

Министерство науки и высшего образования Российской Федерации
Федеральное государственное бюджетное образовательное учреждение
высшего образования «Уфимский университет науки и технологий»

Кафедра ТК

Отчет по практической работе № 3
Начало работы с FastAPI

Выполнил: ст. гр. ИВТ-432Б

Лисовский В.И.

Принял: к.т.н., доц. каф. ТК

Насыров Р.В.

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Цель: познакомиться с созданием и использованием виртуальной среды. Настроить Docker и создать сборку с простым приложением. Создание простого приложения FastAPI.

Ход работы:

Знакомство с созданием виртуальной среды:

```
Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/todos (master)  
$ python -m venv venv
```

Рисунок 1 – Установка библиотеки виртуального окружения

```
Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/todos (master)  
$ pip install virtualenv  
Collecting virtualenv  
  Downloading virtualenv-20.34.0-py3-none-any.whl.metadata (4.6 kB)  
Collecting distlib<1,>=0.3.7 (from virtualenv)  
  Downloading distlib-0.4.0-py2.py3-none-any.whl.metadata (5.2 kB)  
Collecting filelock<4,>=3.12.2 (from virtualenv)  
  Downloading filelock-3.19.1-py3-none-any.whl.metadata (2.1 kB)  
Collecting platformdirs<5,>=3.9.1 (from virtualenv)  
  Downloading platformdirs-4.4.0-py3-none-any.whl.metadata (12 kB)  
Downloading virtualenv-20.34.0-py3-none-any.whl (6.0 MB)  
----- 6.0/6.0 MB 702.8 kB/s eta 0:00:00  
Downloading distlib-0.4.0-py2.py3-none-any.whl (469 kB)  
Downloading filelock-3.19.1-py3-none-any.whl (15 kB)  
Downloading platformdirs-4.4.0-py3-none-any.whl (18 kB)  
Installing collected packages: distlib, platformdirs, filelock, virtualenv  
Successfully installed distlib-0.4.0 filelock-3.19.1 platformdirs-4.4.0 virtualenv-20.34.0  
  
[notice] A new release of pip is available: 25.0.1 -> 25.2  
[notice] To update, run: python.exe -m pip install --upgrade pip
```

Рисунок 2 – Библиотека установлена

```
Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/todos (master)  
$ source venv/Scripts/activate  
(venv)
```

Рисунок 3 – Активация виртуальное окружения

```

D:\Учеба\Сетевые технологии\Практики\Практика 3\todos\venv>pip install fastapi
Collecting fastapi
  Downloading fastapi-0.118.0-py3-none-any.whl.metadata (28 kB)
Collecting starlette<0.49.0,>=0.40.0 (from fastapi)
  Downloading starlette-0.48.0-py3-none-any.whl.metadata (6.3 kB)
Collecting pydantic!=1.8,!>=1.8.1,!>=2.0.0,!>=2.0.1,!>=2.1.0,<3.0.0,>=1.7.4 (from fastapi)
  Downloading pydantic-2.11.9-py3-none-any.whl.metadata (68 kB)
Collecting typing-extensions>=4.8.0 (from fastapi)
  Downloading typing_extensions-4.15.0-py3-none-any.whl.metadata (3.3 kB)
Collecting annotated-types>=0.6.0 (from pydantic!=1.8,!>=1.8.1,!>=2.0.0,!>=2.0.1,!>=2.1.0,<3.0.0,>=1.7.4->fastapi)
  Downloading annotated_types-0.7.0-py3-none-any.whl.metadata (15 kB)
Collecting pydantic-core==2.33.2 (from pydantic!=1.8,!>=1.8.1,!>=2.0.0,!>=2.0.1,!>=2.1.0,<3.0.0,>=1.7.4->fastapi)
  Downloading pydantic_core-2.33.2-cp311-cp311-win_amd64.whl.metadata (6.9 kB)
Collecting typing-inspection>=0.4.0 (from pydantic!=1.8,!>=1.8.1,!>=2.0.0,!>=2.0.1,!>=2.1.0,<3.0.0,>=1.7.4->fastapi)
  Downloading typing_inspection-0.4.2-py3-none-any.whl.metadata (2.6 kB)
Collecting anyio<5,>=3.6.2 (from starlette<0.49.0,>=0.40.0->fastapi)
  Downloading anyio-4.11.0-py3-none-any.whl.metadata (4.1 kB)
Requirement already satisfied: idna>=2.8 in c:\users\владислав\appdata\local\programs\python\python311\lib\site-packages (from anyio<5,>=3.6.2->starlette<0.49.0,>=0.40.0->fastapi) (3.4)
Collecting sniffio>=1.1 (from anyio<5,>=3.6.2->starlette<0.49.0,>=0.40.0->fastapi)
  Downloading sniffio-1.3.1-py3-none-any.whl.metadata (3.9 kB)
Downloading fastapi-0.118.0-py3-none-any.whl (97 kB)
Downloading pydantic-2.11.9-py3-none-any.whl (444 kB)
Downloading pydantic_core-2.33.2-cp311-cp311-win_amd64.whl (2.0 MB)
----- 2.0/2.0 MB 680.4 kB/s eta 0:00:00
Downloading starlette-0.48.0-py3-none-any.whl (73 kB)
Downloading typing_extensions-4.15.0-py3-none-any.whl (44 kB)
Downloading annotated_types-0.7.0-py3-none-any.whl (13 kB)
Downloading anyio-4.11.0-py3-none-any.whl (109 kB)
Downloading typing_inspection-0.4.2-py3-none-any.whl (14 kB)
Downloading sniffio-1.3.1-py3-none-any.whl (10 kB)
Installing collected packages: typing-extensions, sniffio, annotated-types, typing-inspection, pydantic-core, anyio, starlette, pydantic, fastapi
Successfully installed annotated-types-0.7.0 anyio-4.11.0 fastapi-0.118.0 pydantic-2.11.9 pydantic-core-2.33.2 sniffio-1.3.1 starlette-0.48.0 typing-extensions-4.15.0 typing-inspection-0.4.2

```

Рисунок 4 – Установка FastAPI в локальное окружение

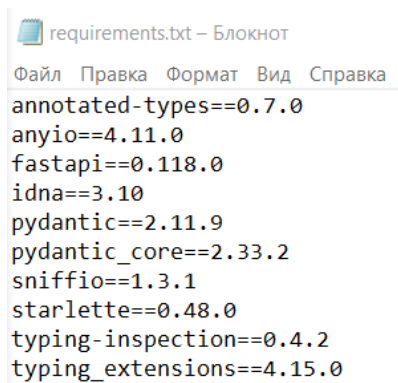
```

Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/todos (master)
$ python -m pip list
Package            Version
-----
annotated-types    0.7.0
anyio              4.11.0
fastapi            0.118.0
idna               3.10
pip               22.3.1
pydantic           2.11.9
pydantic_core      2.33.2
setuptools         65.5.0
sniffio            1.3.1
starlette          0.48.0
typing_extensions  4.15.0
typing-inspection  0.4.2

[notice] A new release of pip available: 22.3.1 -> 25.2
[notice] To update, run: python.exe -m pip install --upgrade pip
(venv)
Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/todos (master)
$ pip freeze > requirements.txt
(venv)

```

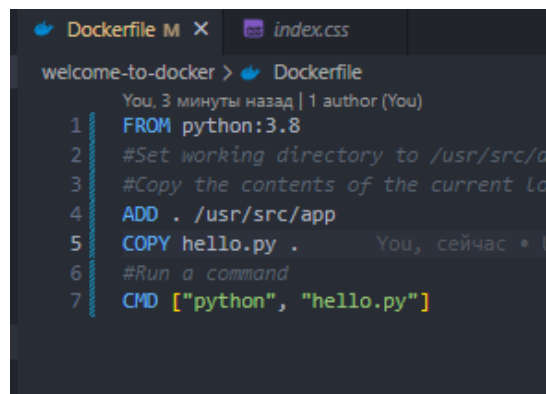
Рисунок 5 – Список установленных библиотек в локальном окружении и сохранение списка в текстовый файл



```
requirements.txt - Блокнот
Файл Правка Формат Вид Справка
annotated-types==0.7.0
anyio==4.11.0
fastapi==0.118.0
idna==3.10
pydantic==2.11.9
pydantic_core==2.33.2
sniffio==1.3.1
starlette==0.48.0
typing-inspection==0.4.2
typing_extensions==4.15.0
```

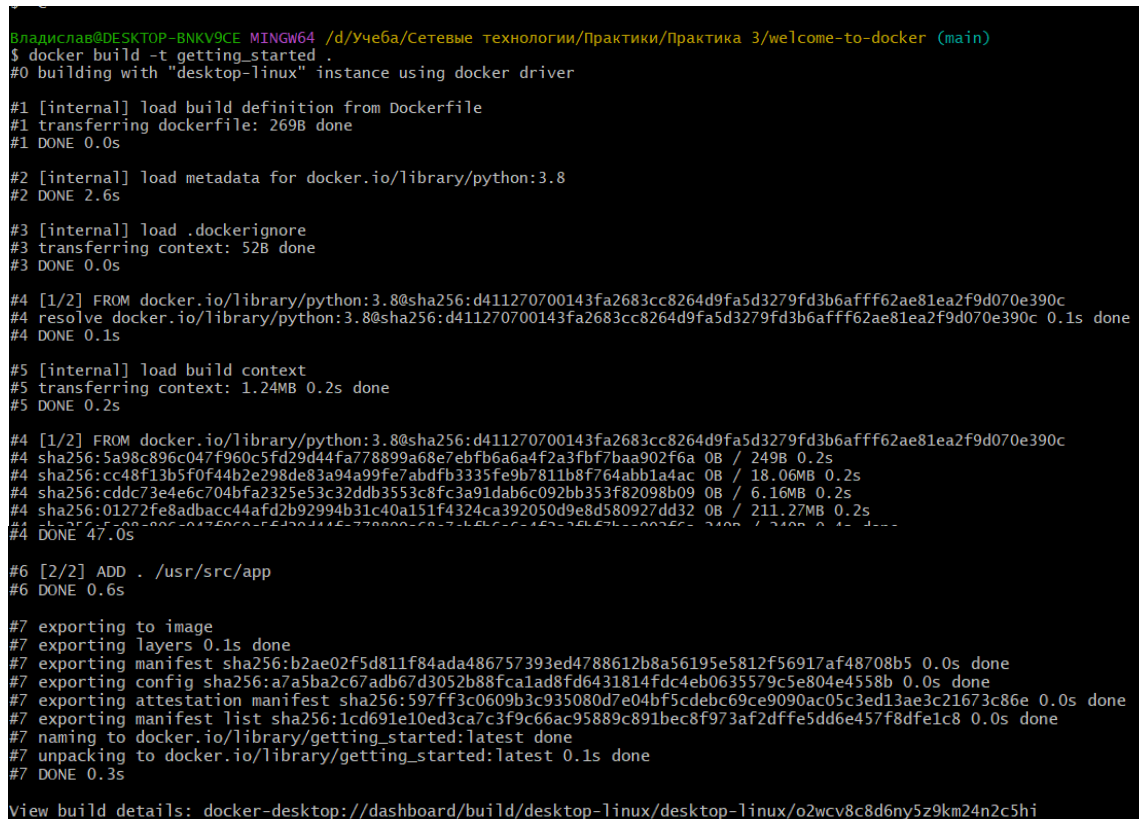
Рисунок 6 – Созданный текстовый файл

Docker



```
Dockerfile M X index.css
welcome-to-docker > Dockerfile
You, 3 минуты назад | 1 author (You)
1 FROM python:3.8
2 #Set working directory to /usr/src/app
3 #Copy the contents of the current local
4 ADD . /usr/src/app
5 COPY hello.py . You, сейчас * U
6 #Run a command
7 CMD ["python", "hello.py"]
```

Рисунок 7 – Созданный Dockerfile



```
Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/welcome-to-docker (main)
$ docker build -t getting_started .
#0 building with "desktop-linux" instance using docker driver

#1 [internal] load build definition from Dockerfile
#1 transferring dockerfile: 269B done
#1 DONE 0.0s

#2 [internal] load metadata for docker.io/library/python:3.8
#2 DONE 2.6s

#3 [internal] load .dockerignore
#3 transferring context: 52B done
#3 DONE 0.0s

#4 [1/2] FROM docker.io/library/python:3.8@sha256:d411270700143fa2683cc8264d9fa5d3279fd3b6afff62ae81ea2f9d070e390c
#4 resolve docker.io/library/python:3.8@sha256:d411270700143fa2683cc8264d9fa5d3279fd3b6afff62ae81ea2f9d070e390c 0.1s done
#4 DONE 0.1s

#5 [internal] load build context
#5 transferring context: 1.24MB 0.2s done
#5 DONE 0.2s

#4 [1/2] FROM docker.io/library/python:3.8@sha256:d411270700143fa2683cc8264d9fa5d3279fd3b6afff62ae81ea2f9d070e390c
#4 sha256:5a98c896c047f960c5fd29d44fa778899a68e/ebfb6a64f2a3fbf7baa902f6a 0B / 249B 0.2s
#4 sha256:cc48f13b5f0f44b2e298de83a94a99fe7abdfb3335fe9b7811b8f764abb1a4ac 0B / 18.06MB 0.2s
#4 sha256:cddc73e4e6c704bfa2325e3c32ddb3553c8fc3a91dab6c092bb353f82098b09 0B / 6.16MB 0.2s
#4 sha256:01272fe8adbacc44afd2b92994b31c40a151f4324ca392050d9e8d580927dd32 0B / 211.27MB 0.2s
#4 sha256:5a98c896c047f960c5fd29d44fa778899a68e/ebfb6a64f2a3fbf7baa902f6a 249B / 249B 0.1s done
#4 DONE 47.0s

#6 [2/2] ADD . /usr/src/app
#6 DONE 0.6s

#7 exporting to image
#7 exporting layers 0.1s done
#7 exporting manifest sha256:b2ae02f5d811f84ada486757393ed4788612b8a56195e5812f56917af48708b5 0.0s done
#7 exporting config sha256:a7a5ba2c67adb67d3052b88fca1ad8fd6431814fdc4eb0635579c5e804e4558b 0.0s done
#7 exporting attestation manifest sha256:597ff3c0609b3c935080d7e04bf5cdebc69ce9090ac05c3ed13ae3c21673c86e 0.0s done
#7 exporting manifest list sha256:1cd691e10ed3ca7c3f9c66ac95889c891bec8f973af2dffe5dd6e457f8dfe1c8 0.0s done
#7 naming to docker.io/library/getting_started:latest done
#7 unpacking to docker.io/library/getting_started:latest 0.1s done
#7 DONE 0.3s

View build details: docker-desktop://dashboard/build/desktop-linux/desktop-linux/o2wcv8c8d6ny5z9km24n2c5hi
```

Рисунок 8 – Создание образа контейнера


<input type="checkbox"/>	Name	ID	Builder	Duration	↓ Created	Author
<input type="checkbox"/>	✓ welcome-to-docker	o2wcv8	 def...	50.6s	4 minutes ago	N/A

Рисунок 9 – Образ в DockerDesktop

```
Владислав@DESKTOP-BNKV9CE MINGW64 /d/учеба/Сетевые технологии/Практики/Практика 3/welcome-to-docker (main)
$ docker run getting_started
Hello, world!
```

Рисунок 10 – Запуск образа контейнера

Создание простого приложения FastAPI

```
Владислав@DESKTOP-BNKV9CE MINGW64 /d/учеба/Сетевые технологии/Практики/Практика 3/todos (master)
$ source venv/Scripts/activate
(venv)
Владислав@DESKTOP-BNKV9CE MINGW64 /d/учеба/Сетевые технологии/Практики/Практика 3/todos (master)
$ pip install fastapi uvicorn
Requirement already satisfied: fastapi in d:\... 3\todos\venv\lib\site-packages (0.118.0)
Collecting uvicorn
  Downloading uvicorn-0.37.0-py3-none-any.whl (67 kB)
----- 68.0/68.0 kB 730.8 kB/s eta 0:00:00
Requirement already satisfied: starlette<0.49.0,>=0.40.0 in d:\... 3\todos\venv\lib\site-packages (from fastapi==0.118.0) (0.40.0)
Requirement already satisfied: pydantic!=1.8,!=1.8.1,!=2.0.0,!=2.0.1,!=2.1.0,<3.0.0,>=1.7.4 in d:\... 3\todos\venv\lib\site-packages (from fastapi==0.118.0) (2.10.6)
Requirement already satisfied: typing-extensions>=4.8.0 in d:\... 3\todos\venv\lib\site-packages (from fastapi==0.118.0) (4.12.0)
Collecting click>=7.0
  Downloading click-8.3.0-py3-none-any.whl (107 kB)
----- 107.3/107.3 kB 6.1 MB/s eta 0:00:00
Collecting h11>=0.8
  Downloading h11-0.16.0-py3-none-any.whl (37 kB)
Collecting colorama
  Using cached colorama-0.4.6-py2.py3-none-any.whl (25 kB)
Requirement already satisfied: annotated-types>=0.6.0 in d:\... 3\todos\venv\lib\site-packages (from pydantic!=1.8,!=1.8.1,!=2.0.0,!=2.0.1,!=2.1.0,<3.0.0,>=1.7.4 in d:\... 3\todos\venv\lib\site-packages) (0.7.0)
Requirement already satisfied: pydantic-core==2.33.2 in d:\... 3\todos\venv\lib\site-packages (from pydantic!=1.8,!=1.8.1,!=2.0.0,!=2.0.1,!=2.1.0,<3.0.0,>=1.7.4 in d:\... 3\todos\venv\lib\site-packages) (2.33.2)
Requirement already satisfied: typing-inspection>=0.4.0 in d:\... 3\todos\venv\lib\site-packages (from pydantic!=1.8,!=1.8.1,!=2.0.0,!=2.0.1,!=2.1.0,<3.0.0,>=1.7.4 in d:\... 3\todos\venv\lib\site-packages) (0.4.2)
Requirement already satisfied: anyio<5,>=3.6.2 in d:\... 3\todos\venv\lib\site-packages (from starlette<0.49.0,>=0.40.0 in d:\... 3\todos\venv\lib\site-packages) (3.6.2)
Requirement already satisfied: idna>=2.8 in d:\... 3\todos\venv\lib\site-packages (from anyio<5,>=3.6.2 in d:\... 3\todos\venv\lib\site-packages) (3.10.1)
Requirement already satisfied: sniffio>=1.1 in d:\... 3\todos\venv\lib\site-packages (from anyio<5,>=3.6.2 in d:\... 3\todos\venv\lib\site-packages) (1.3.1)
Installing collected packages: h11, colorama, click, uvicorn
Successfully installed click-8.3.0 colorama-0.4.6 h11-0.16.0 uvicorn-0.37.0

[notice] A new release of pip available: 22.3.1 -> 25.2
[notice] To update, run: python.exe -m pip install --upgrade pip
(venv)
```

Рисунок 11 – Установка зависимости uvicorn

```
Dockerfile M  api.py U X
todos > api.py > welcome
1 from fastapi import FastAPI
2 app = FastAPI()
3 @app.get("/")
4 async def welcome() -> dict:
5     return {"message": "Hello World"}
```

Рисунок 12 – Создание простого приложения

```

Владислав@DESKTOP-BNKV9CE MINGW64 /d/Учеба/Сетевые технологии/Практики/Практика 3/todos (mast
$ uvicorn api:app --port 8000 --reload
INFO: Will watch for changes in these directories: ['D:\\[REDACTED]\\[REDACTED]\\[REDACTED]\\[REDACTED]
INFO: Uvicorn running on http://127.0.0.1:8000 (Press CTRL+C to quit)
INFO: Started reloader process [4820] using StatReload
INFO: Started server process [15076]
INFO: Waiting for application startup.
INFO: Application startup complete.
INFO: 127.0.0.1:55851 - "GET / HTTP/1.1" 200 OK
INFO: 127.0.0.1:55851 - "GET /favicon.ico HTTP/1.1" 404 Not Found
INFO: 127.0.0.1:55863 - "GET / HTTP/1.1" 200 OK

```

Рисунок 13 – Запуск приложения с помощью uvicorn

```

Владислав@DESKTOP-BNKV9CE MINGW64 /d
$ curl http://127.0.0.1:8000
  % Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
                                 Dload  Upload   Total   Spent    Left   Speed
100    25    100    25    0     0   3323      0  --:--:-- --:--:-- --:--:--  3571{"
message":"Hello World"}

```

Рисунок 14 – Ответ приложения

Все изменения были сохранены в новую ветвь “Практика3(02.10.25)” глобального репозитория GitTest:

[https://github.com/FoxVlad41/GitTest/tree/Практика3\(02.10.25\)](https://github.com/FoxVlad41/GitTest/tree/Практика3(02.10.25))