Droplet - Develop, Stage and Deploy
Student Manual

Getting Started

Droplet is a repository and environment to keep a track of projects at your university. Droplet ensures that you get exposure to the right set of tools to provide an all-round development as a software engineer. You will learn how to develop, stage and deploy your applications.

Profile

This is where you will receive a list of assignments that you have been assigned throughout your time at the university.

They will be arranged in order of submission date to make it easier for you to keep track of deadlines.

To view more about an assignment, click on the title of the assignment. The link will take you to the next step.

Assignment Details

Now you can view the details of the assignment given to you. You will also be able to download and view all the test cases that will be run on your application in the form of a zip file.

You may notice that there is a tab called ‘UI’. This is what we will look at next.

UI Details

UI or the user interface is how any client will use your application. Most of droplet’s testing tools are based on synthetic user testing.

1. Web UI: In this type of application, the UI is rendered in the form of web pages. These web pages are tested using Selenium. Selenium IDE is a plugin to create selenium scripts by recording and replying browser actions.
2. REST API: Most internal communication between servers happens via REST APIs. Hence, it is vital for an engineer to be familiar with this concept. To test REST APIs, Droplet introduces Postman, an automated API testing tool.

3. CUI: This is the most common UI that developers use in their early university years. This helps developers to learn languages and build executables thus giving more emphasis on backend coding. Droplet offers an in-built testing tool for this purpose.

Deployment

Processes these days do not run as a monolithic application. With the advent of virtualisation, Linux introduced a concept called ‘containers’. These containers are nothing but virtual spaces that run on the kernel. They are pretty much virtual machines with no hypervisor! Docker is a tool that allows containers to be configured and managed.

Droplet offers a sample Dockerfile for each UI type. You may use them to get a headstart on building your own Dockerfile.

It is recommended to practice and check the working of the Dockerfile offline using the docker command line tool before uploading it to Docker hub.

Instructions based on UI type

CUI

Offline:

- ➔ On the assignment details page, you will be shown the Executable name for your app. Ensure that you use the same name.
- ➔ Create a run.sh file as follows:

```
#!/bin/bash

./<exec_name> < $1
```

- ➔ Replace <exec_name> with the one specified in the assignment.
- ➔ In the Dockerfile given as an example, replace execname with the name of your executable file.

Online:

- ➔ Provide a link to the source code of your application from a code repository (like Github).
- ➔ Provide a link to the source code of your application from a docker repository (like Docker hub).
- ➔ Provide a link to the report of your application stored on the cloud. (like GDrive).

After Submission:

- If you go back and check the assignment, the submission will now be available. You may not make changes to a submission. However, the code on GitHub or Docker hub can be changed.
- You will now be able to go directly to the links you provided in the submission by clicking on the respective icons.
- The Spin Docker field allows you to spin up a docker on the remote server running droplet and it will show you how many cases passed or failed.

WebUI

Offline:

- On the assignment details page, you will be shown the scenarios for your app. These will help let you know what to record on navigating on your final application.
- In the Dockerfile given as an example:
  - Change the base image
  - Add source files
  - Run commands inside the docker to install dependencies and setup the environment.
  - Use ENTRYPOINT and CMD to tell the container what to run after it has been created.

NOTE: Remember to bind your application to 0.0.0.0 but feel free to use any non-reserved port on your system to serve the application.

Testing:

- Install the Selenium IDE plugin on Firefox or Chrome
- For each scenario, record the test case
- Export them as one file named selenium.side

Online:

- Provide a link to the source code of your application from a code repository (like Github).
- Provide a link to the source code of your application from a docker repository (like Docker hub).
- Provide a link to the report of your application stored on the cloud. (like GDrive).
- Upload the selenium.side file containing the script to run all the scenarios.
- Provide the port where you will serve the application.

After Submission:

- ➔ If you go back and check the assignment, the submission will now be available. You may not make changes to a submission. However, the code on GitHub or Docker hub can be changed.
- ➔ You will now be able to go directly to the links you provided in the submission by clicking on the respective icons.
- ➔ The Spin Docker field allows you to spin up a docker on the remote server running droplet and it will show you the endpoint where the container has been hosted. Use this endpoint to run the 'side' script using **selenium-side-runner**. Click stop to kill the container.

REST

Offline:

- ➔ On the assignment details page, you will be shown the APIs along with the respective method and expected status code to be implemented in the app. The input and output json files will be made available for download.
- ➔ In the Dockerfile given as an example:
  - ◆ Change the base image
  - ◆ Add source files
  - ◆ Run commands inside the docker to install dependencies and setup the environment.
  - ◆ Use ENTRYPOINT and CMD to tell the container what to run after it has been created.

NOTE: Remember to bind your application to 0.0.0.0 but feel free to use any non-reserved port on your system to serve the application.

Testing:

- ➔ Install the Postman app on your system.
- ➔ Make tests for each and every API call specified in the assignment with the exact same URL.
- ➔ Create a collection of successful test results.
- ➔ Export them as one file named postman.json

Online:

- ➔ Provide a link to the source code of your application from a code repository (like Github).

- ➔ Provide a link to the source code of your application from a docker repository (like Docker hub).
- ➔ Provide a link to the report of your application stored on the cloud. (like GDrive).
- ➔ Upload the postman.json file containing the script to run all the APIs.
- ➔ Provide the port where you will serve the application.

After Submission:

- ➔ If you go back and check the assignment, the submission will now be available. You may not make changes to a submission. However, the code on GitHub or Docker hub can be changed.
- ➔ You will now be able to go directly to the links you provided in the submission by clicking on the respective icons.
- ➔ The Spin Docker field allows you to spin up a docker on the remote server running droplet and it will show you which API tests passed or failed.

Going Further

Droplet is a tiny insight into the wide range of development, testing and deployment tools available today. Droplet hopes to have taught you some best practices that will enable you to build robust, safe and easily deployable applications.