1998 Paper 12 Question 9

Databases

The relational model of data was introduced in the early 1970s in a sequence of papers by E.F. Codd. This model proposes a tabular view of data, with a simple Data Manipulation Language (DML) based on relational algebra or relational calculus. Briefly explain the essential features of the model and its DML.   [6 marks]

Later work by Codd and others addressed weaknesses in the expressive power of the relational model. For each of the following give an example to show how the weakness arises, and explain an approach proposed to resolve the difficulty:

(*a*)   computing the transitive closure   [4 marks]

(*b*)   manipulating collections of records   [4 marks]

(*c*)   handling entity specialisation   [6 marks]

In case (*c*) you should outline the proposals of *either* the Object-Oriented Database System Manifesto *or* the Third Generation Database System Manifesto.