How to use migrations
Django translates the models into respective database tables in the backend database with a mechanism known as migration. It also propagates any changes in the model structure such as adding, modifying or removing a field attribute of a model class to the mapped table.
Django's migration system has the following commands:

makemigrations

migrate

sqlmigrate

showmigrations

Django's migration is a version control system. Whenever you add a new model or effect changes in an existing model, you need to run the **makemigrations** command. It creates a script for making changes in the mapped table. Every time you run the **makemigrations** command and Django detects the changes, a script with its name and version number is created. To implement the changes according to the migration script, you need to run the **migrate** command.

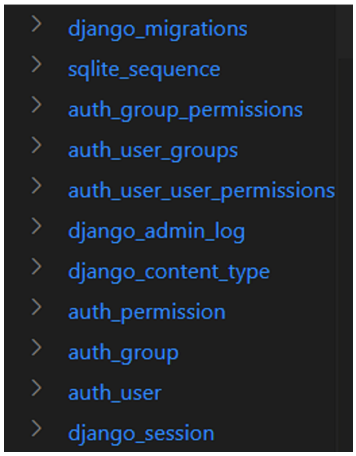
Migrating Models of INSTALLED APPS
When you create a Django project with the **startproject**command, certain apps are installed by default. These apps are listed in the **INSTALLED_APPS** section in the project's **settings.py** file.

```
INSTALLED_APPS = [
    'django.contrib.admin',
    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
]
```

Data needs to be stored via these apps for their functionality to work. For example, the **auth** package controls the users, groups, and permissions, so there must be corresponding tables created in the database. Django uses the SQLite database by default. For that purpose, you run the **migrate** command.

```
python manage.py migrate
```

Then, the tables required by the **INSTALLED_APPS** are created.



Let's create an app inside our Django project.

```
(django) C:\django\myproject> python manage.py startapp myapp
```

This creates a **myapp** package folder inside the outer **myproject** folder. Inside **myapp**, a **migrations** package is also created, which is empty to begin with.

Using the **makemigrations** command
Open the **models.py** file and add a person model to it.

```
from django.db import models
class Person(models.Model):
    name = models.CharField(max_length=20)
    email = models.EmailField()
    phone = models.CharField(max_length=20)
```

The first step towards creating the Person table in the database is to run the **makemigrations** command.

```
(django) C:\django\myproject>python manage.py makemigrations
Migrations for 'myapp':
  myapp\migrations\0001_initial.py
    - Create model Person
```

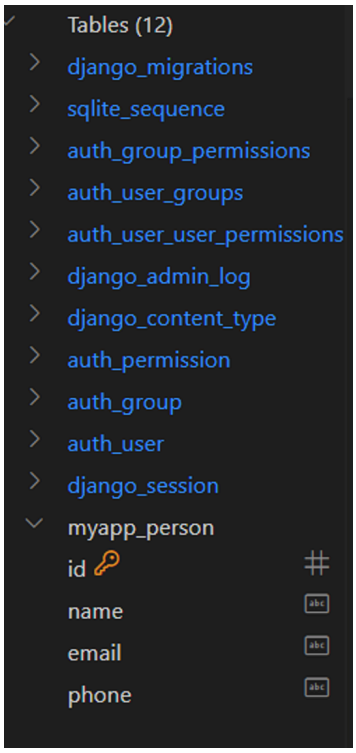
Notice that in the **migrations** package, a migration script **0001_initial.py**, is created. It indicates what the script intends to do, which is: **Create model Person**.
If you open the **migration** file, you'll find a migration class in it.

```
from django.db import migrations, models

class Migration(migrations.Migration):

    initial = True

    dependencies = [
    ]

    operations = [
        migrations.CreateModel(
            name='Person',
            fields=[
                ('id', models.BigAutoField(auto_created=True, primary_key=True, serialize=Fal
                ('name', models.CharField(max_length=20)),
                ('email', models.EmailField(max_length=254)),
                ('phone', models.CharField(max_length=20)),
            ],
        ),
    ]
```

As mentioned above, you need to run the **migrate** command to apply the tasks in the **migrations** file to be performed.

```
(django) C:\django\myproject>python manage.py migrate
Operations to perform:
  Apply all migrations: admin, auth, contenttypes, myapp, sessions
Running migrations:
  Applying myapp.0001_initial... OK
```

Have a look at the tables in your database **db.sqlite3**. The person table with three fields can be seen in it.



Version control

Now, let's modify the person model class by changing the **`name`**field to **`Person_name`** and running **`makemigrations`** again.

```
(django) C:\django\myproject>python manage.py makemigrations
Was person.name renamed to person.person_name (a CharField)? [y/N] y
Migrations for 'myapp':
  myapp\migrations\0002_rename_name_person_person_name.py
    - Rename field name on person to person_name
```

A second migration script is created in the **`migrations`** folder. Before finalizing the change, add a new field – age – in the person model and run **`makemigrations`** again.

```
(django) C:\django\myproject>python manage.py makemigrations
Migrations for 'myapp':
  myapp\migrations\0003_person_age.py
    - Add field age to person
```

`Showmigrations` command

Now there are two unmigrated changes in the model. Run the **`showmigrations`** command:

```
(django) C:\django\myproject>python manage.py showmigrations
. . .
. . .
myapp
[X] 0001_initial
[ ] 0002_rename_name_person_person_name
[ ] 0003_person_age
. . .
```

The initial migration (file numbered **0001**) has already migrated. The X mark is indicative of this. However, the next two migrations don't show the X mark, which means they are pending. If we run the **`migrate`** command, both modifications will be reflected in the table structure.

```
(django) C:\django\myproject>python manage.py migrate
Operations to perform:
  Apply all migrations: admin, auth, contenttypes, myapp, sessions
Running migrations:
  Applying myapp.0002_rename_name_person_person_name... OK
```

```
  Applying myapp.0003_person_age... OK
```

As mentioned earlier, Django's migration mechanism provides efficient version control. You may want to fall back upon the table structure before adding the **age** field. Run the **migrate** command and specify which migration file to be used so that the migrations after it will be undone or unapplied.

```
(django) C:\django\myproject>python manage.py migrate myapp 0002_rename_name_person_person_na
Operations to perform:
  Target specific migration: 0002_rename_name_person_person_name, from myapp
Running migrations:
  Rendering model states... DONE
  Unapplying myapp.0003_person_age... OK
```

sqlmigrate Command

Lastly, the **sqlmigrate**command shows the SQL query or queries executed when a certain migration script is run. For example, the first migration over the **myapp's** person model is intended to create the person table. The **sqlmigrate**command for this script shows the **CREATE TABLE** statement for this purpose.

```
(django) C:\django\myproject>python manage.py sqlmigrate myapp 0001_initial
BEGIN;
--
-- Create model Person
--
CREATE TABLE "myapp_person" ("id" integer NOT NULL PRIMARY KEY AUTOINCREMENT, "name" varchar(
COMMIT;
```

In this reading, you learned about when to use migrations, best practices and that the migration system in Django manages data creation and modification very effectively and efficiently.