



TECHNICAL UNIVERSITY OF MOLDOVA  
FACULTY OF COMPUTERS, INFORMATICS AND MICROELECTRONICS  
DEPARTMENT OF SOFTWARE ENGINEERING AND AUTOMATION

WEB PROGRAMMING  
LABORATORY WORK #5

---

**BACKEND DEVELOPMENT**

---

*Author:*  
Daniela AFTENI  
std. gr. FAF-203

*Supervisor:*  
Alexei ȘERŞUN

Chișinău 2023

# 1 Task

The tasks for this lab are:

1. Follow [this basic tutorial](<https://core.telegram.org/bots/tutorial>) to create a Telegram bot using [@BotFather](<https://t.me/botfather>) bot - name it using the format ‘faf20x<your name><your surname>bot’ and save the token in a safe place;
2. Pick a backend framework and programming language of your choice;
3. Your application should use Telegram [webhooks](<https://core.telegram.org/bots/apisetwebhook>) to respond to updates from chats;
4. Use a reverse proxy to establish a secure communication between your local web server and Telegram e.g. Ngrok;
5. Your bot should implement at least the following commands:
  - ‘/start’ - to show a greeting;
  - ‘/latestnews’ with optional parameter ‘topic’ - to search for latest news on some topic (up to 5 links);
    - ‘/savenews’ with required parameter ‘url’ - to add the URL to the saved news for the given user;
    - ‘/savednews’ - to show a list of saved news for the given user.
6. Your application should send HTTP requests to some news API aggregators (e.g. Google News API, NYT API) to fetch the news;

# 2 Results

In the Laboratory work nr. 5 have been realised all the tasks, including 2 extra: the main telegram bot, all commands: start, latest news + topic, save news + URL, saved news, as well as 2 types of users: the regular one and admin, and a feedback bot which handles documents and photos with other groups in which he is present.

To implement this laboratory work, I have used Python, the Daily News[1] for searching for News using Python and the last Search for News[2] file for registration and use of corresponding tokens at searching. I used as well SQLite3[3].

In the Figure 1 is represented how the simple user is greeted. It has its specific sticker and command allowed to use, such as latest news, save news and saved news.

In the next Figure 2 is represented how the admin user is as well greeted. It has another sticker and message, as well as commands, that are allowed to use. Those are latest news, save news, saved news and contact user. For the first 3 are already known their functionality, but in case of contact user, the admin will receive the list of ids of all users (it can be seen in Figure 9).

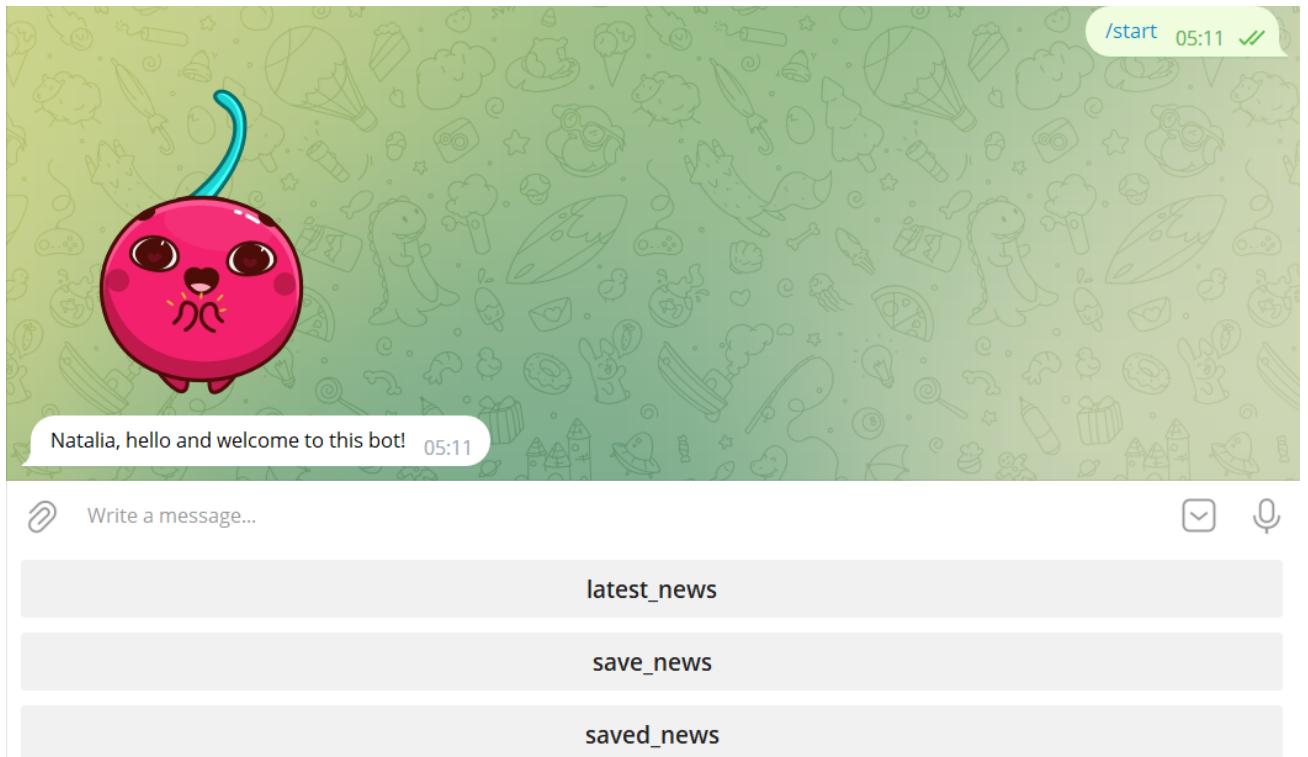


Figure 1: Start, regular user, 3 commands

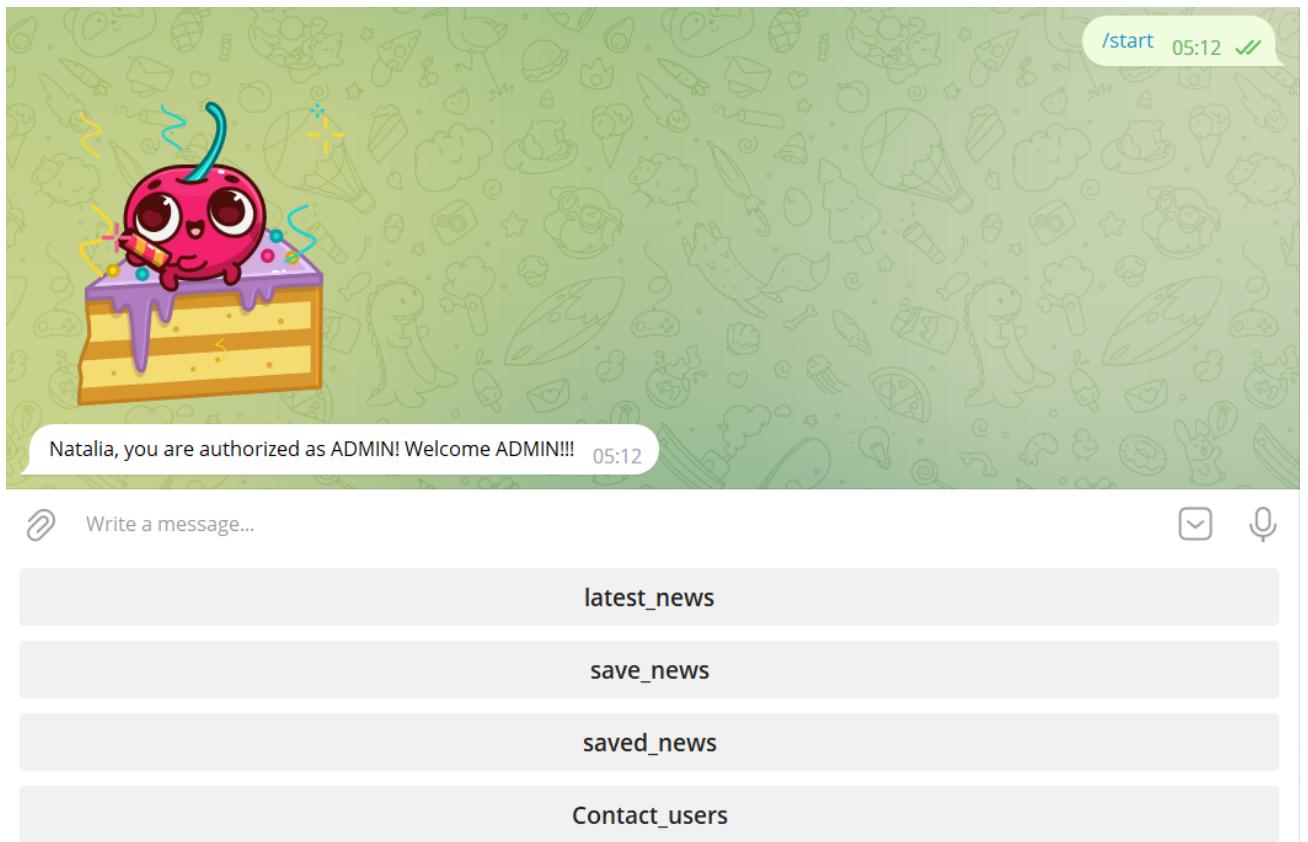


Figure 2: Start, admin user, 4 commands

Latest news is the function that is shown in Figure 3. As it can be seen after any of those typed commands, we can still type them unlimited times. So, after selecting the latest news option from the given below we, are required to pull the topic button in order to give us permission to type the

topic in which we are interested. In this example was typed "Google", and 5 daily news appeared, as it can be seen in Figure 4 and Figure 5.

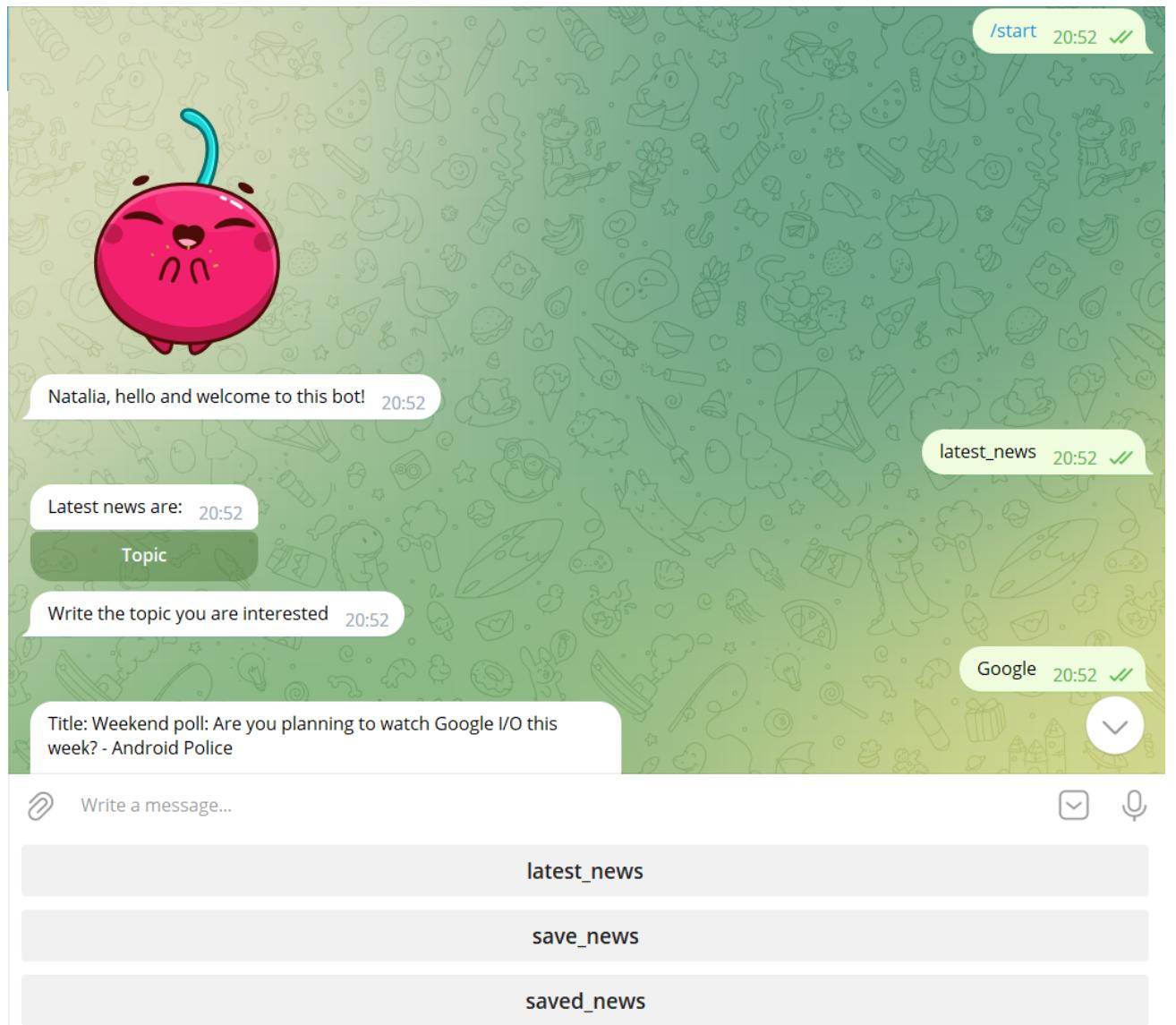


Figure 3: Latest news + topic, part 1

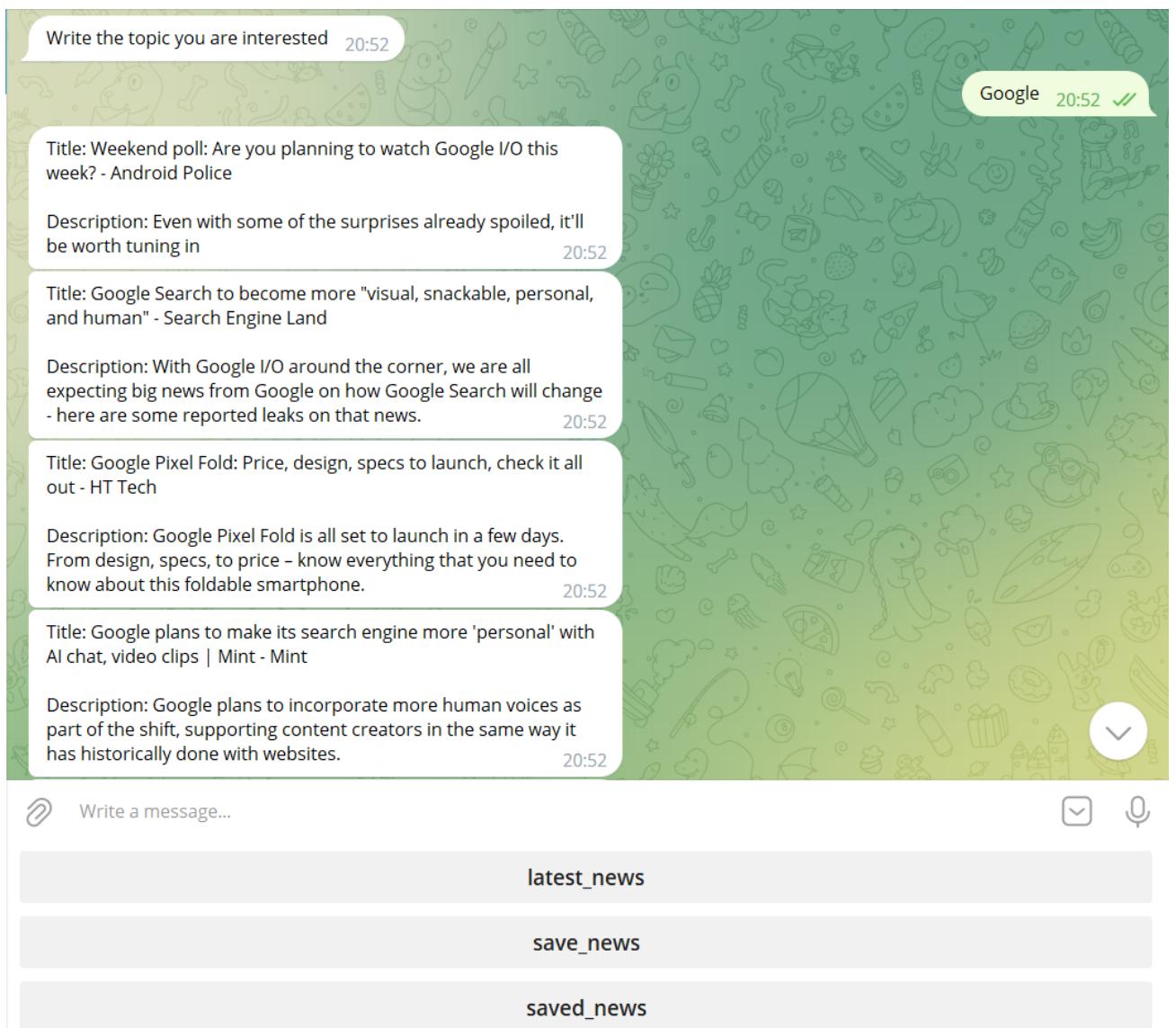


Figure 4: Latest news + topic, part 2

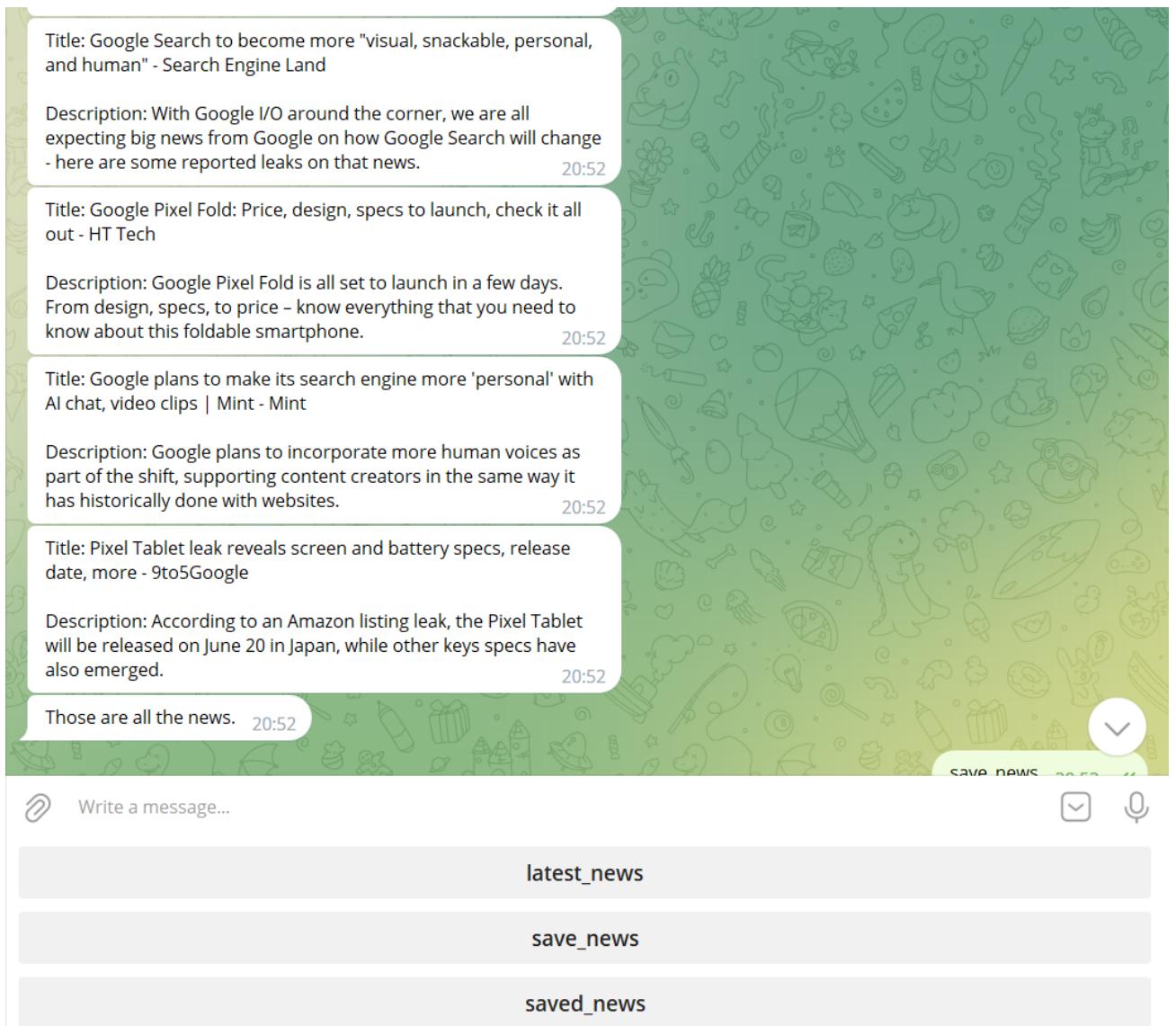


Figure 5: Latest news + topic, part 3

Regarding how to save the URLs of news, it can be seen in Figure 6 and in Figure 7. We again select the corresponding option presented below and press the button for the URL, to give the permission to insert our own URL. After that, it is required from us to confirm that we for sure want to save this URL. In case if not then there is also going to be present a button "Anulare" to cancel and go back to the previous options. Otherwise, if everything is nice then we just Confirm it, and get a message to show that URL was saved.

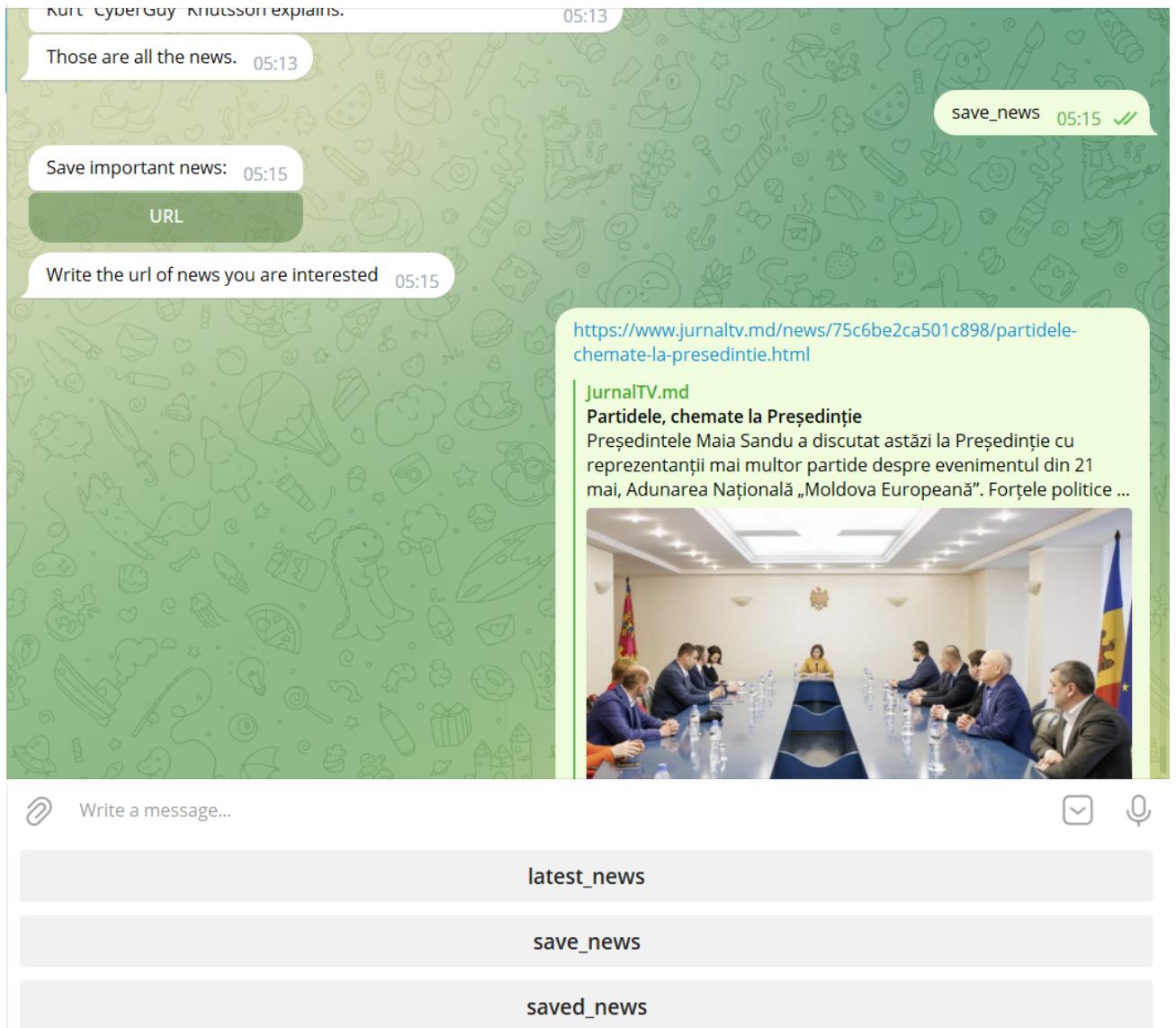


Figure 6: Save news + URL, part 1

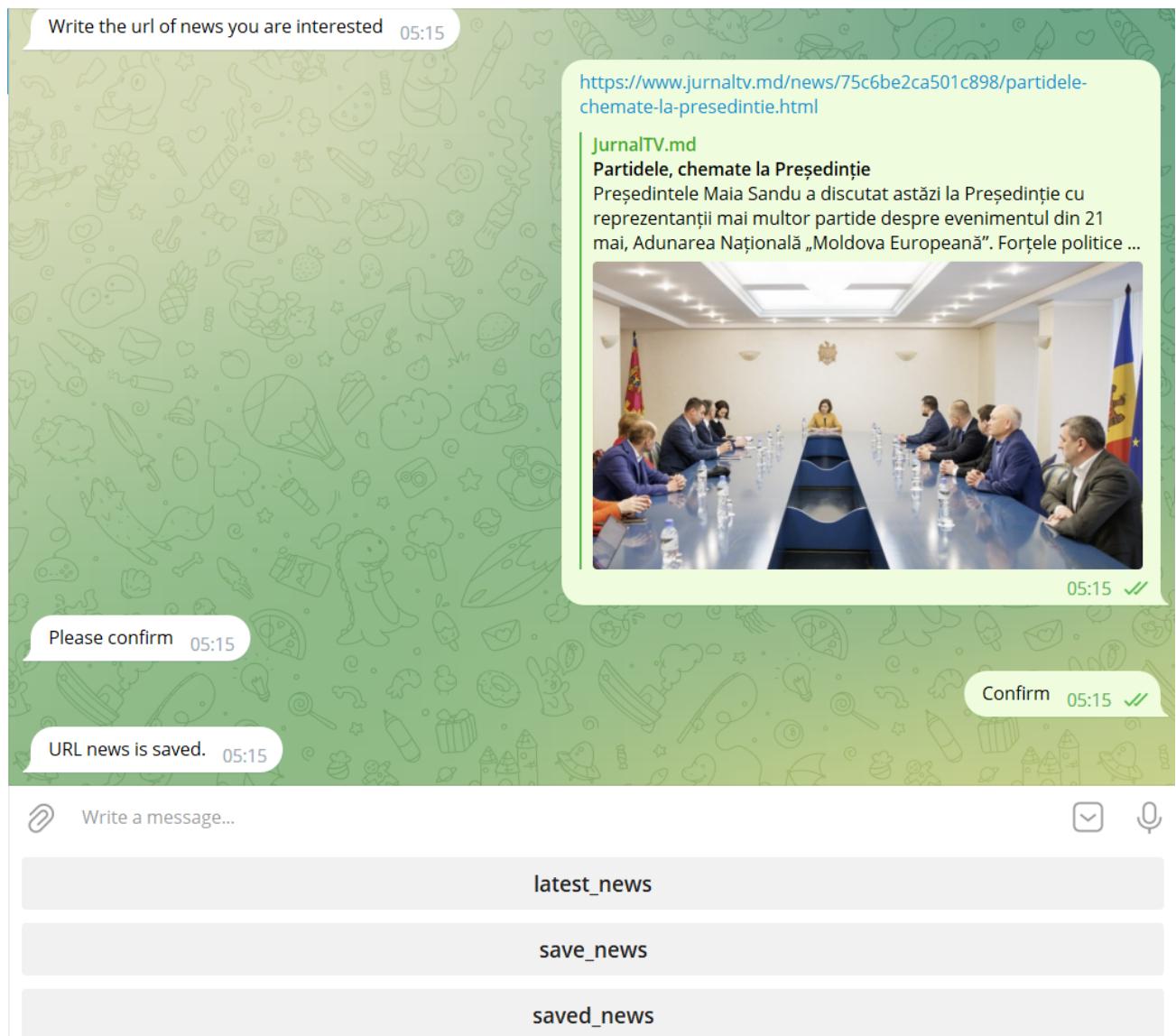


Figure 7: Save news + URL, part 2

The saved news function (Figure 8) is one that does not require any supplementary parameters, and just by pressing this option, is going to appear a list of URLs that correspond to this user.

A major importance is the fact that every save news + URL and saved news command is separate for each user. Thus, it will be possible to add the URL to the saved news for the given user, and to show a list of saved news for the given user.

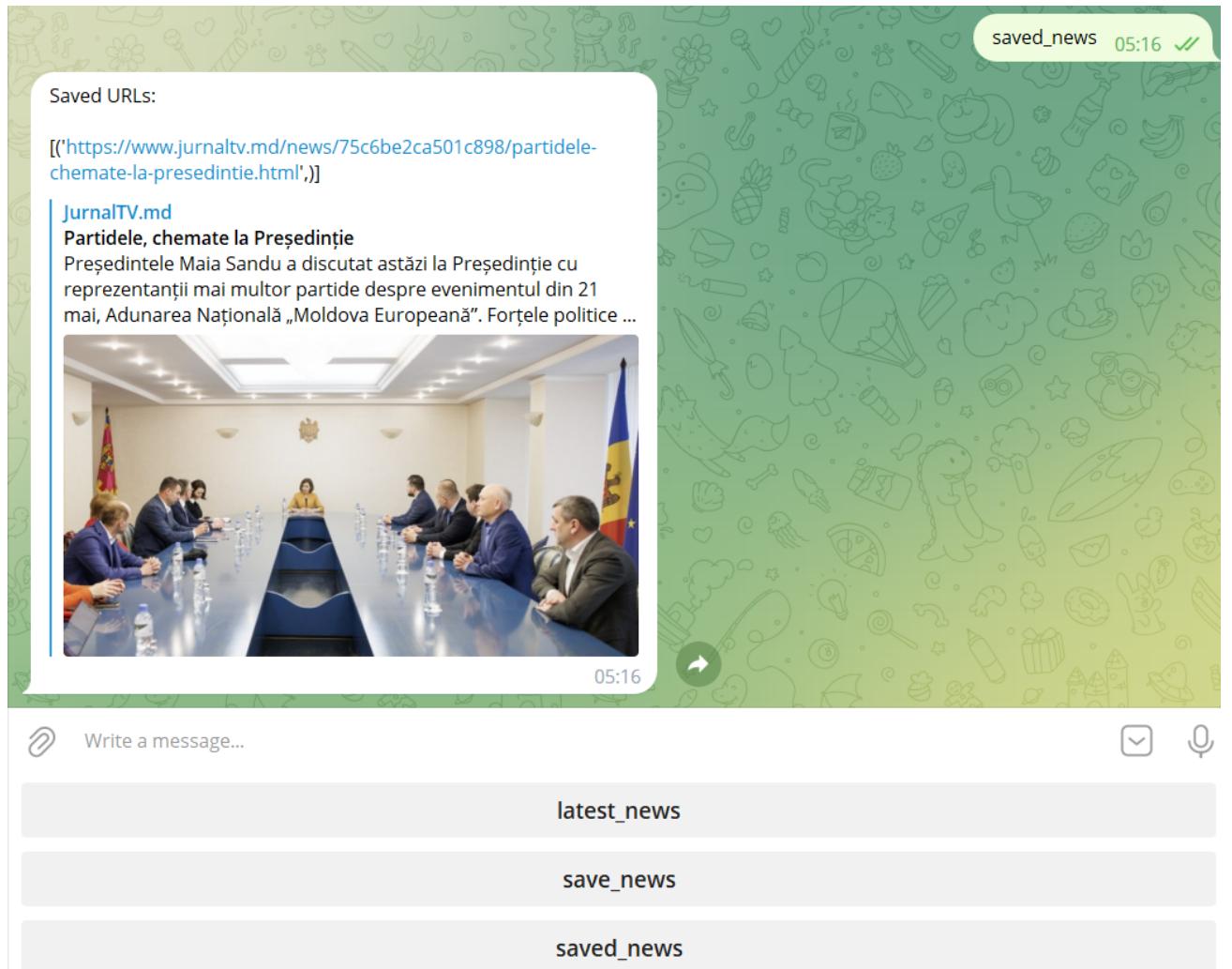


Figure 8: Saved news

As it was already mentioned before, there are 2 more functionalities. One is represented in Figure 9, which gives the possibility to the admin user to get the list of all id users from the data base.

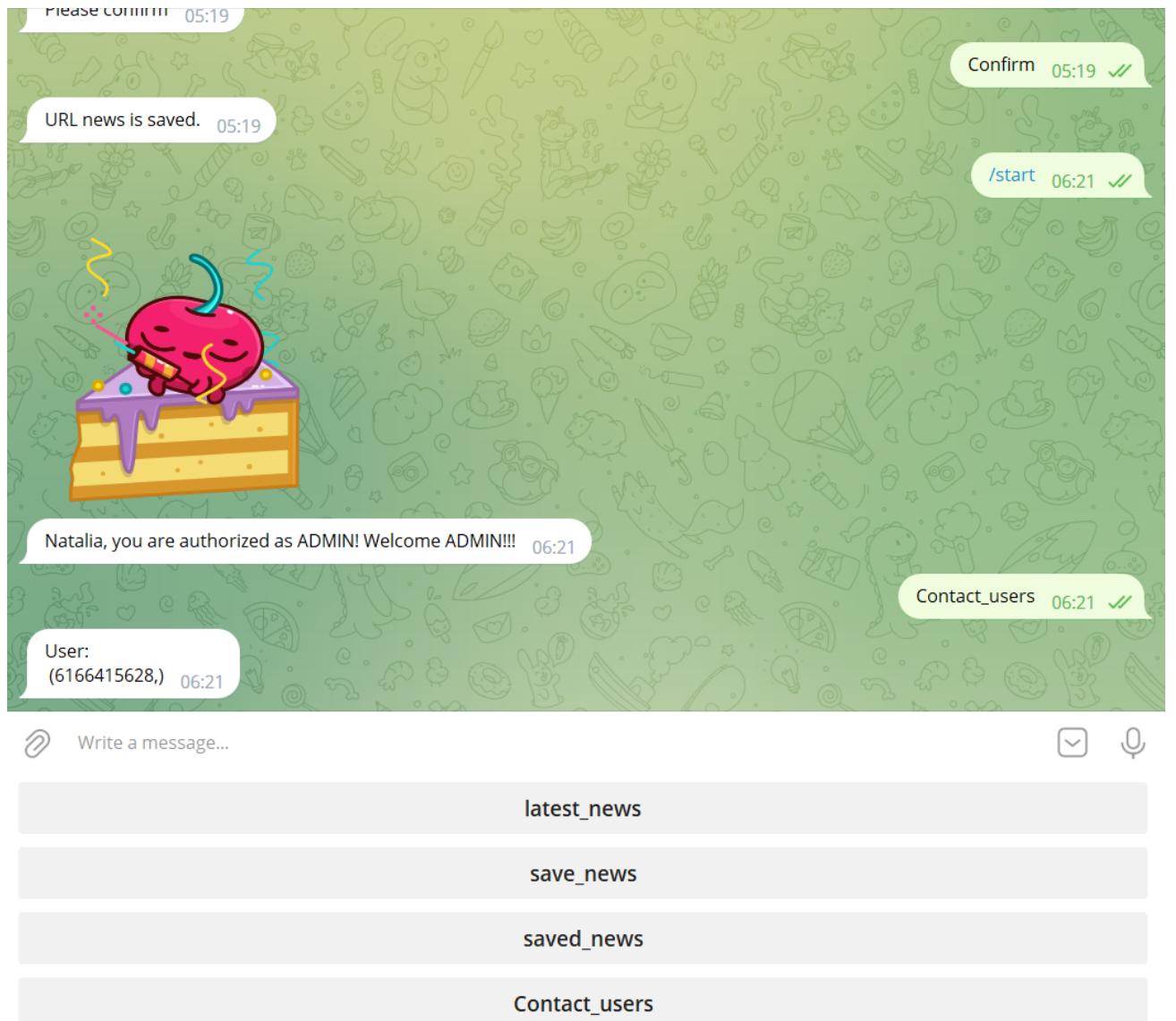


Figure 9: Contact users, admin user

Another bonus functionality was the feedback bot, which is going to send the documents and photos that I send to him, into the group where he is present as admin. It is like a process of handling specific formats of messages. But, for this, there were necessary to make some steps, first being the creation of the "Group1", where I and my bot are included (the bot has the admin role in Group1). Then, in the file "main.py", the line 134 (which is right now set as comment) was sending back to the bot the id of the Group1 (Figure 10).

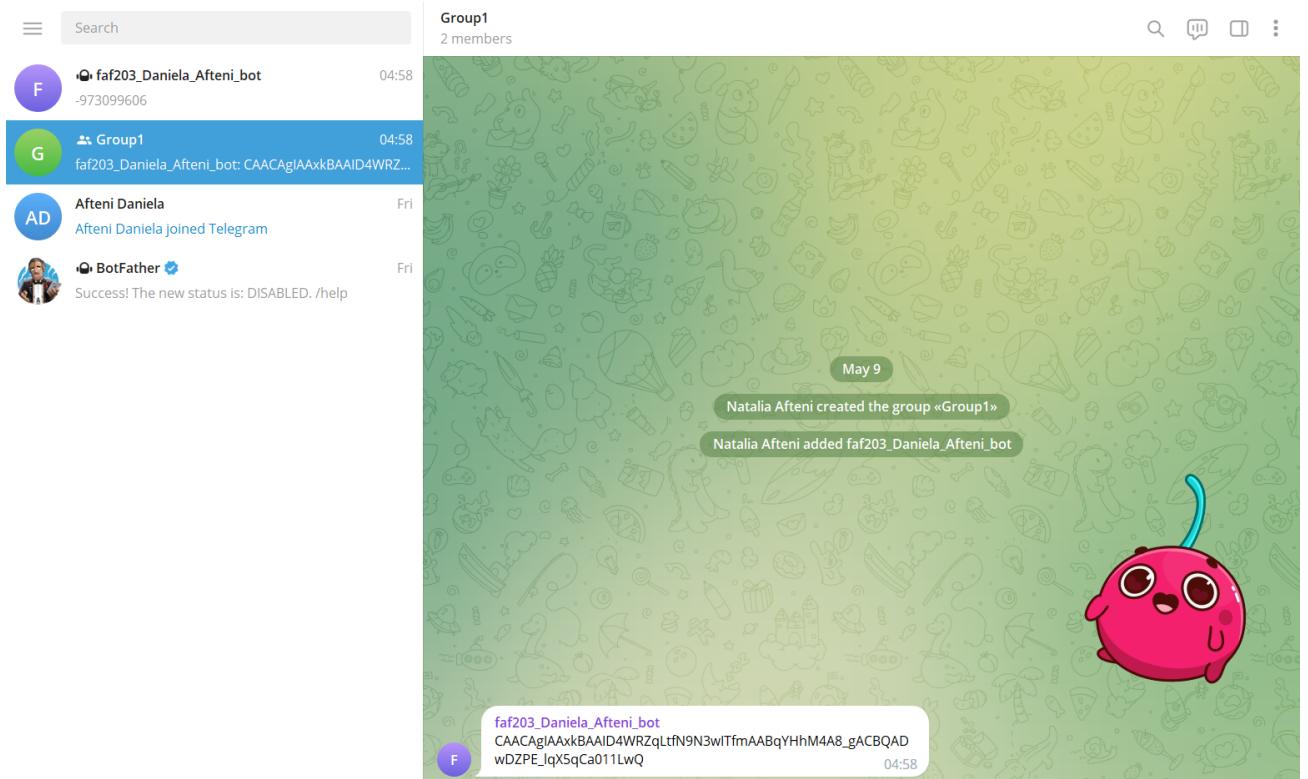


Figure 10: Send a sticker to get id of the Group1

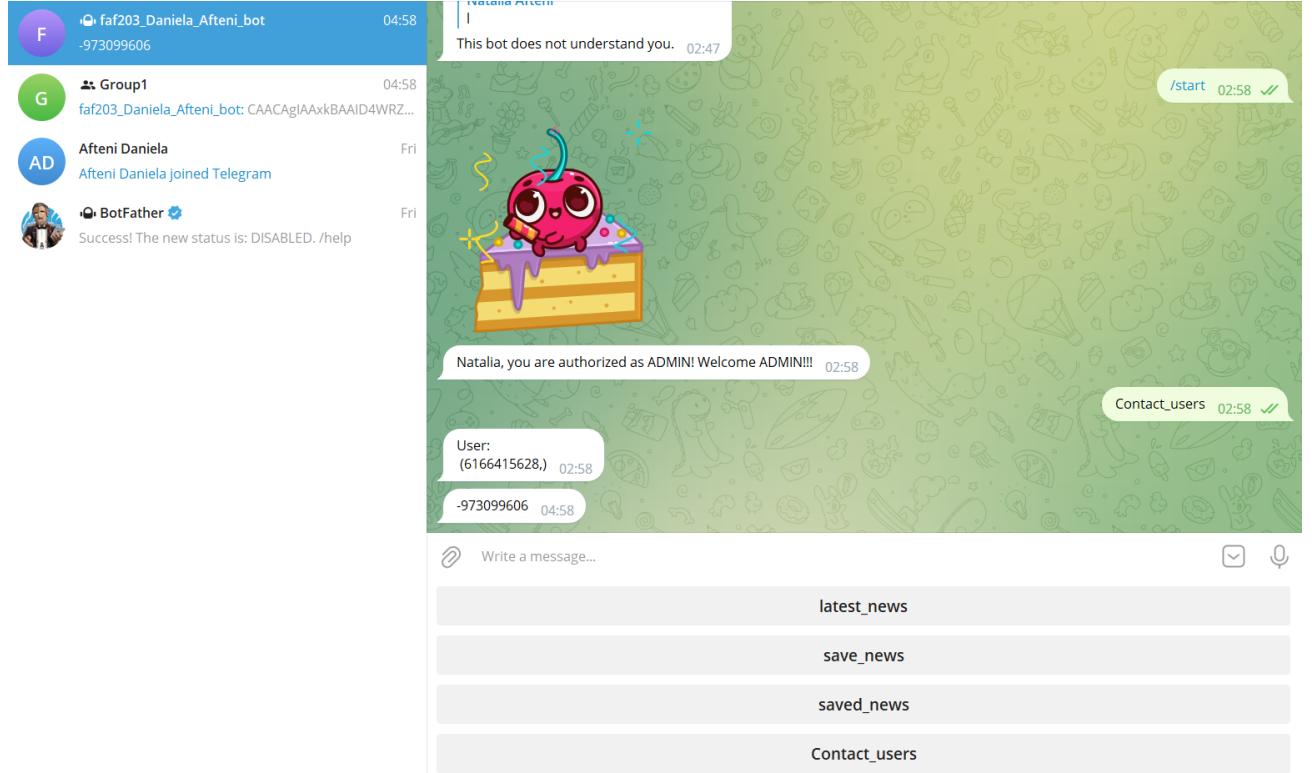


Figure 11: id of the Group1

This id number is saved in .env file for security purposes, and used in some functions. After restarting the bot, now we can send to him, for example "main.py" (Figure 12), and see that this file arrived in Group1 (Figure 13).

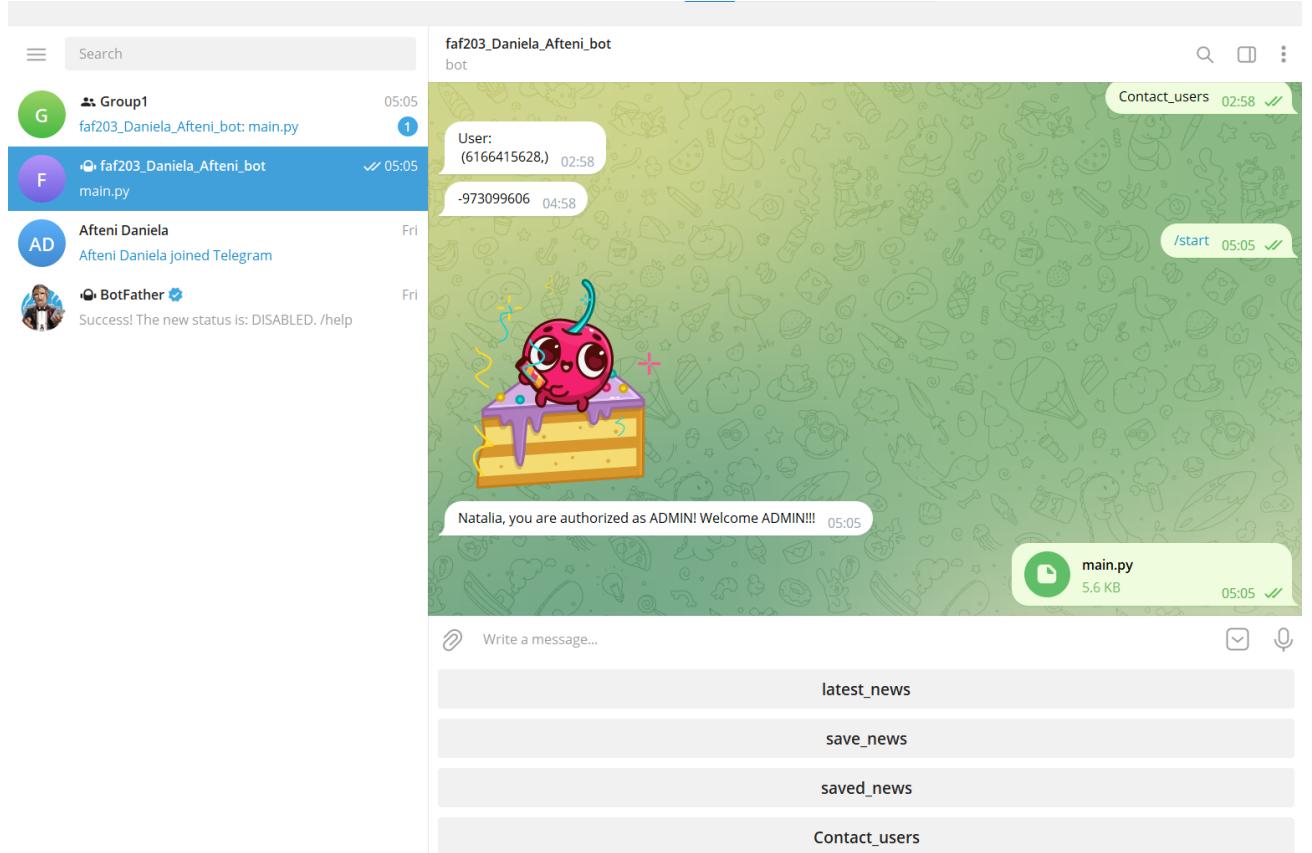


Figure 12: Sending personally to bot "main.py"

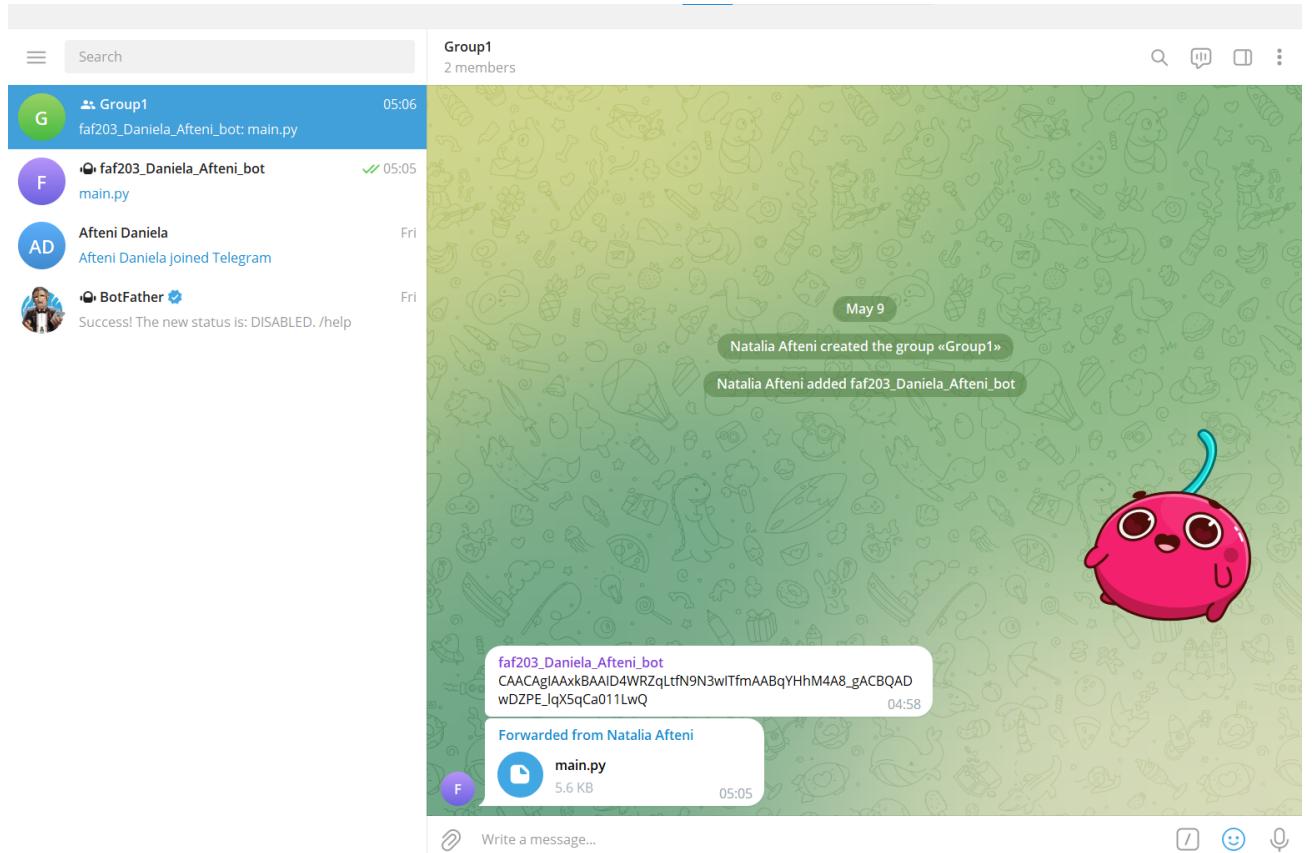
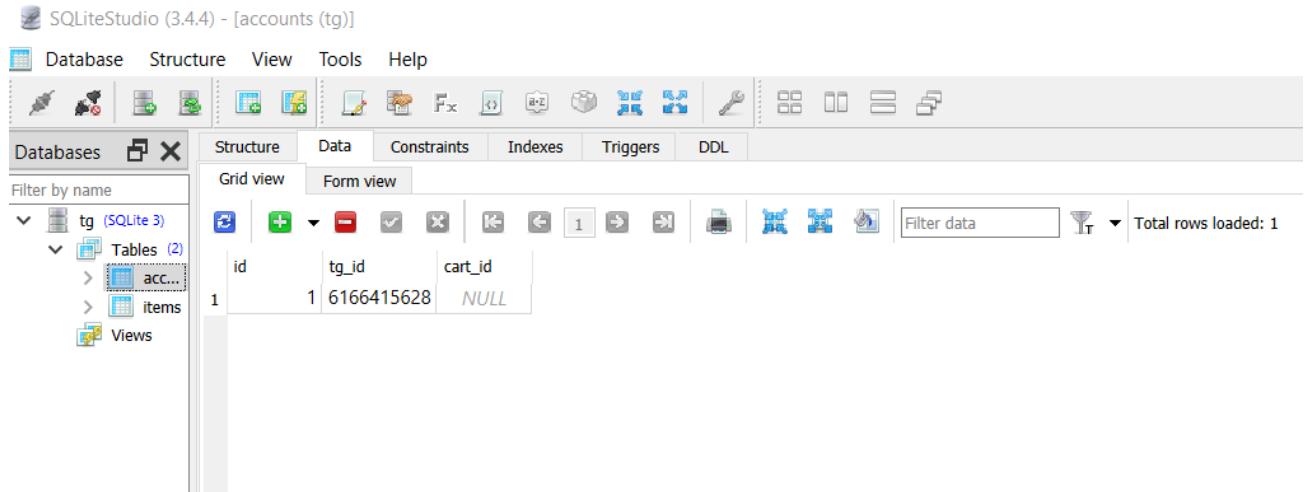


Figure 13: Receiving from bot, in Group1, "main.py"

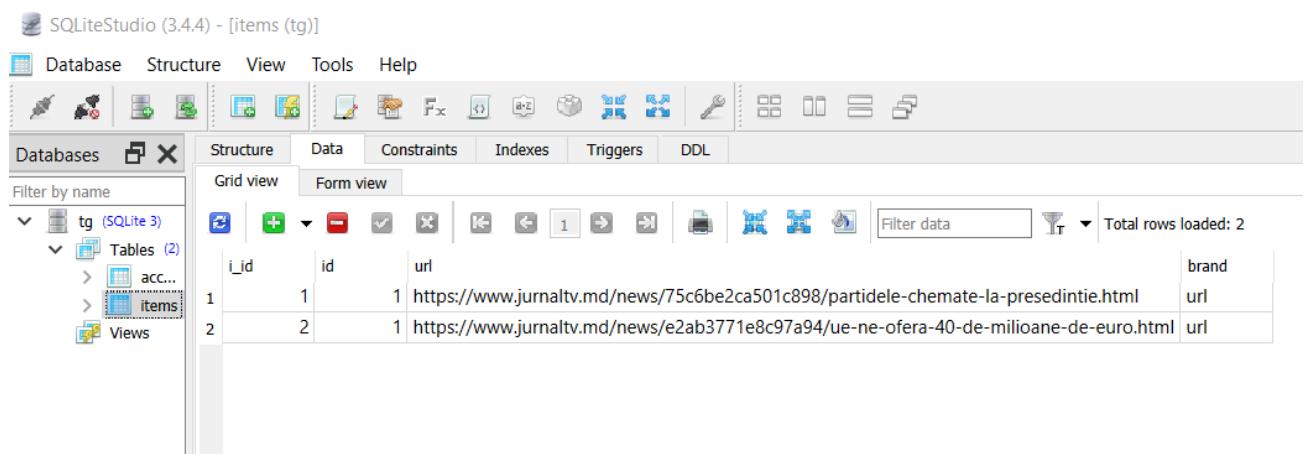
As shown in Figure 14, each user is going to registered in the table, with his id from telegram. And in Figure 15, there can be seed the saved URL, each of them being saved with separate id, and with id of the user. In this particular case, I have just one account, that is why there is just one user, and all the URLs are saved with this id (if you want to experiment with multiple users, it will work, because it's working with foreign key).



The screenshot shows the SQLiteStudio interface with the database 'tg (SQLite 3)' selected. The 'Tables' section contains two tables: 'acc...' and 'items'. The 'acc...' table is currently selected, showing a single row with columns 'id', 'tg\_id', and 'cart\_id'. The value for 'id' is 1, 'tg\_id' is 6166415628, and 'cart\_id' is NULL.

	<b>id</b>	<b>tg_id</b>	<b>cart_id</b>
1	1	6166415628	NULL

Figure 14: User table

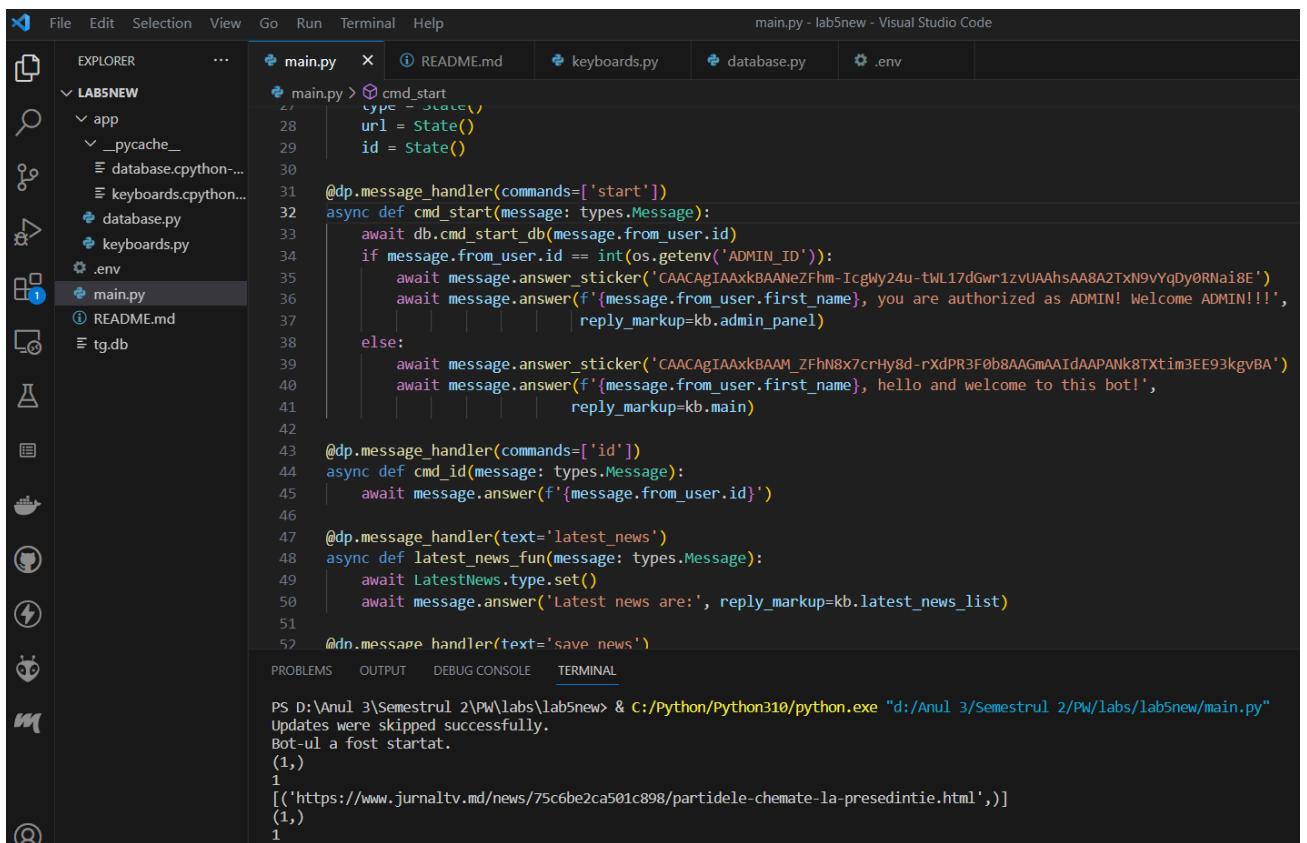


The screenshot shows the SQLiteStudio interface with the database 'tg (SQLite 3)' selected. The 'Tables' section contains two tables: 'acc...' and 'items'. The 'items' table is currently selected, showing two rows with columns 'i\_id', 'id', and 'url'. The first row has 'i\_id' as 1, 'id' as 1, and 'url' as https://www.jurnaltv.md/news/75c6be2ca501c898/partidele-chemate-la-presedintie.html. The second row has 'i\_id' as 2, 'id' as 1, and 'url' as https://www.jurnaltv.md/news/e2ab3771e8c97a94/ue-ne-ofera-40-de-milioane-de-euro.html. A column 'brand' is also present in the table structure.

	<b>i_id</b>	<b>id</b>	<b>url</b>	<b>brand</b>
1	1	1	https://www.jurnaltv.md/news/75c6be2ca501c898/partidele-chemate-la-presedintie.html	url
2	2	1	https://www.jurnaltv.md/news/e2ab3771e8c97a94/ue-ne-ofera-40-de-milioane-de-euro.html	url

Figure 15: Saved URL table

Below, in Figure 16, is represented a part of the main code.



The screenshot shows the Visual Studio Code interface with the following details:

- File Explorer:** Shows the project structure under "LAB5NEW": app, \_\_pycache\_, database.cpython-310.pyc, keyboards.cpython-310.pyc, database.py, keyboards.py, .env, main.py (selected), README.md, and tg.db.
- Code Editor:** Displays the "main.py" file with Python code for a bot. The code includes handlers for "/start", "/id", and "/latest\_news" commands, as well as a news fetcher function. It uses the Bot API and SQLite.
- Terminal:** Shows the command line output of running the script, indicating successful updates and a bot start message.
- Status Bar:** Shows the current file path as "D:\Anul 3\Semestrul 2\PW\labs\lab5new\main.py".

Figure 16: Part of code

If you want this code to work on your computer, then it is going to be required to change the ".env" file, with NEWS TOKEN (please consult <https://newsapi.org/> in order to get the token), ADMIN ID (it is my id, but using command "message.from-user.id" you can get yours), and GROUP ID (just uncomment the line 134 in "main.py" and follow the sections about the Group1).

Initially the file "tg.db" is not present in the project. It is created at the run of the "main.py" file, thus, you can just delete it or include in your SQLiteStudio. You just need to run the "main.py" file.

### 3 Conclusion

Due to this laboratory work, I practiced working with Python at the backend development, and learned how to work with SQLiteStudio by inserting and selecting the required data. Searching for the daily news at a specific topic, was as well very interesting. Depending on the imported libraries it was possible to create and structure this system. Initial structure of the bot was created based on the given skeleton with main functionalities. Thus, there were implemented start, latest news + topic, save news + URL, saved news, as well as 2 types of users: the regular one and admin with his privileges, and a feedback bot which handles documents and photos with other groups in which he is present. I was also able to implement all the requirements regarding the bot as well as 2 more non-trivial functions. Thus, I learned about how to correctly structure the telegram bot, and its available functions.

### References

- [1] Daily News, [\*https://towardsdatascience.com/get-the-latest-news-using-python-and-perf\*](https://towardsdatascience.com/get-the-latest-news-using-python-and-perf)  
Accessed on May 3, 2023.
- [2] Search for News, [\*https://medium.com/daily-python/python-script-to-search-for-news-based-on-a-topic-4a2a2a2a2a2a\*](https://medium.com/daily-python/python-script-to-search-for-news-based-on-a-topic-4a2a2a2a2a2a)  
Accessed on May 3, 2023.
- [3] SQLite, [\*https://realpython.com/python-sqlite-sqlalchemy/\*](https://realpython.com/python-sqlite-sqlalchemy/)  
Accessed on May 3, 2023.