

Account(Dim)

Created_at

Updated_at

Account_subscription_type

Account_id

Security(Dim)

Security_key

Stock_QRcode

Stock_id

Stock(Dim)

Stock_id

Stock_name

Stock_category

No_of_stock_traded

CustomerScores(Dim)

Activity scores

Profitability scores.

Updated_scores

- data analysts have told us that they have developed two customer scoring techniques that are used extensively in their analysis.
- Each customer is placed into one of nine Customer Activity Segments based on their frequency of transactions, average transaction size, and recency of transactions.
- EachcustomerisassignedaCustomerProfitabilityScorebasedontheprofitsearned asaresultofthatcustomer's trades. The score can be either 1,2,3,4, or 5, with 5 being the most profitable.

These two scores are frequently used as filters or grouping attributes in queries. For example:

Q.How many trades were placed in July by customers in each customer activity segment?

Ans:- Number of trades were placed in july by customers in each customer activity segment is based on the scores earned by the customers.

Q. What was the total commission earned in each quarter of 2003 on trades of IBM stock by customers with a profitability score of 4 or 5?

Ans:- The total commission earned in each quarter of 2003 on trades of IBM stock by customers with a profitability score of 4 or 5 is not mentioned in this scenario.

There are a total of 100,000 customers, and scores are recalculated every three months. The activity level or profitability level of some customers changes over time, and users are very interested in understanding how and why this occurs.

We are considering several options for dealing with the customer scores:

OptionA Option B Option C

Option D

Solution:- I have choosen option C

Option C

The scores are stored in a separate Customer Scores dimension which contains 45 rows, one for each combi- nation of activity and profitability scores. The Trades fact table includes a foreign key to the Customer Scores dimension.

Please answer the following questions.

Question 5. What are the strengths and weaknesses of each option?

Ans:-

Option C

The strengths of option C are:-

- Customer scores dimension table helps to calculate the exact and correct scores of the customers.
- The foreign key of the fact table referring to the customer scores dimension table which give the exact value of the trade placed.

The Weaknesses of option C are:-

- In this it is not mention that how many trades were placed by the each and every customers.

Option A

The strengths of option A are:-

- The old scores will overwritten by the new updated scores
- The scores row will be added in the customer dimension itself.

The weakness of option A are:-

- We can’t able to know about the old scores once it will overwritten by the new scores.
- In this it is not mention that how many trades were placed by the each and every customers.

Option B

The strengths of option B are :-

- There are two separate rows scores and updated scores are included in the customer dimension table.

The weaknesses of option B are:-

- In this it is not mention that how many trades were placed by the each and every customers.

Option D

The strengths of option D are:-

- It includes outrigger table .
- The scores are stored in a Customer Scores outrigger table which contains 45 rows.

The weaknesses of option D are:-

- It has completely changed the nature of both dimension table and fact table
- It is unrecognizable that what it is trying to say.
- In this it is not mention that how many trades were placed by the each and every customers.

Question 6. Which option would you choose and why?

Ans:- I would choose option C because it helps in calculating the perfect and correct scores of all customers in a more clear and perfect way.

Question 7. Would your answer to Question 6 be different if the number of customers and/or the time interval between score recalculations was much larger or much smaller? (Explain your answer.)

Ans:- No my answer to Question 6 is not different if the number of customers and /or the time interval between score recalculations was much larger or much smaller because customer scores dimension table helps to calculate the exact and correct scores of the customers.