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Introduction to Django

Agenda

What is Web Framework?

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“Web framework is a set of components designed to simplify your web development process. It has basic structuring tools in it, which serve as a solid base for your project. It allows you to focus on the most important details and project’s goals instead of creating things, that you can simply pull out of the framework.”

What is Django?

01 Django is a web application framework written in Python programming language.

02 It is based on MVT (Model View Template) design pattern.

03 The Django is very demanding due to its rapid development feature.

04 It takes less time to build application after collecting client requirement.

05 This framework uses a famous tag line: The web framework for perfectionists with deadlines.

History

2003 — 2005 — 2008 — 2017 — 2018

2003: Django was design and developed by Lawrence journal world.

2005: Publicly released under BSD license.

2008: 1.0 version is launched

2017: 2.0 version is launched

2018: Its current stable version 2.0.3 is launched.

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Version	Date	Description
0.90	16 Nov 2005	
0.91	11 Jan 2006	magic removal
0.96	23 Mar 2007	newforms, testing tools
1.0	3 Sep 2008	API stability, decoupled admin, unicode
1.1	29 Jul 2009	Aggregates, transaction based tests
1.2	17 May 2010	Multiple db connections, CSRF, model validation
1.3	23 Mar 2011	Timezones, in browser testing, app templates.
1.5	26 Feb 2013	Python 3 Support, configurable user model
1.6	6 Nov 2013	Dedicated to Malcolm Tredinnick, db transaction management, connection pooling.

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1.7	**2 Sep 2014**	**Migrations, application loading and configuration.**
1.8 LTS	**2 Sep 2014**	**Migrations, application loading and configuration.**
1.8 LTS	**1 Apr 2015**	**Native support for multiple template engines.*Supported until at least April 2018***
1.9	**1 Dec 2015**	**Automatic password validation. New styling for admin interface.**
1.10	**1 Aug 2016**	**Full text search for PostgreSQL. New-style middleware.**
1.11 LTS	**1.11 LTS**	**Last version to support Python 2.7.*Supported until at least April 2020***
2.0	**Dec 2017**	**First Python 3-only release, Simplified URL routing syntax, Mobile friendly admin.**

Features of Django

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Rapid Development

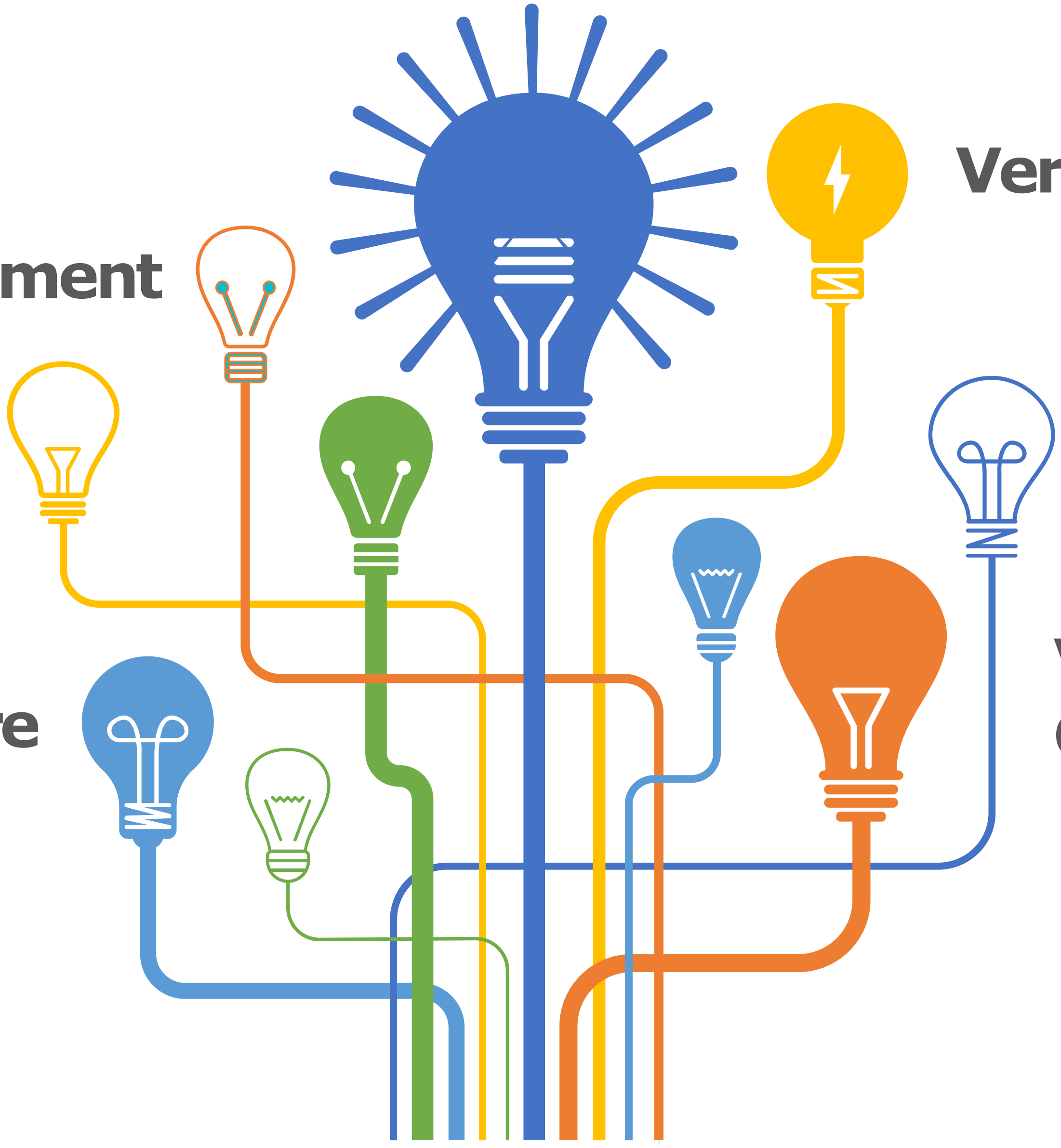
Scalable

Secure

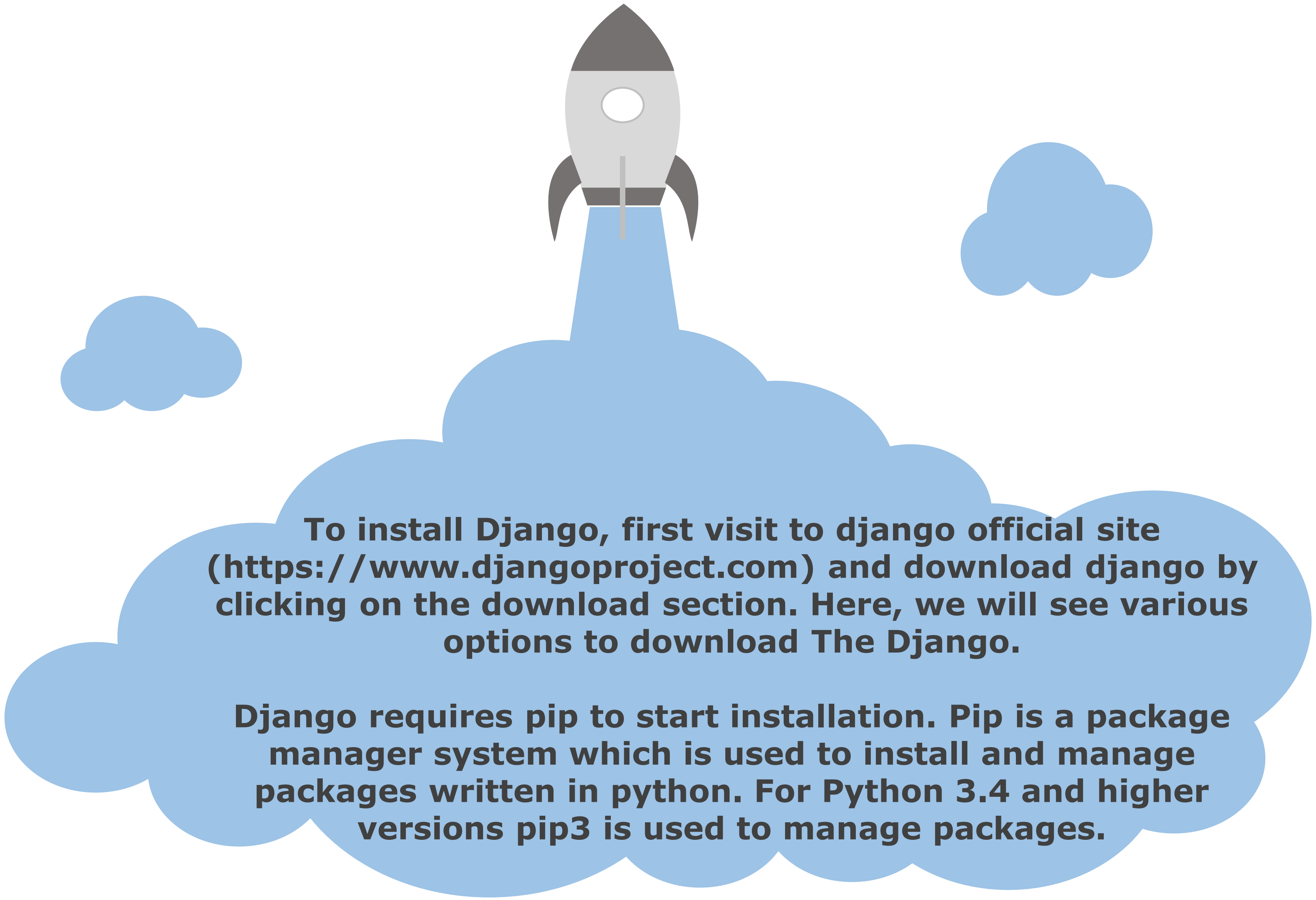
Versatile

Open Source

Vast and Supported Community



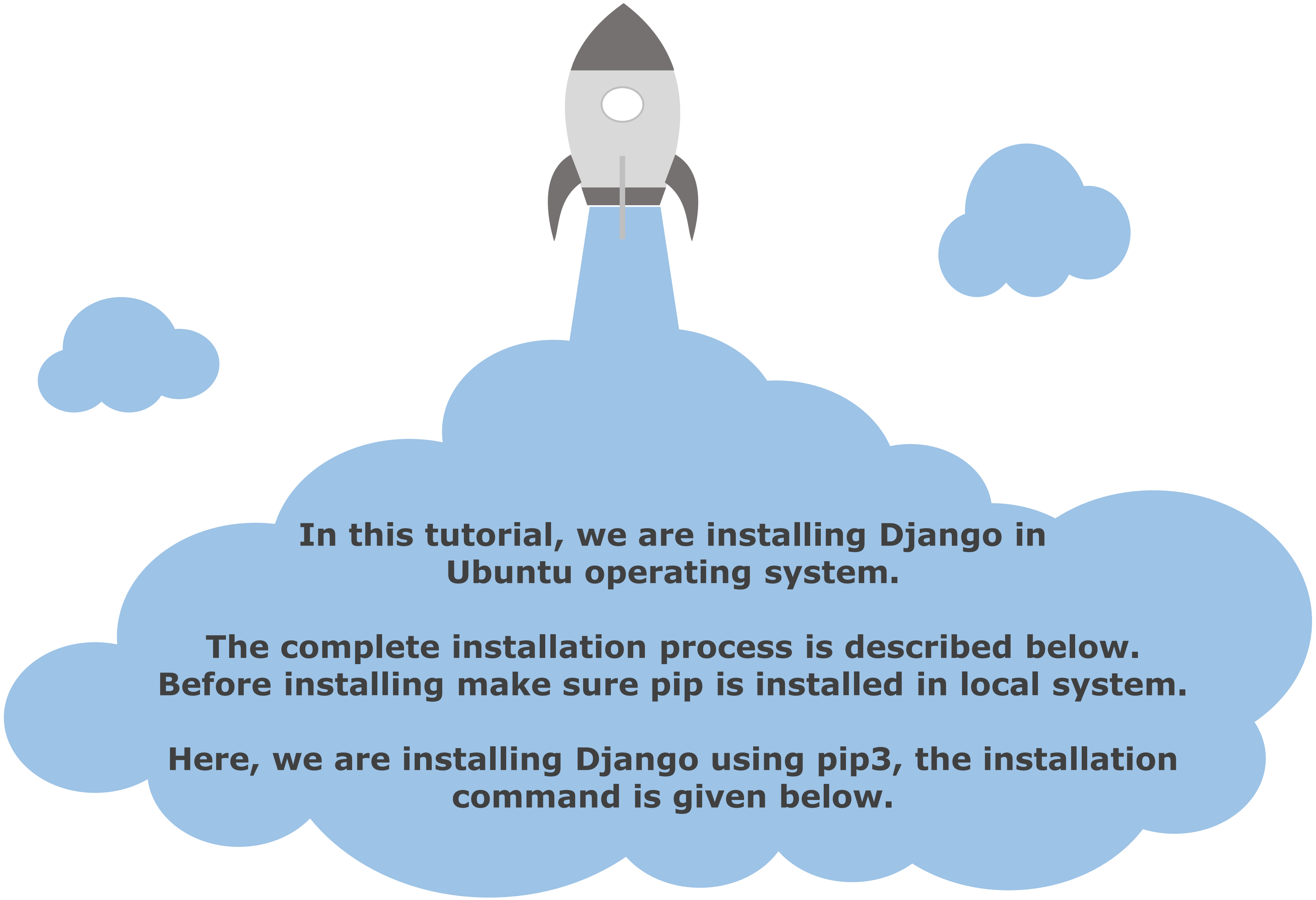
Django Installation



To install Django, first visit to django official site (https://www.djangoproject.com) and download django by clicking on the download section. Here, we will see various options to download The Django.

Django requires pip to start installation. Pip is a package manager system which is used to install and manage packages written in python. For Python 3.4 and higher versions pip3 is used to manage packages.

Django Installation

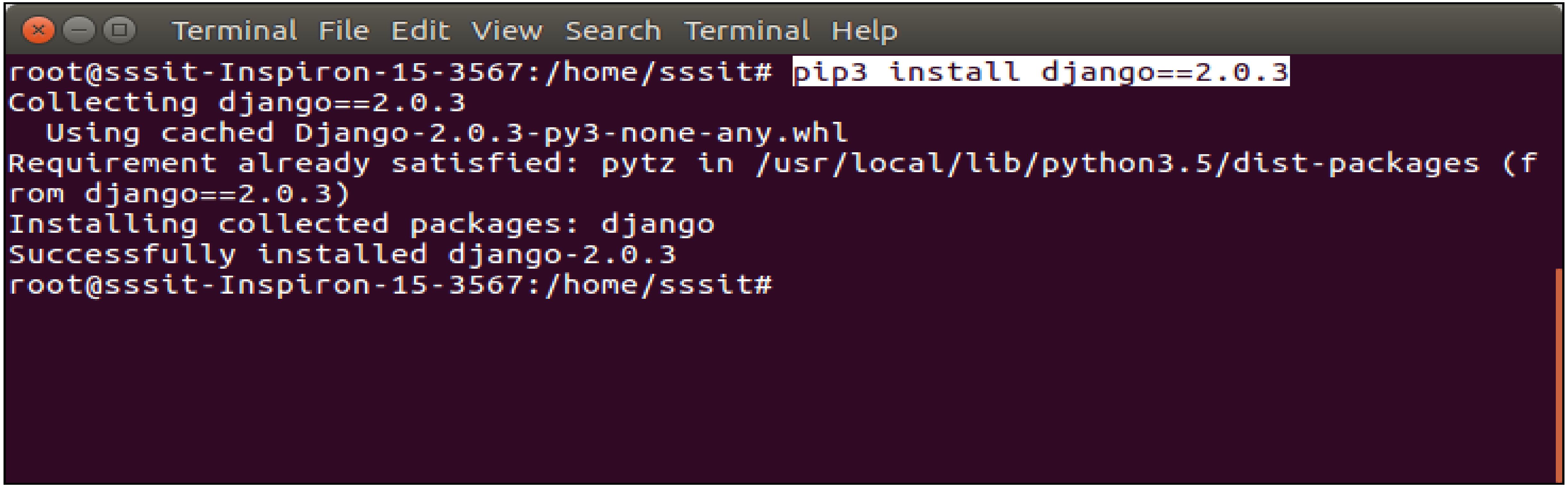


In this tutorial, we are installing Django in Ubuntu operating system.

The complete installation process is described below. Before installing make sure pip is installed in local system.

Here, we are installing Django using pip3, the installation command is given below.

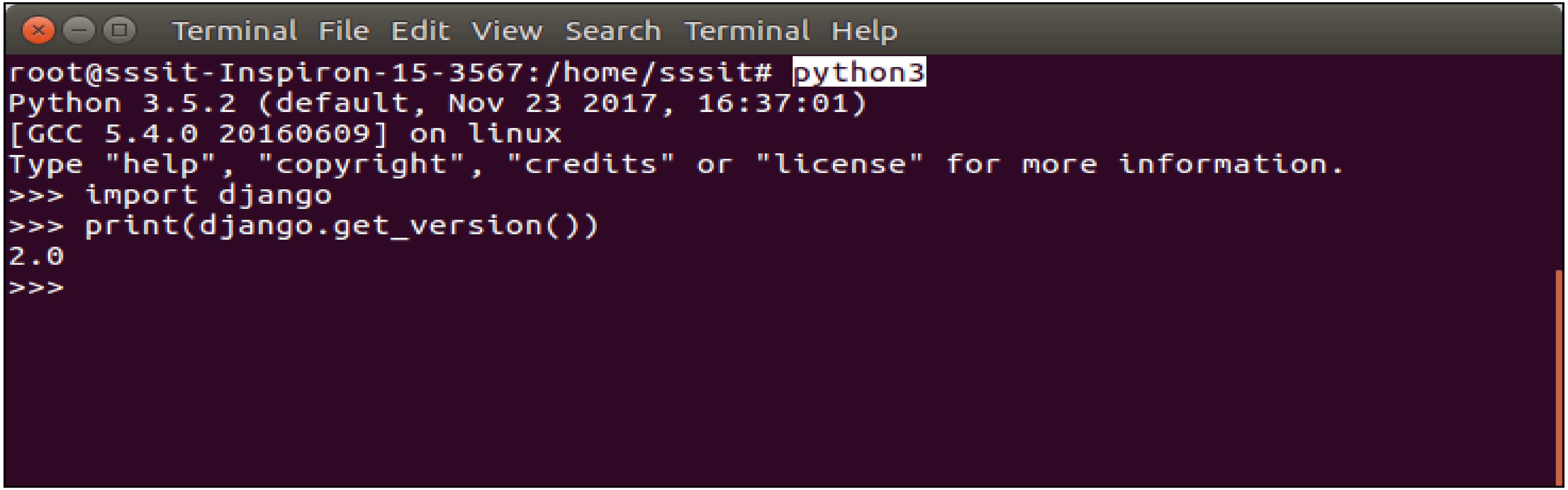
$ pip3 install django==2.0.3



```
root@sssit-Inspiron-15-3567:/home/sssit# pip3 install django==2.0.3
Collecting django==2.0.3
  Using cached Django-2.0.3-py3-none-any.whl
Requirement already satisfied: pytz in /usr/local/lib/python3.5/dist-packages (f
rom django==2.0.3)
Installing collected packages: django
Successfully installed django-2.0.3
root@sssit-Inspiron-15-3567:/home/sssit#
```

Verify Django Installation

After installing Django, we need to verify the installation. Open terminal and write python3 and press enter. It will display python shell where we can verify django installation.



```
root@sssit-Inspiron-15-3567:/home/sssit# python3
Python 3.5.2 (default, Nov 23 2017, 16:37:01)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> import django
>>> print(django.get_version())
2.0
>>>
```

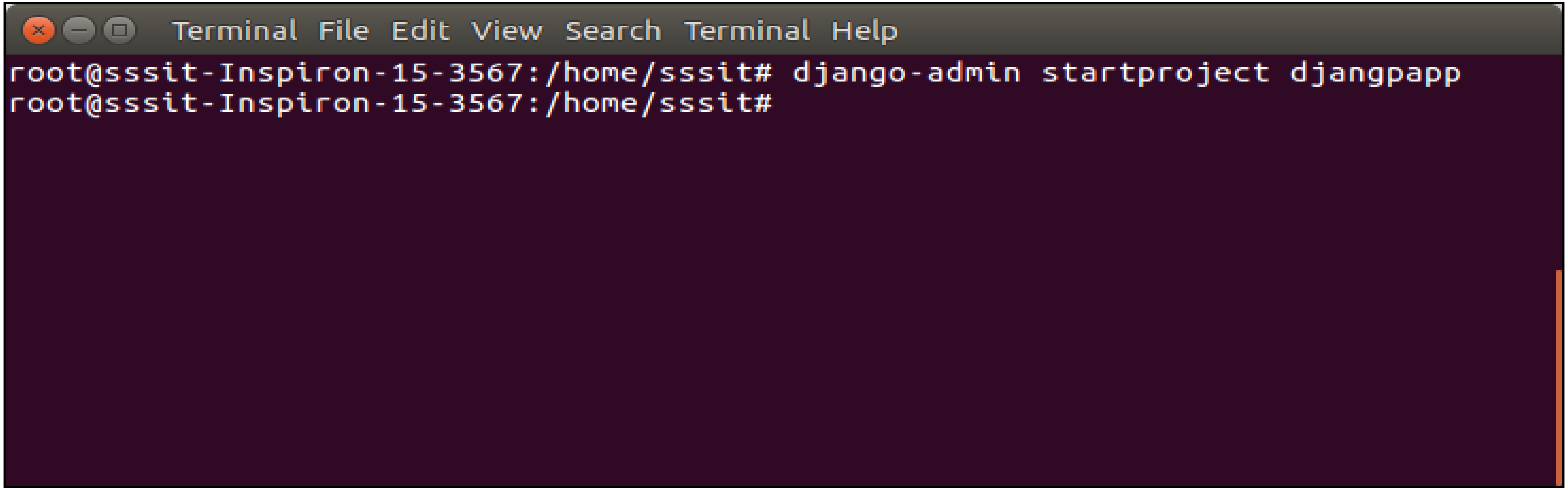
Django Project

In the previous topic, we have installed Django successfully. Now, we will learn step by step process to create a Django application.

Django Project Example

Here, we are creating a project djangpapp in the current directory.

```
$ django-admin startproject djangpapp
```

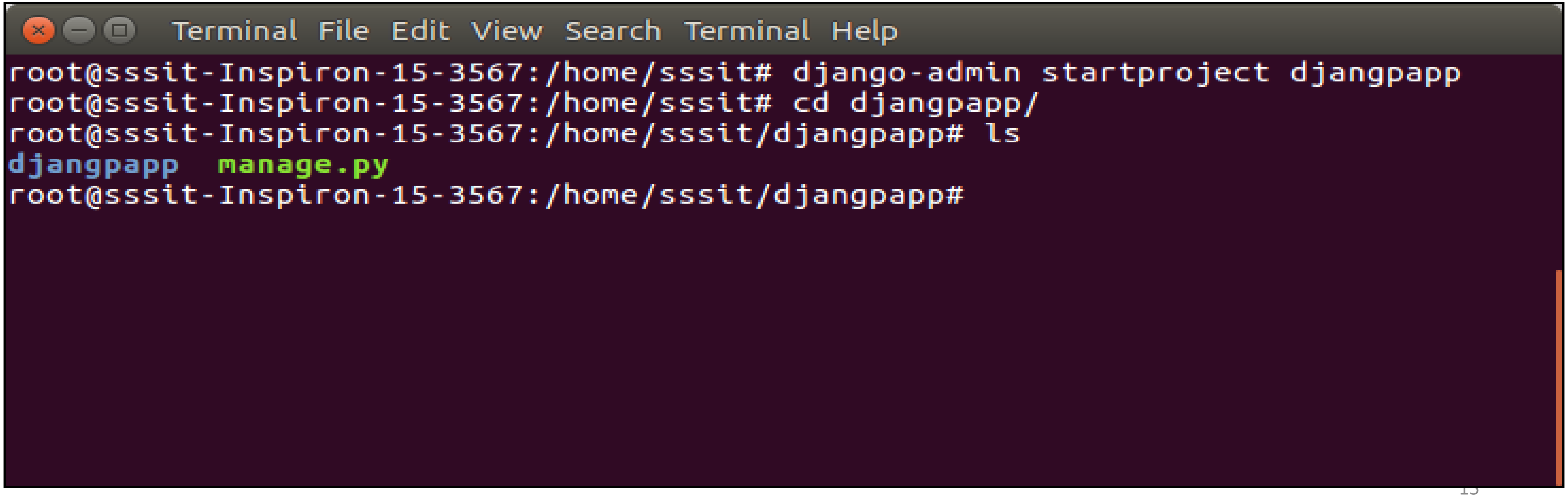


```
root@sssit-Inspiron-15-3567:/home/sssit# django-admin startproject djangpapp
root@sssit-Inspiron-15-3567:/home/sssit#
```

Locate into the Project

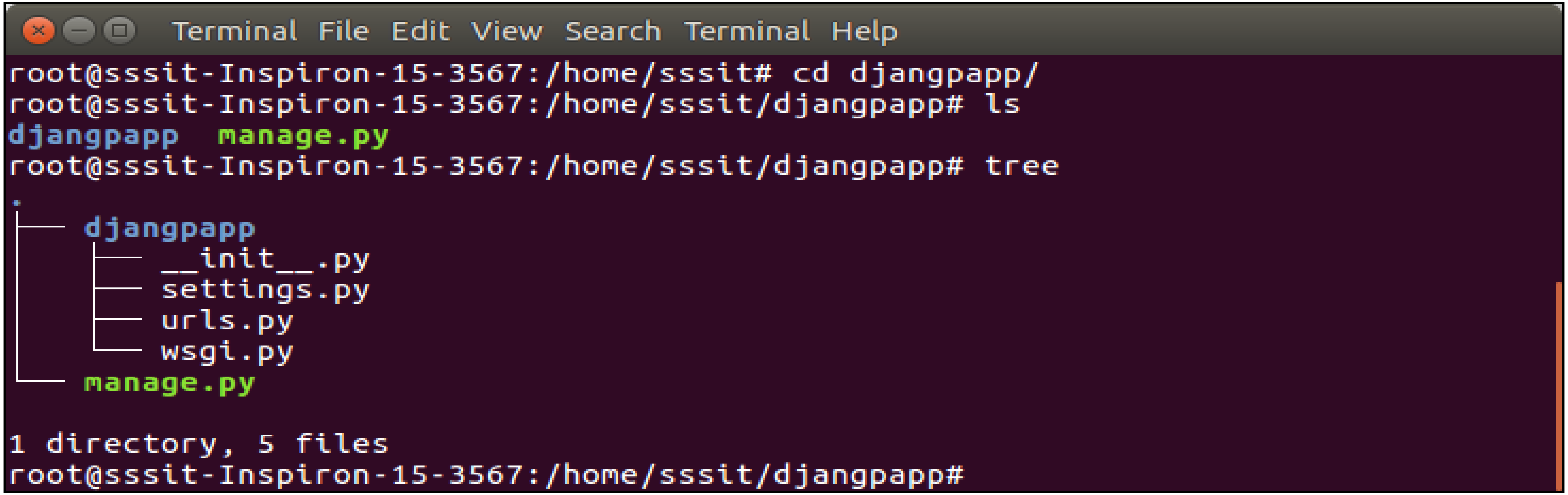
Now, move to the project by changing the directory. The Directory can be changed by using the following command.

cd djangpapp



```
root@sssit-Inspiron-15-3567:/home/sssit# django-admin startproject djangpapp
root@sssit-Inspiron-15-3567:/home/sssit# cd djangpapp/
root@sssit-Inspiron-15-3567:/home/sssit/djangpapp# ls
djangpapp  manage.py
root@sssit-Inspiron-15-3567:/home/sssit/djangpapp#
```

To see all the files and subfolders of django project, we can use tree command to view the tree structure of the application. This is a utility command, if it is not present, can be downloaded via apt-get install tree command.



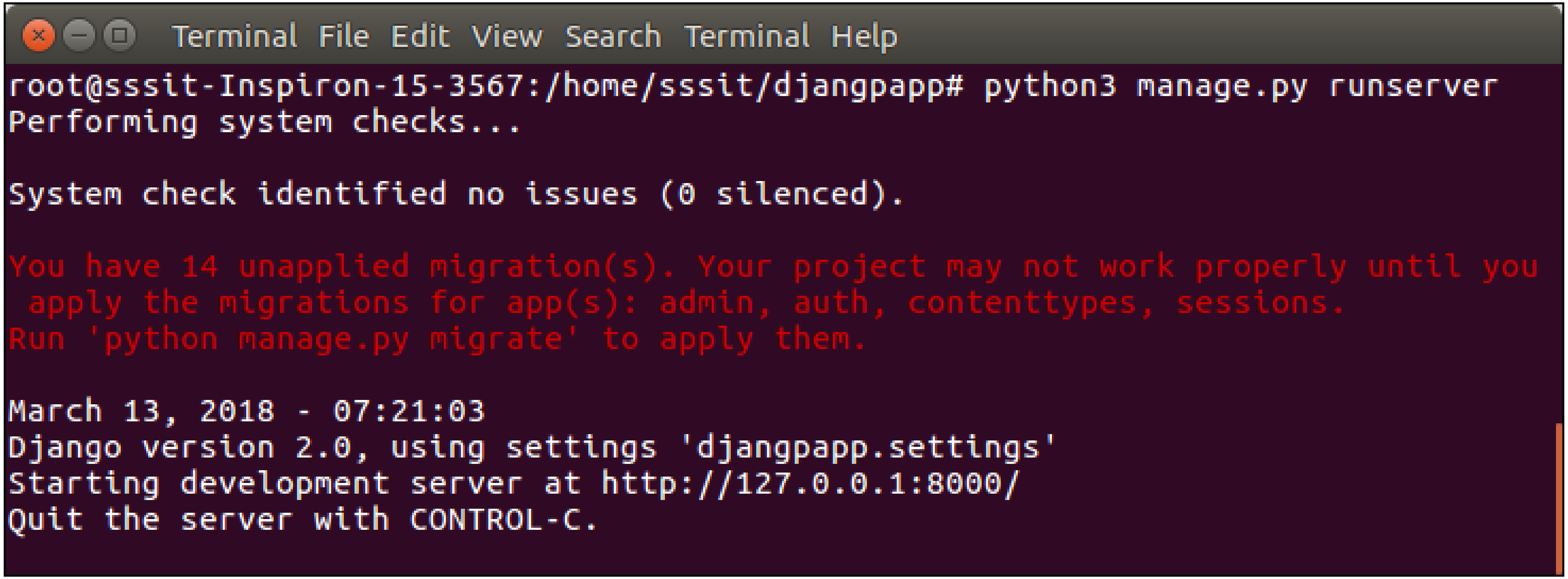
```
root@sssit-Inspiron-15-3567:/home/sssit# cd djangpapp/
root@sssit-Inspiron-15-3567:/home/sssit/djangpapp# ls
djangpapp  manage.py
root@sssit-Inspiron-15-3567:/home/sssit/djangpapp# tree
.
├── djangpapp
│   ├── __init__.py
│   ├── settings.py
│   ├── urls.py
│   └── wsgi.py
└── manage.py

1 directory, 5 files
root@sssit-Inspiron-15-3567:/home/sssit/djangpapp#
```

Running the Django Project

Django project has a built-in development server which is used to run application instantly without any external web server. It means we don't need of Apache or another web server to run the application in development mode.

To run the application, we can use the following command.

```
$ python3 manage.py runserver
```



```
root@sssit-Inspiron-15-3567:/home/sssit/djangpapp# python3 manage.py runserver
Performing system checks...

System check identified no issues (0 silenced).

You have 14 unapplied migration(s). Your project may not work properly until you
 apply the migrations for app(s): admin, auth, contenttypes, sessions.
Run 'python manage.py migrate' to apply them.

March 13, 2018 - 07:21:03
Django version 2.0, using settings 'djangpapp.settings'
Starting development server at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

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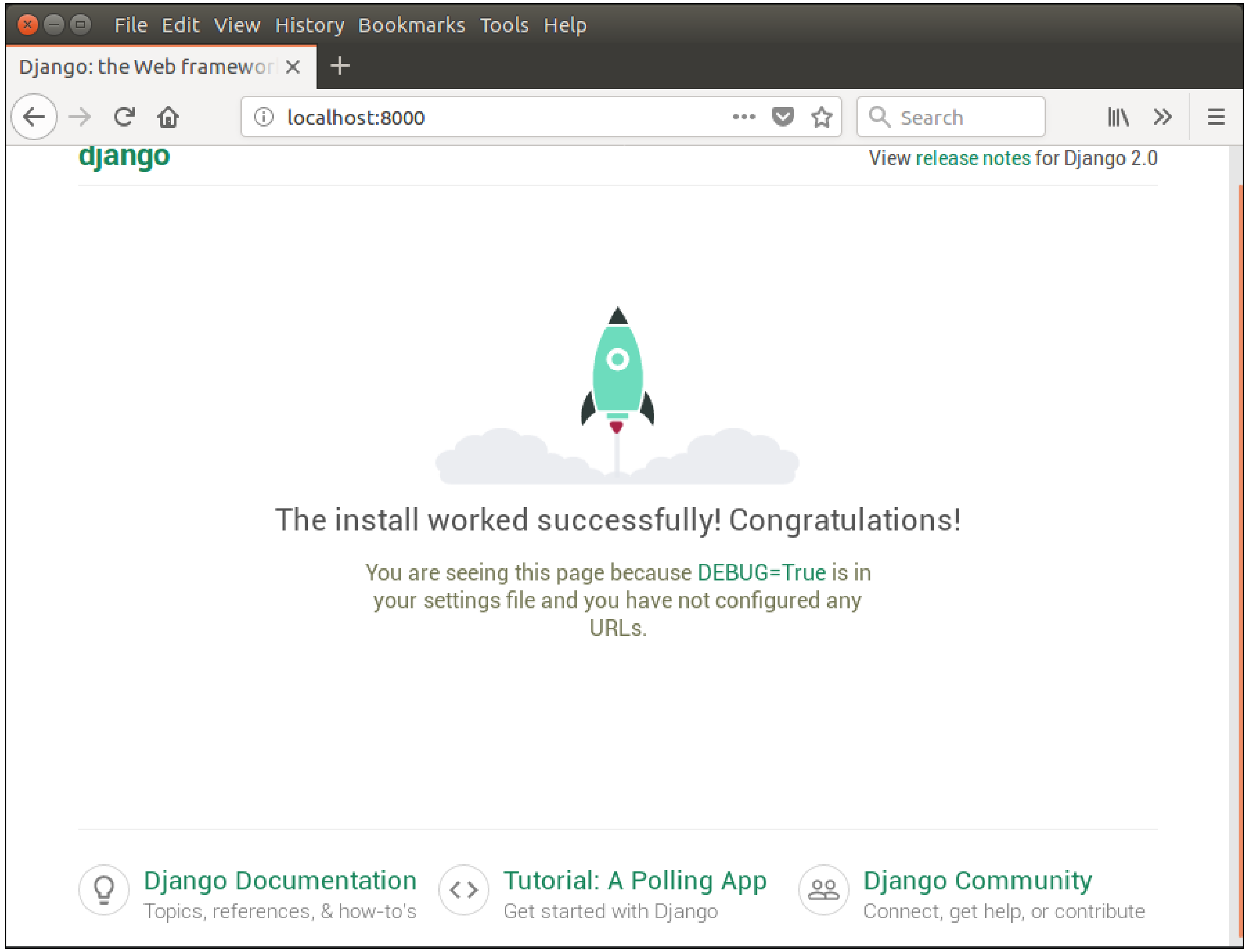
Look server has started and can be accessed at localhost with port 8000. Let's access it using the browser, it looks like the below.


File Edit View History Bookmarks Tools Help
Django: the Web framewor
localhost:8000
Search
django
View release notes for Django 2.0

The install worked successfully! Congratulations!

You are seeing this page because DEBUG=True is in your settings file and you have not configured any URLs.

Django Documentation
Topics, references, & how-to's
Tutorial: A Polling App
Get started with Django
Django Community
Connect, get help, or contribute

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DJANGO MODELS AND DATABASE

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What is Model?

- A model is the single, definitive source of information about your data.

- It contains the essential fields and behaviors of the data you’re storing

- Generally, each model maps to a single database table.

- Each model is a Python class that subclasses **django.db.models.Model**.

- Each attribute of the model represents a database field.

CREATE YOUR FIRST MODEL

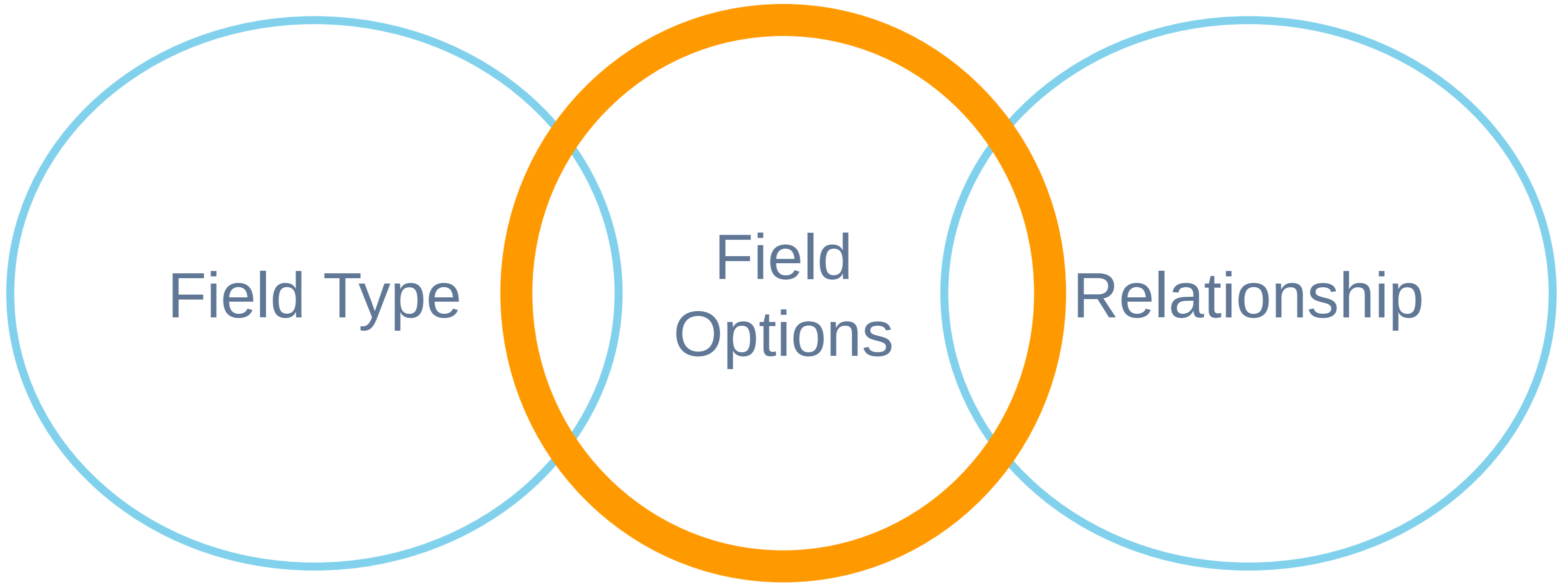
```
from django.db import models

class Person(models.Model):
    first_name = models.CharField(max_length=30)
    last_name = models.CharField(max_length=30)
```

MODEL FIELDS

Fields are organized into records, which contain all the information within the table relevant to a specific entity.

There are concepts to know before creating fields:



1. FIELD TYPE

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The fields defined inside the Model class are the columns name of the mapped table

E.g.

AutoField()

An integer field that automatically increments

BooleanField()

Store true/false value and generally used for checkboxes

CharField()

A string field for small to large-sized strings.

DateField()

A date field represents python datetime. date instance.

2. FIELD OPTIONS

Field option are used to customize and put constraint on the table rows.

E.g.

```
name= models.CharField(max_length = 60)
```

here "max_length" specifies the size of the VARCHAR field.

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The following are some common and mostly used field option:

01 Null

to store empty values as NULL in database.

02 Blank

if True, the field s allowed to be blank.

03 default

store default value for a field

04 primary_key

this field will be the primary key for the table

05 unique_key

puts unique key constraint for column.

3. MODEL FIELD RELATIONSHIP

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The power of relational databases lies in relating tables to each other Django offers ways to define the three most common types of database relationships:

1. **many-to-one**
2. **many-to-many**
3. **one-to-one.**

1) Many-to-one relationships:

To define a many-to-one relationship, use django.db.models.ForeignKey.
You use it just like any other Field type: by including it as a class attribute of your model.

E.g.

```
class Manufacturer(models.Model)
    pass
class Car(models.Model):
    manufacturer = models.ForeignKey(Manufacturer,
on_delete=models.CASCADE)
```

2) Many-to-many relationships

To define a many-to-many relationship, use ManyToManyField. You use it just like any other Field type: by including it as a class attribute of your model.

For example, if a Pizza has multiple Topping objects – that is, a Topping can be on multiple pizzas and each Pizza has multiple toppings – here's how you'd represent that:

```
from django.db import models

class Topping(models.Model):
    # ...
    pass

class Pizza(models.Model):
    # ...
    toppings = models.ManyToManyField(Topping)
```

3) One-to-one relationships

To define a one-to-one relationship, use OneToOneField. You use it just like any other Field type: by including it as a class attribute of your model.

E.g.

```
from django.conf import settings
from django.db import models

class MySpecialUser(models.Model):
        user = models.OneToOneField(settings.AUTH_USER_MODEL)
        supervisor = models.OneToOneField(settings.AUTH_USER_MODEL)
```

Meta Option

- ❑ A metaclass is the class of a class.
- ❑ A class defines how an instance of the class behaves while a metaclass defines how a class behaves.
- ❑ A class is an instance of a metaclass.
- ❑ Give your model metadata by using an inner class Meta.

E.g.

```
from django.db import models

class Student(models.Model):
        name = models.CharField(max_length =50)

        class Meta:
                ordering =["name"]
                db_table = "students"
```

Databases

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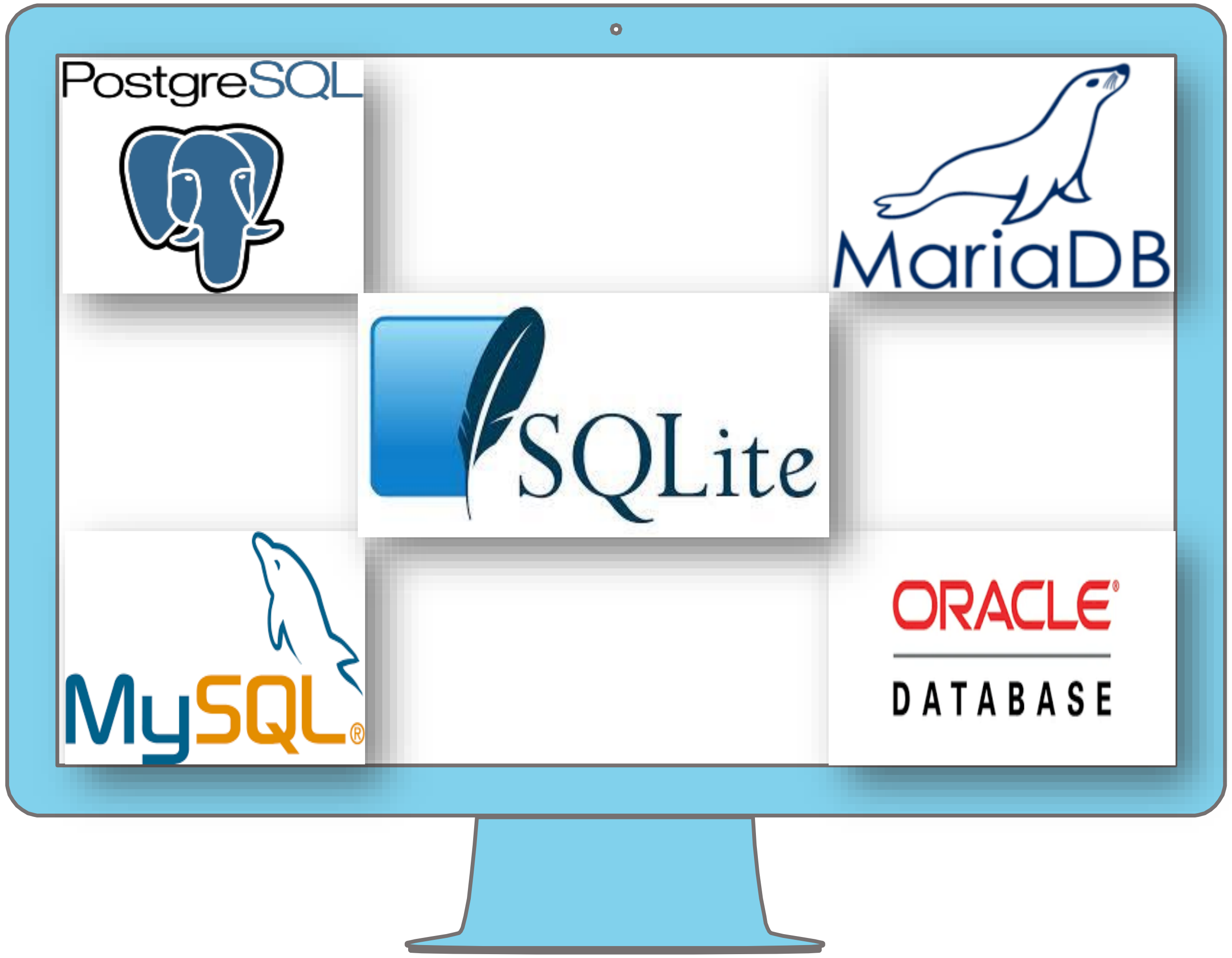
Django officially supports the following databases:



Telling Django About Your Database

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Before we can create any models, we must first setup our database configuration. To do this, open the settings.py and locate the dictionary called DATABASES.

modify the default key/value pair so it looks something like the following example.

```
DATABASES = {
   'default': {
      'ENGINE': 'django.db.backends.sqlite3',
      'NAME': DATABASE_PATH,
   }
}
```

Also create a new variable called DATABASE_PATH and add that to the top of your settings.py

```
DATABASE_PATH = os.path.join(PROJECT_PATH, 'rango.db')
```