

**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ АВТОНОМНОЕ
ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ
«САНКТ-ПЕТЕРБУРГСКИЙ НАЦИОНАЛЬНЫЙ
ИССЛЕДОВАТЕЛЬСКИЙ УНИВЕРСИТЕТ ИНФОРМАЦИОННЫХ
ТЕХНОЛОГИЙ, МЕХАНИКИ И ОПТИКИ»**

Факультет информационных технологий и программирования

Дисциплина:

Администрирование ОС Linux

Лабораторная работа номер 5

Docker

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Задание 1:

Скриншот запуска команды hello-world:



```
1 vagrant@doker:~/dja... 2 vagrant@doker:~  
# backing providers for Vagrant. These expose provider-specific options.  
# Example for VirtualBox:  
#  
# config.vm.provider "virtualbox" do |vb|  
#   # Display the VirtualBox GUI when booting the machine  
#   vb.gui = true  
#  
#   # Customize the amount of memory on the VM:  
#   vb.memory = "1024"  
# end  
#  
# View the documentation for the provider you are using for more  
# information on available options.  
  
# Enable provisioning with a shell script. Additional provisioners such as  
# Ansible, Chef, Docker, Puppet and Salt are also available. Please see the  
# documentation for more information about their specific syntax and use.  
# config.vm.provision "shell", inline: <<-SHELL  
#   apt-get update  
#   apt-get install -y apache2  
# SHELL  
end  
~/neostudy/Ansible > cd ..  
~/neostudy > cd ..  
~ > cd lab5_linux  
~/lab5_linux > ls -la  
total 16  
drwxr-xr-x  3 fedor fedor 4096 Dec 18 13:37 .  
drwx----- 81 fedor fedor 4096 Dec 18 14:00 ..  
drwxr-xr-x  5 fedor fedor 4096 Dec 18 13:37 .vagrant  
-rw-r--r--  1 fedor fedor 3430 Dec 18 13:37 Vagrantfile  
~/lab5_linux > vagrant ssh docker.lab.5  
Last login: Sat Dec 18 10:46:10 2021  
[vagrant@doker ~]$ sudo docker run hello-world  
  
Hello from Docker!  
This message shows that your installation appears to be working correctly.  
  
To generate this message, Docker took the following steps:  
1. The Docker client contacted the Docker daemon.  
2. The Docker daemon pulled the "hello-world" image from the Docker Hub.  
   (amd64)  
3. The Docker daemon created a new container from that image which runs the  
   executable that produces the output you are currently reading.  
4. The Docker daemon streamed that output to the Docker client, which sent it  
   to your terminal.  
  
To try something more ambitious, you can run an Ubuntu container with:  
$ docker run -it ubuntu bash  
  
Share images, automate workflows, and more with a free Docker ID:  
https://hub.docker.com/  
  
For more examples and ideas, visit:  
https://docs.docker.com/get-started/  
  
[vagrant@doker ~]$
```

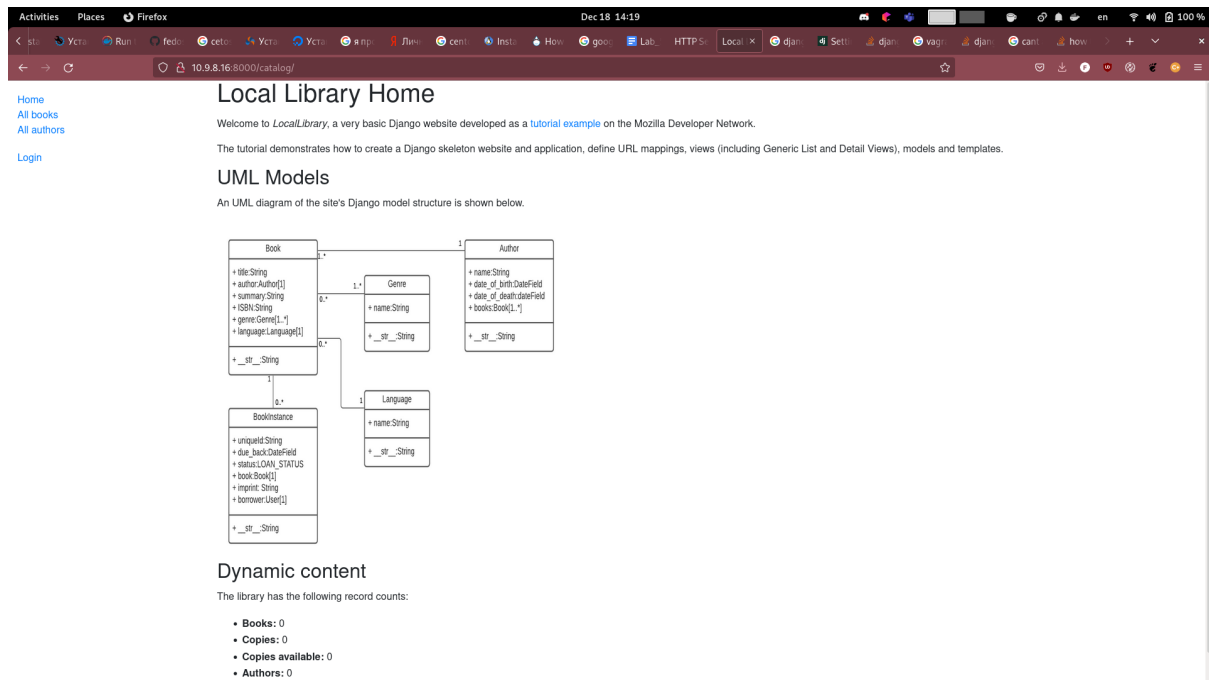
Задание 2: Содержание файла .env:

```
SECRET_KEY="StrongPassowrd"
```

```
DEBUG=True
```

Задание 3:

Скриншот запуска на localhost :



Задание 4:

Dockerfile.django:

```
FROM python:3
COPY . ./app
RUN rm -rf ./app/staticfiles
RUN rm -rf ./app/catalog/static
WORKDIR ./app
RUN pip install --upgrade pip
RUN pip3 install -r requirements.txt && python3 manage.py
makemigrations && python3 manage.py migrate
CMD gunicorn locallibrary.wsgi:application --bind 0.0.0.0:8000
```

Dockerfile.nginx:

FROM nginx

COPY nginx.conf /etc/nginx/conf.d/default.conf

docker-compose.yml:

```
version: "3"
services:
  app:
    container_name: app
    build:
      context: .
      dockerfile: Dockerfile.django
```

```

nginx:
  container_name: nginx
  ports:
    - 80:80
  build:
    context: .
  dockerfile: Dockerfile.nginx
  links:
    - app
  volumes:
    - ./staticfiles:/var/html/static/

```

```

nginx.conf:
server {
    listen      80;

    location / {
        proxy_pass http://app:8000/;
    }

    location /static/ {
        alias /var/html/static/;
    }
}

```

Задание 5:

Скриншот развертывания в docker

The screenshot shows a terminal window with the following content:

```

Step 1/2 : FROM nginx
=> 652ca386ed1
Step 2/2 : COPY nginx.conf /etc/nginx/conf.d/default.conf
=> b925e9488293
Successfully built b925e9488293
Successfully tagged django-locallibrary-tutorial/nginx:latest
WARNING: Image for service nginx was built because it did not already exist. To rebuild this image you must use `do
cker-compose build` or `docker-compose up --build`.
Creating app ... done
Attaching to app, nginx
app      | [2021-12-18 11:49:01 +0000] [8] [INFO] Starting gunicorn 20.0.4
app      | [2021-12-18 11:49:01 +0000] [8] [INFO] Listening at: http://0.0.0.0:8000 (8)
app      | [2021-12-18 11:49:01 +0000] [8] [INFO] Using worker: sync
app      | [2021-12-18 11:49:01 +0000] [9] [INFO] Booting worker with pid: 9
nginx    | /docker-entrypoint.sh: /docker-entrypoint.d/ is not empty, will attempt to perform configuration
nginx    | /docker-entrypoint.sh: Looking for shell scripts in /docker-entrypoint.d/
nginx    | /docker-entrypoint.sh: Launching /docker-entrypoint.d/10-listen-on-ipv6-by-default.sh
nginx    | 10-listen-on-ipv6-by-default.sh: info: /etc/nginx/conf.d/default.conf differs from the packaged version
nginx    | 10-listen-on-ipv6-by-default.sh: info: /etc/nginx/conf.d/default.conf differs from the packaged version
nginx    | /docker-entrypoint.sh: Launching /docker-entrypoint.d/20-envsubst-on-templates.sh
nginx    | /docker-entrypoint.sh: Launching /docker-entrypoint.d/30-tune-worker-processes.sh
nginx    | /docker-entrypoint.sh: Configuration complete; ready for start up
nginx    | [2021/12/18 11:49:02 [notice] 141: using the "poll" event method
nginx    | [2021/12/18 11:49:02 [notice] 141: nginx/1.21.4
nginx    | [2021/12/18 11:49:02 [notice] 141: built by gcc 10.2.1 20210110 (Debian 10.2.1-6)
nginx    | [2021/12/18 11:49:02 [notice] 141: OS: Linux 4.18.0-240.1.1.el8_3.x86_64
nginx    | [2021/12/18 11:49:02 [notice] 141: getrlimit(RLIMIT_NOFILE): 1048576:1048576
nginx    | [2021/12/18 11:49:02 [notice] 141: start worker process 30
nginx    | [2021/12/18 11:49:02 [notice] 141: start worker process 31
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:16 +0000] "GET / HTTP/1.1" 301 0 "-" Mozilla/5.0 (X11; Linux x86_64; rv
194.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:16 +0000] "GET /catalog/ HTTP/1.1" 200 1963 "-" Mozilla/5.0 (X11; Linux
x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:16 +0000] "GET /static/css/styles.css HTTP/1.1" 200 78 "http://10.9.8.16
/catalog/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:16 +0000] "GET /static/images/local_library_model_unl.png HTTP/1.1" 200
29633 "http://10.9.8.16/catalog/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
app      | Not Found: /favicon.ico
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:16 +0000] "GET /favicon.ico HTTP/1.1" 404 2416 "http://10.9.8.16/catalog
/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:24 +0000] "GET /catalog/ HTTP/1.1" 200 1963 "http://10.9.8.16/catalog/"
Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:24 +0000] "GET /static/css/styles.css HTTP/1.1" 304 0 "http://10.9.8.16/
catalog/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:24 +0000] "GET /static/images/local_library_model_unl.png HTTP/1.1" 304
0 "http://10.9.8.16/catalog/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:25 +0000] "GET /catalog/books/ HTTP/1.1" 200 1092 "http://10.9.8.16/ca
log/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:25 +0000] "GET /static/css/styles.css HTTP/1.1" 304 0 "http://10.9.8.16/
catalog/books/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:25 +0000] "GET /catalog/authors/ HTTP/1.1" 200 1098 "http://10.9.8.16/ca
log/books/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"
nginx    | 10.9.8.1 -- [18/Dec/2021:11:49:25 +0000] "GET /static/css/styles.css HTTP/1.1" 304 0 "http://10.9.8.16/
catalog/authors/" Mozilla/5.0 (X11; Linux x86_64; rv:94.0) Gecko/20100101 Firefox/94.0" "-"

```

The application is named 'Local Library Home' and is a tutorial example for creating a Django skeleton website and application. The terminal also shows the UML Models for the application, including Book, Author, Genre, and Language entities.

UML Models

An UML diagram of the site's Django model structure is shown below.

```

classDiagram
    class Book {
        +title String
        +author Author[]
        +summary String
        +ISBN String
        +genre Genre[]
        +language Language[]
        +__str__ String
    }
    class Author {
        +name String
        +date_of_birth DateField
        +date_of_death DateField
        +books Book[]
        +__str__ String
    }
    class Genre {
        +name String
        +__str__ String
    }
    class Language {
        +name String
        +__str__ String
    }
    class BookInstance {
        +uniqueid String
        +due_date DateField
        +status(CALL_STATUS)
        +book Book[]
        +imprint String
        +borrower User[]
        +__str__ String
    }
    Book "1" -- "0..*" Genre
    Book "1" -- "0..*" Language
    Book "1" -- "0..*" BookInstance
    Author "1" -- "0..*" Book
    Genre "1" -- "0..*" Book
    Language "1" -- "0..*" Book

```

Dynamic content

The library has the following record counts:

- Books: 0
- Copies: 0
- Copies available: 0
- Authors: 0

Задание 6:

workflow/main.yml:

```
name: Run Tests
on: [push]
jobs:
  TEST_PYTHON:
    runs-on: ubuntu-20.04
    steps:
      - name: Check out repository code
        uses: actions/checkout@v2
      - run: ls -la
      - name: Run Scripts to test
        run: pip3 install -r requirements.txt
      - run: python3 manage.py migrate
      - run: python3 manage.py collectstatic
      - run: python3 manage.py test
```

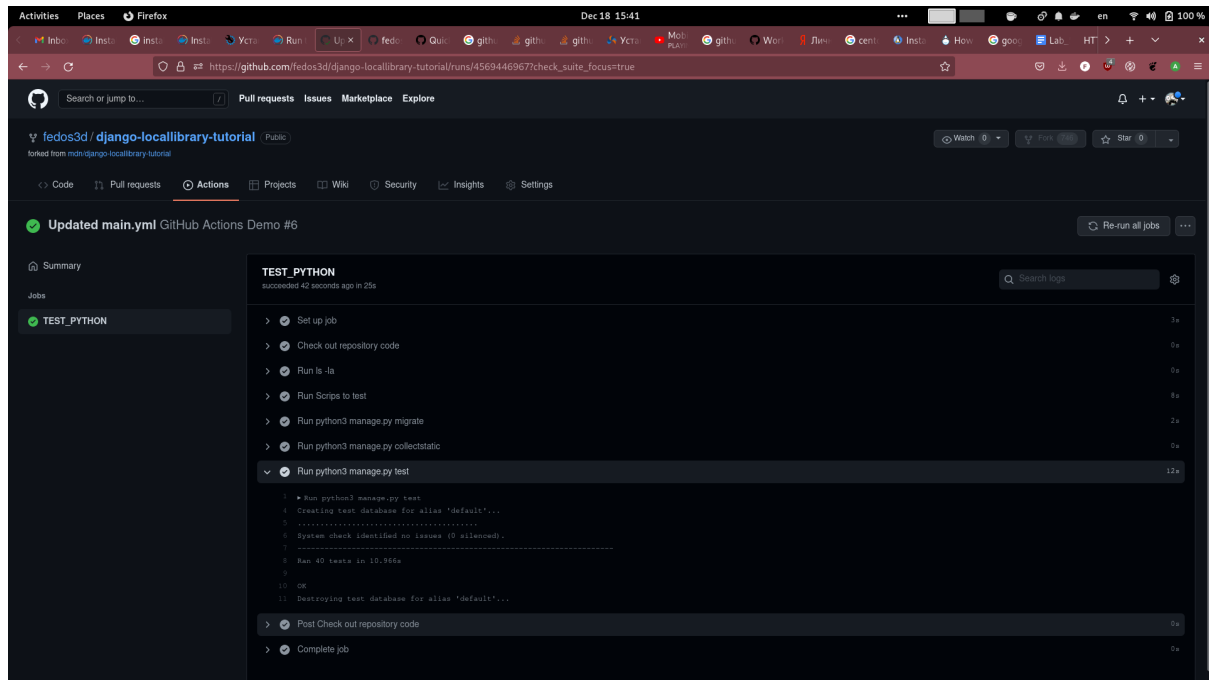
workflow/dockerbuild.yml:

```
name: Build Docker and Push
on: [push]
jobs:
  Build_and_push:
    runs-on: ubuntu-20.04
    steps:
      - name: Set up QEMU
        uses: docker/setup-qemu-action@v1

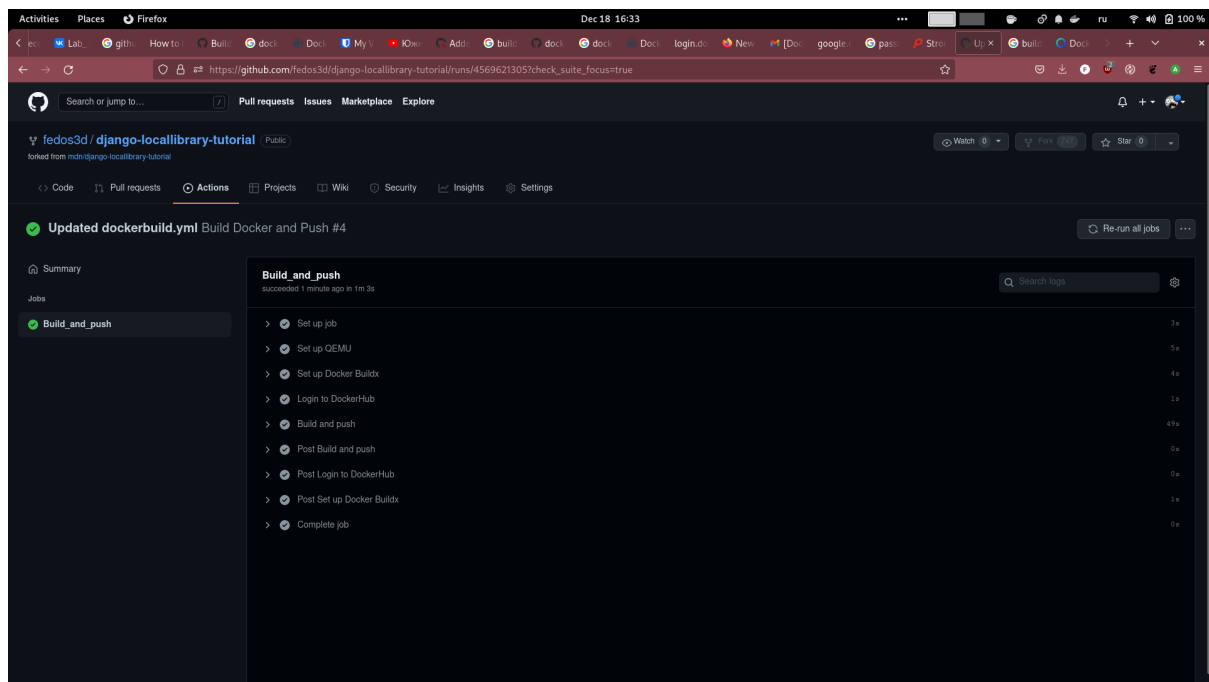
      - name: Set up Docker Buildx
        uses: docker/setup-buildx-action@v1
      - name: Login to DockerHub
        uses: docker/login-action@v1
        with:
          username: ${ secrets.DOCKERHUB_USERNAME }
          password: ${ secrets.DOCKERHUB_TOKEN }
      - name: Build and push
        id: docker_build
        uses: docker/build-push-action@v2
        with:
          push: true
          tags: fedos3d/djangoapp:latest
          file: Dockerfile.django
```

Задание 7:

Прохождение автотестов:



Сборка образа:



Задание 8:

<https://hub.docker.com/repository/docker/fedos3d/djangoapp>

<https://github.com/fedos3d/django-locallibrary-tutorial>