Course:

Database Management Systems (DBMS)

Assesment 3: Constraints

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Task:

Create a book (BID, BName, Author name, Price, Year of publication) relation using the following:

1. While creating the table impose "Primary key" constraint on one field. [1]
2. While creating the table impose "Not Null" constraint on one field. [1]
3. Using alteration impose "Unique" constraint on two fields. [1]
4. Create another relation Publisher (PID, Pname). Use PID as the foreign key of book relation. [1]
5. Alter the book table to impose a constraint to restrict the price between 500 and 1000. [1]
6. Alter the publisher relation to make the default Pname as "Elsevier". [1]
7. Give some examples (by inserting records into book relation) to violate the primary key, not null, unique, foreign key and check constraints. [include the screenshot of the error as the answer along with the handwritten query]. [4]

Initial metadata:

	Field	Type	Null	Key	Default	Extra
▶	BID	int	YES		NULL	
	BName	varchar(255)	YES		NULL	
	AuthorName	varchar(255)	YES		NULL	
	Price	int	YES		NULL	
	YearOfPub	date	YES		NULL	

Initial schema:

	BID	BName	AuthorName	Price	YearOfPub

Code:

```
 1 •   create database books;
 2 •   use books;
 3 • ⊝ create table book (
 4 |     BID int,
 5 |     BName varchar(255),
 6 |     AuthorName varchar(255),
 7 |     Price int,
 8 |     YearOfPub date
 9 └   );
10 •   desc book;
11 •   select * from book;
```

```
create table book (
BID int,
BName varchar(255),
AuthorName varchar(255),
Price int,
YearOfPub date
);
```

1. **While creating the table impose "Primary key" constraint on one field.**   [1]

Code:

```
 3 • ⊝ create table book (
 4 |     BID int primary key,
 5 |     BName varchar(255),
 6 |     AuthorName varchar(255),
 7 |     Price int,
 8 |     YearOfPub date
 9 └   );
10 •   desc book;
```

```
create table book (
BID int  primary key,
BName varchar(255),
AuthorName varchar(255),
Price int,
YearOfPub date
);
```

Output:

	Field	Type	Null	Key	Default	Extra
▶	BID	int	NO	PRI	NULL	
	BName	varchar(255)	YES		NULL	
	AuthorName	varchar(255)	YES		NULL	
	Price	int	YES		NULL	
	YearOfPub	date	YES		NULL	

2. While creating the table impose "Not Null" constraint on one field.   [1]

Code:

```
create table book (
BID int primary key,
BName varchar(255) not null,
AuthorName varchar(255),
Price int,
YearOfPub date
);
desc book;
```

```
create table book (
BID int primary key,
BName varchar(255) not null,
AuthorName varchar(255),
Price int,
YearOfPub date
);
```

Output:

	Field	Type	Null	Key	Default	Extra
▶	BID	int	NO	PRI	NULL	
	BName	varchar(255)	NO		NULL	
	AuthorName	varchar(255)	YES		NULL	
	Price	int	YES		NULL	
	YearOfPub	date	YES		NULL	

3. Using alteration impose "Unique" constraint on two fields. [1]

Code:

```
create table book (
BID int primary key,
BName varchar(255) not null,
AuthorName varchar(255),
Price int,
YearOfPub date
);
desc book;
alter table book
add unique(BName,AuthorName);
desc book;
```

```
create table book (
BID int primary key,
BName varchar(255) not null,
AuthorName varchar(255),
Price int,
YearOfPub date
);
alter table book
add unique(BName,AuthorName);
```

Execution 1: Before implementing unique constraints:

Field	Type	Null	Key	Default	Extra
BID	int	NO	PRI	NULL	
BName	varchar(255)	NO		NULL	
AuthorName	varchar(255)	YES		NULL	
Price	int	YES		NULL	
YearOfPub	date	YES		NULL	

Execution 2: After implementing unique constraints:

Field	Type	Null	Key	Default	Extra
BID	int	NO	PRI	NULL	
BName	varchar(255)	NO	MUL	NULL	
AuthorName	varchar(255)	YES		NULL	
Price	int	YES		NULL	
YearOfPub	date	YES		NULL	

4. Create another relation Publisher (PID, Pname). Use PID as the foreign key of book relation.

[1]

Code:

```sql
> create table book (
  BID int primary key,
  BName varchar(255) not null,
  AuthorName varchar(255),
  Price int,
  YearOfPub date
- );
  alter table book
  add unique(BName,AuthorName);
  desc book;
> create table Publisher (
  PID int primary key,
  Pname varchar(255),
  BID int not null,
  foreign key (BID) references book(BID)
- );
  desc Publisher;
```

```
create table book (
BID int  primary key,
BName varchar(255) not null ,
AuthorName varchar(255),
Price int,
YearOfPub date
);
alter table book
add unique(BName,AuthorName);
create table Publisher (
PID int primary key,
Pname varchar(255),
BID int not null,
foreign key (BID) references book(BID)
);
```

Outputs:

Table book:

Field	Type	Null	Key	Default	Extra
BID	int	NO	PRI	NULL	
BName	varchar(255)	NO	MUL	NULL	
AuthorName	varchar(255)	YES		NULL	
Price	int	YES		NULL	
YearOfPub	date	YES		NULL	

Table Publisher:

Field	Type	Null	Key	Default	Extra
PID	int	NO	PRI	NULL	
Pname	varchar(255)	YES		NULL	
BID	int	NO	MUL	NULL	

5. Alter the book table to impose a constraint to restrict the price between 500 and 1000.

Code:

```
alter table book
add constraint CHK_Book check (Price between 500 and 1000);
select * from book;
```

Output:

BID	BName	AuthorName	Price	YearOfPub
3	Atomic habits	James Clear	850	2016-08-17
4	The Alchemist	Paulo Coelho	600	2019-06-12
NULL	NULL	NULL	NULL	NULL

```
alter table book
add constraint CHK_Book check (Price between 500 and
1000);
select * from book;
```

6. Alter the publisher relation to make the default Pname as "Elsevier".   [1]

Code:

```
ALTER TABLE Publisher
ALTER Pname SET DEFAULT 'Elsevier';
desc Publisher;
```

Output:

Field	Type	Null	Key	Default	Extra
▸ PID	int	NO	PRI	NULL	
Pname	varchar(255)	YES		Elsevier	
BID	int	NO	MUL	NULL	

7. Give some examples (by inserting records into book relation) to violate the primary key, not null, unique, foreign key and check constraints. [include the screenshot of the error as the answer along with the handwritten query]. [4]

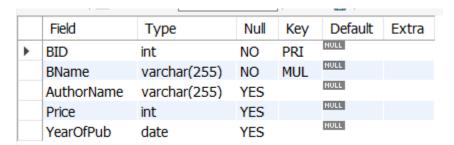# in order to violate the property of primary key:

Code:

```
insert into book
values (1, '1984', 'George Orwell', 350,'2019-06-13');
insert into book
values (1, 'The Kite Runner', 'Khaled Hosseini', 450,'2018-04-12');

desc book;
```

Output / Error:

#	Time	Action	Message
✓ 1	20:29:14	insert into book values (1, '1984', 'George Orwell', 350,'2019-06-13')	1 row(s) affected
✗ 2	20:29:14	insert into book values (1, 'The Kite Runner', 'Khaled Hosseini', 450,'2018-04-12')	Error Code: 1062. Duplicate entry '1' for key 'book.PRIMARY'
✓ 3	20:29:34	desc book	5 row(s) returned

Here the second error denotes the violation of property of primary key

Schema:

Field	Type	Null	Key	Default	Extra
▶ BID	int	NO	PRI	NULL	
BName	varchar(255)	NO	MUL	NULL	
AuthorName	varchar(255)	YES		NULL	
Price	int	YES		NULL	
YearOfPub	date	YES		NULL	

in order to violate the property of not null:

Code:

```
insert into book
values (1, '1984', 'George Orwell', 350,'2019-06-13');
insert into book
values (2, 'Khaled Hosseini', 450,'2018-04-12');
```

```
insert into book
values (1, '1984', 'George Orwell', 350,'2019-06-13');
insert into book
values (2, , 'Khaled Hosseini', 450,'2018-04-12');
```
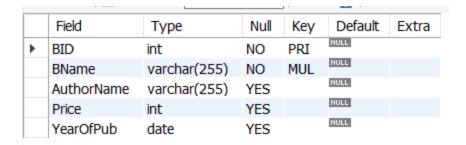
Output / Error:

#	Time	Action	Message
✓ 1	20:32:46	insert into book values (1, '1984', 'George Orwell', 350,'2019-06-13')	1 row(s) affected
✗ 2	20:32:46	insert into book values (2, 'Khaled Hosseini', 450,'2018-04-12')	Error Code: 1136. Column count doesn't match value count at row 1
✓ 3	20:32:55	desc book	5 row(s) returned

Here the second error denotes the violation of property of not null.

Schema:

	Field	Type	Null	Key	Default	Extra
▶	BID	int	NO	PRI	NULL	
	BName	varchar(255)	NO	MUL	NULL	
	AuthorName	varchar(255)	YES		NULL	
	Price	int	YES		NULL	
	YearOfPub	date	YES		NULL	

in order to violate the unique property:

Code:

```
insert into book
values (3, 'Atomic habits', 'James Clear', 850,'2016-08-17');
insert into book
values (4, 'Atomic habits', 'James Clear', 600,'2019-06-12');
desc book;
select * from book;
```


Output / Error:

	Time	Action	Message
✓	1 20:37:31	insert into book values (3, 'Atomic habits', 'James Clear', 850,'2016-08-17')	1 row(s) affected
✗	2 20:37:31	insert into book values (4, 'Atomic habits', 'James Clear', 600,'2019-06-12')	Error Code: 1062. Duplicate entry 'Atomic habits-James Clear' for key 'book.BName'
✓	3 20:37:36	desc book	5 row(s) returned
✓	4 20:37:58	select * from book LIMIT 0, 1000	1 row(s) returned

Here the second error denotes the violation of unique property.

Schema:

	Field	Type	Null	Key	Default	Extra
▶	BID	int	NO	PRI	NULL	
	BName	varchar(255)	NO	MUL	NULL	
	AuthorName	varchar(255)	YES		NULL	
	Price	int	YES		NULL	
	YearOfPub	date	YES		NULL	

Table:

	BID	BName	AuthorName	Price	YearOfPub
▶	3	Atomic habits	James Clear	850	2016-08-17
*	NULL	NULL	NULL	NULL	NULL

in order to violate the property of foreign key:

Code:

```
insert into Publisher
values (5, 'Piegons', 3);
insert into Publisher
values (6, 'Parrot', 6);
select * from book;
select * from Publisher;
```

```
insert into Publisher
values (5, 'Piegons', 3);
insert into Publisher
values (6, 'Parrot', 6);
select * from book;
select * from Publisher;
```

Output / Error:

Main Table:

	BID	BName	AuthorName	Price	YearOfPub
▶	1	1984	George Orwell	350	2019-06-13
	2	The Kite Runner	Khaled Hosseini	450	2018-04-12
	3	Atomic habits	James Clear	850	2016-08-17

Error:

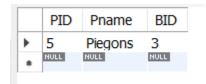|				
✓	1	20:46:30	insert into Publisher values (5, 'Piegons', 3)	1 row(s) affected
✗	2	20:46:30	insert into Publisher values (6, 'Parrot', 6)	Error Code: 1452. Cannot add or update a child row: a foreign key constraint fails (`books`.`publisher`, CONS...
✓	3	20:47:03	select * from book LIMIT 0, 1000	3 row(s) returned
✓	4	20:47:03	select * from Publisher LIMIT 0, 1000	1 row(s) returned

Here the second error denotes the violation of foreign key property since there is no value '6' in BID but we tried inserting in foreign table.

Hence,

Foreign table:

	PID	Pname	BID
▶	5	Piegons	3
*	NULL	NULL	NULL

in order to violate the check constraint property:

Code:

```
insert into book
values (3, 'Atomic habits', 'James Clear', 850,'2016-08-17');
insert into book
values (4, 'The Alchemist', 'Paulo Coelho', 600,'2019-06-12');
insert into book
values (5, 'The Great Gatsby', 'F . Scott Fitzgerald', 150,'2021-07-13');
select * from book;
```
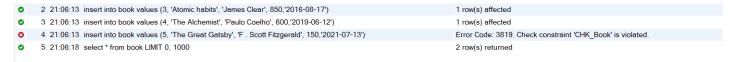
insert into book
values (3, 'Atomic habits', 'James Clear', 850,'2016-08-17');
insert into book
values (4, 'The Alchemist', 'Paulo Coelho', 600,'2019-06-12');
insert into book
values (5, 'The Great Gatsby', 'F. Scott Fitzgerald', 150,'2021-07-13');
*select * from book;*

Output / Error:

✓	2	21:06:13	insert into book values (3, 'Atomic habits', 'James Clear', 850,'2016-08-17')	1 row(s) affected
✓	3	21:06:13	insert into book values (4, 'The Alchemist', 'Paulo Coelho', 600,'2019-06-12')	1 row(s) affected
✗	4	21:06:13	insert into book values (5, 'The Great Gatsby', 'F . Scott Fitzgerald', 150,'2021-07-13')	Error Code: 3819. Check constraint 'CHK_Book' is violated.
✓	5	21:06:18	select * from book LIMIT 0, 1000	2 row(s) returned

Here the third line error is caused due since we tried entering price as 150 but the check constraint is for the price in between 500 to 1000 which gets executed successfully.

Hence the table is as follows:

	BID	BName	AuthorName	Price	YearOfPub
▶	3	Atomic habits	James Clear	850	2016-08-17
	4	The Alchemist	Paulo Coelho	600	2019-06-12
*	NULL	NULL	NULL	NULL	NULL