Constraints

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Constraints are rules that are defined on tables/columns which validates the data being stored/updated in the table

Adam Need Some Help

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Adam is a software developer in a leading IT organization he has been provided a requirement to design a table to store all the credit card information ensuring unique credit card number and card credit limit < 5000

How can we help Adam to design a table catering to the business requirements?

He used constraints.

Illustration : Solution

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Adam to solve his problem creates a *Credit card* table with credit card number column as unique and creates a constraint on credit limit column to verify the amount is always <5000.

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Adam to solve his problem creates a *Credit card* table with credit card number column as unique and creates a constraint on credit limit column to verify the amount is always <5000.

Outcome of Constraint: If anyone tries to store a credit card for which a credit card number exists or credit limit is > 5000 the database engine will throw an error.

Types of Constraints

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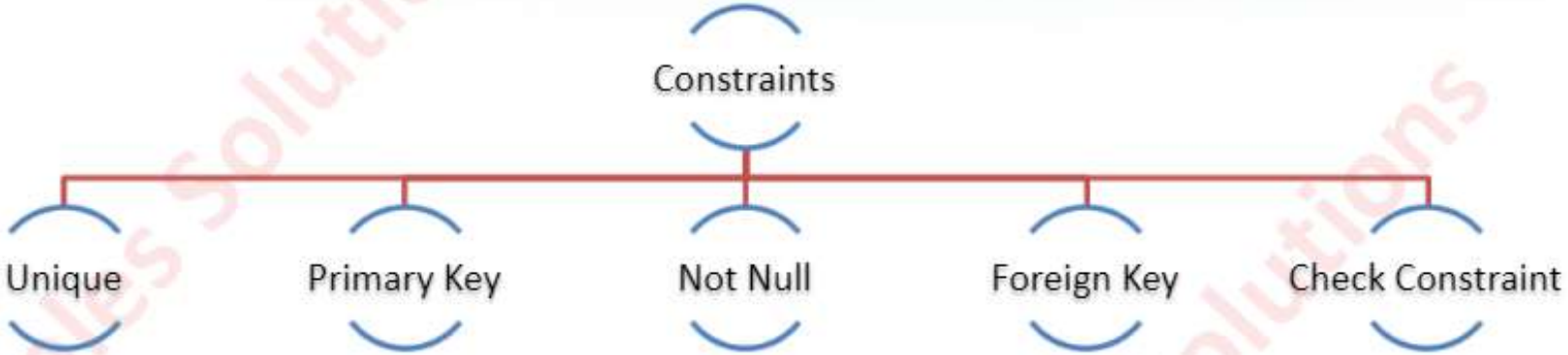

Primary Key

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Primary Key is a constraint which is a combination of NOT NULL and unique constraint.

Salient points :

- Table or view can have only one primary key.
- A column cannot have both the primary key and a unique key constraint.
- Composite primary keys are a combination of columns created with a primary key constraint.
- Composite primary key cannot have more than 32 columns.

Illustration: Primary Key Constraint

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Assume a table Credit card where credit_card_number is defined as primary key.

Credit_Card_Number	Credit_Limit	Expiry_Date
1234	50000	11/11/2013
5678	33000	11/11/2012
1567	22000	11/11/2011

- All the records have unique credit card number..
- Credit card number cannot hold null value.

Error will be thrown,

- If another records is inserted with the same value say 1234.
- If a record with null credit card number is entered.

Assume a table Credit card where credit_card_number and credit limit is defined as composite primary key.

Credit_Card_Number	Credit_Limit	Expiry_Date
1234	50000	11/11/2013
5678	33000	11/11/2012
1567	22000	11/11/2011

- The combination of value in credit card number and credit limit should always be unique.

Error will be thrown,

- If user tries to insert a record with a value 1234 and 50000 for credit card number and credit limit respectively.
- If one or more of the values entered is null.

How to create a Primary Key Constraint?

Click to Continue

Syntax for creating a primary key.

How to create a Primary Key Constraint?

Click to Continue

In the given example we create a table Bus ticket with primary key ticket id.

```
e Name>

e) ,
 column_name2 data_type(size),
PRIMARY KEY (column_name1))....
);
```

Example: The ticket_id is created as a primary key in ticket table.

```
CREATE TABLE IF NOT EXISTS Bus_ticket ( ticket_Id INT NOT NULL,
From_Location VARCHAR(45) NULL, To_location VARCHAR(45) NULL,
Price DECIMAL(2) NULL, Booking_Date DATE NULL,  PRIMARY KEY
(ticket_Id))
```

What is a Foreign Key?

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A foreign key constraint is a *referential integrity* constraint associated to a column in a table.

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A foreign key constraint is a *referential integrity* constraint associated to a column in a table.

Illustration of a Foreign Key

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Assume there are two tables *Student* and *Student Details*

Student

Student_ID	Last_Name	First_Name
1001	Adam	Eve
1002	Tim	Tan
1003	Chan	Jackie

Student_Details

Student_ID	DOB	City
1001	12/303/1960	Chennai
1002	13/02/1987	Delhi
1003	13/03/1988	Mumbai

The *Student_Id* created as a *primary key*. This table is the *parent object*.

The *Student _Id* here will be created as a *Foreign key*. This table is the *child object*. When a user tries to insert a record in student_details for which a record is not available in students table an error will be thrown.

How to create Foreign Key? Click to Continue

Illustration: Assuming ticket_id is already created as primary key in *bus_ticket* table. The ticket_id will be created as *foreign key* in the child table *ticket_passengers*.

```
CREATE TABLE ticket_passenger (passenger_id INT NOT
NULL, ticket_id INT NULL, passenger_name VARCHAR(45)
NULL, age INT NULL, is_child BINARY(1) NULL,
CONSTRAINT ticket_id_FK FOREIGN KEY (ticket_id)
REFERENCES bus_ticket (ticket_Id) , primary
key(passenger_id));
```

How to create Foreign Key? Click to Continue

Illustration: Assuming ticket_id is already created as primary key in *bus_ticket* table. The ticket_id will be created as *foreign key* in the child table *ticket_passengers*.

```
CREATE TABLE ticket_passenger (passenger_id INT NOT
NULL,  ticket_id INT NULL,  passenger_name VARCHAR(45)
NULL,  age INT NULL,  is_child BINARY(1) NULL,
CONSTRAINT ticket_id_FK   FOREIGN KEY (ticket_id)
REFERENCES bus_ticket (ticket_Id) , primary
key(passenger_id));
```

Test foreign Key:

Try inserting a record in passenger table for a ticket which does not exist and look at the error,

```
INSERT INTO `tms`.`ticket_passenger` (`passenger_id`, `ticket_id`,
`passenger_name`, `age`,is_child) VALUES ('2', '5', 'Jack', '12',1);
```

Unique Constraint

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A unique constraint ensures that a column can have only unique values in a table.

Few Salient Points:

- ✓ A composite unique key is set on a two or more columns ensuring unique value for the combination of columns.
- ✓ The unique key can contain null values.
- ✓ A composite unique key cannot be created for a combination of more than 32 columns.

Illustration: Unique Constraint

Click to Continue

Assume a table Credit card where credit_card_number is defined as unique key.

Credit_Card_Number	Credit_Limit	Expiry_Date
1234	50000	11/11/2013
5678	33000	11/11/2012
1567	22000	11/11/2011
Null	11000	11/11/2010

- All the records have unique credit card number..
- Credit card number also holds null value.

Error will be thrown,

- If another records is inserted with the same value say 1234.
- If another record with a null credit card number is entered as they are duplicate values.

Assume a table Credit card where credit_card_number and credit limit is defined as composite unique key.

Credit_Card_Number	Credit_Limit	Expiry_Date
1234	50000	11/11/2013
5678	33000	11/11/2012
1567	22000	11/11/2011
Null	11000	11/11/2010

- The combination of value in credit card number and credit limit should always be unique.

Error will be thrown,

If user tries to insert a record with a value 1234 and 50000 for credit card number and credit limit respectively.

How to add a unique constraint

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How to add a unique constraint

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Syntax: ALTER TABLE ticket_passenger ADD UNIQUE INDEX passenger_name_UNIQUE (passenger_name);

Drop the constraint:

ALTER TABLE ticket_passenger DROP INDEX passenger_name_UNIQUE;

Composite unique key : Passenger name and ticket id is unique.

ALTER TABLE ticket_passenger ADD UNIQUE INDEX passenger_name_UNIQUE (passenger_name,ticket_id);

Please try this queries in MySQL workbench.