```
(base) tithishah@Tithis-MacBook-Pro dbms project % mysql -u root -p security_project < schema.sql
Enter password:
DATABASE()
security_project
Tables_in_security_project
AuditLogs
Permissions
RolePermissions
Roles
UserRoles
Users
Field   Type    Null    Key     Default Extra
user_id int     NO      PRI     NULL    auto_increment
username        varchar(50)     NO      UNI     NULL
password_hash   varchar(255)    NO              NULL
email   varchar(100)    NO      UNI     NULL
created_at      timestamp       YES             CURRENT_TIMESTAMP       DEFAULT_GENERATED
last_login      timestamp       YES             NULL
Field   Type    Null    Key     Default Extra
role_id int     NO      PRI     NULL    auto_increment
role_name       varchar(50)     NO      UNI     NULL
Field   Type    Null    Key     Default Extra
user_id int     NO      PRI     NULL
role_id int     NO      PRI     NULL
Field   Type    Null    Key     Default Extra
permission_id   int     NO      PRI     NULL    auto_increment
permission_name varchar(100)    NO      UNI     NULL
Field   Type    Null    Key     Default Extra
role_id int     NO      PRI     NULL
permission_id   int     NO      PRI     NULL
Field   Type    Null    Key     Default Extra
log_id  bigint  NO      PRI     NULL    auto_increment
timestamp       timestamp       YES             CURRENT_TIMESTAMP       DEFAULT_GENERATED
user_id int     YES     MUL     NULL
action_type     varchar(50)     NO              NULL
table_name      varchar(100)    YES             NULL
record_id       varchar(255)    YES             NULL
old_value       text    YES             NULL
new_value       text    YES             NULL
query_executed  text    YES             NULL
ip_address      varchar(45)     YES             NULL
status  varchar(20)     YES             NULL
details text    YES             NULL
Table   Create Table
Users   CREATE TABLE `Users` (\n  `user_id` int NOT NULL AUTO_INCREMENT,\n  `username` varchar(50) NOT NULL,\n  `password_hash` varchar(255) NOT NULL,\n  `email` varchar(100) NOT NULL,\n  `created_at` tim
estamp NULL DEFAULT CURRENT_TIMESTAMP,\n  `last_login` timestamp NULL DEFAULT NULL,\n  PRIMARY KEY (`user_id`),\n  UNIQUE KEY `username` (`username`),\n  UNIQUE KEY `email` (`email`)\n) ENGINE=InnoDB DEFA
ULT CHARSET=utf8mb4 COLLATE=utf8mb4_0900_ai_ci
```

```
(base) tithishah@Tithis-MacBook-Pro dbms project % mysql -u root -p security_project < data.sql
Enter password:
t       c
Roles   4
Permissions     9
Users   4
UserRoles       4
RolePermissions 15
role_id role_name
1       Admin
2       Auditor
3       DataEntry
4       Guest
user_id username         password_hash   email   created_at      last_login
1       admin   e86f78a8a3caf0b60d8e74e5942aa6d86dc150cd3c03338aef25b7d2d7e3acc7         admin@example.com       2025-09-03 23:29:18     NULL
2       auditor1        b42c16f05c16e60eded3f4460bcf0b41b5c49e9ccc453e70799409d88575b7f8         auditor1@example.com    2025-09-03 23:29:18     NULL
3       dataentry1      fe873f27dbf333b28b74dde49e75fa142a92781ba4fa3b57642f17f5d3aa2391         dataentry1@example.com  2025-09-03 23:29:18     NULL
4       guest1  907621bb6d2431200e50466ef9bc2d59cf24a07f7af00eb2e2fbd1a44420565a        guest1@example.com      2025-09-03 23:29:18     NULL
```

```
(base) tithishah@Tithis-MacBook-Pro dbms project % mysql -u root -p security_project < crud.sql
Enter password:
Db        Name    Type    Language        Definer Modified        Created Security_type   Comment character_set_client    collation_connection    Database Collation
security_project        sp_assign_role  PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
security_project        sp_create_role  PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
security_project        sp_create_user  PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
security_project        sp_delete_user  PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
security_project        sp_get_user_permissions PROCEDURE        SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
security_project        sp_grant_permission_to_role     PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci   utf8m
900_ai_ci
security_project        sp_revoke_permission_from_role  PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci   utf8m
900_ai_ci
security_project        sp_revoke_role  PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
security_project        sp_update_user_email    PROCEDURE       SQL     root@localhost  2025-09-03 23:33:39     2025-09-03 23:33:39     DEFINER         utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
permission_name
READ_PRODUCTS
```

```
(base) tithishah@Tithis-MacBook-Pro dbms project % mysql -u root -p security_project < audit.sql
Enter password:
Trigger Event   Table   Statement       Timing  Created sql_mode        Definer character_set_client    collation_connection    Database Collation
trg_products_after_insert       INSERT  Products        INSERT INTO AuditLogs(\n  timestamp, user_id, action_type, table_name, record_id,\n  new_value, ip_address, status, details\n)\nVALUES (\n  NOW()
current_user_id, 'INSERT', 'Products', NEW.product_id,\n  JSON_OBJECT('product_id', NEW.product_id, 'product_name', NEW.product_name, 'price', NEW.price, 'stock', NEW.stock_quantity),\n  '127.0.0.1',
CESS', CONCAT('Inserted product: ', NEW.product_name)\n)  AFTER   2025-09-03 23:33:58.34        ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO_ZERO_IN_DATE,NO_ZERO_DATE,ERROR_FOR_DIVISION_BY_ZERO,NO_ENGINE
BSTITUTION      root@localhost  utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
trg_products_after_update       UPDATE  Products        INSERT INTO AuditLogs(\n  timestamp, user_id, action_type, table_name, record_id,\n  old_value, new_value, ip_address, status, details\n)\nVALUES
n  NOW(), @current_user_id, 'UPDATE', 'Products', NEW.product_id,\n  JSON_OBJECT('product_name', OLD.product_name, 'price', OLD.price, 'stock', OLD.stock_quantity),\n  JSON_OBJECT('product_name', NEW.p
uct_name, 'price', NEW.price, 'stock', NEW.stock_quantity),\n  '127.0.0.1', 'SUCCESS', CONCAT('Updated product: ', NEW.product_name)\n)  AFTER   2025-09-03 23:33:58.35  ONLY_FULL_GROUP_BY,STRICT_TRANS_
LES,NO_ZERO_IN_DATE,NO_ZERO_DATE,ERROR_FOR_DIVISION_BY_ZERO,NO_ENGINE_SUBSTITUTION        root@localhost  utf8mb3 utf8mb3_general_ci        utf8mb4_0900_ai_ci
trg_products_after_delete       DELETE  Products        INSERT INTO AuditLogs(\n  timestamp, user_id, action_type, table_name, record_id,\n  old_value, ip_address, status, details\n)\nVALUES (\n  NOW()
current_user_id, 'DELETE', 'Products', OLD.product_id,\n  JSON_OBJECT('product_id', OLD.product_id, 'product_name', OLD.product_name, 'price', OLD.price, 'stock', OLD.stock_quantity),\n  '127.0.0.1',
CESS', CONCAT('Deleted product: ', OLD.product_name)\n)  AFTER   2025-09-03 23:33:58.35        ONLY_FULL_GROUP_BY,STRICT_TRANS_TABLES,NO_ZERO_IN_DATE,NO_ZERO_DATE,ERROR_FOR_DIVISION_BY_ZERO,NO_ENGINE
BSTITUTION      root@localhost  utf8mb3 utf8mb3_general_ci utf8mb4_0900_ai_ci
Tables_in_security_project      Table_type
vw_failedloginattempts  VIEW
vw_productaudittrail    VIEW
vw_sensitivedataaccess  VIEW
vw_useractivitysummary  VIEW
Table   Non_unique      Key_name        Seq_in_index    Column_name     Collation       Cardinality     Sub_part        Packed  Null    Index_type      Comment Index_comment   Visible Expression
AuditLogs       0       PRIMARY 1       log_id  A       0       NULL    NULL    NULL    BTREE                   YES     NULL
AuditLogs       1       idx_audit_timestamp     1       timestamp       A       0       NULL    NULL    YES     BTREE                   YES     NULL
AuditLogs       1       idx_audit_user_id       1       user_id A       0       NULL    NULL    YES     BTREE                   YES     NULL
AuditLogs       1       idx_audit_action_type   1       action_type     A       0       NULL    NULL    BTREE                   YES     NULL
AuditLogs       1       idx_audit_table_name    1       table_name      A       0       NULL    NULL    YES     BTREE                   YES     NULL
```

```
(base) tithishah@Tithis-MacBook-Pro dbms project % mysql -u root -p security_project < demo.sql
Enter password:
log_id  timestamp         user_id action_type  table_name    record_id    status  details
3       2025-09-03 23:34:08    1     DELETE  Products        1          SUCCESS Deleted product: USB-C Hub
2       2025-09-03 23:34:08    1     UPDATE  Products        1          SUCCESS Updated product: USB-C Hub
1       2025-09-03 23:34:08    1     INSERT  Products        1          SUCCESS Inserted product: USB-C Hub
username       action_type    total_actions   first_action    last_action
admin   INSERT  1       2025-09-03 23:34:08     2025-09-03 23:34:08
admin   UPDATE  1       2025-09-03 23:34:08     2025-09-03 23:34:08
admin   DELETE  1       2025-09-03 23:34:08     2025-09-03 23:34:08
timestamp       username        action_type    old_value       new_value       details
2025-09-03 23:34:08     admin   INSERT  NULL    {"price": 2499.00, "stock": 50, "product_id": 1, "product_name": "USB-C Hub"}   Inserted product: USB-C Hub
2025-09-03 23:34:08     admin   UPDATE  {"price": 2499.00, "stock": 50, "product_name": "USB-C Hub"}    {"price": 2299.00, "stock": 48, "product_name": "USB-C Hub"}    Updated product: USB-C Hub
2025-09-03 23:34:08     admin   DELETE  {"price": 2299.00, "stock": 48, "product_id": 1, "product_name": "USB-C Hub"}    NULL    Deleted product: USB-C Hub
log_id  timestamp       user_id action_type  table_name    record_id    old_value       new_value       query_executed  ip_address      status  details
3       2025-09-03 23:34:08    1     DELETE  Products        1        {"price": 2299.00, "stock": 48, "product_id": 1, "product_name": "USB-C Hub"}   NULL    NULL    127.0.0.1       SUCCESS Deleted p
roduct: USB-C Hub
2       2025-09-03 23:34:08    1     UPDATE  Products        1        {"price": 2499.00, "stock": 50, "product_name": "USB-C Hub"}    {"price": 2299.00, "stock": 48, "product_name": "USB-C Hub"}    N
ULL    127.0.0.1       SUCCESS Updated product: USB-C Hub
1       2025-09-03 23:34:08    1     INSERT  Products        1        NULL    {"price": 2499.00, "stock": 50, "product_id": 1, "product_name": "USB-C Hub"}    NULL    127.0.0.1       SUCCESS Inserted
product: USB-C Hub
username       action_type    total_actions   first_action    last_action
admin   INSERT  1       2025-09-03 23:34:08     2025-09-03 23:34:08
admin   UPDATE  1       2025-09-03 23:34:08     2025-09-03 23:34:08
admin   DELETE  1       2025-09-03 23:34:08     2025-09-03 23:34:08
timestamp       username        action_type    old_value       new_value       details
2025-09-03 23:34:08     admin   INSERT  NULL    {"price": 2499.00, "stock": 50, "product_id": 1, "product_name": "USB-C Hub"}   Inserted product: USB-C Hub
2025-09-03 23:34:08     admin   UPDATE  {"price": 2499.00, "stock": 50, "product_name": "USB-C Hub"}    {"price": 2299.00, "stock": 48, "product_name": "USB-C Hub"}    Updated product: USB-C Hub
2025-09-03 23:34:08     admin   DELETE  {"price": 2299.00, "stock": 48, "product_id": 1, "product_name": "USB-C Hub"}    NULL    Deleted product: USB-C Hub
(base) tithishah@Tithis-MacBook-Pro dbms project %
```