

Building Modern APIs using Django 2.0

Salam!

I AM MASHHOOD!

I lead the engineering team at Sastaticket.pk and am GDE for Web and Angular

You can find me on twitter:
@mashhoodr

**DO YOU KNOW
PYTHON3.6?**

**DO YOU KNOW
DJANGO2.0?**

**DO YOU KNOW
REST?**

■ GOALS

- Create models using Django
- Build API using Django REST
- Add authentication
- Understand deployment

Time is very tight so we will try to wrap up as much as possible.

■ FORMAT

- Step by step workshop
- Some theory then exercise (few minutes will be given)
- Solution will be done afterwards
- If there is an issue, raise your hands
- If you have a question, ask the mentors

■ QUIZ

Name one new feature in Python 3.6

Introduction to Django

What powers the most powerful framework in Python?

■ Django 2.0

- <https://www.djangoproject.com/>
- Originally launched in 2005
- Latest version is 2.1 (stable)
- Maintained by Django Software Foundation
- Is completely open source (BSD)

■ TOOLS

- Terminal
- Python 3.6
- Virtualenv
- Pip
- Visual Studio Code

Can everyone please check they have the tools on their machines?

■ SETUP YOUR ENVIRONMENT

- *virtualenv -p python3 env*
- *source ./env/bin/activate*
- *python --version*
- *pip install django*

This will install django in your environment!

■ SCAFFOLDING

- *django-admin startproject eventmanager*
- Create a folder with the basic project structure
- Open the folder in VSCode
 - *cd eventmanager*
 - *code .*
- *pip freeze > requirements.txt*

■ QUIZ

What is the purpose of the `__init__.py` file?

FILE BREAKDOWN

▲ eventmanager

 `__init__.py`

 `settings.py`

 `urls.py`

 `wsgi.py`

 `manage.py`

■ RUN DJANGO

- *python manage.py runserver*
- Starts the server
- Serves your API and assets
- Auto-reloads on code changes
- Used only for dev

■ NEW DJANGO “APP”

- *python manage.py startapp event*
- Creates a new folder with required files
- We will create the model, routes, serializers in this folder
- *python manage.py migrate*
- *python manage.py createsuperuser --email admin@example.com --username admin*

■ CONFIGURE YOUR NEW APP

In your eventmanager/settings.py

```
INSTALLED_APPS = [  
    ...  
    'django.contrib.staticfiles',  
    'event'  
]
```

FILE STRUCTURE

▲ event

▸ migrations

 __init__.py

 admin.py

 apps.py

 models.py

 tests.py

 views.py

■ DJANGO MODELS

- Essentially a table in your DB
- You define how the table looks like, its columns and the types
- We extend from Django's models (`models.Model`)

■ Example model

```
from django.db import models
```

```
class Event(models.Model):
```

```
    title = models.CharField(max_length=30)
```

```
    description = models.CharField(max_length=30)
```

■ DJANGO MIGRATIONS

- Django Migrations automatically detect the changes in the models and update the database using a single CLI command! Make migrations is only run the first time.
- *python manage.py makemigrations*
- *python manage.py migrate*

■ DJANGO ADMIN

- Django Admin make it easy to manage the data in the tables. A nice GUI to help you manage your app.
- We can configure it by registering the model in `admin.py`

■ CONFIGURE ADMIN

Inside admin.py:

admin.site.register(Event)

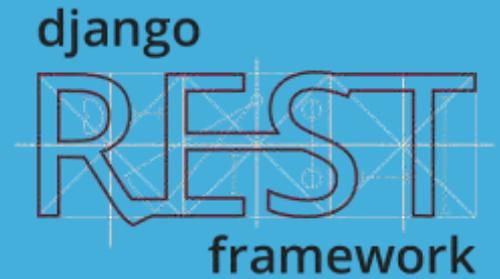
- Restart your server and see if you can find the model in the admin!

DEMO



■ DJANGO VIEWS

- For an API Endpoint we will need:
 - `django.views.generic.list.ListView`
 - `django.views.generic.edit.CreateView`
 - Template File
 - URL update
 - (Possibly) a `ModelForm`
- Can we do better?



Introducing Django REST framework

A plugin to make awesome APIs

■ DJANGO REST FRAMEWORK [DRF]

- **django-rest-framework.org**
- Allows you to create a web browsable API (with GUI!)
- Includes authentication schemes
- Configures data serialization and validation

■ REST PATTERN

Representational State Transfer (REST) is a software architectural style that defines a set of constraints to be used for creating web services.

RESTful APIs are usually stateless and defined in a very specific pattern.

DRF INSTALLATION

- *pip install djangorestframework*

In eventmanager/settings.py

- Add 'rest_framework' to your INSTALLED_APPS setting

DRF MODELSERIALIZERS

- Serializers allow complex data such as querysets and model instances to be converted to native Python datatypes that can then be easily rendered into JSON, XML or other content types.
- Essentially they are the interface between Python and the data coming in.

DRF MODELSERIALIZERS conti

```
from .models import Event
from rest_framework import serializers

class EventSerializer(serializers.ModelSerializer):
    class Meta:
        model = Event
        fields = ('title', 'description')
```

DRF VALIDATIONS

- You can call `is_valid` on a serialized object
- You can check the `errors` property
- You can configure custom validations

```
def validate_title(self, attrs, source):  
    value = attrs[source]  
    if "django" not in value.lower():  
        raise serializers.ValidationError("Event post is not about Django")  
    return attrs
```

DRF RENDERERS

- Let's configure our renderer!

```
from rest_framework import viewsets
class EventView(viewsets.ModelViewSet):
    queryset = Event.objects.all()
    serializer_class = EventSerializer
```

- These 3 lines allow us to configure CRUD operations on this model.

DRF URLs

- Everything is almost ready, just need to configure the URLs!

```
from rest_framework.routers import DefaultRouter
router = DefaultRouter()
router.register('events', EventView)

urlpatterns = [
    path('admin/', admin.site.urls),
    path('api/', include(router.urls))
]
```

VOILA, YOUR FIRST DJANGO API

Now let's test it out!

■ DRF WEB BROWSABLE API

- Visit <http://localhost:8000/api/events/>
- Here you can play with your API, add objects, fetch them, get the JSON etc.

DRF AUTHENTICATION

- REST usually uses Token based authentication. So for that we will use Simple JWT library
- *pip install djangorestframework_simplejwt*

DRF AUTHENTICATION SETTINGS

Configure the authentication in settings:

```
REST_FRAMEWORK = {  
    'DEFAULT_PERMISSION_CLASSES':  
    ('rest_framework.permissions.IsAuthenticatedOrReadOnly',),  
    'DEFAULT_AUTHENTICATION_CLASSES':  
    ('rest_framework_simplejwt.authentication.JWTAuthentication',)  
}
```

DRF AUTHENTICATION URLS

```
from rest_framework_simplejwt.views import (  
    TokenObtainPairView,  
    TokenRefreshView)  
  
urlpatterns = [  
    path('api/token', TokenObtainPairView.as_view()),  
    path('api/token/refresh', TokenRefreshView.as_view())  
    ...  
]
```

■ TESTING AUTHENTICATION

- Add option is no longer available in the Web API services.
- We will use postman to test the permissions and authentication

DEPLOYMENT

- So many options!
- You need to serve via wsgi, assets served separately via nginx/apache, Django served via Gunicorn
- Gunicorn process should be monitored by supervisor

DEPLOYMENT (2)

- Configure your `STATIC_ROOT` in settings
- *python manage.py collectstatic*
- Your app is ready for deployment!

■ DEPLOYMENT (3)

- Configure nginx, gunicorn and supervisor
- Nginx (or Apache) will use a proxy pass to the gunicorn process
- It will also serve the static files from the ``STATIC_ROOT``

FINAL RECAP

Let's make some awesome APIs!

REVIEWING COOKIECUTTER

- <https://github.com/pydanny/cookiecutter-django>
- A nice scaffolding which has a lot of good things configured including Docker and

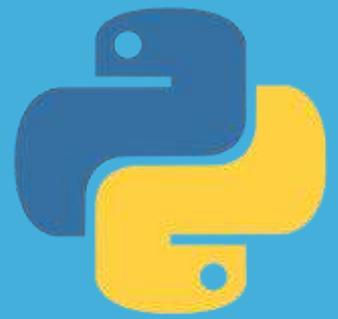
RESOURCES

- <https://www.youtube.com/watch?v=w0xgJ5C9Be8>
- <http://www.django-rest-framework.org/tutorial/quickstart/>
- <http://blog.kevinastone.com/getting-started-with-django-rest-framework-and-angularjs.html>



OPEN SOURCE PRACTICE

[github.com/recurship/
event-manager](https://github.com/recurship/event-manager)



Python Karachi

Python Karachi Group

bit.ly/python-karachi

THANKS!

Any questions?

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mrastgar@sastaticket.pk

slides: bit.ly/pycon18-rest

- Flow
- <https://speakerdeck.com/phildini/api-driven-django>
- Introduction about the workshop
- !! Need TAs
- About me
- Format
- Goals
- Introduction to Django
- Introduction to Django Rest
- Introduce the project we are going to work on
- Focus on CRUD
- Setup
 - pipenv
 - create project
 - Migrate
 - Super user
 - Admin panel
- Model
- Views
 - Apiview
 - Json return
- Serializer
- JSON RENDERer
- Browsable api renderer
- Authentication
- Testing
- Deployment (gunicorn, collectstatic, nginx)

Instructions for use

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Hello!

I AM JAYDEN SMITH

I am here because I love to give presentations.

You can find me at:
@username

1.

TRANSITION HEADLINE

Let's start with the first set of slides

“

*Quotations are commonly printed
as a means of inspiration and to
invoke philosophical thoughts from
the reader.*

■ THIS IS A SLIDE TITLE

- Here you have a list of items
- And some text
- But remember not to overload your slides with content

Your audience will listen to you or read the content, but won't do both.



BIG CONCEPT



Bring the attention of your audience over a key concept using icons or illustrations

YOU CAN ALSO **SPLIT** YOUR CONTENT

White

Is the color of milk and fresh snow, the color produced by the combination of all the colors of the visible spectrum.

Black

Is the color of coal, ebony, and of outer space. It is the darkest color, the result of the absence of or complete absorption of light.

■ IN TWO OR THREE COLUMNS

Yellow

Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue

Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

Red

Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

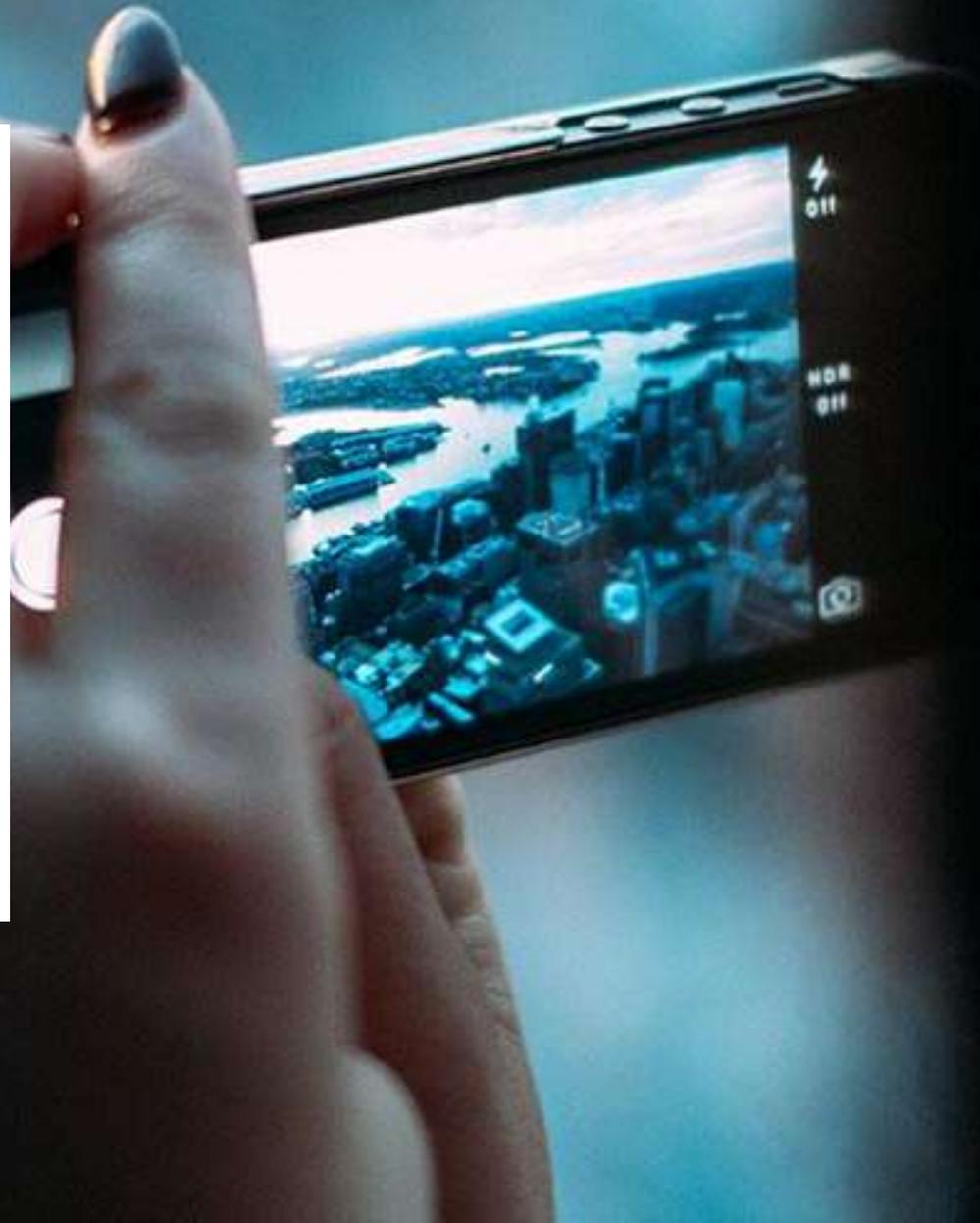
■ A PICTURE IS WORTH A THOUSAND WORDS

A complex idea can be conveyed with just a single still image, namely making it possible to absorb large amounts of data quickly.

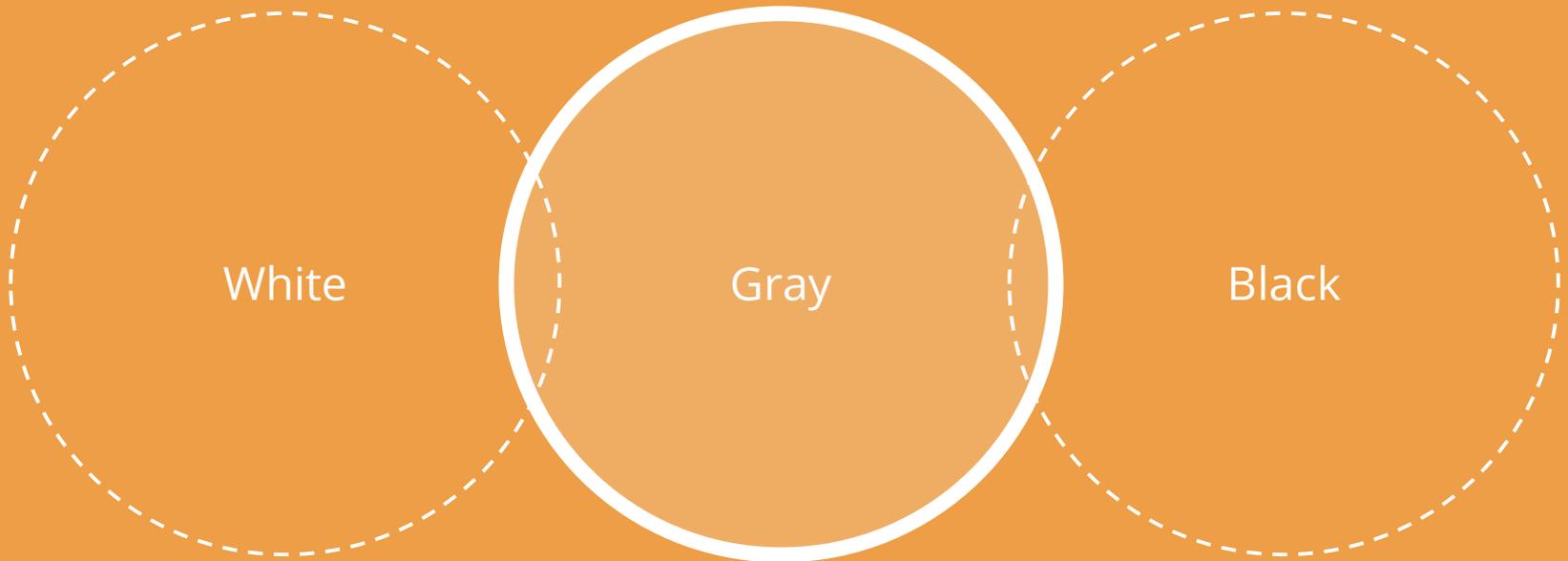


WANT BIG IMPACT?

Use BIG image.



USE CHARTS TO EXPLAIN YOUR IDEAS

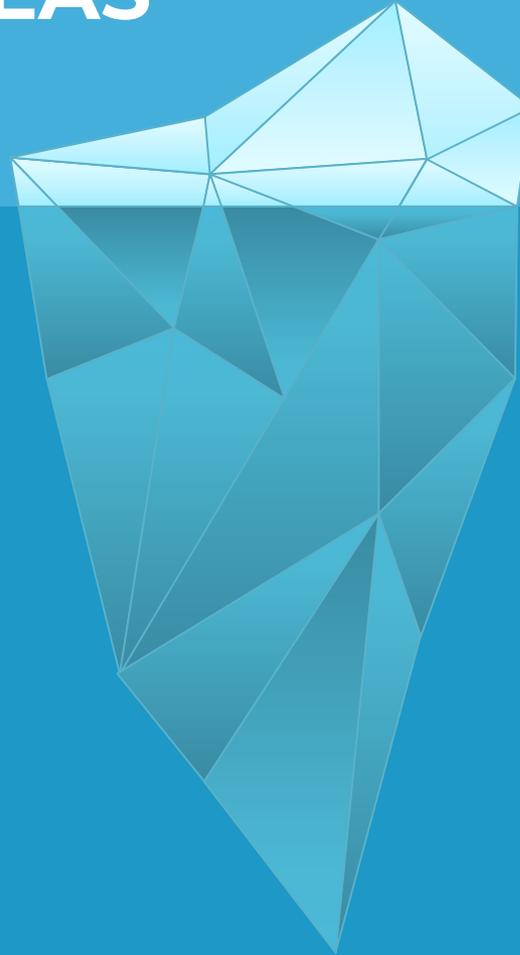


OR **DIAGRAMS** TO EXPLAIN COMPLEX IDEAS

Diagram featured by
poweredtemplate.com

Example text.

Go ahead and replace it with your own text. Go ahead and replace it with your own text. This is an example text. Go ahead and replace it with your own text. Go ahead and replace it with your own text. Go ahead and replace it with your own text. Go ahead and replace it with your own text.



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AND TABLES TO COMPARE DATA

	A	B	C
Yellow	10	20	7
Blue	30	15	10
Orange	5	24	16



MAPS



89,526,124

Whoa! That's a big number,
aren't you proud?

 **89,526,124\$**

That's a lot of money

 **185,244 users**

And a lot of users

 **100%**

Total success!

OUR PROCESS IS EASY



Let's review some concepts

Yellow



Is the color of gold, butter and ripe lemons. In the spectrum of visible light, yellow is found between green and orange.

Blue



Is the colour of the clear sky and the deep sea. It is located between violet and green on the optical spectrum.

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Is the color of blood, and because of this it has historically been associated with sacrifice, danger and courage.

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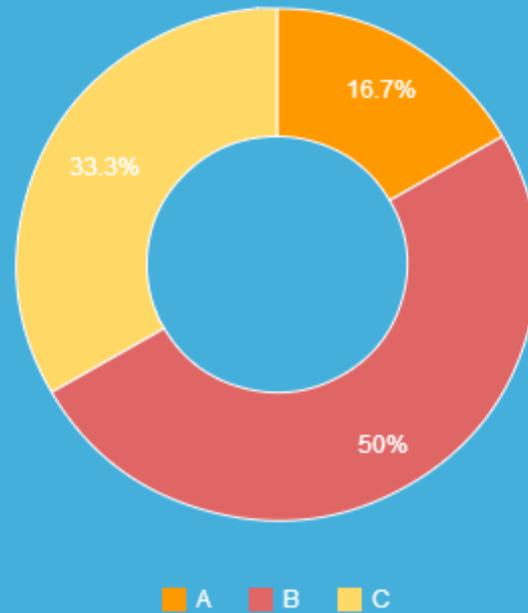


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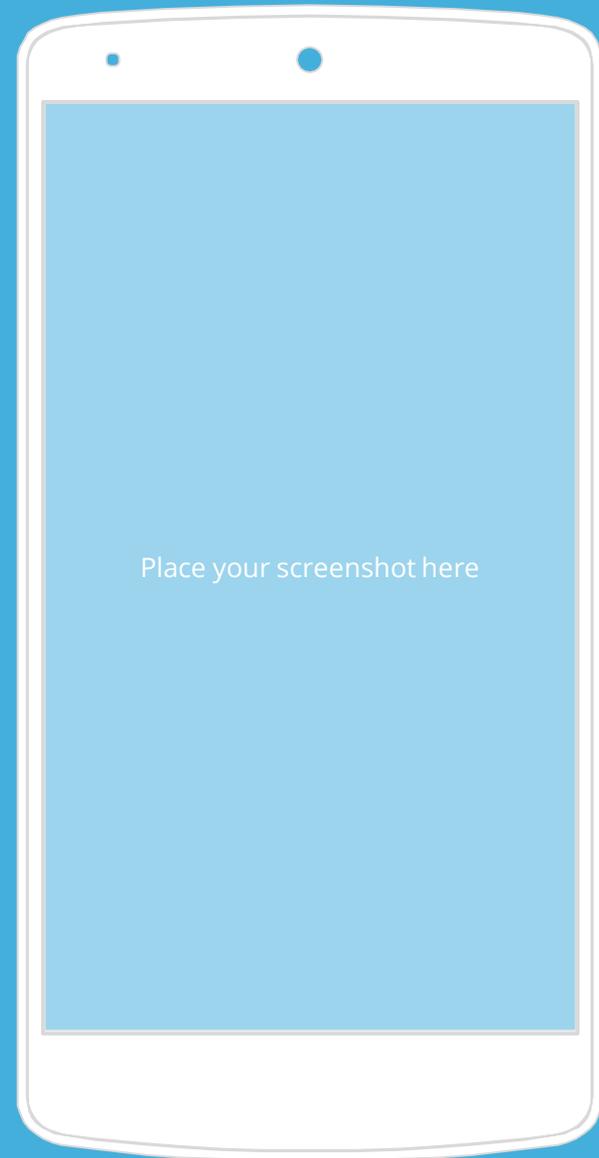
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You can copy&paste graphs from [Google Sheets](#)

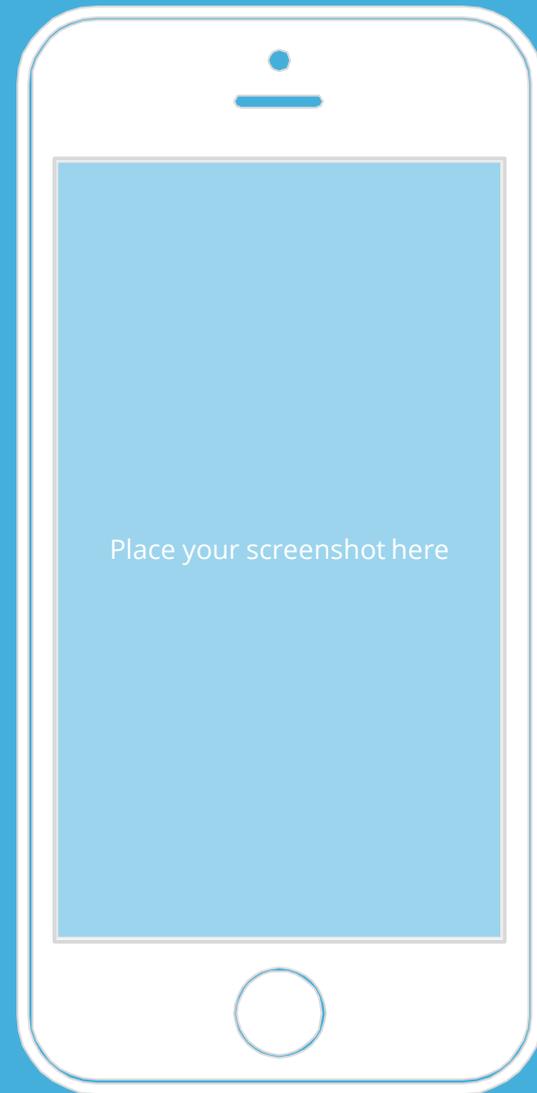
■ ANDROID PROJECT

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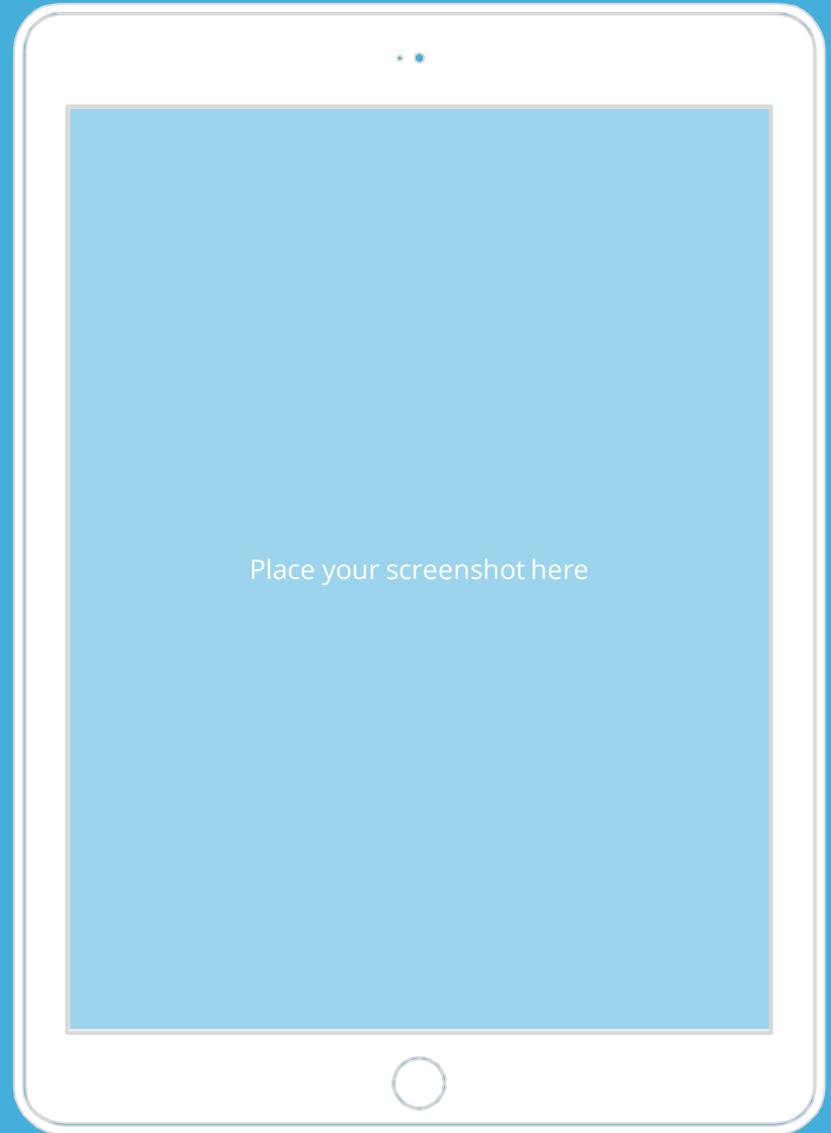
IPHONE PROJECT

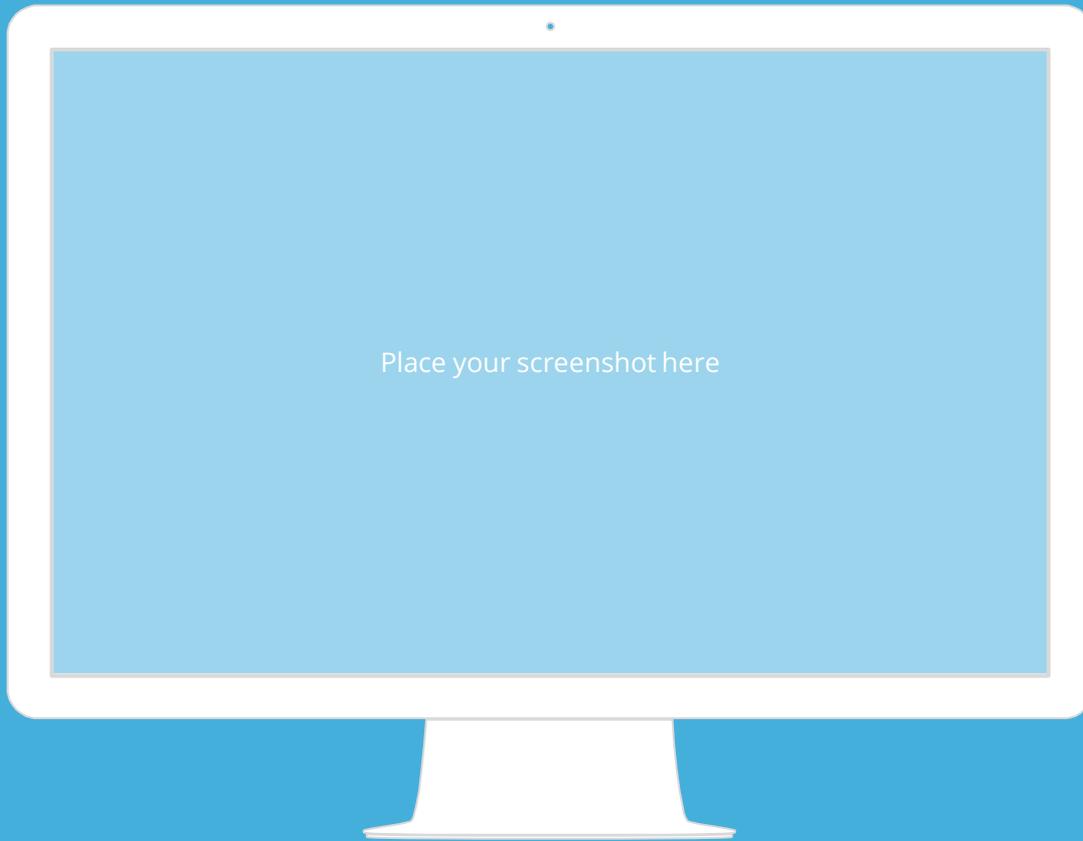
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TABLET PROJECT

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DESKTOP PROJECT

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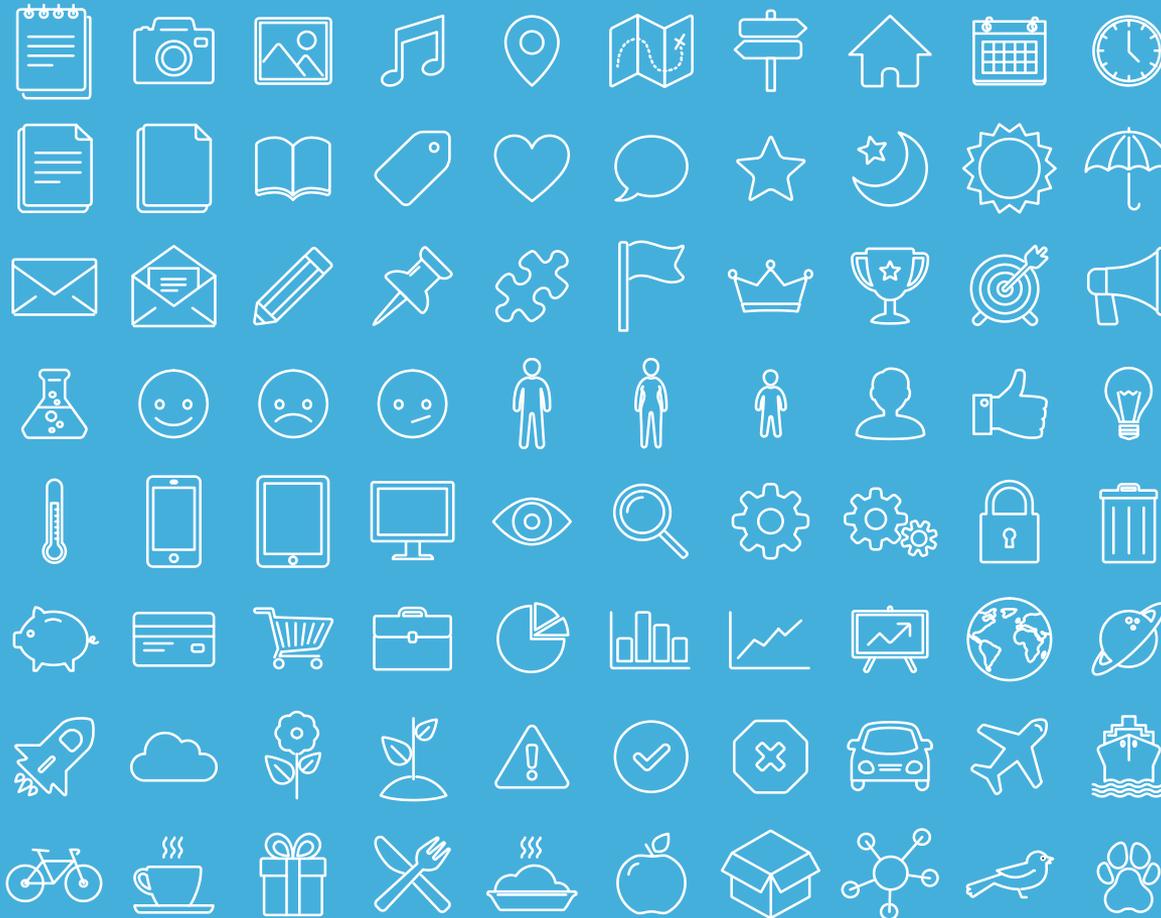
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<https://www.fontsquirrel.com/fonts/montserrat>

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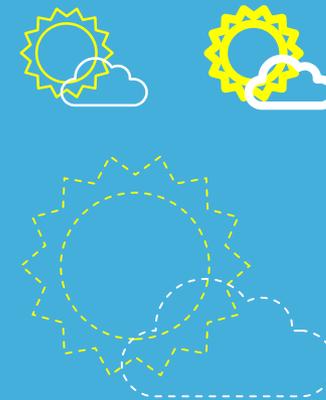
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- Resize them without losing quality.
- Change line color, width and style.

Isn't that nice? :)

Examples:





Now you can use any emoji as an icon!

And of course it resizes without losing quality and you can change the color.

How? Follow Google instructions

<https://twitter.com/googledocs/status/730087240156643328>

