

Task 1

Intuitive design of a data cube from a functional specification of operational database

A data warehouse of a train company contains information about train trips. The company would like to implement the following applications.

- (i) *find the total number of kilometers made by trains in a given year, departing from the stations located in a given country and arriving at the stations located in a given country.*
- (ii) *find the total duration of international trips in a given year, that is, trips departing from a station located in a country and arriving at a station located in another country,*
- (iii) *find the total number of trips that departed from or arrived at a given city in a given month of a given year,*
- (iv) *find and average duration of train trips in a given country in a given year,*
- (v) *for all trips in a given year, find an average number of passengers on a trip.*
- (vi) *find an average number of passengers all trips between two given city.*
- (vii) *find total number of trips per each driver.*
- (viii) *find the total number of trips that used a given train type in a given year.*

- (1) Use the specifications of applications listed above to find a data cube, that should be implemented by the train company to create a data warehouse. In your specification of a data cube, list the names of dimensions, hierarchies, measures, and attributes used to describe a data cube.
- (2) Pick any three dimensions from a data cube found in the previous step and at least 4 values in each dimension and draw a sample three dimensional data cube in a perspective view similar to a view included in a presentation 03 Data Warehouse Concepts, slide 6.

Deliverables

A file `solution1.pdf` that contains

- (1) a specification of data cube as a list of names of dimensions, list of hierarchies, list of measures and a list of attributes as a result of task (1),
 - (2) a perspective drawing of three dimensional data cube as a result of task (2).
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Solution 1

Facts: TRIP (Trip is performed from departure city to arrival city on a day)

Dimensions: DepartureCity, ArrivalCity, Date/Time, Driver, TrainType

Hierarches: Year Consist of Months, Month Conists of Days, Day consists of Hours,
Country consists of DepartureCity and ArrivalCity

Measures: Trip length in kms,
Trip duration in hours,
Total number of passengers on a trip

(2)

Obvious