Search for similar images by text

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Introduction:

Overview:

- This report discusses the work done in the development of pixabay image downloader and a search for a similar images by text usign python and kivy to create the user interface

Background and Motivation:

- Search for images by text can be found in a large variety of applications like search engines because this method give you a quick accesss to external search functions such as images

Objective:

- Download a 50 pictures from pixabay or unsplash , give each picture a name with the format studentid_pictureid.jpg for each picture there a file text with the same name studentid_pictureid.txt, put this pictures in a folder with the name Pictures
- Create a search form which enable the user to search for the images in Pictures Folder by typing a tag in the search form and display the first 10 pictures that have this tag in their text files

Tools:

Programming language:

Figure 1: Python

Framework:

Kivy Open source Python framework for rapid development of applications that make use of innovative user interfaces

Figure 2: Kivy

Text editor:

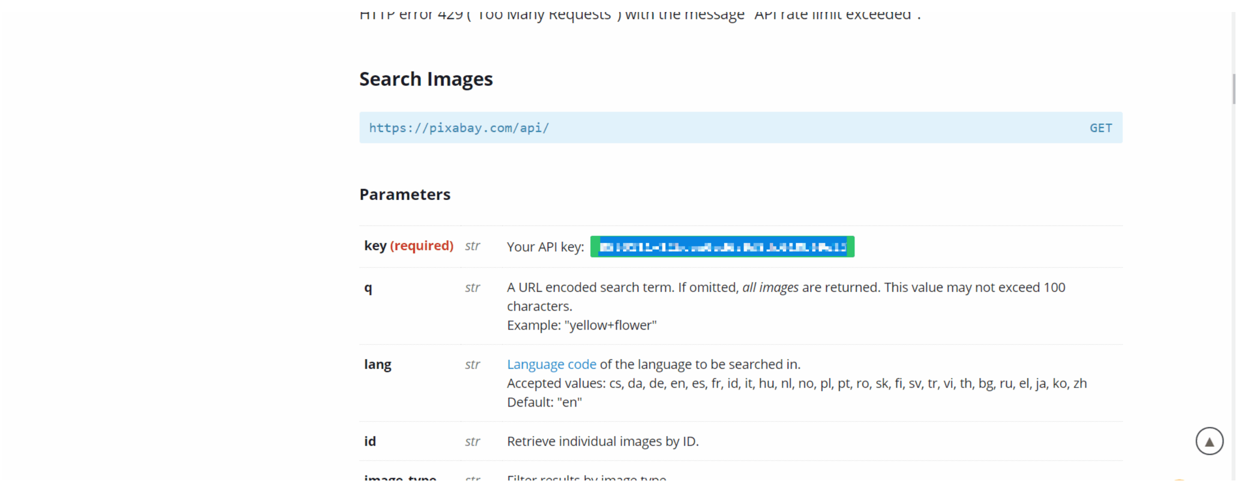
Figure 3: Visual Studio Code

Results :

Pixabay Photos downloader :

- This tool is uses a command line interface , implemented on python to communicate wih the user .
- Make it easy for any student to download the 50 pictures, give each picture and text file a name , put the pictures tags in the text file, and finally save them in Pictures Folder .
- Inorder to user this tool u should :

1. install python
2. get Pixabay API Key by creating an account on pixabayApi website Figure4 show this step



HTTP error 429 (Too Many Requests) with the message API rate limit exceeded .

Search Images

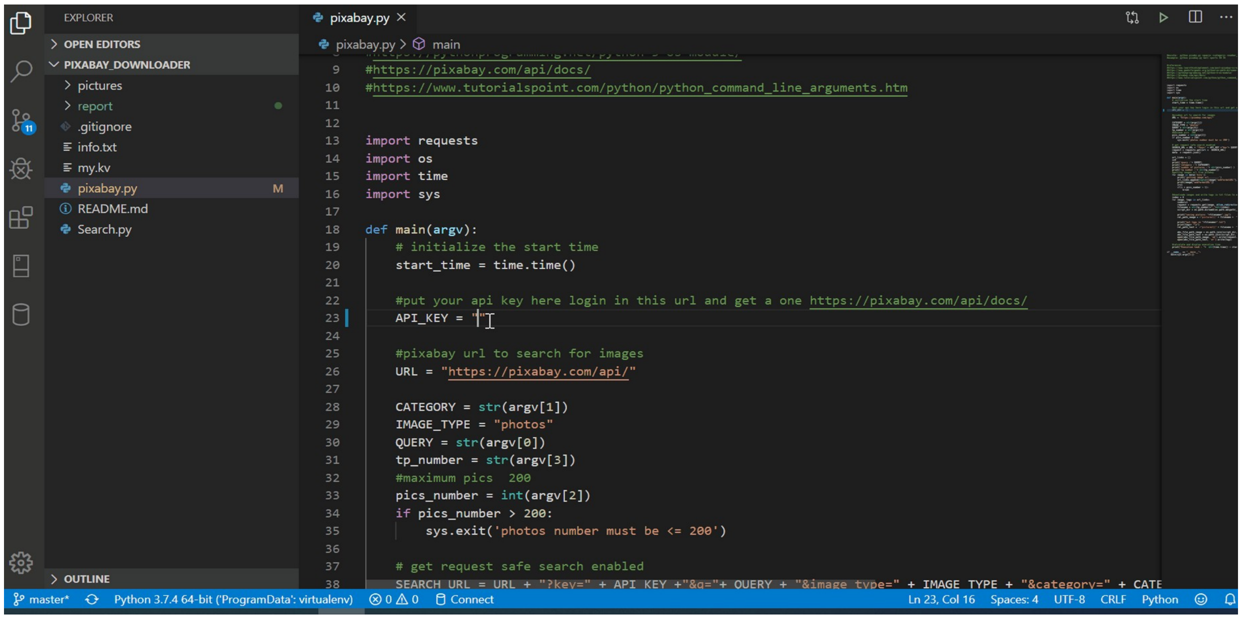
`https://pixabay.com/api/` GET

Parameters

key (required)	*str*	Your API key: [redacted]
q	*str*	A URL encoded search term. If omitted, *all images* are returned. This value may not exceed 100 characters. Example: "yellow+flower"
lang	*str*	Language code of the language to be searched in. Accepted values: cs, da, de, en, es, fr, id, it, hu, nl, no, pl, pt, ro, sk, fi, sv, tr, vi, th, bg, ru, el, ja, ko, zh Default: "en"
id	*str*	Retrieve individual images by ID.
image_type	*str*	Filter results by image type.

Figure 4: pixabay api webpage after login and api Key

3. Copy the api key and put it in pixaby.py Figure5 show this step



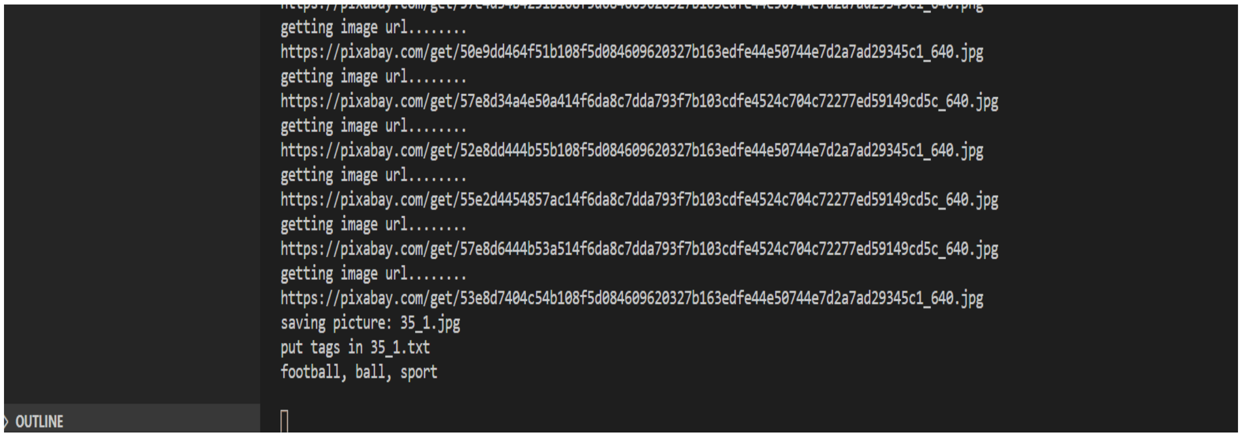
```python
#https://pixabay.com/api/docs/
#https://www.tutorialspoint.com/python/python_command_line_arguments.htm


import requests
import os
import time
import sys

def main(argv):
    # initialize the start time
    start_time = time.time()

    #put your api key here login in this url and get a one https://pixabay.com/api/docs/
    API_KEY = ""

    #pixabay url to search for images
    URL = "https://pixabay.com/api/"

    CATEGORY = str(argv[1])
    IMAGE_TYPE = "photos"
    QUERY = str(argv[0])
    tp_number = str(argv[3])
    #maximum pics  200
    pics_number = int(argv[2])
    if pics_number > 200:
        sys.exit('photos number must be <= 200')

    # get request safe search enabled
    SEARCH_URL = URL + "?key=" + API_KEY +"&q="+ QUERY + "&image_type=" + IMAGE_TYPE + "&category=" + CATE
```

Figure 5: copy your api key in pixabay downloader

4. now execute :

   ```
   python pixaby.py <query> <category> <number_of_pics <= 200 > <tp_num>
   ```

   the Figure 6 show the result and the example

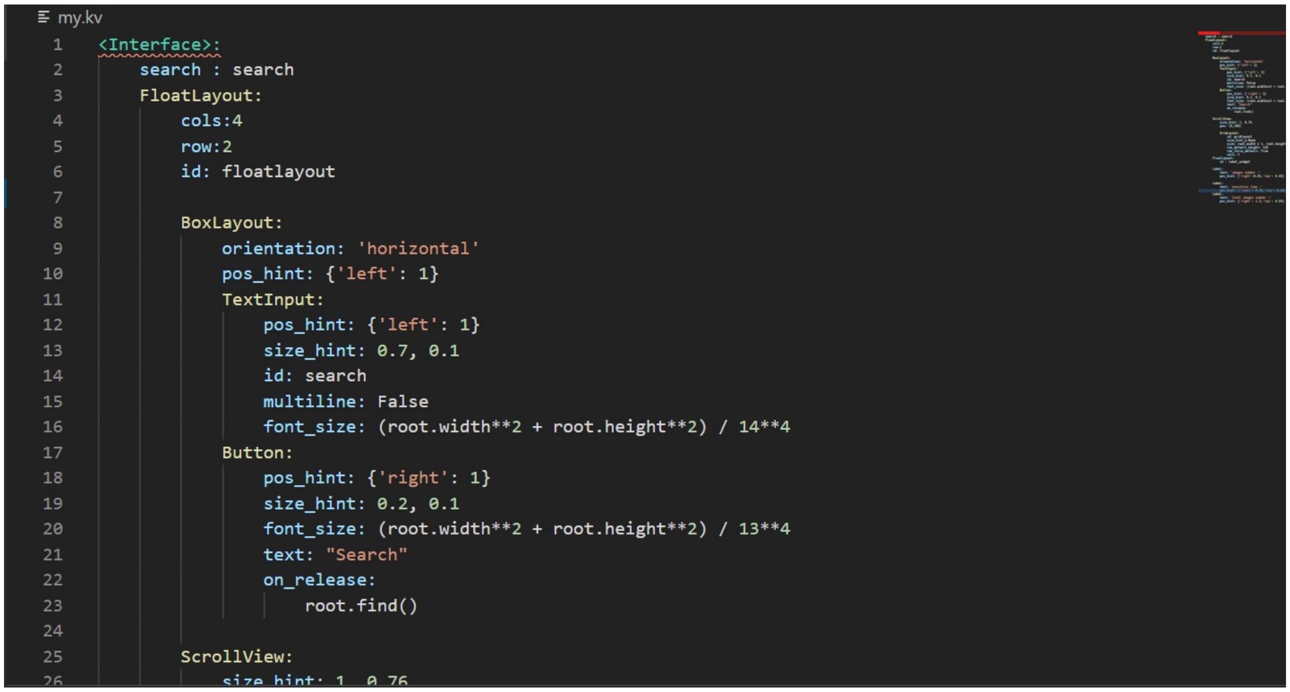


```
getting image url........
https://pixabay.com/get/50e9dd464f51b108f5d084609620327b163edfe44e50744e7d2a7ad29345c1_640.jpg
getting image url........
https://pixabay.com/get/57e8d34a4e50a414f6da8c7dda793f7b103cdfe4524c704c72277ed59149cd5c_640.jpg
getting image url........
https://pixabay.com/get/52e8dd444b55b108f5d084609620327b163edfe44e50744e7d2a7ad29345c1_640.jpg
getting image url........
https://pixabay.com/get/55e2d4454857ac14f6da8c7dda793f7b103cdfe4524c704c72277ed59149cd5c_640.jpg
getting image url........
https://pixabay.com/get/57e8d6444b53a514f6da8c7dda793f7b103cdfe4524c704c72277ed59149cd5c_640.jpg
getting image url........
https://pixabay.com/get/53e8d7404c54b108f5d084609620327b163edfe44e50744e7d2a7ad29345c1_640.jpg
saving picture: 35_1.jpg
put tags in 35_1.txt
football, ball, sport
```

Figure 6: How to run and execute pixaby downloader

Images Search:

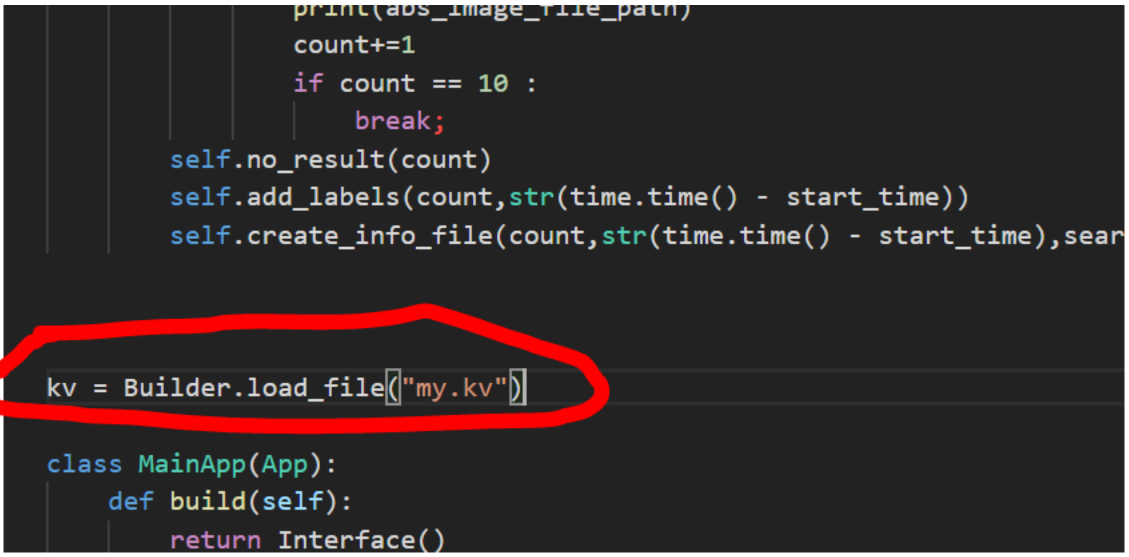
1. Create an Interface using Kivy



```
<Interface>:
    search : search
    FloatLayout:
        cols:4
        row:2
        id: floatlayout

        BoxLayout:
            orientation: 'horizontal'
            pos_hint: {'left': 1}
            TextInput:
                pos_hint: {'left': 1}
                size_hint: 0.7, 0.1
                id: search
                multiline: False
                font_size: (root.width**2 + root.height**2) / 14**4
            Button:
                pos_hint: {'right': 1}
                size_hint: 0.2, 0.1
                font_size: (root.width**2 + root.height**2) / 13**4
                text: "Search"
                on_release:
                    root.find()

        ScrollView:
            size_hint: 1, 0.76
```

Figure 7: Kivy User Interface Code

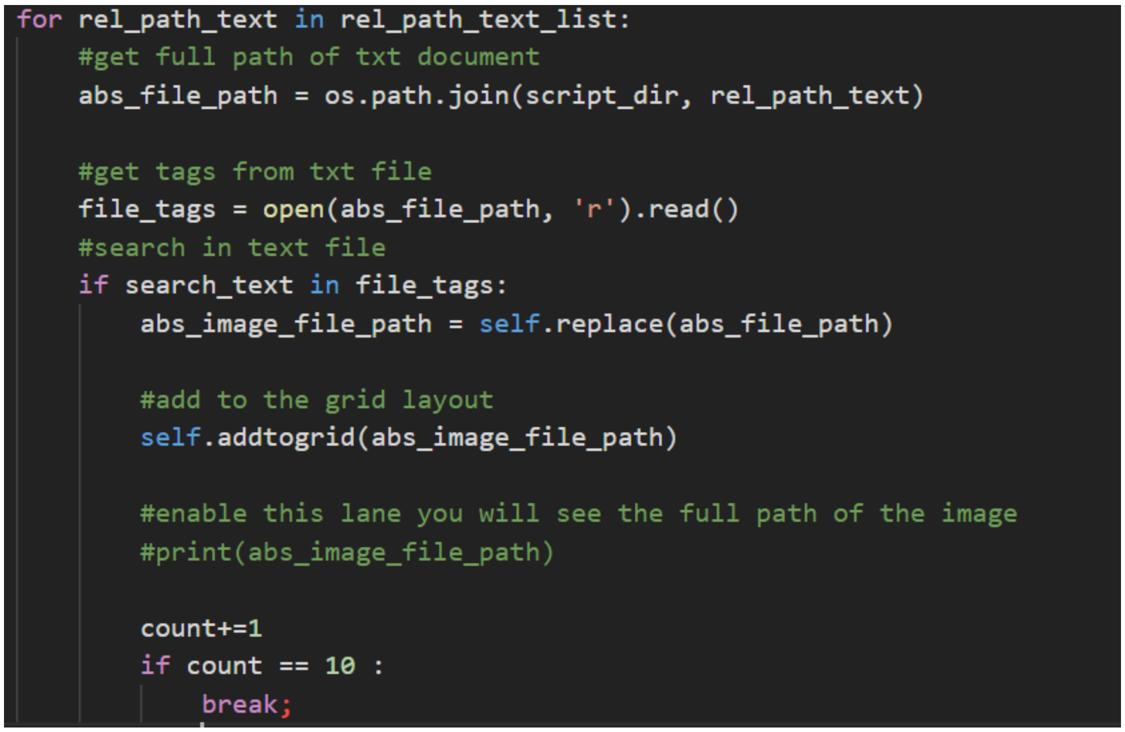
2. call the Kivy Interface in my Python code



```
                    print(abs_image_file_path)
                    count+=1
                    if count == 10 :
                        break;
                self.no_result(count)
                self.add_labels(count,str(time.time() - start_time))
                self.create_info_file(count,str(time.time() - start_time),sear


kv = Builder.load_file("my.kv")

class MainApp(App):
    def build(self):
        return Interface()
```

Figure 8: call kivy interface in the python code

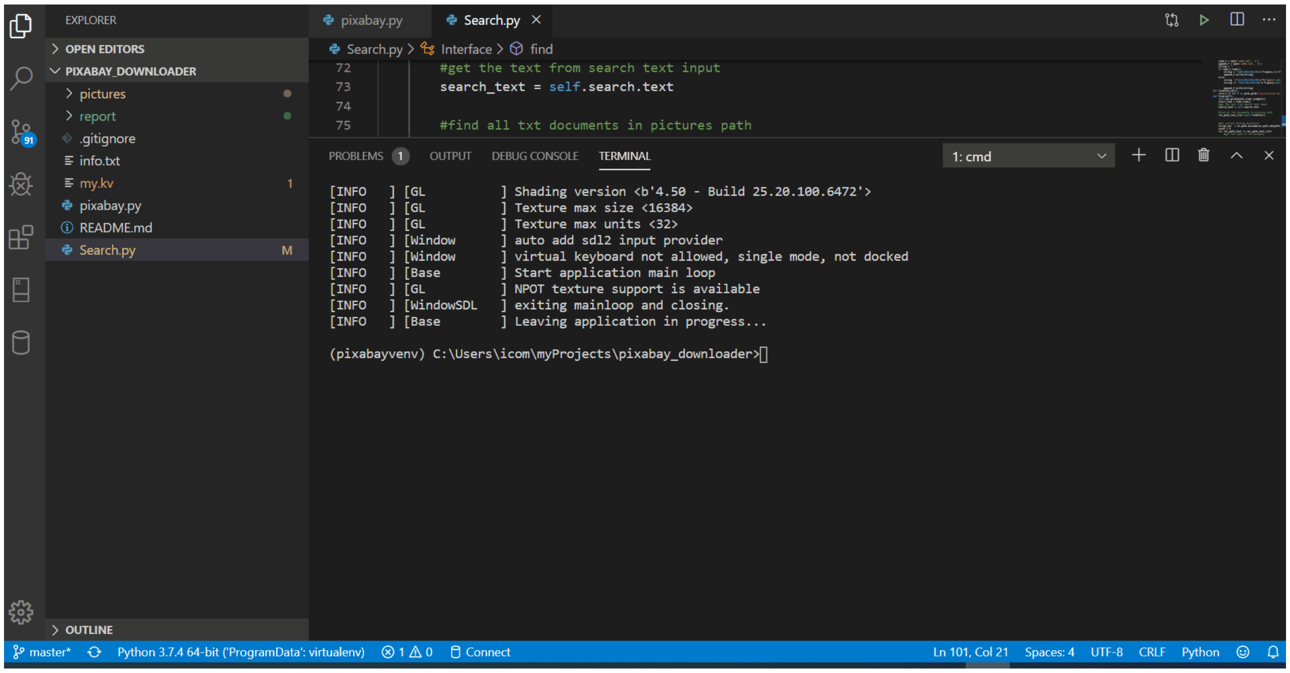
3. find the 10 first pictures which contain the tag that the user searched for



```
for rel_path_text in rel_path_text_list:
    #get full path of txt document
    abs_file_path = os.path.join(script_dir, rel_path_text)

    #get tags from txt file
    file_tags = open(abs_file_path, 'r').read()
    #search in text file
    if search_text in file_tags:
        abs_image_file_path = self.replace(abs_file_path)

        #add to the grid layout
        self.addtogrid(abs_image_file_path)

        #enable this lane you will see the full path of the image
        #print(abs_image_file_path)

        count+=1
        if count == 10 :
            break;
```

Figure 9: find the 10 pictures

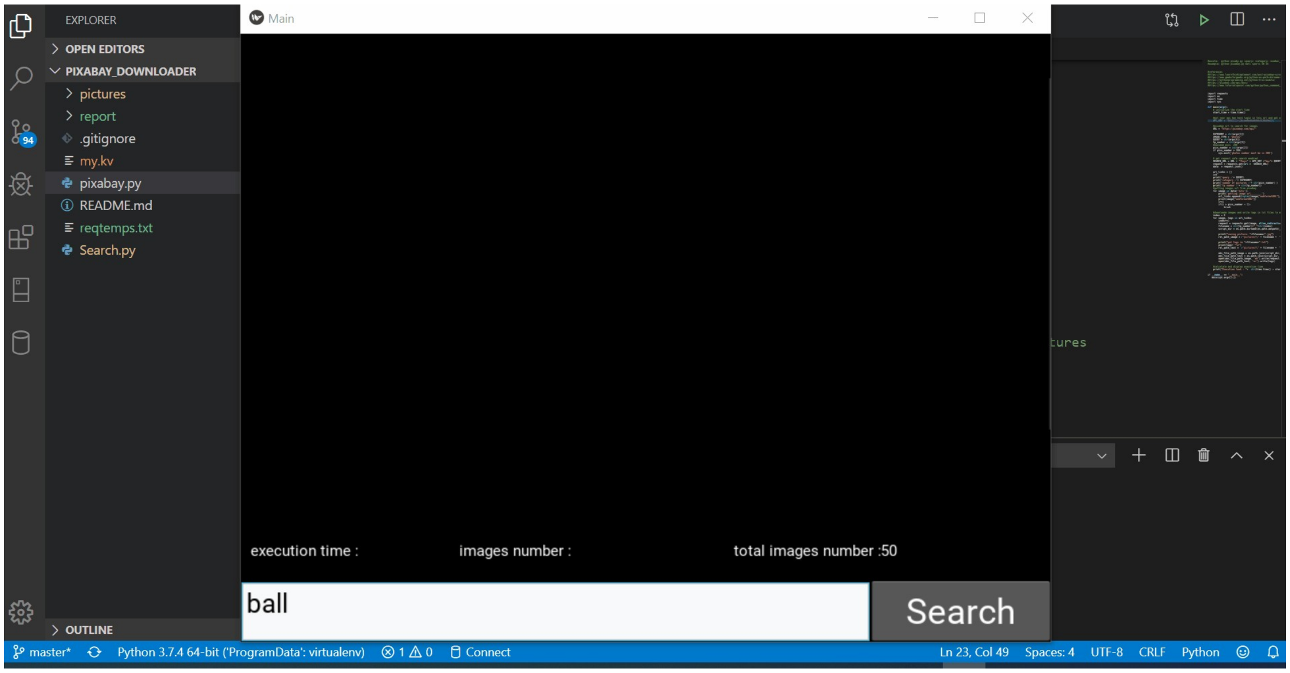
4. Execution:



```
72        #get the text from search text input
73        search_text = self.search.text
74
75        #find all txt documents in pictures path
```

```
[INFO   ] [GL          ] Shading version <b'4.50 - Build 25.20.100.6472'>
[INFO   ] [GL          ] Texture max size <16384>
[INFO   ] [GL          ] Texture max units <32>
[INFO   ] [Window      ] auto add sdl2 input provider
[INFO   ] [Window      ] virtual keyboard not allowed, single mode, not docked
[INFO   ] [Base        ] Start application main loop
[INFO   ] [GL          ] NPOT texture support is available
[INFO   ] [WindowSDL   ] exiting mainloop and closing.
[INFO   ] [Base        ] Leaving application in progress...

(pixabayvenv) C:\Users\icom\myProjects\pixabay_downloader>
```

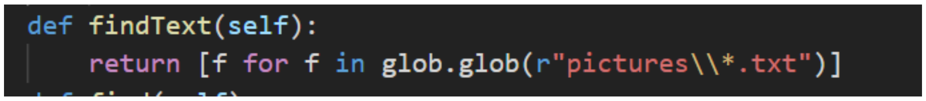
5. save query info in reqtemps.txt



Complexity:

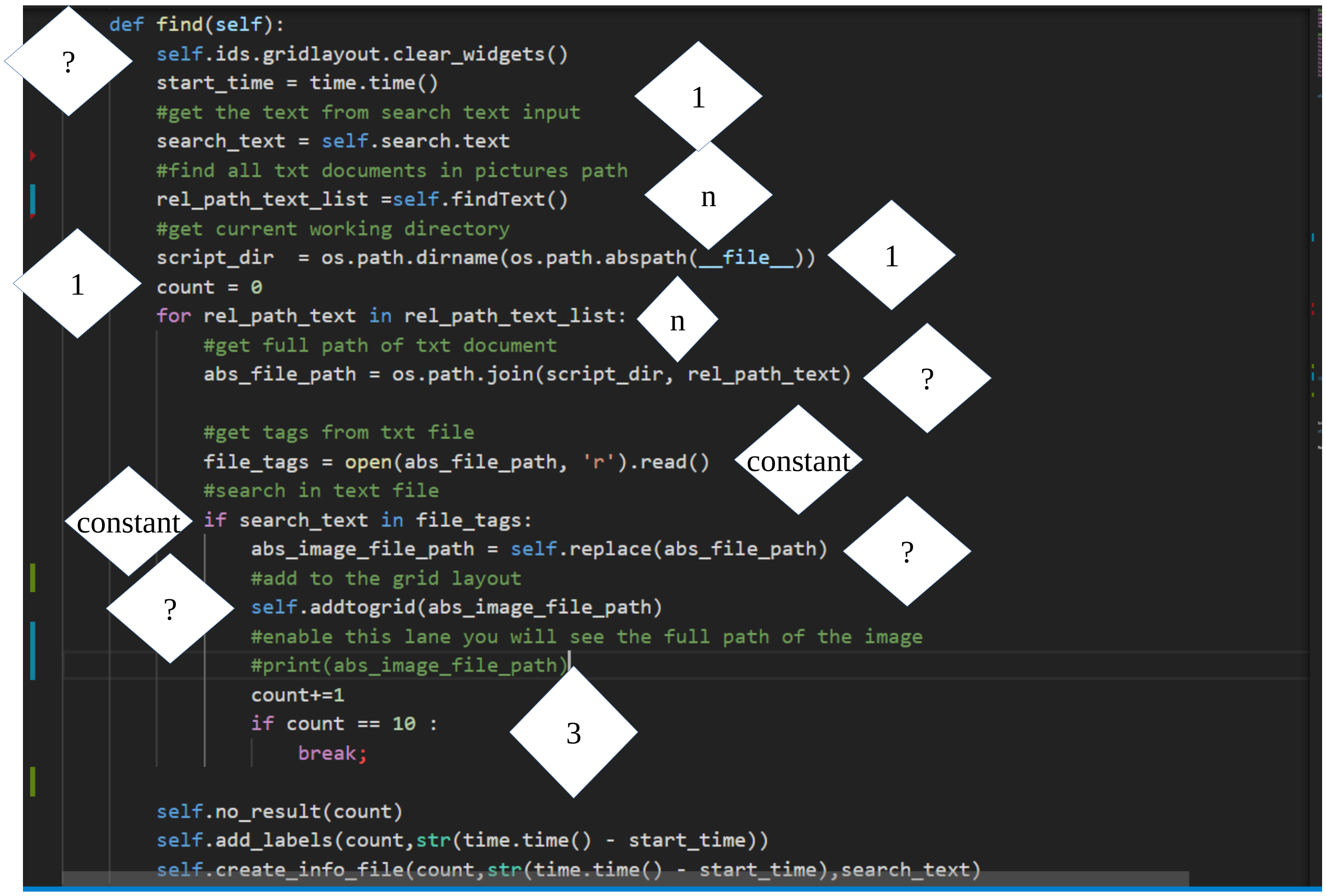
- In this mini project i prefer to use a Linear search to find words in text file because we have an unsorted files

1. **Find all text files function:** Complexity of O(n) because "f" run through the hole pictures file and add the text files in a new list



```python
def findText(self):
    return [f for f in glob.glob(r"pictures\\*.txt")]
```

2. **Search function:** Complexity of O (n)



```python
def find(self):
    self.ids.gridlayout.clear_widgets()
    start_time = time.time()
    #get the text from search text input
    search_text = self.search.text
    #find all txt documents in pictures path
    rel_path_text_list =self.findText()
    #get current working directory
    script_dir  = os.path.dirname(os.path.abspath(__file__))
    count = 0
    for rel_path_text in rel_path_text_list:
        #get full path of txt document
        abs_file_path = os.path.join(script_dir, rel_path_text)

        #get tags from txt file
        file_tags = open(abs_file_path, 'r').read()
        #search in text file
        if search_text in file_tags:
            abs_image_file_path = self.replace(abs_file_path)
            #add to the grid layout
            self.addtogrid(abs_image_file_path)
            #enable this lane you will see the full path of the image
            #print(abs_image_file_path)
            count+=1
            if count == 10 :
                break;

    self.no_result(count)
    self.add_labels(count,str(time.time() - start_time))
    self.create_info_file(count,str(time.time() - start_time),search_text)
```

T(n) = (n+c +c + 3)+ n + 1+1+?

so T(n) ≈ O(n)

3.**Problems :**

we could not find or calculate the complexity of the following functions :

1. addtogrid
2. clear_widgets
3. os.path.dirname

Conlusion:

In computer science, analysis of algorithms is a very crucial part. It is important to find the most efficient algorithm for solving a problem. It is possible to have many algorithms to solve a problem, but the challenge here is to choose the most efficient one.