Databases Project

Academic Year 2021-22

Course Test 4.23: Credit Check Company

Design of a

Credit Check Company

Database

Pietro Rodolfo Masera

Chapter 1: Introduction

The scope of the following project is to design a database for a Credit Check Company following the information given in the assignment text:

You have been hired by a Credit Check company, and your first job it to design a database for them. A credit limit check parameter determines which type of credit check (no check, simple check,...) is performed for each of the sales document types. A sales document type can only be assigned to one credit limit check parameter. There are credit groups for e.g. sales order, delivery and goods issue. A credit group can be assigned to several sales document types, whereas a sales document type can only be assigned to one credit group. Many sales document types can be assigned to the same billing type and the same delivery type. Sales document types are uniquely assigned to a billing type and a delivery type. The system can automatically propose a block reason for sales documents that must be checked before billing. A block can be assigned to several sales document types, whereas a sales document type is assigned to one block reason only.

Chapter 2: Entities, attributes and relations

For the project I chose the following entities:
1) **Sales document** (which is a superclass for the subclasses **Sales order** and **Complaint**)
2) **Credit Limit Check Parameter**
3) **Block Reason**
4) **Credit Group**
5) **Billing**
6) **Delivery**
7) **Sales order**
8) **Complaint**
9) **Employee Manager** (which I personally added to the list)
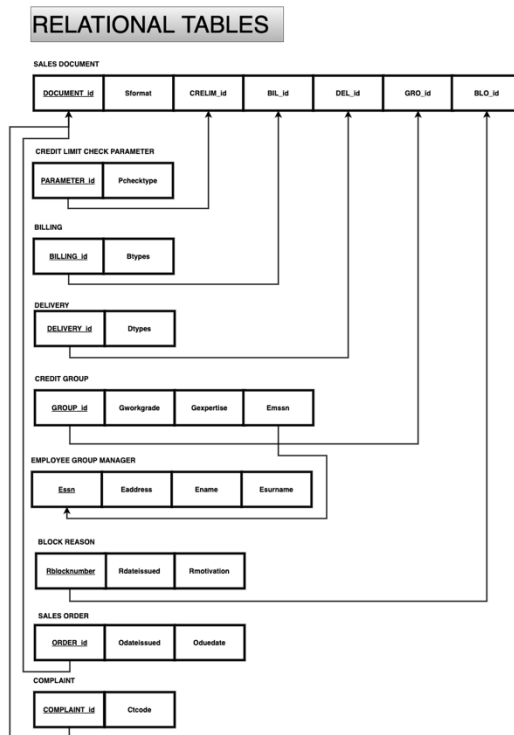
Relationships with structural constraints:
1) **PERFORMED FOR: One Credit Limit Check Parameter** performs a check type for **1 to N Sales Documents**, while to a **Sales Document** is assigned only **one Credit Limit Check Parameter**

2) **ASSIGN BLOCK REASON: One Block Reason** is assigned to **1 to N Sales Documents,** while a **Sales Document** can only have **one Block Reason**.

3) **ASSIGN GROUP: One Credit Group** is assigned to **1 to N Sales Documents,** while a **Sales Document** can only have **one Credit Group**.

4) **IS MANAGED: One Credit Group** has only **1 Employee Manager** and **1 Employee Manager** manages only **one Credit Group.**

5) **ASSIGN BILLING: One Billing type** is assigned to **1 to N Sales Document** while a **Sales Document** can only have **one Billing Type.**

6) **ASSIGN DELIVERY: One Delivery type** is assigned to **1 to N Sales Document** while a **Sales Document** can only have **one Delivery type.**

7) **DISJOINT RELATION**: From Sales Document to **Sales Order** and **Delivery**

Attributes:
1) **Sales Document:** <u>ID Number</u>, Format (Digital or Physical)

2) **Credit Limit Check Parameter:** <u>Credit Limit ID</u>, Credit check type

3) **Block Reason:** <u>Block identifier number,</u> Date issued, Motivation

4) **Credit Group:** <u>Group ID,</u> Group Expertise (skilled, new group, well trained), Work Performance Grade (From F to A based on the work performance)

5) **Billing:** <u>Billing ID,</u> Billing type

6) **Delivery:** <u>Delivery ID</u>, Delivery Types

7) **Sales order:** Date issued, Due date

8) **Complaint:** TCode (non-unique codes)

9) **Employee Manager:** <u>Ssn</u>, Name, Surname, Address

Chapter 3: EER and Relational Diagram

EER DIAGRAM

EER DIAGRAM

- Block identifier number
- Date issued
- Motivation
- Block Reason — (1,N)
- Assign Block Reason
- The overall skill of the group based on the work performed (skilled, medium skilled, need of training)
- The groups are graded from F to A based on their work performance
- Group ID
- Group Expertise
- Work performance grade
- Surname
- Ssn
- Name
- Address
- Credit Limit ID
- Credit check type
- Digital or physical
- Format
- ID N°
- Credit Limit Check Parameter — (1,N) — Performed for — (1,1) — Sales Document — (1,1) — Assign Group — (1,N) — Credit Group — (1,1) — Is Managed — (1,1) — Employee Manager
- Assign Billing — Assign Delivery
- d
- Sales Order — Complaint
- Billing — (1,N)
- Delivery — (1,N)
- Date issued — Due date — TCode
- Billing Types — Billing ID
- Delivery Types — Delivery ID
- TCodes are non-unique codes to define the management process of complaints https://wiki.scn.sap.com/wiki/display/ERPLO/CUSTOMER+COMPLAINTS

RELATIONAL TABLES

SALES DOCUMENT

DOCUMENT_id	Sformat	CRELIM_id	BIL_id	DEL_id	GRO_id	BLO_id

CREDIT LIMIT CHECK PARAMETER

PARAMETER_id	Pchecktype

BILLING

BILLING_id	Btypes

DELIVERY

DELIVERY_id	Dtypes

CREDIT GROUP

GROUP_id	Gworkgrade	Gexpertise	Emssn

EMPLOYEE GROUP MANAGER

Essn	Eaddress	Ename	Esurname

BLOCK REASON

Rblocknumber	Rdateissued	Rmotivation

SALES ORDER

ORDER_id	Odateissued	Oduedate

COMPLAINT

COMPLAINT_id	Ctcode

Chapter 4: Normalization

As for the normalization, the Relational Schema results already normalized in the third normal form for the following reasons:

1) The Relational Schema has only **one** value per column/tuple, so that all the values will be *atomic.* Therefore, it satisfies the first normal form.

2) The Relational Schema presents attributes that are fully functional dependency on the primary key, therefore it satisfies the second normal form.

3) Being the second normal form satisfied, the Relational Schema also has nonprime attributes that are not transitively dependent on the primary key. Therefore, the third normal form is satisfied.

Chapter 5: Queries

"Normal" Queries
Find all the information of a sales order issued from January 2020 to August 2020

```
#1
SELECT *
FROM SalesOrder
WHERE Odateissued BETWEEN '2020-01-01' AND '2020-08-31';
```

Result

ORDER_id	Odateissued	Oduedate
1	2020-07-10	2021-12-21
2	2020-07-25	2021-07-29
5	2020-07-23	2021-07-04
6	2020-07-31	2021-08-12
9	2020-06-06	2021-07-17
11	2020-06-01	2021-03-24
12	2020-07-16	2021-05-02
13	2020-07-23	2021-12-12
19	2020-08-14	2021-08-31
21	2020-08-23	2021-07-15
22	2020-07-10	2021-06-30
30	2020-07-26	2021-11-07
31	2020-07-10	2021-09-05
32	2020-08-21	2021-06-21
34	2020-06-20	2021-06-02
36	2020-06-01	2021-09-20
38	2020-07-03	2021-08-29
39	2020-08-04	2021-06-07

Find all the information about a block reason issued not for blocking sales order nor for payment not received

```
#2
SELECT *
FROM BlockReason
WHERE Rmotivation NOT IN ('sales order blocking reason', 'payment not received');
```

Result

Rblocknumber	Rdateissued	Rmotivation
6	2021-10-08	delivery blocking reason
7	2021-05-20	not enough credit
8	2021-08-11	billing blocking reason
10	2021-08-28	not enough credit
11	2021-07-04	not enough credit
12	2021-10-31	billing blocking reason
13	2021-06-05	not enough credit
15	2021-06-02	delivery blocking reason
17	2021-10-07	billing blocking reason
18	2021-09-25	billing blocking reason
19	2021-04-19	not enough credit
21	2021-07-16	not enough credit
22	2021-05-30	not enough credit
23	2021-07-08	billing blocking reason
24	2021-02-23	not enough credit
26	2021-03-14	billing blocking reason
27	2021-06-21	delivery blocking reason
29	2020-12-16	delivery blocking reason
30	2021-09-02	delivery blocking reason
31	2021-07-05	billing blocking reason
36	2020-11-12	not enough credit
37	2020-12-14	billing blocking reason
38	2021-04-11	billing blocking reason

Find all the information about a new credit group with the highest grade

```
#3
SELECT *
FROM CreditGroup
WHERE Gexpertise = 'new group' AND Gworkgrade = 'A';
```

Result

GROUP_id	Gworkgrade	Gexpertise	EMssn
4	A	new group	4
21	A	new group	21
27	A	new group	27

Write a query to find all the information about the delivery where the type is not outbound delivery, ordered alphabetically by type

```
#4
SELECT *
FROM Delivery
WHERE Dtypes <> 'outbound delivery'
ORDER BY Dtypes;
```

Result

DELIVERY_id	Dtypes
7	delivery for stock transfer
12	delivery for stock transfer
16	delivery for stock transfer
18	delivery for stock transfer
31	delivery for stock transfer
35	delivery for stock transfer
40	delivery for stock transfer
9	inbound delivery
14	inbound delivery
17	inbound delivery
20	inbound delivery
22	inbound delivery
37	inbound delivery
5	replenishment delivery
13	replenishment delivery
19	replenishment delivery
30	replenishment delivery
32	replenishment delivery
33	replenishment delivery
34	replenishment delivery
38	replenishment delivery
6	returns delivery
8	returns delivery
24	returns delivery
25	returns delivery
27	returns delivery
28	returns delivery
36	returns delivery

Join Queries
#1
Find the format and the document id where the sales document has no check or a soft check

```
SELECT Sformat, document_id
FROM SalesDocument AS sd
INNER JOIN CreditLimitCheckParameter AS cl ON (sd.CRELIM_id = cl.PARAMETER_id)
WHERE Pchecktype IN ('no check', 'soft check');
```

Result

Sformat	document_id
physical	1
physical	2
digital	3
digital	7
digital	8
digital	12
digital	15
physical	16
digital	22
physical	23
physical	24
physical	25
physical	26
physical	29
physical	30
digital	32
physical	33
physical	34
physical	36
digital	37
physical	39

Write a query to find the format and the document id of a document with a billing type different than past due invoice and pro forma invoice

```
#2
SELECT Sformat, document_id
FROM SalesDocument AS sd
INNER JOIN Billing AS b ON (sd.BIL_id = b.BILLING_id)
WHERE Btypes NOT IN ('past due invoice', 'pro forma invoice');
```

Result

Sformat	document_id
digital	3
physical	4
digital	6
digital	7
digital	8
physical	10
physical	11
digital	12
digital	13
physical	17
physical	19
physical	21
digital	22
physical	23
physical	25
physical	26
digital	27
digital	28
physical	29
digital	32
physical	33
physical	34
physical	36
digital	37
digital	40

Write a query to find the billing types and the document id of physical sales documents, ordered by format (before digital then physical)

```
#3
SELECT Btypes, document_id
FROM Billing AS b
INNER JOIN SalesDocument AS sd ON (b.BILLING_id = sd.BIL_id)
INNER JOIN Delivery AS d ON (sd.DEL_id = DELIVERY_id)
WHERE Sformat = 'Physical'
ORDER BY Sformat;
```

Result

Btypes	document_id
past due invoice	1
pro forma invoice	2
recurring invoice	4
recurring invoice	10
final invoice	11
pro forma invoice	16
recurring invoice	17
recurring invoice	19
final invoice	21
final invoice	23
pro forma invoice	24
recurring invoice	25
recurring invoice	26
recurring invoice	29
pro forma invoice	30
recurring invoice	33
final invoice	34
pro forma invoice	35
final invoice	36
past due invoice	38
pro forma invoice	39

Find the manager id and their full name for the managers assigned to a group where the block is caused by not having enough credit

```
#4
SELECT Essn AS 'Manager ID', CONCAT(Ename, ' ', Esurname) AS 'Group Manager'
FROM EmployeeGManager AS e
INNER JOIN CreditGroup AS cg ON (e.essn = cg.EMssn)
INNER JOIN SalesDocument AS sd ON (sd.GRO_id = cg.GROUP_id)
INNER JOIN BlockReason AS bl ON (sd.BLO_id = bl.Rblocknumber)
WHERE Rmotivation = 'not enough credit';
```

Result

Manager ID	Group Manager
7	Gradey Gainsborough
10	Marty Kubis
11	Julie Mervyn
13	Dwayne Jahns
19	Colas Tiltman
21	Jennilee Komorowski
22	Amerigo Spargo
24	Benedick Artz
36	Sandi Jenkins

Nested Queries

Find the work grade and the group id where the employees have the following addresses: 1242 Scofield Circle, 626 Truax Road, 5 Fordem Plaza

```
#1################################################################
SELECT Gworkgrade AS 'Work Grade', GROUP_id
FROM CreditGroup
WHERE EMssn IN (SELECT Essn
               FROM EmployeeGManager
               WHERE Eaddress IN ('1242 Scofield Circle', '626 Truax Road', '5 Fordem Plaza'));
```

Result

Work Grade	GROUP_id
D	15
D	16
B	24

Find the transaction code and the complaint id for those physical document assigned to a group that has the highest grade

```
#2#####################################################################
SELECT Ctcode, complaint_id
FROM Complaint
WHERE complaint_id IN (SELECT DOCUMENT_id
                       FROM SalesDocument
                       WHERE Sformat = 'physical' AND Gro_id IN (SELECT GROUP_id
                                                                 FROM CreditGroup
                                                                 WHERE Gworkgrade = 'A'));
```

Result

Ctcode	complaint_id
LT03	4
VL01N	21

Find the format and the id of those sales document having hard or no checks and that have a block reason issued between March 2021 and August 2021

```
#3#############################################################################
SELECT DOCUMENT_id, Sformat
FROM SalesDocument
WHERE CRELIM_id IN
                (SELECT PARAMETER_id
                 FROM CreditLimitCheckParameter
                 WHERE Pchecktype IN ('hard check', ' no check'))
AND BLO_id IN
            (SELECT Rblocknumber
             FROM BlockReason
             WHERE Rdateissued BETWEEN '2021-03-01' AND '2021-08-31');
```

Result

DOCUMENT_id	Sformat
11	physical
19	physical
21	physical
31	digital

Write a query to find the document id and the format of those sales document assigned to a group having A, C and E grades, managers with a C in their names and assigned to a block reason due to payment not received and billing

```
#4#################################################################
SELECT DOCUMENT_id, sformat
FROM SalesDocument AS sd
WHERE GRO_id IN (SELECT GROUP_id
                 FROM CreditGroup
                 WHERE Gworkgrade IN  ('A', 'C', 'E') AND EMssn IN (SELECT Essn
                                                                    FROM EmployeeGManager
                                                                    WHERE Ename LIKE '%C%'))
  AND BLO_id IN
                 (SELECT Rblocknumber
                  FROM BlockReason
                  WHERE Rmotivation IN ('payment not received', 'billing blocking reason'));
```

Result

DOCUMENT_id	sformat
18	digital
32	digital