

PART I – VKONTAKTE API BASICS

Design and implement an application that generates a list of all communities, which include community №1 members, by the community №1 identifier. The list should be ranked from the most popular community to the least.

Working process:

1. Register in the social network VKontakte - vk.com
2. Create a stand-alone application <https://vk.com/dev> and get the application ID
3. Get a token for working with the VK API
4. Using any programming language, implement the function of displaying communities by popularity among participants in the initial community No. 1 (the number of participants must be at least 2000).

VKontacte application creation

Follow the next steps:

1. Log in at vk.com
2. Go to the <https://vk.com/dev> and select “My Application” (fig. 1)

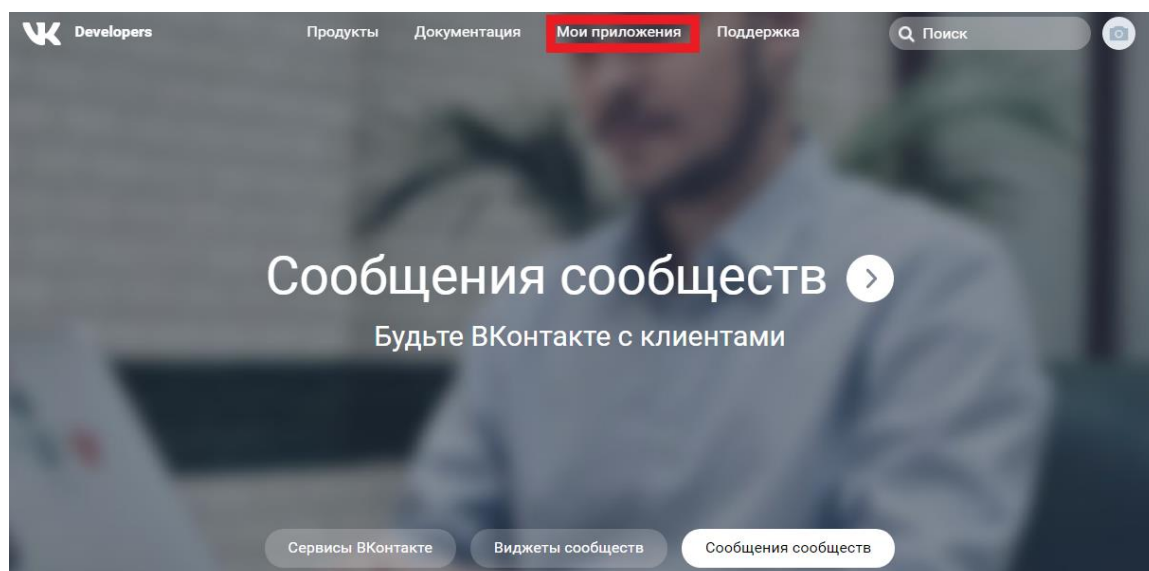


Fig. 1

3. Press “Create an application” (fig. 2)

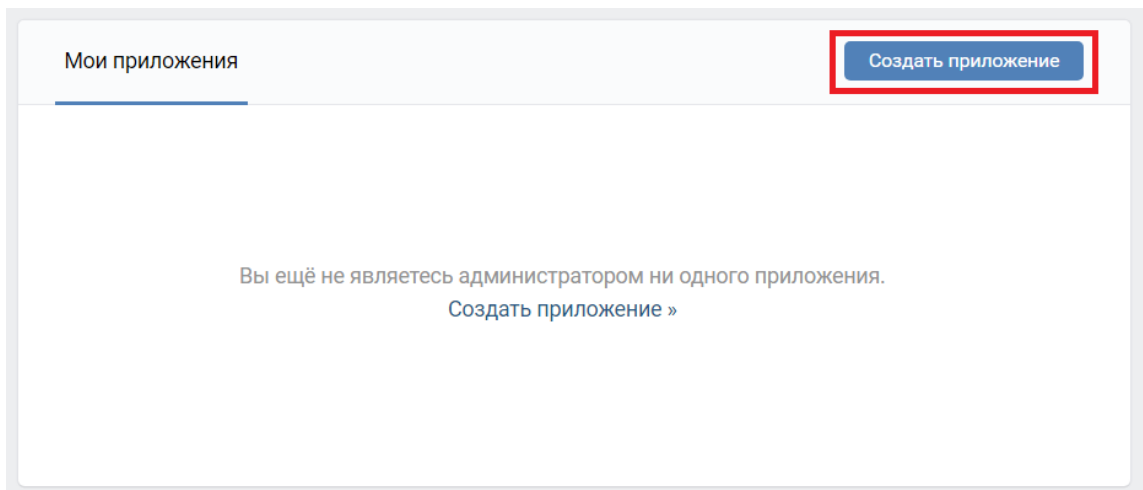


Fig. 2

4. Select “Standalone-application”, write the name of application and press “Connect Application ” (fig. 3)

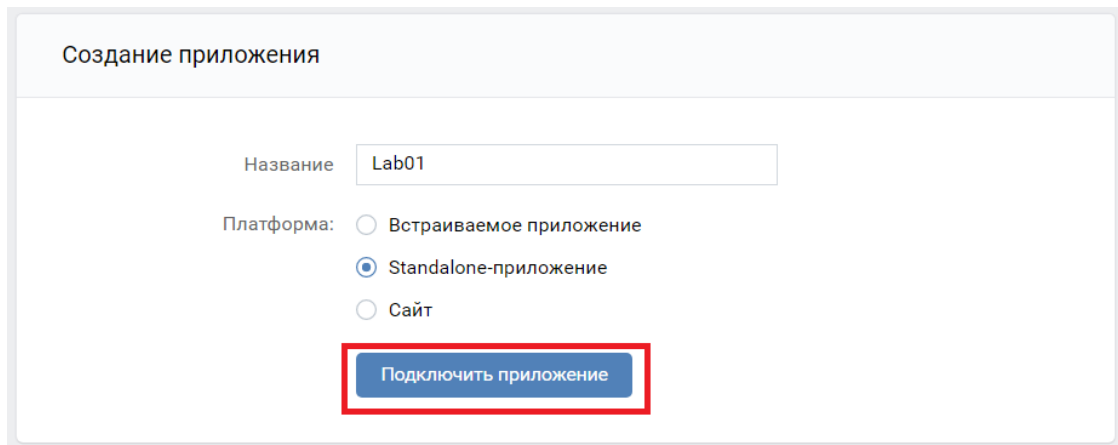


Fig. 3

5. Copy the application ID (fig. 4) and paste it instead “5490057” in the next link. Then go to it.

https://oauth.vk.com/authorize?client_id=5490057&display=page&redirect_uri=https://oauth.vk.com/blank.html&scope=friends&response_type=token&v=5.52

6. Find your token for VKontakte API:

https://oauth.vk.com/blank.html#access_token=8584e3ede2db17d7d5c88ea297aedaed248878fe6b00024ff4803d495ce28efeb4b7863f5cb45f3dd67&expires_in=86400&user_id=548044298

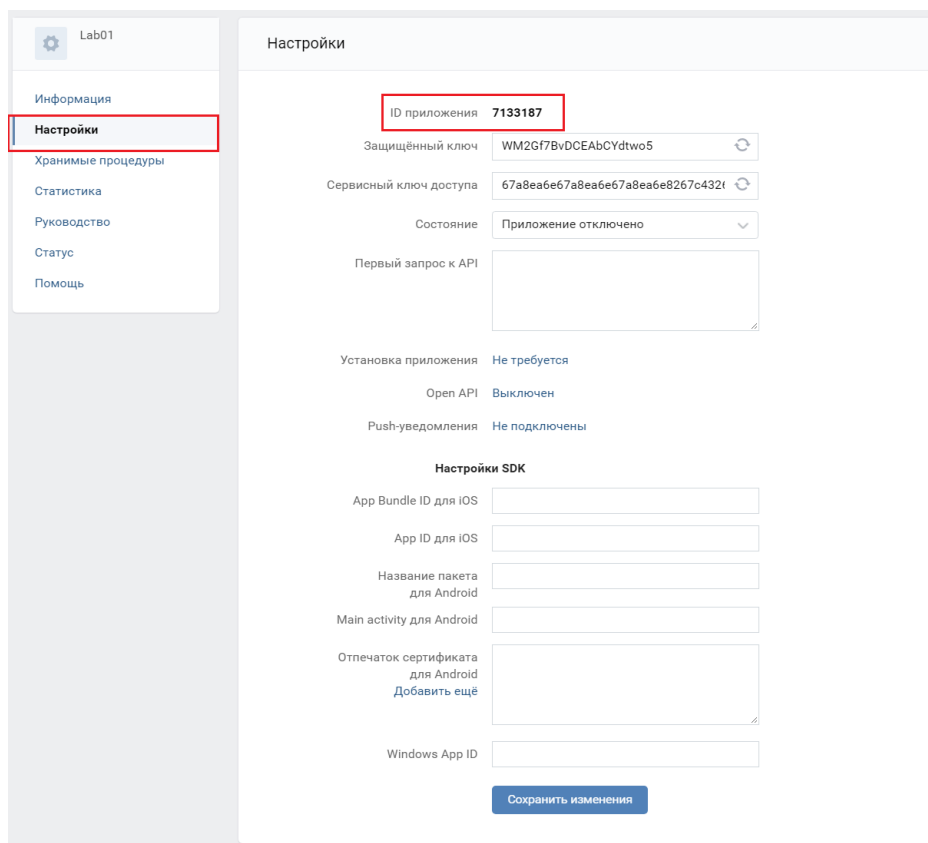


Fig. 4.

Example result (for the community https://vk.com/abiturient_tpu)

Community Name	Link	Members from community №1
Подслушано в ТПУ	https://vk.com/overhear_tpu	1706
Помогашки в ТПУ	https://vk.com/pomogashkitpu	838
МКЦ ТПУ	https://vk.com/mkc_tpu	686

References

API Description

https://vk.com/dev/first_guide

List of API Methods for Working with Communities

<https://vk.com/dev/groups>

List of methods for working with users

<https://vk.com/dev/users>

An example of working with C #

<https://habr.com/ru/post/314518/>

PART II – DEMOGRAPHY OF THE COMMUNITY

Design and implement the function of a VK community “demographic portrait” forming. As an input parameter, the function should accept the identifier of the VK group. The output should contain:

1. The number of community members.
2. The average age of community members. Median age of community members. Percentage of users with no information about age.
3. Gender of community members: percentage of men, women, participants who did not indicate gender.
4. Place of residence - country, city. Percentage of users who did not indicate their place of residence.

The result should be displayed in tables and graphs.

PART III – IMPORTANCE OF THE NODES

Develop and implement the following functions:

1. Social graph of VK community members’ visualization (numbering more than 1,000 users).
2. Identification of the most important node (the user) by degree centrality, closeness centrality, betweenness centrality, and eigenvector centrality.

The result should be presented as a section of the report containing a listing of program code and screenshots.

References:

Community Detection and Mining in Social Media

<https://www.morganclaypool.com/doi/abs/10.2200/s00298ed1v01y201009dmk003>

Degree Centrality

<https://www.sciencedirect.com/science/article/pii/B9780128016565000214>

Closeness Centrality

<https://www.sci.unich.it/~francesc/teaching/network/closeness.html>

Betweenness centrality

<https://neo4j.com/docs/graph-algorithms/current/labs-algorithms/betweenness-centrality/>

Eigenvector centrality

<https://www.geeksforgeeks.org/eigenvector-centrality-centrality-measure/>

PART IV – Basics of modeling the information cascade

For a selected community on a social network:

1. Define a user with at least 5 friends also participating in the community (user #0).
2. Rate the measure of similarity between friends and user # 0 (based on the values of the "age" parameter *or* any other and their combinations).
3. Determine the threshold value of similarity at which the "friend" will decide to further information transmission (the source of which is user #0).
4. For each of the friends, repeat steps 1-3 until there are no friends participating in the community or friends who have decided to continue information transmission.
5. Estimate the percentage of users who probably transmitted the information further with respect to:
a) the total number of users involved in the cascade; b) the total number of community members.

References:

Understanding Information Cascades

<https://www.investopedia.com/articles/investing/052715/guide-understanding-information-cascades.asp>