IT252 Assignment-2

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TOPIC: SQL – DDL CONSTRAINTS

- **Tables used from previous database:**

1) student_courses   2)student_info

sname	sid	cname	cid

sname	sid	dept

3)course_list

cname	cid

- **Dummy Tables used for ON DELETE and ON UPDATE:**

1)books   2)authors

book_id	book_name
Primary key	

auth_id	auth_name	book_id
Primary key		Foreign key

NOTE: Output screen shots contain schema of all above tables and their content. Screenshots have been attached in the zip folder.

- Screenshots for all commands:

NOTE: "set default" in on delete/on update couldn't be used because engine was set to "InnoDB" which doesn't support on delete/on update set default.

```
suyash@suyash-VirtualBox:~$ sudo mysql
[sudo] password for suyash:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.22-0ubuntu0.20.04.3 (Ubuntu)

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owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> show databases;
+--------------------+
| Database           |
+--------------------+
| company            |
| hospital           |
| information_schema |
| mysql              |
| nitk               |
| performance_schema |
| sys                |
| trial              |
+--------------------+
8 rows in set (0.01 sec)

mysql> use nitk;
Reading table information for completion of table and column names
You can turn off this feature to get a quicker startup with -A

Database changed
mysql> show tables;
+-----------------+
| Tables_in_nitk  |
+-----------------+
| course_list     |
| fac_courses     |
| fac_info        |
| student_courses |
| student_info    |
+-----------------+
5 rows in set (0.00 sec)

mysql> desc student_courses;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
```

```
mysql> desc student_courses;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| sname | varchar(25) | YES  |     | NULL    |       |
| sid   | char(9)     | YES  |     | NULL    |       |
| cname | varchar(25) | YES  |     | NULL    |       |
| cid   | char(6)     | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> select * from student_courses;
+-------+----------+-------+-------+
| sname | sid      | cname | cid   |
+-------+----------+-------+-------+
| stud3 | 191cs001 | dm    | cs001 |
| stud4 | 191me001 | eg    | me001 |
| stud5 | 191sm001 | hrm   | sm001 |
+-------+----------+-------+-------+
3 rows in set (0.00 sec)

mysql> alter table student_courses modify sid char(9) primary key;
Query OK, 0 rows affected (0.04 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc student_courses;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| sname | varchar(25) | YES  |     | NULL    |       |
| sid   | char(9)     | NO   | PRI | NULL    |       |
| cname | varchar(25) | YES  |     | NULL    |       |
| cid   | char(6)     | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> insert into student_courses values ('stud1','191it001','dbms','it001');
Query OK, 1 row affected (0.00 sec)

mysql> insert into student_courses values ('stud2','191it001','dbms','it001');
ERROR 1062 (23000): Duplicate entry '191it001' for key 'student_courses.PRIMARY'
mysql> select * from student_courses;
+-------+----------+-------+-------+
| sname | sid      | cname | cid   |
+-------+----------+-------+-------+
| stud3 | 191cs001 | dm    | cs001 |
| stud1 | 191it001 | dbms  | it001 |
| stud4 | 191me001 | eg    | me001 |
```

```
mysql> insert into student_courses values ('stud2','191it001','dbms','it001');
ERROR 1062 (23000): Duplicate entry '191it001' for key 'student_courses.PRIMARY'
mysql> select * from student_courses;
+-------+----------+--------+-------+
| sname | sid      | cname  | cid   |
+-------+----------+--------+-------+
| stud3 | 191cs001 | dm     | cs001 |
| stud1 | 191it001 | dbms   | it001 |
| stud4 | 191me001 | eg     | me001 |
| stud5 | 191sm001 | hrm    | sm001 |
+-------+----------+--------+-------+
4 rows in set (0.00 sec)

mysql> desc course_list;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| cname | varchar(25) | YES  |     | NULL    |       |
| cid   | char(6)     | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
2 rows in set (0.00 sec)

mysql> alter table course_list modify cid char(6) primary key;
Query OK, 0 rows affected (0.03 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table student_courses add constraint cid_fk foreign key(cid) references course_list(cid);
Query OK, 4 rows affected (0.05 sec)
Records: 4  Duplicates: 0  Warnings: 0

mysql> select * from student_courses;
+-------+----------+--------+-------+
| sname | sid      | cname  | cid   |
+-------+----------+--------+-------+
| stud3 | 191cs001 | dm     | cs001 |
| stud1 | 191it001 | dbms   | it001 |
| stud4 | 191me001 | eg     | me001 |
| stud5 | 191sm001 | hrm    | sm001 |
+-------+----------+--------+-------+
4 rows in set (0.00 sec)

mysql> insert into student_courses values ('stud2','191it002','os','it002');
Query OK, 1 row affected (0.01 sec)

mysql> insert into student_courses values ('stud8','191it009','os','it111');
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`nitk`.`student_courses`, CONSTRAINT `cid_fk` FOREIGN KEY (`cid`) REFERENCES `course_list` (`cid`))
mysql> insert into student_courses values(null,'191it003','dsa','it003);
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'it003)' at line 1
```

```
mysql> insert into student_courses values ('stud8','191it009','os','it111');
ERROR 1452 (23000): Cannot add or update a child row: a foreign key constraint fails (`nitk`.`student_courses`, CONSTRAINT `cid_fk` FOREIGN KEY (`cid`) REFERENCES `course_list` (`cid`))
mysql> insert into student_courses values(null,'191it003','dsa','it003);
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'it003)' at line 1
mysql> insert into student_courses values(null,'191it003','dsa','it003);
Query OK, 1 row affected (0.01 sec)
mysql> delete from student_courses where sid='191it003';
Query OK, 1 row affected (0.01 sec)

mysql> alter table student_courses modify sname varchar(25) not null;
Query OK, 0 rows affected (0.06 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> insert into student_courses values(null,'191it003','dsa','it003);
ERROR 1048 (23000): Column 'sname' cannot be null
mysql> desc student_courses;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| sname | varchar(25) | NO   |     | NULL    |       |
| sid   | char(9)     | NO   | PRI | NULL    |       |
| cname | varchar(25) | YES  |     | NULL    |       |
| cid   | char(6)     | YES  | MUL | NULL    |       |
+-------+-------------+------+-----+---------+-------+
4 rows in set (0.00 sec)

mysql> desc student_info;
+-------+-------------+------+-----+---------+-------+
| Field | Type        | Null | Key | Default | Extra |
+-------+-------------+------+-----+---------+-------+
| sname | varchar(25) | YES  |     | NULL    |       |
| sid   | char(9)     | NO   |     | NULL    |       |
| dept  | varchar(20) | YES  |     | NULL    |       |
+-------+-------------+------+-----+---------+-------+
3 rows in set (0.00 sec)

mysql> alter table student_info modify sname varchar(25) unique;
Query OK, 0 rows affected (0.02 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> insert into student_info values('stud1','191it010','it');
ERROR 1062 (23000): Duplicate entry 'stud1' for key 'student_info.sname'
mysql> alter table student_info modify sid char(9) unique;
Query OK, 0 rows affected (0.05 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> alter table student_info modify dept varchar(20) default('it');
```

```
mysql> alter table student_info modify dept varchar(20) default('it');
Query OK, 0 rows affected (0.01 sec)
Records: 0  Duplicates: 0  Warnings: 0

mysql> desc student_info;
+-------+-------------+------+-----+----------------+-------------------+
| Field | Type        | Null | Key | Default        | Extra             |
+-------+-------------+------+-----+----------------+-------------------+
| sname | varchar(25) | YES  | UNI | NULL           |                   |
| sid   | char(9)     | YES  | UNI | NULL           |                   |
| dept  | varchar(20) | YES  |     | _utf8mb4\'it\' | DEFAULT_GENERATED |
+-------+-------------+------+-----+----------------+-------------------+
3 rows in set (0.00 sec)

mysql> insert into student_info values('stud8','191iit008',default);
Query OK, 1 row affected (0.01 sec)

mysql> select * from student_info;
+-------+-----------+------+
| sname | sid       | dept |
+-------+-----------+------+
| stud1 | 191iit001 | it   |
| stud2 | 191iit002 | it   |
| stud3 | 191cs001  | cs   |
| stud4 | 191me001  | me   |
| stud5 | 191sm001  | sm   |
| stud6 | 191iit003 | it   |
| stud7 | 191iit004 | it   |
| stud8 | 191iit008 | it   |
+-------+-----------+------+
8 rows in set (0.00 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.02 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on delete cascade);
Query OK, 0 rows affected (0.02 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> select * from books;
+---------+-----------+
| book_id | book_name |
+---------+-----------+
|       1 | book1     |
|       2 | book2     |
```

```
mysql> select * from books;
+---------+-----------+
| book_id | book_name |
+---------+-----------+
|       1 | book1     |
|       2 | book2     |
|       3 | book3     |
+---------+-----------+
3 rows in set (0.00 sec)

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       1 | abc       |       1 |
|       2 | lmn       |       1 |
|       3 | xyz       |       1 |
|       4 | ijk       |       2 |
|       5 | def       |       2 |
+---------+-----------+---------+
5 rows in set (0.00 sec)

mysql> delete from books where book_id=1;
Query OK, 1 row affected (0.01 sec)

mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       4 | ijk       |       2 |
|       5 | def       |       2 |
+---------+-----------+---------+
2 rows in set (0.00 sec)

mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.02 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on delete no action);
```

```
mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.02 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on delete no action);
Query OK, 0 rows affected (0.03 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> delete from books where book_id=1;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails (`nitk`.`authors`, CONSTRAINT `authors_ibfk_1` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`))
mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table authors;
ERROR 1051 (42S02): Unknown table 'nitk.authors'
mysql> drop table books;
Query OK, 0 rows affected (0.01 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.03 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on delete set null);
Query OK, 0 rows affected (0.03 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> delete from books where book_id=1;
Query OK, 1 row affected (0.01 sec)

mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       1 | abc       |    NULL |
|       2 | lmn       |    NULL |
|       3 | xyz       |    NULL |
|       4 | ijk       |       2 |
```

```
mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       1 | abc       |    NULL |
|       2 | lmn       |    NULL |
|       3 | xyz       |    NULL |
|       4 | ijk       |       2 |
|       5 | def       |       2 |
+---------+-----------+---------+
5 rows in set (0.00 sec)

mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.03 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int default(3), foreign key(book_id) references books(book_id) on delete set default);
Query OK, 0 rows affected (0.03 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> delete from books where book_id=1;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails (`nitk`.`authors`, CONSTRAINT `authors_ibfk_1` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`))
mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.03 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on update cascade);
Query OK, 0 rows affected (0.02 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
```

```
mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> update books set book_id=4 where book_id=1;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       1 | abc       |       4 |
|       2 | lmn       |       4 |
|       3 | xyz       |       4 |
|       4 | ijk       |       2 |
|       5 | def       |       2 |
+---------+-----------+---------+
5 rows in set (0.00 sec)

mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.02 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on update no action);
Query OK, 0 rows affected (0.03 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> update books set book_id=4 where book_id=1;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails (`nitk`.`authors`, CONSTRAINT `authors_ibfk_1` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`))
mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)
```

```
mysql> update books set book_id=4 where book_id=1;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails (`nitk`.`authors`, CONSTRAINT `authors_ibfk_1` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`))
mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.02 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int, foreign key(book_id) references books(book_id) on update set null);
Query OK, 0 rows affected (0.04 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.02 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> update books set book_id=4 where book_id=1;
Query OK, 1 row affected (0.01 sec)
Rows matched: 1  Changed: 1  Warnings: 0

mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       1 | abc       |    NULL |
|       2 | lmn       |    NULL |
|       3 | xyz       |    NULL |
|       4 | ijk       |       2 |
|       5 | def       |       2 |
+---------+-----------+---------+
5 rows in set (0.00 sec)

mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.04 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int default(3), foreign key(book_id) references books(book_id) on update set deafult);
```

```
mysql> select * from authors;
+---------+-----------+---------+
| auth_id | auth_name | book_id |
+---------+-----------+---------+
|       1 | abc       |    NULL |
|       2 | lmn       |    NULL |
|       3 | xyz       |    NULL |
|       4 | ijk       |       2 |
|       5 | def       |       2 |
+---------+-----------+---------+
5 rows in set (0.00 sec)

mysql> drop table authors;
Query OK, 0 rows affected (0.02 sec)

mysql> drop table books;
Query OK, 0 rows affected (0.02 sec)

mysql> create table books(book_id int primary key,book_name varchar(30));
Query OK, 0 rows affected (0.04 sec)

mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int default(3), foreign key(book_id) references books(book_id) on update set deaflult);
ERROR 1064 (42000): You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near 'deaflult)' at line 1
mysql> create table authors(auth_id int primary key,auth_name char(20),book_id int default(3), foreign key(book_id) references books(book_id) on update set default);
Query OK, 0 rows affected (0.03 sec)

mysql> insert into books values (1,'book1'),(2,'book2'),(3,'book3');
Query OK, 3 rows affected (0.01 sec)
Records: 3  Duplicates: 0  Warnings: 0

mysql> insert into authors values (1,'abc',1),(2,'lmn','1'),(3,'xyz','1'),(4,'ijk','2'),(5,'def','2');
Query OK, 5 rows affected (0.01 sec)
Records: 5  Duplicates: 0  Warnings: 0

mysql> update books set book_id=4 where book_id=1;
ERROR 1451 (23000): Cannot delete or update a parent row: a foreign key constraint fails (`nitk`.`authors`, CONSTRAINT `authors_ibfk_1` FOREIGN KEY (`book_id`) REFERENCES `books` (`book_id`))
mysql> desc authors;
+-----------+----------+------+-----+---------+-------------------+
| Field     | Type     | Null | Key | Default | Extra             |
+-----------+----------+------+-----+---------+-------------------+
| auth_id   | int      | NO   | PRI | NULL    |                   |
| auth_name | char(20) | YES  |     | NULL    |                   |
| book_id   | int      | YES  | MUL | 3       | DEFAULT_GENERATED |
+-----------+----------+------+-----+---------+-------------------+
3 rows in set (0.00 sec)

mysql>
```



```
mysql> show table status where name='books';
+-------+--------+---------+------------+------+----------------+-------------+-----------------+--------------+-----------+----------------+---------------------+---------------------+------------+----------------------+----------+----------------+---------+
| Name  | Engine | Version | Row_format | Rows | Avg_row_length | Data_length | Max_data_length | Index_length | Data_free | Auto_increment | Create_time         | Update_time         | Check_time | Collation            | Checksum | Create_options | Comment |
+-------+--------+---------+------------+------+----------------+-------------+-----------------+--------------+-----------+----------------+---------------------+---------------------+------------+----------------------+----------+----------------+---------+
| books | InnoDB |      10 | Dynamic    |    3 |           5461 |       16384 |               0 |            0 |         0 |           NULL | 2021-01-21 01:01:58 | 2021-01-21 01:02:42 | NULL       | utf8mb4_0900_ai_ci   |     NULL |                |         |
+-------+--------+---------+------------+------+----------------+-------------+-----------------+--------------+-----------+----------------+---------------------+---------------------+------------+----------------------+----------+----------------+---------+
1 row in set (0.01 sec)

mysql>
```
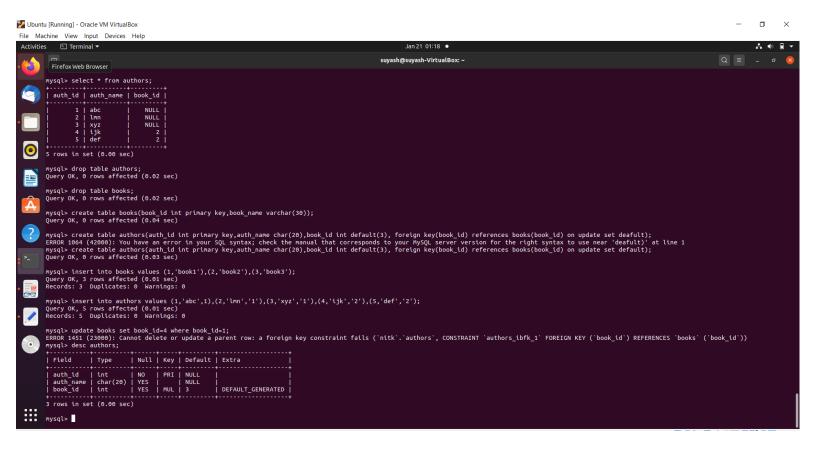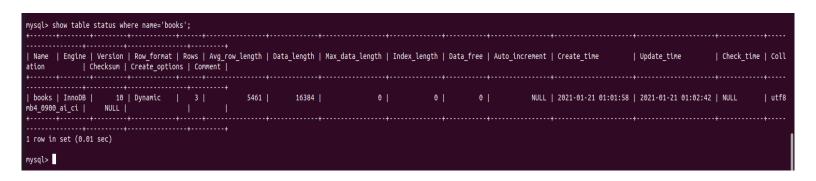
- Picture above shows an example the default engine used by the tables, i.e. InnoDB.