

## 00 Modeling hierarchical structures

# Modeling hierarchical structures

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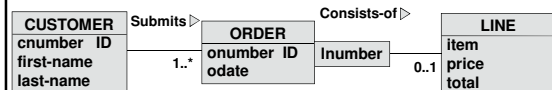
## 00 Modeling hierarchical structures

## Typical hierarchical design

A customer is described by a unique customer number, first, and last name.

Customers submit orders. An order is described by a unique order number and order date.

Orders consist of lines. A line contains information about a name of ordered item, price per single item and total number of ordered items

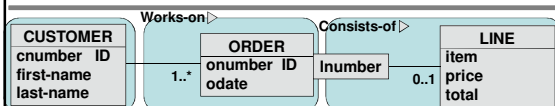


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## Relational implementation



```

CUSTOMER(cnumber, first-name, last-name)
PK = (cnumber)
ORDER(onumber, odate, cnumber)
PK = (onumber)
FK = (cnumber) references CUSTOMER(cnumber)
LINE(onumber, lnumber, item, price, total)
PK = (onumber, lnumber)
FK = (onumber) references ORDER(onumber)
  
```

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## SQL application

```

CUSTOMER(cnumber, fname, lname)
PK = (cnumber)
ORDER(onumber, odate, cnumber)
PK = (onumber)
FK = (cnumber) references CUSTOMER(cnumber)
LINE(onumber, lnumber, item, price, total)
PK = (onumber, lnumber)
FK = (onumber) references ORDER(onumber)
  
```

*Find the names of items ordered by James Bond*

```

SELECT DISTINCT item
FROM ITEM JOIN ORDER
ON ITEM.onumber = ORDER.onumber
JOIN CUSTOMER
ON ORDER.cnumber = CUSTOMER.cnumber
WHERE fname = 'James' AND lname = 'Bond';
  
```

*Do we really need to join three relational tables ?*

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## Can we just have only one relational table ?

cnumber	fname	lname	onumber	odate	lnumber	item	price	total
007	James	Bond	7	1996	1	bolt	5	20
007	James	Bond	7	1996	2	nut	6	20
007	James	Bond	7	1996	3	screw	7	10
007	James	Bond	77	1997	1	screw	8	20
007	James	Bond	77	1997	2	bolt	7	10
007	James	Bond	77	1997	3	nut	8	20
007	James	Bond	77	1997	4	lock	100	1

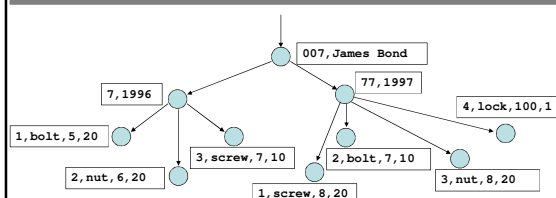
*Due to the redundancies we cannot have just one relational table !*

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## But ... we can still build a hierarchical structure



*Does there exist a hierarchical data model ?*

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