Django ORM Cookbook Documentation

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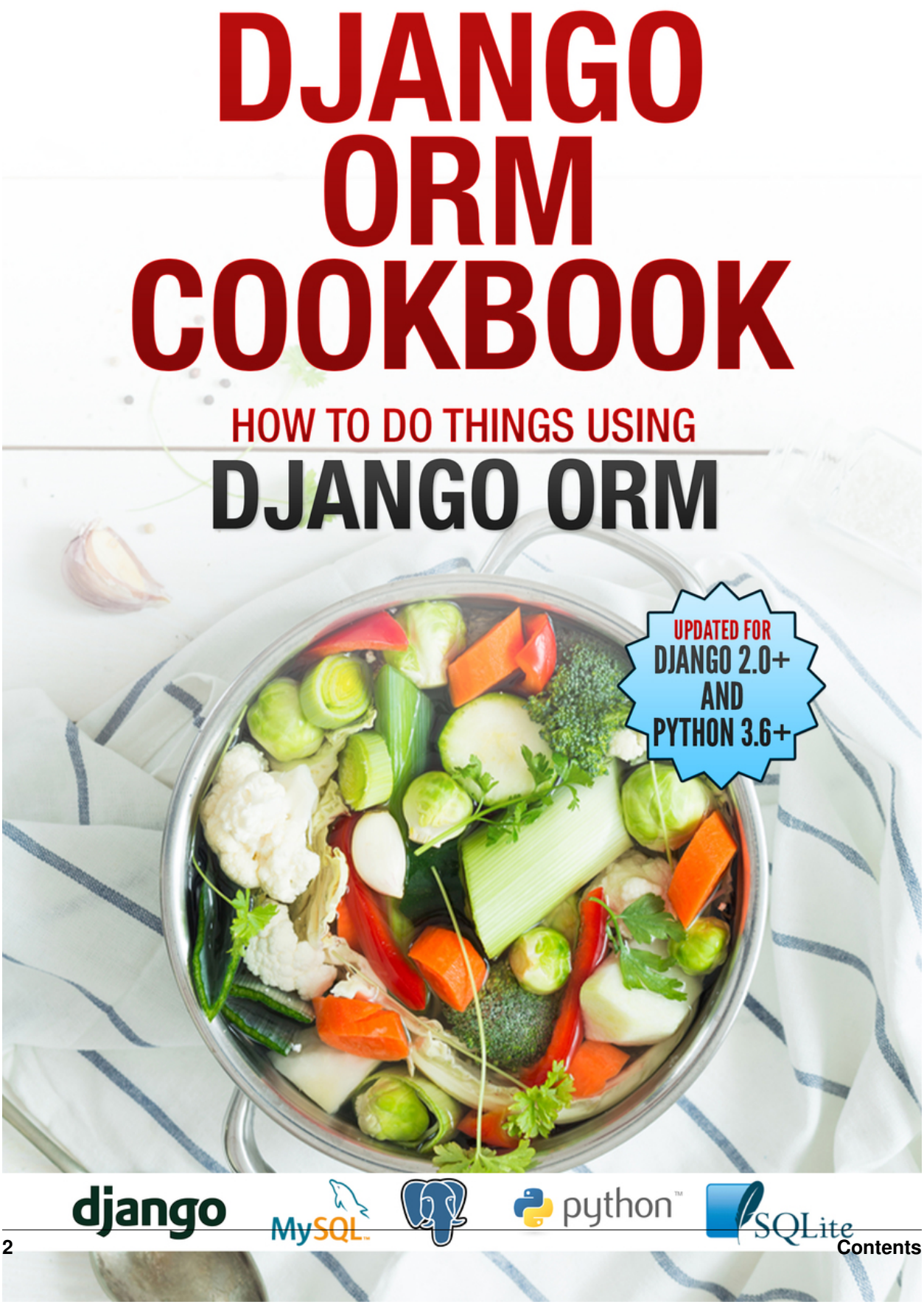
ORM ORM . “MTV”(--) - .

ORM// 50 .


DJANGO
ORM
COOKBOOK
HOW TO DO THINGS USING
DJANGO ORM
UPDATED FOR
DJANGO 2.0+
AND
PYTHON 3.6+
django
MySQL
python
SQLite

CHAPTER 1

Introduction

Django ORM is one of the key pillars of Django. It provides abstractions to work with databases, in a mostly database agnostic way.

Django ORM combines ease of use with powerful abstractions. It keeps "Simple things easy and hard things possible".

In this book, we will learn Django ORM by doing things with it. We will ask about 50 questions about Django ORM, and get a deeper understanding of the ORM.

1.1 How to read this book.

Each chapter in the book is question. The questions are grouped in related chapters. You can read the book in eaither of two ways.

1. If you are looking to get answers to specific questions, read that chapter and other chapters in that group.
2. If you are need to get a deeper understanding of Django ORM and models layer, read the chapters from start to the end.

CHAPTER 2

2.1 How to find the query associated with a queryset?

Sometime you want to know how a Django ORM makes our queries execute or what is the corresponding SQL of the code you are writing. This is very strightforward. Youn can get `str` of any `queryset.query` to get the sql.

You have a model called `Event`. For getting all records, you will write something like `Event.objects.all()`, then do `str(queryset.query)`

```
>>> queryset = Event.objects.all()
>>> str(queryset.query)
SELECT "events_event"."id", "events_event"."epic_id",
    "events_event"."details", "events_event"."years_ago"
    FROM "events_event"
```

```
Type "help", "copyright", "credits" or "license" for more information.
(InteractiveConsole)
>>> queryset = Event.objects.all()
>>> print(queryset.query)
SELECT "events_event"."id", "events_event"."epic_id", "events_event"."details", "events_event"."years_ago" FROM "events_event"
>>>
```

Example 2

```
>>> queryset = Event.objects.filter(years_ago__gt=5)
>>> str(queryset.query)
SELECT "events_event"."id", "events_event"."epic_id", "events_event"."details",
"events_event"."years_ago" FROM "events_event"
WHERE "events_event"."years_ago" > 5
```

2.2 How to do OR queries in Django ORM?

	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@aol.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com

If you are using `django.contrib.auth`, you will have a table called `auth_user`. It will have fields as `username`, `first_name`, `last_name` and more.

A common requirement is performing `OR` filtering with two ore more conditions. Say you want find all users with firstname starting with 'R' and last_name starting with 'D'.

Django provides two options.

- `queryset_1 | queryset_2`
- `filter(Q(<condition_1>)|Q(<condition_2>)`

2.2.1 The query in detail

The SQL query for the above condition will look something like

```
SELECT username, first_name, last_name, email FROM auth_user WHERE first_name LIKE 'R%
↪' OR last_name LIKE 'D%';
```

	username	first_name	last_name	email
1	Ricky	Ricky	Dayal	ricky@gmail.com
2	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
3	Radha	Radha	George	radha@gmail.com
4	Raghu	Raghu	Khan	raghu@rediffmail.com
5	rishab	Rishabh	Deol	rishabh@yahoo.com

Similarly our ORM query would look like

```
queryset = User.objects.filter(
        first_name__startswith='R'
    ) | User.objects.filter(
```

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```
    last_name__startswith='D'
)
queryset
<QuerySet [<User: Ricky>, <User: Ritesh>, <User: Radha>, <User: Raghu>, <User: rishab>
↪]>
```

You can also look at the generated query.

```
In [5]: str(queryset.query)
Out[5]: 'SELECT "auth_user"."id", "auth_user"."password", "auth_user"."last_login",
"auth_user"."is_superuser", "auth_user"."username", "auth_user"."first_name",
"auth_user"."last_name", "auth_user"."email", "auth_user"."is_staff",
"auth_user"."is_active", "auth_user"."date_joined" FROM "auth_user"
WHERE ("auth_user"."first_name"::text LIKE R% OR "auth_user"."last_name"::text LIKE D
↪%)'
```

Alternatively, you can use the `Q` objects.

```
from django.db.models import Q
qs = User.objects.filter(Q(first_name__startswith='R')|Q(last_name__startswith='D'))
```

If you look at the generated query, the result is exactly the same

```
In [9]: str(qs.query)
Out[9]: 'SELECT "auth_user"."id", "auth_user"."password", "auth_user"."last_login",
 "auth_user"."is_superuser", "auth_user"."username", "auth_user"."first_name",
  "auth_user"."last_name", "auth_user"."email", "auth_user"."is_staff",
  "auth_user"."is_active", "auth_user"."date_joined" FROM "auth_user"
  WHERE ("auth_user"."first_name"::text LIKE R% OR "auth_user"."last_name"::text LIKE␣
↪D%)'
```

2.3 How to do AND queries in Django ORM?

	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@aol.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com

If you are using `django.contrib.auth`, you will have a table called `auth_user`. It will have fields as `username`, `first_name`, `last_name` and more.

You would frequently need to want to perform AND operation, to find querysets which match multiple criteria.

Say you want to find users with `firstname` starting with 'R' AND `last_name` starting with 'D'.

Django provides three options.

- `filter(<condition_1>, <condition_2>)`
- `queryset_1 & queryset_2`
- `filter(Q(<condition_1>) & Q(<condition_2>))`

2.3.1 The query in detail

Our SQL query for the above condition will look something like

```
SELECT username, first_name, last_name, email FROM auth_user WHERE first_name LIKE 'R%
↪' AND last_name LIKE 'D%';
```

	username	first_name	last_name	email
1	Ricky	Ricky	Dayal	ricky@gmail.com
2	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
3	rishab	Rishabh	Deol	rishabh@yahoo.com

The default way to combine multiple conditions in `filter` is `AND`, so you can just do.

```
queryset_1 = User.objects.filter(
    first_name__startswith='R',
    last_name__startswith='D'
)
```

Alternatively, you can explicitly use the *&* operator on querysets.

```
queryset_2 = User.objects.filter(
    first_name__startswith='R'
) & User.objects.filter(
    last_name__startswith='D'
)
```

For complete customisability, you can use the `Q` objects.

```
queryset_3 = User.objects.filter(
    Q(first_name__startswith='R') &
    Q(last_name__startswith='D')
)


queryset_1
<QuerySet [<User: Ricky>, <User: Ritesh>, <User: rishab>]>
```

You can look at the generated query and verify that they are all same.

```
In [10]: str(queryset_2.query)
Out[10]: 'SELECT "auth_user"."id", "auth_user"."password", "auth_user"."last_login",
↪"auth_user"."is_superuser", "auth_user"."username", "auth_user"."first_name", "auth_
↪user"."last_name", "auth_user"."email", "auth_user"."is_staff", "auth_user"."is_
↪active", "auth_user"."date_joined" FROM "auth_user" WHERE ("auth_user"."first_name
↪"::text LIKE R% AND "auth_user"."last_name"::text LIKE D%)'
```

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```
In [11]: str(queryset_1.query) == str(queryset_2.query) == str(queryset_3.query)
Out[11]: True
```

2.4 How to do a NOT query in Django queryset?

	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@aol.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com

If you are using `django.contrib.auth`, you will have a table called `auth_user`. It will have fields as `username`, `first_name`, `last_name` and more.

Say you want to fetch all users with id NOT < 5. You need a NOT operation.

Django provides two options.

- `exclude(<condition>)`
- `filter(~Q(<condition>))`

2.4.1 The query in detail

Our SQL query for the above condition will look something like

```
SELECT id, username, first_name, last_name, email FROM auth_user WHERE NOT id < 5;
```

	id	username	first_name	last_name	email
1	5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
2	6	Billy	Billy	Sharma	billy@gmail.com
3	7	Radha	Radha	George	radha@gmail.com
4	8	sohan	Sohan	Upadhyay	sohan@aol.com
5	9	Raghu	Raghu	Khan	raghu@rediffmail.com
6	10	rishab	Rishabh	Deol	rishabh@yahoo.com

Method 1 using exclude

Method 2 using Q() method

```
>>> from django.db.models import Q
>>> queryset = User.objects.filter(~Q(id__lt=5))
>>> queryst
<QuerySet [<User: Ritesh>, <User: Billy>, <User: Radha>, <User: sohan>, <User: Raghu>,
↪ <User: rishab>]>
```

2.5 2 (union)?

union 2 . . , .

`auth_user` . union 2 .

```
>>> q1 = User.objects.filter(id__gte=5)
>>> q1
<QuerySet [<User: Ritesh>, <User: Billy>, <User: Radha>, <User: sohan>, <User: Raghu>,
↪ <User: rishab>]>
>>> q2 = User.objects.filter(id__lte=9)
>>> q2
<QuerySet [<User: yash>, <User: John>, <User: Ricky>, <User: sharukh>, <User: Ritesh>,
↪ <User: Billy>, <User: Radha>, <User: sohan>, <User: Raghu>]>
>>> q1.union(q2)
<QuerySet [<User: yash>, <User: John>, <User: Ricky>, <User: sharukh>, <User: Ritesh>,
↪ <User: Billy>, <User: Radha>, <User: sohan>, <User: Raghu>, <User: rishab>]>
>>> q2.union(q1)
<QuerySet [<User: yash>, <User: John>, <User: Ricky>, <User: sharukh>, <User: Ritesh>,
↪ <User: Billy>, <User: Radha>, <User: sohan>, <User: Raghu>, <User: rishab>]>
```

,.

```
>>> q3 = EventVillain.objects.all()
>>> q3
<QuerySet [<EventVillain: EventVillain object (1)>]>
>>> q1.union(q3)
django.db.utils.OperationalError: SELECTs to the left and right of UNION do not have␣
↪the same number of result columns
```

union . error . 2 union .

`Hero Villain` `name gender` 2 `values_list` union .

```
Hero.objects.all().values_list(
    "name", "gender"
).union(
Villain.objects.all().values_list(
    "name", "gender"
))
```

`Hero Villain` name gender .

2.6 How to select some fields only in a queryset?

	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@aol.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com

The `auth_user` model has a number of fields in it. But sometimes, you do not need to use all the fields. In such situations, we can query only desired fields.

Django provides two ways to do this

- *values* and *values_list* methods on queryset.
- *only_method*

Say, we want to get `first_name` and `last_name` of all the users whose name starts with **R**. You do not want the fetch the other fields to reduce the work the DB has to do.

```
>>> User.objects.filter(
    first_name__startswith='R'
).values('first_name', 'last_name')
<QuerySet [{'first_name': 'Ricky', 'last_name': 'Dayal'}, {'first_name': 'Ritesh',
↪'last_name': 'Deshmukh'}, {'first_name': 'Radha', 'last_name': 'George'}, {'first_
↪name': 'Raghu', 'last_name': 'Khan'}, {'first_name': 'Rishabh', 'last_name': 'Deol'}
↪]
```

You can verify the generated sql using `str(queryset.query)`, which gives.

```
SELECT "auth_user"."first_name", "auth_user"."last_name"
FROM "auth_user" WHERE "auth_user"."first_name"::text LIKE R%
```

The output will be list of dictionaries.

Alternatively, you can do

```
>> queryset = User.objects.filter(
    first_name__startswith='R'
).only("first_name", "last_name")
```

`str(queryset.query)`, gives us

```
SELECT "auth_user"."id", "auth_user"."first_name", "auth_user"."last_name"
FROM "auth_user" WHERE "auth_user"."first_name"::text LIKE R%
```

The only difference between `only` and `values` is `only` also fetches the `id`.

2.7 How to do a subquery expression in Django?

Django allows using SQL subqueries. Let's start with something simple, We have a `UserParent` model which has `OnetoOne` relation with auth user. We will find all the `UserParent` which have a `UserParent`.

```
>>> from django.db.models import Subquery
>>> users = User.objects.all()
>>> UserParent.objects.filter(user_id__in=Subquery(users.values('id')))
<QuerySet [<UserParent: UserParent object (2)>, <UserParent: UserParent object (5)>,
↪<UserParent: UserParent object (8)>]>
```

Now for something more complex. For each `Category`, we want to find the most benevolent `Hero`.

The models look something like this.

```
class Category(models.Model):
    name = models.CharField(max_length=100)


class Hero(models.Model):
    # ...
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)

    benevolence_factor = models.PositiveSmallIntegerField(
        help_text="How benevolent this hero is?",
        default=50
    )
```

You can find the most benevolent Hero like this

```
hero_qs = Hero.objects.filter(
    category=OuterRef("pk")
).order_by("-benevolence_factor")
Category.objects.all().annotate(
    most_benevolent_hero=Subquery(
        hero_qs.values('name')[:1]
    )
)
```

If you look at the generated sql, you will see

```
SELECT "entities_category"."id",
       "entities_category"."name",

  (SELECT U0."name"
   FROM "entities_hero" U0
   WHERE U0."category_id" = ("entities_category"."id")
   ORDER BY U0."benevolence_factor" DESC
   LIMIT 1) AS "most_benevolent_hero"
FROM "entities_category"
```

Let's break down the queryset logic. The first part is

```
hero_qs = Hero.objects.filter(
    category=OuterRef("pk")
).order_by("-benevolence_factor")
```

We are ordering the `Hero` object by `benevolence_factor` in DESC order, and using `category=OuterRef("pk")` to declare that we will be using it in a subquery.

Then we annotate with `most_benevolent_hero=Subquery(hero_qs.values('name')[:1])`, to get use the subquery with a `Category` queryset. The `hero_qs.values('name')[:1]` part picks up the first name from subquery.

2.8

Django ORM . `first_name` `'R'` `User` Object `User.objects.filter(first_name__startswith='R')` . first_name last_name `F` obejct . user .

```
In [27]: User.objects.create_user(email="shabda@example.com", username="shabda",␣
↪first_name="Shabda", last_name="Raaj")
Out[27]: <User: shabda>

In [28]: User.objects.create_user(email="guido@example.com", username="Guido", first_
↪name="Guido", last_name="Guido")
Out[28]: <User: Guido>
```

fisrt_name last_name .

```
In [29]: User.objects.filter(last_name=F("first_name"))
Out[29]: <QuerySet [<User: Guido>]>
```

`F` object annotate . first_name last_name `Substr("first_name", 1, 1)` .

```
In [41]: User.objects.create_user(email="guido@example.com", username="Tim", first_
↪name="Tim", last_name="Teters")
Out[41]: <User: Tim>
#...
In [46]: User.objects.annotate(first=Substr("first_name", 1, 1), last=Substr("last_
↪name", 1, 1)).filter(first=F("last"))
Out[46]: <QuerySet [<User: Guido>, <User: Tim>]>
```

`F` object `__gt`, `__lt` expression .

2.9 Object FileField ?

`FileField` `ImageField` . Database `CharField` . object .

```
no_files_objects = MyModel.objects.filter(
    Q(file='')|Q(file=None)
)
```

2.10 Django ORM join ?

SQL Join . Join .

```
>>> a1 = Article.objects.select_related('reporter') // Using select_related
>>> a1
<QuerySet [<Article: International News>, <Article: Local News>, <Article: Morning␣
↪news>, <Article: Prime time>, <Article: Test Article>, <Article: Weather Report>]>
>>> print(a1.query)
SELECT "events_article"."id", "events_article"."headline", "events_article"."pub_date
↪", "events_article"."reporter_id", "events_article"."slug", "auth_user"."id", "auth_
↪user"."password", "auth_user"."last_login", "auth_user"."is_superuser", "auth_user".
↪"username", "auth_user"."first_name", "auth_user"."last_name", "auth_user"."email",
↪"auth_user"."is_staff", "auth_user"."is_active", "auth_user"."date_joined" FROM
↪"events_article" INNER JOIN "auth_user" ON ("events_article"."reporter_id" = "auth_
↪user"."id") ORDER BY "events_article"."headline" ASC
>>> a2 = Article.objects.filter(reporter__username='John')
>>> a2
<QuerySet [<Article: International News>, <Article: Local News>, <Article: Prime time>
↪, <Article: Test Article>, <Article: Weather Report>]>
>>> print(a2.query)
SELECT "events_article"."id", "events_article"."headline", "events_article"."pub_date
↪", "events_article"."reporter_id", "events_article"."slug" FROM "events_article"␣
↪INNER JOIN "auth_user" ON ("events_article"."reporter_id" = "auth_user"."id") WHERE
↪"auth_user"."username" = John ORDER BY "events_article"."headline" ASC
```

2.11 record ?

. Django ORM `first()` `last()` n . slice

	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@aol.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com

slice N record .

```
>>> user = User.objects.order_by('-last_login')[1] // Second Highest record w.r.t
↪'last_login'
>>> user.first_name
'Raghu'
```

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```
>>> user = User.objects.order_by('-last_login')[2] // Third Highest record w.r.t
↪'last_login'
>>> user.first_name
'Sohan'
```

User.objects.order_by('-last_login')[2] Database SQL . LIMIT ... OFFSET SQL LIMIT ... OFFSET .

```
SELECT "auth_user"."id",
       "auth_user"."password",
       "auth_user"."last_login",
       "auth_user"."is_superuser",
       "auth_user"."username",
       "auth_user"."first_name",
       "auth_user"."last_name",
       "auth_user"."email",
       "auth_user"."is_staff",
       "auth_user"."is_active",
       "auth_user"."date_joined"
FROM "auth_user"
ORDER BY "auth_user"."last_login" DESC
LIMIT 1
OFFSET 2
```

2.12

id	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@gmail.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com
11	johny	John	Smith	john@example.com
12	paul	Paul	Jones	paul@example.com
13	johny1	John	Smith	johny@example.com

first_name user . record .

```
>>> duplicates = User.objects.values(
    'first_name'
```

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```
    ).annotate(name_count=Count('first_name')).filter(name_count__gt=1)
>>> duplicates
<QuerySet [{'first_name': 'John', 'name_count': 3}]>
```

record id .

```
>>> records = User.objects.filter(first_name__in=[item['first_name'] for item in␣
↪duplicates])
>>> print([item.id for item in records])
[2, 11, 13]
```

How to find distinct field values from queryset? ?

==========

id	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@gmail.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com
11	johny	John	Smith	john@example.com
12	paul	Paul	Jones	paul@example.com
13	johny1	John	Smith	johny@example.com

first_name .

```
distinct = User.objects.values(
    'first_name'
).annotate(
    name_count=Count('first_name')
).filter(name_count=1)
records = User.objects.filter(first_name__in=[item['first_name'] for item in␣
↪distinct])
```

`User.objects.distinct("first_name").all()`, `first_name` .

2.13 Q ?

`Q OR AND NOT .Q` Where .

`OR` ,

```
>>> from django.db.models import Q
>>> queryset = User.objects.filter(
    Q(first_name__startswith='R') | Q(last_name__startswith='D')
)
>>> queryset
<QuerySet [<User: Ricky>, <User: Ritesh>, <User: Radha>, <User: Raghu>, <User: rishab>
↪]>
```

AND ,

```
>>> queryset = User.objects.filter(
    Q(first_name__startswith='R') & Q(last_name__startswith='D')
)
>>> queryset
<QuerySet [<User: Ricky>, <User: Ritesh>, <User: rishab>]>
```

(first_name) 'R' (last_name) 'Z'

```
>>> queryset = User.objects.filter(
    Q(first_name__startswith='R') & ~Q(last_name__startswith='Z')
)
```

.

```
SELECT "auth_user"."id",
       "auth_user"."password",
       "auth_user"."last_login",
       "auth_user"."is_superuser",
       "auth_user"."username",
       "auth_user"."first_name",
       "auth_user"."last_name",
       "auth_user"."email",
       "auth_user"."is_staff",
       "auth_user"."is_active",
       "auth_user"."date_joined"
FROM "auth_user"
WHERE ("auth_user"."first_name"::text LIKE R%
       AND NOT ("auth_user"."last_name"::text LIKE Z%))
```

Q .

2.14 Django ORM ?

Max, Min, Avg, Sum Django ORM . Django . .

```
>>> from django.db.models import Avg, Max, Min, Sum, Count
>>> User.objects.all().aggregate(Avg('id'))
{'id__avg': 7.571428571428571}
>>> User.objects.all().aggregate(Max('id'))
{'id__max': 15}
>>> User.objects.all().aggregate(Min('id'))
{'id__min': 1}
>>> User.objects.all().aggregate(Sum('id'))
{'id__sum': 106}
```

2.15 ?

category .

```
class Category(models.Model):
    name = models.CharField(max_length=100)

    class Meta:
        verbose_name_plural = "Categories"

    def __str__(self):
        return self.name
```

Category .

(order_by) . .

```
def get_random():
    return Category.objects.order_by("?").first()
```

: order_by('?') . 100 Category . python manage.py dbshell db .

```
INSERT INTO entities_category
            (name)
(SELECT Md5(Random() :: text) AS descr
 FROM   generate_series(1, 1000000));
```

. md5-s name db .

max_id [1, max_id] . db .

```
In [1]: from django.db.models import Max

In [2]: from entities.models import Category

In [3]: import random

In [4]: def get_random2():
   ...:     max_id = Category.objects.all().aggregate(max_id=Max("id"))['max_id']
   ...:     pk = random.randint(1, max_id)
   ...:     return Category.objects.get(pk=pk)
   ...:

In [5]: get_random2()
Out[5]: <Category: e2c3a10d3e9c46788833c4ece2a418e2>

In [6]: get_random2()
Out[6]: <Category: f164ad0c5bc8300b469d1c428a514cc1>
```

, Category .

```
In [8]: def get_random3():
   ...:     max_id = Category.objects.all().aggregate(max_id=Max("id"))['max_id']
   ...:     while True:
   ...:         pk = random.randint(1, max_id)
   ...:         category = Category.objects.filter(pk=pk).first()
   ...:         if category:
   ...:             return category
```

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```
   ...:

In [9]: get_random3()
Out[9]: <Category: 334aa9926bd65dc0f9dd4fc86ce42e75>

In [10]: get_random3()
Out[10]: <Category: 4092762909c2c034e90c3d2eb5a73447>
```

`while True:` return `.timeit` .

```
In [14]: timeit.timeit(get_random3, number=100)
Out[14]: 0.20055226399563253

In [15]: timeit.timeit(get_random, number=100)
Out[15]: 56.92513192095794
```

`get_random3` 283 `.get_random` `get_random3` .

2.16 ?

Django `Lower`, `Coalesce`, `Max` . .

Django Django `Func` .

Postgres `fuzzystrmatch` . `create extension fuzzystrmatch` postgres DB .

Postgres `levenshtein` . Hero .

```
Hero.objects.create(name="Zeus", description="A greek God", benevolence_factor=80,␣
↪category_id=12, origin_id=1)
Hero.objects.create(name="ZeuX", description="A greek God", benevolence_factor=80,␣
↪category_id=12, origin_id=1)
Hero.objects.create(name="Xeus", description="A greek God", benevolence_factor=80,␣
↪category_id=12, origin_id=1)
Hero.objects.create(name="Poseidon", description="A greek God", benevolence_factor=80,
↪ category_id=12, origin_id=1)
```

(`name`) Zeus `Hero` .

```
from django.db.models import Func, F
Hero.objects.annotate(like_zeus=Func(F('name'), function='levenshtein', template="
↪%(function)s(%(expressions)s, 'Zeus')"))
```

`like_zeus=Func(F('name'), function='levenshtein', template="%(function)s(%expressions)s, 'Zeus')")` function template, . .

```
class LevenshteinLikeZeus(Func):
    function='levenshtein'
    template="%(function)s(%(expressions)s, 'Zeus')"
```

`Hero.objects.annotate(like_zeus=LevenshteinLikeZeus(F("name")))` .

`like_zeus` .

```
In [16]: Hero.objects.annotate(
    ...:         like_zeus=LevenshteinLikeZeus(F("name"))
    ...:     ).filter(
    ...:         like_zeus__lt=2
    ...:     )
    ...:
Out[16]: <QuerySet [<Hero: Zeus>, <Hero: ZeuX>, <Hero: Xeus>]>
```

CHAPTER 3

Creating, Updating and Deleting things

3.1 How to create multiple objects in one shot?

There are conditions when we want to save multiple objects in one go. Say we want to add multiple categories at once and we don't want to make many queries to the database. We can use `bulk_create` for creating multiple objects in one shot.

Here is an example.

```
>>> Category.objects.all().count()
2
>>> Category.objects.bulk_create(
    [Category(name="God"),
     Category(name="Demi God"),
     Category(name="Mortal")]
)
[<Category: God>, <Category: Demi God>, <Category: Mortal>]
>>> Category.objects.all().count()
5
```

`bulk_create` takes a list of unsaved objects.

3.2 How to copy or clone an existing model object?

There is no built-in method for copying model instances, it is possible to create new instance with all fields values copied.

If an instance is saved with instance's `pk` set to `None`, the instance is used to create a new record in the DB. That means every field other than the `PK` is copied.

```
In [2]: Hero.objects.all().count()
Out[2]: 4
```

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```
In [3]: hero = Hero.objects.first()

In [4]: hero.pk = None

In [5]: hero.save()

In [6]: Hero.objects.all().count()
Out[6]: 5
```

3.3 How to ensure that only one object can be created?

Sometimes you want to ensure that only one record can be created for a model. This is commonly required as application configuration store, or as a locking mechanism to access shared resources.

Let us convert our `Origin` model to be singleton.

```
class Origin(models.Model):
    name = models.CharField(max_length=100)

    def save(self, *args, **kwargs):
        if self.__class__.objects.count():
            self.pk = self.__class__.objects.first().pk
        super().save(*args, **kwargs)
```

What did we do? We overrode the `save` method, and set the `pk` to an existing value. This ensures that when `create` is called and any object exists, an `IntegrityError` is raised.

3.4 How to update denormalized fields in other models on save?

You have models like this.

```
class Category(models.Model):
    name = models.CharField(max_length=100)
    hero_count = models.PositiveIntegerField()
    villain_count = models.PositiveIntegerField()

    class Meta:
        verbose_name_plural = "Categories"


class Hero(models.Model):
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)
    # ...


class Villain(models.Model):
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)
    # ...
```

You need the `hero_count` and `villain_count`, to be updated when new objects are created.

You can do something like this

```
class Hero(models.Model):
    # ...

    def save(self, *args, **kwargs):
        if not self.pk:
            Category.objects.filter(pk=self.category_id).update(hero_count=F('hero_
↪count')+1)
        super().save(*args, **kwargs)


class Villain(models.Model):
    # ...

    def save(self, *args, **kwargs):
        if not self.pk:
            Category.objects.filter(pk=self.category_id).update(villain_count=F(
↪'villain_count')+1)
        super().save(*args, **kwargs)
```

Note how we did not use `self.category.hero_count += 1`, as `update` will do a DB update.

The alternative method is using *signals*. You can do it like this.

```
from django.db.models.signals import pre_save
from django.dispatch import receiver

@receiver(pre_save, sender=Hero, dispatch_uid="update_hero_count")
def update_hero_count(sender, **kwargs):
    hero = kwargs['instance']
    if hero.pk:
        Category.objects.filter(pk=hero.category_id).update(hero_count=F('hero_count
↪')+1)

@receiver(pre_save, sender=Villain, dispatch_uid="update_villain_count")
def update_villain_count(sender, **kwargs):
    villain = kwargs['instance']
    if villain.pk:
        Category.objects.filter(pk=villain.category_id).update(villain_count=F(
↪'villain_count')+1)
```

3.4.1 Signals vs Overriding `.save`

Since either of signals of `.save` can be used for the save behviour, when should you use which one? I follow a simple rule.

- If your fields depend on a model you control, override `.save`
- If your fields depend on a model from a 3rd party app, which you do no control, use signals.

3.5 How to perform truncate like operation using Django ORM?

Truncate statement in SQL is meant to empty a table for future use. Though Django doesn't provide a builtin to truncate a table, but still similar result can be achived using `delete()` method. For example:

```
>>> Category.objects.all().count()
7
>>> Category.objects.all().delete()
(7, {'entity.Category': 7})
>>> Category.objects.all().count()
0
```

This works, but this uses `DELETE FROM ...` SQL statement. If you have a large number of records, this can be quite slow. You can add a `classmethod` to `Category` if you want to enable `truncate`.

```
class Category(models.Model):
    # ...

    @classmethod
    def truncate(cls):
        with connection.cursor() as cursor:
            cursor.execute('TRUNCATE TABLE "{0}" CASCADE'.format(cls._meta.db_table))
```

Then you can call `Category.truncate()` to a real database truncate.

3.6 What signals are raised by Django during object creation or update?

Django provides signals which allows hooking into a model objects creation and deletion lifecycle. The signals provided by Django are

- `pre_init`
- `post_init`
- `pre_save`
- `post_save`
- `pre_delete`
- `post_delete`

Among these, the most commonly used signals are `pre_save` and `post_save`. We will look into them in detail.

3.6.1 Signals vs overriding .save

Since signals can be used for similar effects as overriding `.save`, which one to use is a frequent source of confusion. Here is when you should use which.

- If you want other people, eg. third party apps, to override or customize the object `save` behaviour, you should raise your own signals
- If you are hooking into the `save` behavior of an app you do not control, you should hook into the `post_save` or `pre_save`
- If you are customizing the save behaviour of apps you control, you should override `save`.

Lets take an example of a `UserToken` model. This a class used for providing authentication and should get created whenever a `User` is created.

```
class UserToken(models.Model):
    token = models.CharField(max_length=64)

    # ...
```

3.7 How to convert string to datetime and store in database?

We can convert a date-string and store it in the database using django in many ways. Few of them are discussed below. Lets say we have a date-string as "2018-03-11" we can not directly store it to our date field, so we can use some dateparser or python library for it.

```
>>> user = User.objects.get(id=1)
>>> date_str = "2018-03-11"
>>> from django.utils.dateparse import parse_date // Way 1
>>> temp_date = parse_date(date_str)
>>> a1 = Article(headline="String converted to date", pub_date=temp_date,␣
↪reporter=user)
>>> a1.save()
>>> a1.pub_date
datetime.date(2018, 3, 11)
>>> from datetime import datetime // Way 2
>>> temp_date = datetime.strptime(date_str, "%Y-%m-%d").date()
>>> a2 = Article(headline="String converted to date way 2", pub_date=temp_date,␣
↪reporter=user)
>>> a2.save()
>>> a2.pub_date
datetime.date(2018, 3, 11)
```

CHAPTER 4

Ordering things

4.1 ?

order_by . . .

```
>>> User.objects.all().order_by('date_joined') #
<QuerySet [<User: yash>, <User: John>, <User: Ricky>, <User: sharukh>, <User: Ritesh>,
↪ <User: Billy>, <User: Radha>, <User: Raghu>, <User: rishab>, <User: johny>, <User:␣
↪paul>, <User: johny1>, <User: alien>]>
>>> User.objects.all().order_by('-date_joined') #
<QuerySet [<User: alien>, <User: johny1>, <User: paul>, <User: johny>, <User: rishab>,
↪ <User: Raghu>, <User: Radha>, <User: Billy>, <User: Ritesh>, <User: sharukh>,
↪<User: Ricky>, <User: John>, <User: yash>]>
```

.

```
User.objects.all().order_by('date_joined', '-last_login')
```

SQL .

```
SELECT "auth_user"."id",
       -- More fields
       "auth_user"."date_joined"
FROM "auth_user"
ORDER BY "auth_user"."date_joined" ASC,
         "auth_user"."last_login" DESC
```

4.2 ?

id	username	first_name	last_name	email
1	yash	Yash	Rastogi	yashr@agiliq.com
2	John	John	Kumar	john@gmail.com
3	Ricky	Ricky	Dayal	ricky@gmail.com
4	sharukh	Sharukh	Misra	sharukh@hotmail.com
5	Ritesh	Ritesh	Deshmukh	ritesh@yahoo.com
6	Billy	Billy	Sharma	billy@gmail.com
7	Radha	Radha	George	radha@gmail.com
8	sohan	Sohan	Upadhyay	sohan@gmail.com
9	Raghu	Raghu	Khan	raghu@rediffmail.com
10	rishab	Rishabh	Deol	rishabh@yahoo.com
11	johny	John	Smith	john@example.com
12	paul	Paul	Jones	paul@example.com
13	johny1	John	Smith	johny@example.com

order_by , . .

```
>>> User.objects.all().order_by('username').values_list('username', flat=True)
<QuerySet ['Billy', 'John', 'Radha', 'Raghu', 'Ricky', 'Ritesh', 'johny', 'johny1',
↪'paul', 'rishab', 'sharukh', 'sohan', 'yash']>
```

.

```
>>> from django.db.models.functions import Lower
>>> User.objects.all().order_by(Lower('username')).values_list('username', flat=True)
<QuerySet ['Billy', 'John', 'johny', 'johny1', 'paul', 'Radha', 'Raghu', 'Ricky',
↪'rishab', 'Ritesh', 'sharukh', 'sohan', 'yash']>
```

, Lower Annotate , .

```
User.objects.annotate(
    lower_name=Lower('username')
).order_by('lower_name').values_list('username', flat=True)
```

?

order_by ., .

```
In [5]: from django.contrib.auth.models import User

In [6]: User.objects.all().order_by("is_active", "-last_login", "first_name")
Out[6]: <QuerySet [<User: Guido>, <User: shabda>, <User: Tim>]>
```

() ?

Category Hero .

```
class Category(models.Model):
    name = models.CharField(max_length=100)


class Hero(models.Model):
    # ...
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)
```

category category *Hero* name .

```
Hero.objects.all().order_by(
    'category__name', 'name'
)
```

'category__name'` (:code:`__) . , .

SQL .

```
SELECT "entities_hero"."id",
       "entities_hero"."name",
       -- more fields
FROM "entities_hero"
INNER JOIN "entities_category" ON ("entities_hero"."category_id" = "entities_category
↪"."id")
ORDER BY "entities_category"."name" ASC,
         "entities_hero"."name" ASC
```

Annotate ?

Category Hero .

```
class Category(models.Model):
    name = models.CharField(max_length=100)


class Hero(models.Model):
    # ...
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)
```

Category Hero , .

```
Category.objects.annotate(
    hero_count=Count("hero")
).order_by(
    "-hero_count"
)
```

CHAPTER 5

Database Modelling

5.1 ?

.

. , .

, UserParent .

```
from django.contrib.auth.models import User

class UserParent(models.Model):
    user = models.OneToOneField(
        User,
        on_delete=models.CASCADE,
        primary_key=True,
    )
    father_name = models.CharField(max_length=100)
    mother_name = models.CharField(max_length=100)
```

```
>>> u1 = User.objects.get(first_name='Ritesh', last_name='Deshmukh')
>>> u2 = User.objects.get(first_name='Sohan', last_name='Upadhyay')
>>> p1 = UserParent(user=u1, father_name='Vilasrao Deshmukh', mother_name='Vaishali␣
↪Deshmukh')
>>> p1.save()
>>> p1.user.first_name
'Ritesh'
>>> p2 = UserParent(user=u2, father_name='Mr R S Upadhyay', mother_name='Mrs S K␣
↪Upadhyay')
>>> p2.save()
>>> p2.user.last_name
'Upadhyay'
```

on_delete Django . (: ForeignKey)
on_delete=models.CASCADE , Django .

```
>>> u2.delete()
```

UserParent .

5.2 ?

.
. 0 , .

ForeignKey .

```
class Article(models.Model):
    headline = models.CharField(max_length=100)
    pub_date = models.DateField()
    reporter = models.ForeignKey(User, on_delete=models.CASCADE, related_name=
↪'reporter')

    def __str__(self):
        return self.headline

    class Meta:
        ordering = ('headline',)
```

```
>>> u1 = User(username='johny1', first_name='Johny', last_name='Smith', email=
↪'johny@example.com')
>>> u1.save()
>>> u2 = User(username='alien', first_name='Alien', last_name='Mars', email=
↪'alien@example.com')
>>> u2.save()
>>> from datetime import date
>>> a1 = Article(headline="This is a test", pub_date=date(2018, 3, 6), reporter=u1)
>>> a1.save()
>>> a1.reporter.id
13
>>> a1.reporter
<User: johny1>
```

ValueError .

```
>>> u3 = User(username='someuser', first_name='Some', last_name='User', email=
↪'some@example.com')
>>> Article.objects.create(headline="This is a test", pub_date=date(2018, 3, 7),␣
↪reporter=u1)
Traceback (most recent call last):
...
ValueError: save() prohibited to prevent data loss due to unsaved related object
↪'reporter'.
>>> Article.objects.create(headline="This is a test", pub_date=date(2018, 3, 7),␣
↪reporter=u1)
```

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```
>>> Article.objects.filter(reporter=u1)
<QuerySet [<Article: This is a test>, <Article: This is a test>]>
```

u1 Articles . .

5.3 ?

, .

, .
ManyToMany .
, , / .

. Django auth_user .

```
class User(AbstractUser):
    tweet = models.ManyToManyField(Tweet, blank=True)
    follower = models.ManyToManyField(settings.AUTH_USER_MODEL, blank=True)
    pass

class Tweet(models.Model):
    tweet = models.TextField()
    favorite = models.ManyToManyField(settings.AUTH_USER_MODEL, blank=True, related_
↪name='user_favorite')

    def __unicode__(self):
        return self.tweet
```

?

```
1)    /    .
2)         .
3)    /     .
```

.

```
>>> t1 = Tweet(tweet="I am happy today")
>>> t1.save()
>>> t2 = Tweet(tweet="This is my second Tweet")
>>> t2.save()
>>> u1 = User(username='johny1', first_name='Johny', last_name='Smith', email=
↪'johny@example.com')
>>> u1.save()
>>> u2 = User(username='johny1', first_name='Johny', last_name='Smith', email=
↪'johny@example.com')
>>> u2.save()
>>> u3 = User(username='someuser', first_name='Some', last_name='User', email=
↪'some@example.com')
>>> u3.save()
```

ManyToMany , .

.

```
>>> u2.tweet.add(t1)
>>> u2.save()
>>> u2.tweet.add(t2)
>>> u2.save()
>>> #       .
>>> u2.follow.add(u1)
>>> u2.save()
>>> #     .      /       .
>>> t1.favorite.add(u1)
>>> t1.save()
>>> t1.favorite.add(u3)
>>> t1.save()
>>> #
>>> t1.favorite.remove(u1)
>>> t1.save()
```

. : https://github.com/yashrastogi16/simpletwitter

How to include a self-referencing ForeignKey in a model ? ==========

.

.

.

```
class Employee(models.Model):
    manager = models.ForeignKey('self', on_delete=models.CASCADE)

# OR

class Employee(models.Model):
    manager = models.ForeignKey("app.Employee", on_delete=models.CASCADE)
```

5.4 ?

Django `inspectdb` .

.

```
$ python manage.py inspectdb
```

`settings.py` .

.

.

```
$ python manage.py inspectdb > models.py
```

. .

5.5 ?

.
, “ ” .
, .
.

SqliteStuio 26 .

.

```
create view temp_user as
select id, first_name
from auth_user;
```

, 26 1 .

managed = False,db_table="temp_user" .

```
class TempUser(models.Model):
    first_name = models.CharField(max_length=100)

    class Meta:
        managed = False
        db_table = "temp_user"
```

```
>>> #           .
>>> TempUser.objects.all().values()
<QuerySet [{'first_name': 'Yash', 'id': 1}, {'first_name': 'John', 'id': 2}, {'first_
↪name': 'Ricky', 'id': 3}, {'first_name': 'Sharukh', 'id': 4}, {'first_name': 'Ritesh
↪', 'id': 5}, {'first_name': 'Billy', 'id': 6}, {'first_name': 'Radha', 'id': 7}, {
↪'first_name': 'Raghu', 'id': 9}, {'first_name': 'Rishabh', 'id': 10}, {'first_name
↪': 'John', 'id': 11}, {'first_name': 'Paul', 'id': 12}, {'first_name': 'Johny', 'id
↪': 13}, {'first_name': 'Alien', 'id': 14}]>
```

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```
>>> #      .
>>> TempUser.objects.create(first_name='Radhika', id=15)
Traceback (most recent call last):
...
django.db.utils.OperationalError: cannot modify temp_user because it is a view
```

union : http://books.agiliq.com/projects/django-admin-cookbook/en/latest/database_view.html?highlight=view

5.6 Generic ? (:)

.

```
class Category(models.Model):
    name = models.CharField(max_length=100)
    # ...

    class Meta:
        verbose_name_plural = "Categories"


class Hero(models.Model):
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)
    # ...


class Villain(models.Model):
    name = models.CharField(max_length=100)
    category = models.ForeignKey(Category, on_delete=models.CASCADE)
    # ...
```

Category . .
.

```
from django.contrib.contenttypes.fields import GenericForeignKey
from django.contrib.contenttypes.models import ContentType
# ...

class FlexCategory(models.Model):
    name = models.SlugField()
    content_type = models.ForeignKey(ContentType, on_delete=models.CASCADE)
    object_id = models.PositiveIntegerField()
    content_object = GenericForeignKey('content_type', 'object_id')


class Hero(models.Model):
    name = models.CharField(max_length=100)
    flex_category = GenericRelation(FlexCategory, related_query_name='flex_category')
    # ...
```

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```
class Villain(models.Model):
    name = models.CharField(max_length=100)
    flex_category = GenericRelation(FlexCategory, related_query_name='flex_category')
    # ...
```

FlexCategory ForeignKey PositiveIntegerField GenericForeignKey .
GenericRelation .

.

Column	Type	Modifiers
id	integer	not null default nextval('entities_flexcategory_id_seq'::regclass)
name	character varying(50)	not null
object_id	integer	not null
content_type_id	integer	not null

Hero .

```
hero = Hero.objects.create(name='Hades')
FlexCategory.objects.create(content_object=hero, name="mythic")
```

'ghost' Hero .

```
Hero.objects.filter(flex_category__name='ghost')
```

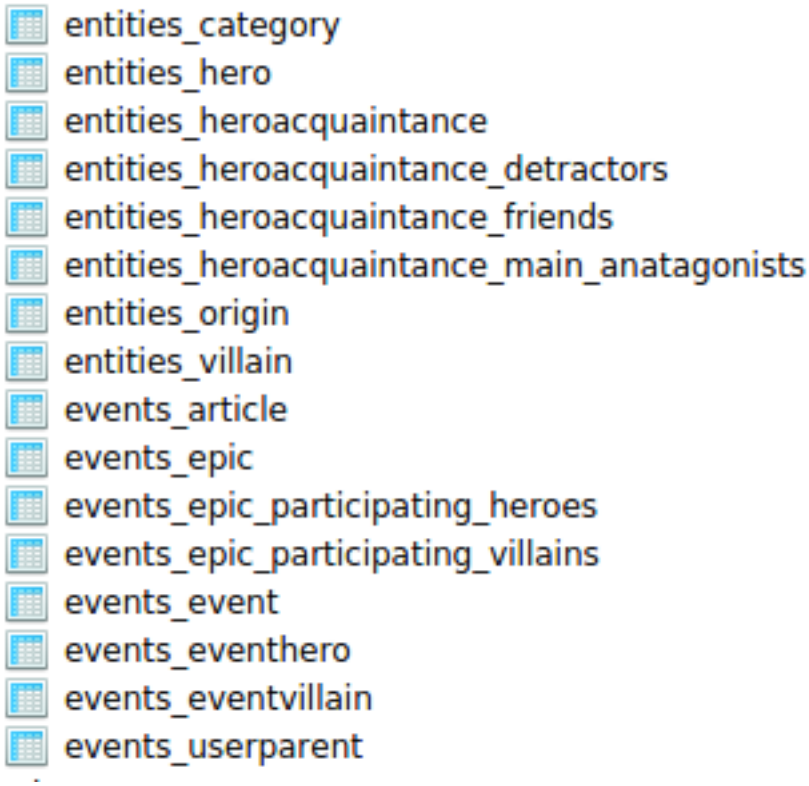
sql .

```
SELECT "entities_hero"."name"
FROM "entities_hero"
INNER JOIN "entities_flexcategory" ON ("entities_hero"."id" = "entities_flexcategory".
↪"object_id"
                                      AND ("entities_flexcategory"."content_type_id"␣
↪= 8))
WHERE "entities_flexcategory"."name" = ghost
```

5.7 How to specify the table name for a model?

To save you time, Django automatically derives the name of the database table from the name of your model class and the app that contains it. A model's database table name is constructed by joining the model's "app label" – the name you used in manage.py startapp – to the model's class name, with an underscore between them.

We have two apps in our demo application i.e., entities and events so all the models in them will have app names as the prefixes followed by _ then the model name.



For renaming them we cab use `db_table` parameter

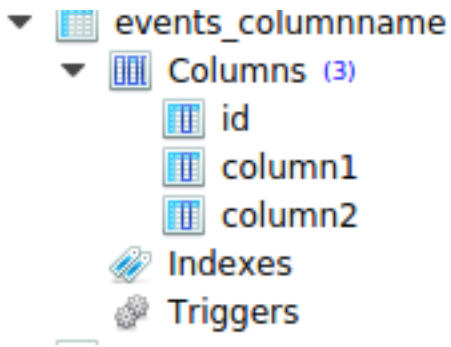
```
class TempUser(models.Model):
    first_name = models.CharField(max_length=100)
    . . .
    class Meta:
        db_table = "temp_user"
```

5.8 How to specify the column name for model field?

Naming of a column in the model can be achieved py passing a `db_column` parameter with some name. If we don't pass this parameter django creates a column with the field name which we give.

```
class ColumnName(models.Model):
    a = models.CharField(max_length=40,db_column='column1')
    column2 = models.CharField(max_length=50)

    def __str__(self):
        return self.a
```



Above we can `db_column` has higher priority over `field name`. First column is named as column1 but not as a.

5.9 What is the difference between `null=True` and `blank=True`?

The default value of both `null` and `blank` is `False`. Both of these values work at field level i.e., whether we want to keep a field null or blank.

`null=True` will set the field's value to NULL i.e., no data. It is basically for the databases column value.

```
date = models.DateTimeField(null=True)
```

`blank=True` determines whether the field will be required in forms. This includes the admin and your own custom forms.

```
title = models.CharField(blank=True) // title can be kept blank. In the database ("")␣
↪will be stored.
```

`null=True` `blank=True` This means that the field is optional in all circumstances.

```
epic = models.ForeignKey(null=True, blank=True)
// The exception is CharFields() and TextFields(), which in Django are never saved as␣
↪NULL. Blank values are stored in the DB as an empty string ('').
```

Also there is a special case, when you need to accept NULL values for a `BooleanField`, use `NullBooleanField`.

5.10 How to use a UUID instead of ID as prmary key?

Whenever we create any new model, there is an ID field attached to it. The ID field's data type will be Integer by default.

To make id field as UUID, there is a new field type UUIDField which was added in django version 1.8+.

Example

```
import uuid
from django.db import models

class Event(models.Model):
    id = models.UUIDField(primary_key=True, default=uuid.uuid4, editable=False)
    details = models.TextField()
    years_ago = models.PositiveIntegerField()
```

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```
>>> eventobject = Event.objects.all()
>>> eventobject.first().id
'3cd2b4b0c36f43488a93b3bb72029f46'
```

5.11 How to use slug field with django for more readability?

Slug is a part of a URL which identifies a particular page on a website in a form readable by users. For making it work django offers us a slugfield. It can be implimented as under. We already had a model `Article` we will be adding slugfield to it to make it user readable.

```
from django.utils.text import slugify
class Article(models.Model):
    headline = models.CharField(max_length=100)
    . . .
    slug = models.SlugField(unique=True)

    def save(self, *args, **kwargs):
        self.slug = slugify(self.headline)
        super(Article, self).save(*args, **kwargs)
    . . .

>>> u1 = User.objects.get(id=1)
>>> from datetime import date
>>> a1 = Article.objects.create(headline="todays market report", pub_date=date(2018,␣
↪3, 6), reporter=u1)
>>> a1.save()
// slug here is auto-generated, we haven't created it in the above create method.
>>> a1.slug
'todays-market-report'
```

Slug is useful because:

it's human friendly (eg. /blog/ instead of /1/).

it's good SEO to create consistency in title, heading and URL.

5.12 How to add multiple databases to the django application ?

The configuration of database related stuff is mostly done in `settings.py` file. So to add multiple database to our django project we need add them in `DATABASES` dictionary.

```
DATABASE_ROUTERS = ['path.to.DemoRouter']
DATABASE_APPS_MAPPING = {'user_data': 'users_db',
                         'customer_data':'customers_db'}

DATABASES = {
    'default': {
        'ENGINE': 'django.db.backends.sqlite3',
        'NAME': os.path.join(BASE_DIR, 'db.sqlite3'),
    },
    'users_db': {
        'NAME': 'user_data',
```

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```
        'ENGINE': 'django.db.backends.postgresql',
        'USER': 'postgres_user',
        'PASSWORD': 'password'
    },
    'customers_db': {
        'NAME': 'customer_data',
        'ENGINE': 'django.db.backends.mysql',
        'USER': 'mysql_cust',
        'PASSWORD': 'root'
    }
}
```

With multiple databases it will be good to talk about `Database Router`. The default routing scheme ensures that if a database isn't specified, all queries fall back to the default database. `Database Router` defaults to `[]`.

```
class DemoRouter:
    """
    A router to control all database operations on models in the
    user application.
    """
    def db_for_read(self, model, **hints):
        """
        Attempts to read user models go to users_db.
        """
        if model._meta.app_label == 'user_data':
            return 'users_db'
        return None

    def db_for_write(self, model, **hints):
        """
        Attempts to write user models go to users_db.
        """
        if model._meta.app_label == 'user_data':
            return 'users_db'
        return None

    def allow_relation(self, obj1, obj2, **hints):
        """
        Allow relations if a model in the user app is involved.
        """
        if obj1._meta.app_label == 'user_data' or \
           obj2._meta.app_label == 'user_data':
           return True
        return None

    def allow_migrate(self, db, app_label, model_name=None, **hints):
        """
        Make sure the auth app only appears in the 'users_db'
        database.
        """
        if app_label == 'user_data':
            return db == 'users_db'
        return None
```

Respective models would be modified as

```
class User(models.Model):
    username = models.Charfield(ax_length=100)
    . . .
        class Meta:
        app_label = 'user_data'

class Customer(models.Model):
    name = models.TextField(max_length=100)
    . . .
        class Meta:
        app_label = 'customer_data'
```

Few helpful commands while working with multiple databases.

```
$ ./manage.py migrate --database=users_db
```

CHAPTER 6

Testing

6.1 ?

assertNumQueries() .

```
def test_number_of_queries(self):
    User.objects.create(username='testuser1', first_name='Test', last_name='user1')
    #  ORM .
    self.assertNumQueries(1)
    User.objects.filter(username='testuser').update(username='test1user')
    # .
    self.assertNumQueries(2)
```

6.2 , ?

python manage.py test . .
, . .

--keepdb .
, . , .

```
$ python manage.py test --keepdb
```

6.3 ?

refresh_from_db() .

. ,

```
class TestORM(TestCase):
  def test_update_result(self):
      userobject = User.objects.create(username='testuser', first_name='Test', last_
↪name='user')
      User.objects.filter(username='testuser').update(username='test1user')
      #  userobject   'testuser',
      #  'test1user'  .
      #       .
      userobject.refresh_from_db()
      self.assertEqual(userobject.username, 'test1user')
```

CHAPTER 7

Indices and tables

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- modindex
- search