

# Inf 523 Fundamentals of Information Technology: Databases (Fall 2011)

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## 1 A Sales Invoice Example

The objective of this exercise is to get you to thinking about relations that are fairly close to real world cases, and so a bit more complex than the ones you have seen in the textbook.

Figure 1 below shows a sales invoice with a few additional attributes.

XYZ CORP.				
Customer Name Customer Address Customer Order Reference B/L Reference			Invoice Number Invoice Date Invoice Terms	
Item No.	Item Desc.	Item Quantity	Item Price	Item Amount
Invoice Total				

Figure 1: SALES-INVOICE

Suppose we squeeze all the attributes that appear on the sales invoice above into one relation. The relation schema would be

```
salesInvoice(invoiceNumber, invoiceDate, invoiceTerms, customerOrderRef,  
             billOfLadingRef, invoiceTotal, itemNumber, itemDescription,  
             itemPrice, itemQuantity, itemAmount, customerName, customerAddress)
```

The functional dependencies between the attributes in the sales invoice are given below:

```
customerName → customerAddress  
itemNumber → itemPrice  
itemNumber → itemDescription  
invoiceNumber → invoiceDate  
invoiceNumber → invoiceTerms  
invoiceNumber → customerOrderReference  
invoiceNumber → B/LReference  
invoiceNumber → invoiceTotal  
invoiceNumber → customerName  
{invoiceNumber, itemNumber} → itemQuantity  
{invoiceNumber, itemNumber} → itemAmount
```

Figure ?? gives the relation schema with the functional dependencies for SALES-INVOICE. I have rearranged the order of the attributes to make the diagram a bit simple.

**REQUIRED:**

- What is the key of the sales invoice relation, given the above functional dependencies?
- What are some of the anomalies of the sales invoice relation?
- How can we decompose this sales invoice relation into smaller relations so that the anomalies are minimised?
- Draw a simple entity relationship diagram for the sales invoice similar to the ones we have drawn in the class.
- Compare the diagram you have drawn with the decomposed relations.

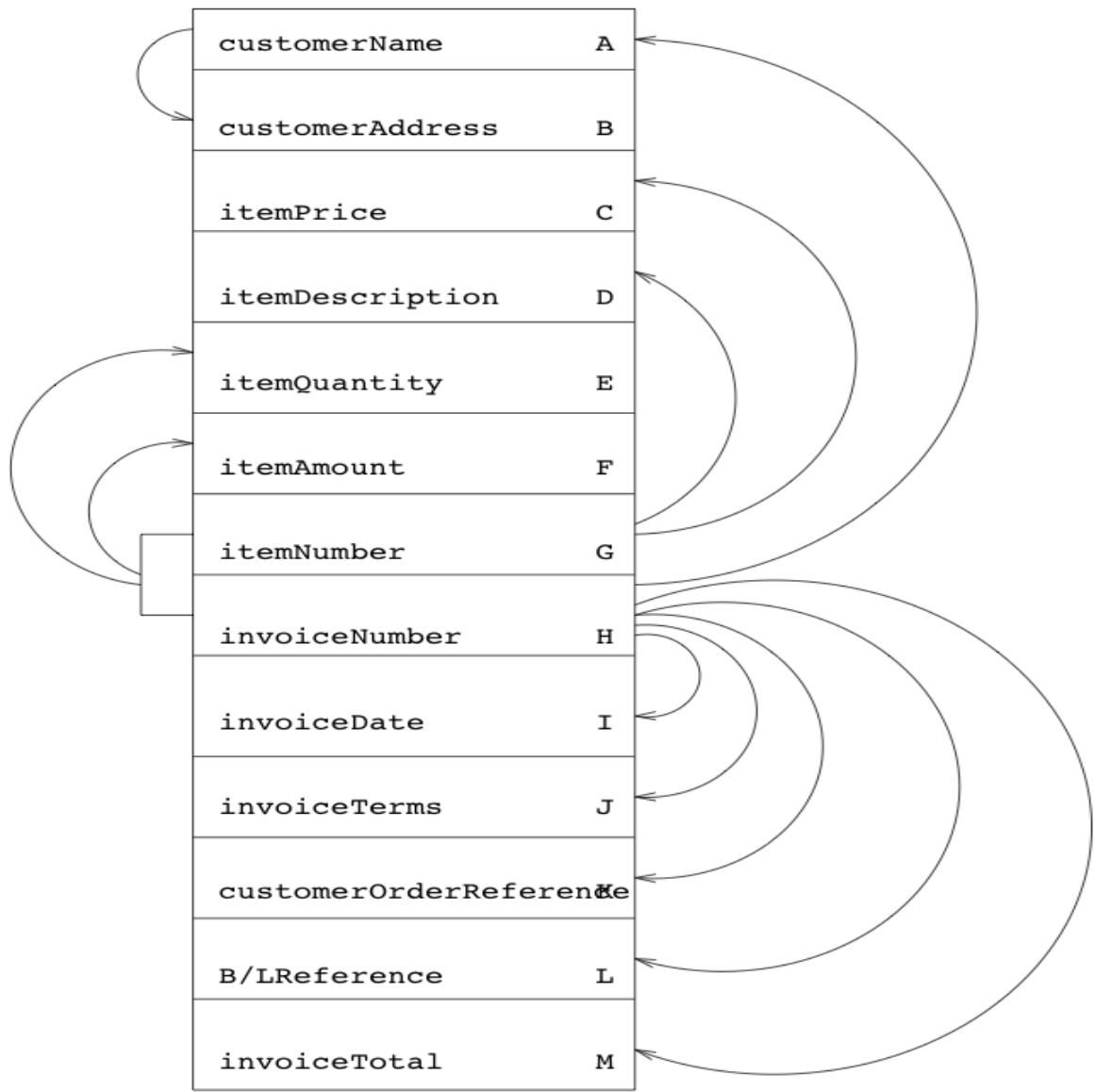


Figure 2: SALES-INVOICE Relation Schema with Functional Dependencies