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1. Write a SQL statement to rename the table countries to country_new.

```
mysql> use lab_1;
Database changed
mysql> show tables;
+-----+
| Tables_in_lab_1 |
+-----+
| countries        |
| countries1       |
| countries2       |
| countries3       |
| countries4       |
| departments      |
| departs          |
| job              |
| job_history      |
| job_history1     |
| jobs             |
| jobs1            |
| tbl_countries    |
| tbl_dup_countries|
+-----+
14 rows in set (0.01 sec)

mysql> alter table countries rename to country_new;
Query OK, 0 rows affected (0.01 sec)

mysql> show tables;
+-----+
| Tables_in_lab_1 |
+-----+
| countries1       |
| countries2       |
| countries3       |
| countries4       |
| country_new      |
| departments      |
| departs          |
| job              |
| job_history      |
| job_history1     |
| jobs             |
| jobs1            |
| tbl_countries    |
| tbl_dup_countries|
+-----+
14 rows in set (0.00 sec)
```

2. Write a SQL statement to add a column `region_id` to the table `locations`.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| city        | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| country_id  | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
6 rows in set (0.00 sec)

mysql> alter table locations add region_id int(5) after state_province;
Query OK, 0 rows affected, 1 warning (0.02 sec)
Records: 0 Duplicates: 0 Warnings: 1

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| city        | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

3. Write a SQL statement to add a columns `ID` as the first column of the table `locations`.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| city        | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> alter table locations add ID int(5) FIRST;
Query OK, 0 rows affected, 1 warning (0.01 sec)
Records: 0 Duplicates: 0 Warnings: 1

mysql> DESC locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| city        | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

4. Write a SQL statement to add a column `region_id` after `state_province` to the table `locations`.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| location_id    | int           | NO   |     | NULL    |       |
| street_address | varchar(15)   | YES  |     | NULL    |       |
| postal_code    | varchar(8)    | YES  |     | NULL    |       |
| city           | varchar(8)    | YES  |     | NULL    |       |
| state_province | varchar(5)    | YES  |     | NULL    |       |
| country_id     | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
6 rows in set (0.00 sec)

mysql> alter table locations add region_id int(5) after state_province;
Query OK, 0 rows affected, 1 warning (0.02 sec)
Records: 0 Duplicates: 0 Warnings: 1

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| location_id    | int           | NO   |     | NULL    |       |
| street_address | varchar(15)   | YES  |     | NULL    |       |
| postal_code    | varchar(8)    | YES  |     | NULL    |       |
| city           | varchar(8)    | YES  |     | NULL    |       |
| state_province | varchar(5)    | YES  |     | NULL    |       |
| region_id      | int           | YES  |     | NULL    |       |
| country_id     | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

5. Write a SQL statement change the data type of the column `country_id` to integer in the table `locations`.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID             | int           | YES  |     | NULL    |       |
| location_id    | int           | NO   |     | NULL    |       |
| street_address | varchar(15)   | YES  |     | NULL    |       |
| postal_code    | varchar(8)    | YES  |     | NULL    |       |
| city           | varchar(8)    | YES  |     | NULL    |       |
| state_province | varchar(5)    | YES  |     | NULL    |       |
| region_id      | int           | YES  |     | NULL    |       |
| country_id     | decimal(4,0) | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

mysql> alter table locations modify country_id int(5);
Query OK, 0 rows affected, 1 warning (0.05 sec)
Records: 0 Duplicates: 0 Warnings: 1

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field          | Type          | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID             | int           | YES  |     | NULL    |       |
| location_id    | int           | NO   |     | NULL    |       |
| street_address | varchar(15)   | YES  |     | NULL    |       |
| postal_code    | varchar(8)    | YES  |     | NULL    |       |
| city           | varchar(8)    | YES  |     | NULL    |       |
| state_province | varchar(5)    | YES  |     | NULL    |       |
| region_id      | int           | YES  |     | NULL    |       |
| country_id     | int           | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)
```

6. Write a SQL statement to drop the column city from the table locations.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID          | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| city        | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
8 rows in set (0.00 sec)

mysql> alter table locations drop city;
Query OK, 0 rows affected (0.01 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID          | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

7. Write a SQL statement to change the name of the column state_province to state, keeping the data type and size same.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID          | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| state_province | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> alter table locations drop state_province,ADD state varchar(5) after postal_code;
Query OK, 0 rows affected (0.01 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID          | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code  | varchar(8) | YES  |     | NULL    |       |
| state        | varchar(5) | YES  |     | NULL    |       |
| region_id   | int       | YES  |     | NULL    |       |
| country_id  | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

8. Write a SQL statement to add a primary key for the columns `location_id` in the `locations` table.

Here is the sample table `employees`.

Sample table: `employees`

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code | varchar(8) | YES  |     | NULL    |       |
| state      | varchar(5) | YES  |     | NULL    |       |
| region_id  | int       | YES  |     | NULL    |       |
| country_id | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> alter table locations add primary key(location_id);
Query OK, 0 rows affected (0.05 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   | PRI | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code | varchar(8) | YES  |     | NULL    |       |
| state      | varchar(5) | YES  |     | NULL    |       |
| region_id  | int       | YES  |     | NULL    |       |
| country_id | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

9. Write a SQL statement to add a primary key for a combination of columns `location_id` and `country_id`.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code | varchar(8) | YES  |     | NULL    |       |
| state      | varchar(5) | YES  |     | NULL    |       |
| region_id  | int       | YES  |     | NULL    |       |
| country_id | int       | YES  |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> alter table locations add primary key(location_id,country_id);
Query OK, 0 rows affected (0.17 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   | PRI | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code | varchar(8) | YES  |     | NULL    |       |
| state      | varchar(5) | YES  |     | NULL    |       |
| region_id  | int       | YES  |     | NULL    |       |
| country_id | int       | NO   | PRI | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

10. Write a SQL statement to drop the existing primary from the table locations on a combination of columns location_id and country_id.

```
mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   | PRI | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code | varchar(8) | YES  |     | NULL    |       |
| state      | varchar(5) | YES  |     | NULL    |       |
| region_id  | int       | YES  |     | NULL    |       |
| country_id | int       | NO   | PRI | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> alter table locations drop primary key;
Query OK, 0 rows affected (0.06 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> desc locations;
+-----+-----+-----+-----+-----+-----+
| Field      | Type      | Null | Key | Default | Extra |
+-----+-----+-----+-----+-----+-----+
| ID         | int       | YES  |     | NULL    |       |
| location_id | int       | NO   |     | NULL    |       |
| street_address | varchar(15) | YES  |     | NULL    |       |
| postal_code | varchar(8) | YES  |     | NULL    |       |
| state      | varchar(5) | YES  |     | NULL    |       |
| region_id  | int       | YES  |     | NULL    |       |
| country_id | int       | NO   |     | NULL    |       |
+-----+-----+-----+-----+-----+-----+
7 rows in set (0.00 sec)
```

11. Write a SQL statement to add a foreign key on `job_id` column of `job_history` table referencing to the primary key `job_id` of `jobs` table.

```
mysql> desc job_history;
+-----+
| Field      | Type   | Null | Key | Default | Extra |
+-----+
| employee_id | int    | NO   |     | NULL    |       |
| start_date  | date   | YES  |     | NULL    |       |
| hire_date   | date   | YES  |     | NULL    |       |
| job_id      | int    | NO   |     | NULL    |       |
| department_id | int    | NO   |     | NULL    |       |
+-----+
5 rows in set (0.00 sec)
```

```
mysql> desc jobs;
+-----+
| Field      | Type          | Null | Key | Default | Extra |
+-----+
| job_id     | int           | NO   | PRI | NULL    |       |
| job_title  | varchar(35)   | NO   |     | NULL    |       |
| min_salary | decimal(6,0)  | YES  |     | NULL    |       |
| max_salary | decimal(6,0)  | YES  |     | NULL    |       |
+-----+
4 rows in set (0.00 sec)
```

```
mysql> alter table job_history add foreign key(job_id) REFERENCES jobs(job_id);
Query OK, 0 rows affected (0.07 sec)
Records: 0 Duplicates: 0 Warnings: 0
```

```
mysql> desc job_history;
+-----+
| Field      | Type   | Null | Key | Default | Extra |
+-----+
| employee_id | int    | NO   |     | NULL    |       |
| start_date  | date   | YES  |     | NULL    |       |
| hire_date   | date   | YES  |     | NULL    |       |
| job_id      | int    | NO   | MUL | NULL    |       |
| department_id | int    | NO   |     | NULL    |       |
+-----+
5 rows in set (0.00 sec)
```

12. Write a SQL statement to add a foreign key constraint named `fk_job_id` on `job_id` column of `job_history` table referencing to the primary key `job id` of `jobs` table.

```
mysql> alter table job_history add constraint fk_job_id foreign key(job_id) REFERENCES jobs(job_id) ON UPDATE RESTRICT ON DELETE CASCADE;  
Query OK, 0 rows affected (0.07 sec)  
Records: 0 Duplicates: 0 Warnings: 0
```

```
mysql> desc job_history;
```

Field	Type	Null	Key	Default	Extra
employee_id	int	NO		NULL	
start_date	date	YES		NULL	
hire_date	date	YES		NULL	
job_id	int	NO	MUL	NULL	
department_id	int	NO		NULL	

5 rows in set (0.00 sec)

```
mysql> show index from job_history;
```

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment	Visible
job_history	1	fk_job_id	1	job_id	A	0			BTREE				YES

1 row in set (0.01 sec)

13. Write a SQL statement to drop the existing foreign key `fk_job_id` from `job_history` table on `job_id` column which is referencing to the `job_id` of `jobs` table.

```
mysql> alter table job_history drop foreign key fk_job_id;
Query OK, 0 rows affected (0.01 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> show index from job_history;
+-----+
| Table | Non_unique | Key_name | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment | Visible |
+-----+
| job_history | 1 | fk_job_id | 1 | job_id | A | 0 | NULL | NULL | NULL | BTREE | | | YES |
+-----+
1 row in set (0.00 sec)

mysql> desc job_history;
+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+
| employee_id | int | NO | | NULL | |
| start_date | date | YES | | NULL | |
| hire_date | date | YES | | NULL | |
| job_id | int | NO | MUL | NULL | |
| department_id | int | NO | | NULL | |
+-----+
5 rows in set (0.00 sec)

mysql> show index from jobs;
+-----+
| Table | Non_unique | Key_name | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment | Visible | Extra |
+-----+
| jobs | 0 | PRIMARY | 1 | job_id | A | 0 | NULL | NULL | NULL | BTREE | | | YES | |
+-----+
1 row in set (0.01 sec)
```

14. Write a SQL statement to add an index named `indx_job_id` on `job_id` column in the table `job_history`.

```
mysql> show index from job_history;
+-----+
| Table | Non_unique | Key_name | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment | Visible |
+-----+
| job_history | 1 | fk_job_id | 1 | job_id | A | 0 | NULL | NULL | NULL | BTREE | | | YES |
+-----+
1 row in set (0.00 sec)

mysql> alter table job_history add index indx_job_id(job_id);
Query OK, 0 rows affected (0.02 sec)
Records: 0 Duplicates: 0 Warnings: 0

mysql> desc job_history;
+-----+
| Field | Type | Null | Key | Default | Extra |
+-----+
| employee_id | int | NO | | NULL | |
| start_date | date | YES | | NULL | |
| hire_date | date | YES | | NULL | |
| job_id | int | NO | MUL | NULL | |
| department_id | int | NO | | NULL | |
+-----+
5 rows in set (0.00 sec)

mysql> show index from job_history;
+-----+
| Table | Non_unique | Key_name | Seq_in_index | Column_name | Collation | Cardinality | Sub_part | Packed | Null | Index_type | Comment | Index_comment | Visible |
+-----+
| job_history | 1 | index_job_id | 1 | job_id | A | 0 | NULL | NULL | NULL | BTREE | | | YES |
+-----+
1 row in set (0.01 sec)
```


15. Write a SQL statement to drop the index `indx_job_id` from `job_history` table.

```
mysql> show index from job_history;
```

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment
comment	Visible	Expression										
job_history	YES	index_job_id	1	job_id	A	0	NULL	NULL	BTREE			
job_history	YES	index_job_id_primary_key	1	job_id	A	0	NULL	NULL	BTREE			

2 rows in set (0.01 sec)

```
mysql> alter table job_history drop index index_job_id;
```

Query OK, 0 rows affected (0.01 sec)
Records: 0 Duplicates: 0 Warnings: 0

```
mysql> show index from job_history;
```

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment
comment	Visible	Expression										
job_history	YES	index_job_id_primary_key	1	job_id	A	0	NULL	NULL	BTREE			

1 row in set (0.00 sec)