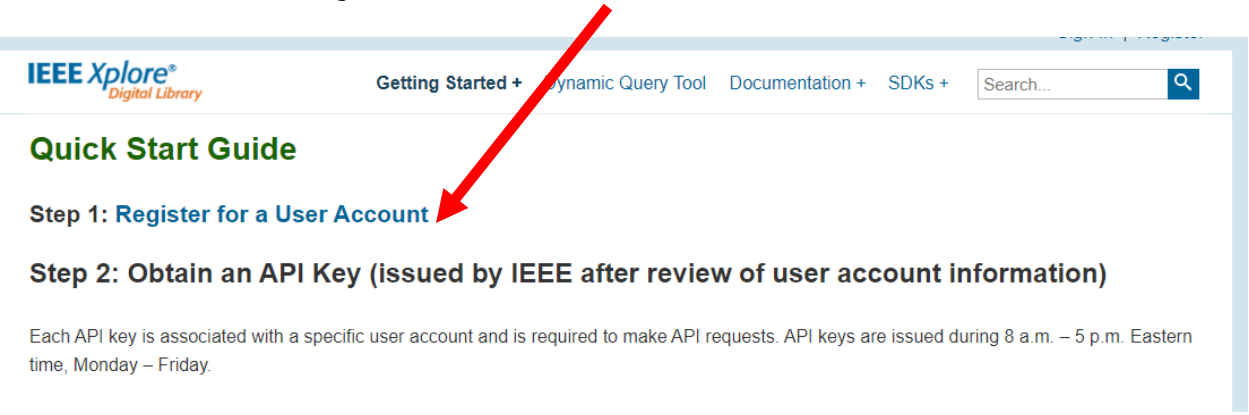
Lab #9

Using R to Connect to an API and Retrieve Data

We will use the IEEE Xplore API as an example, but the same principles will work with any API.

Step # 1 Register and obtain an IEEE Xplore API key (**you can skip this step if you already have an IEEE Xplore API key**).

Go to: `https://developer.ieee.org/Quick_Start_Guide`
and follow the link to **Register for a User Account**



Do this today -- it may take a day or two to receive approval-- if you wait until the last day, I will not give you an extension on the deadline.

- It will ask you for the url AND call back url, you can use your personal website or mine (http://www.itk.ilstu.edu/faculty/jrwolf/) this does not matter because we will only be querying the data. We will not be using it for an application.

- When it asks you the reason for your request, enter:

  I will use the API to research publication frequencies of key terms for a class project.

It may take a day or so, but you will receive confirmation of your request and approval via email.

After you have you key, you may move on to Step 2.

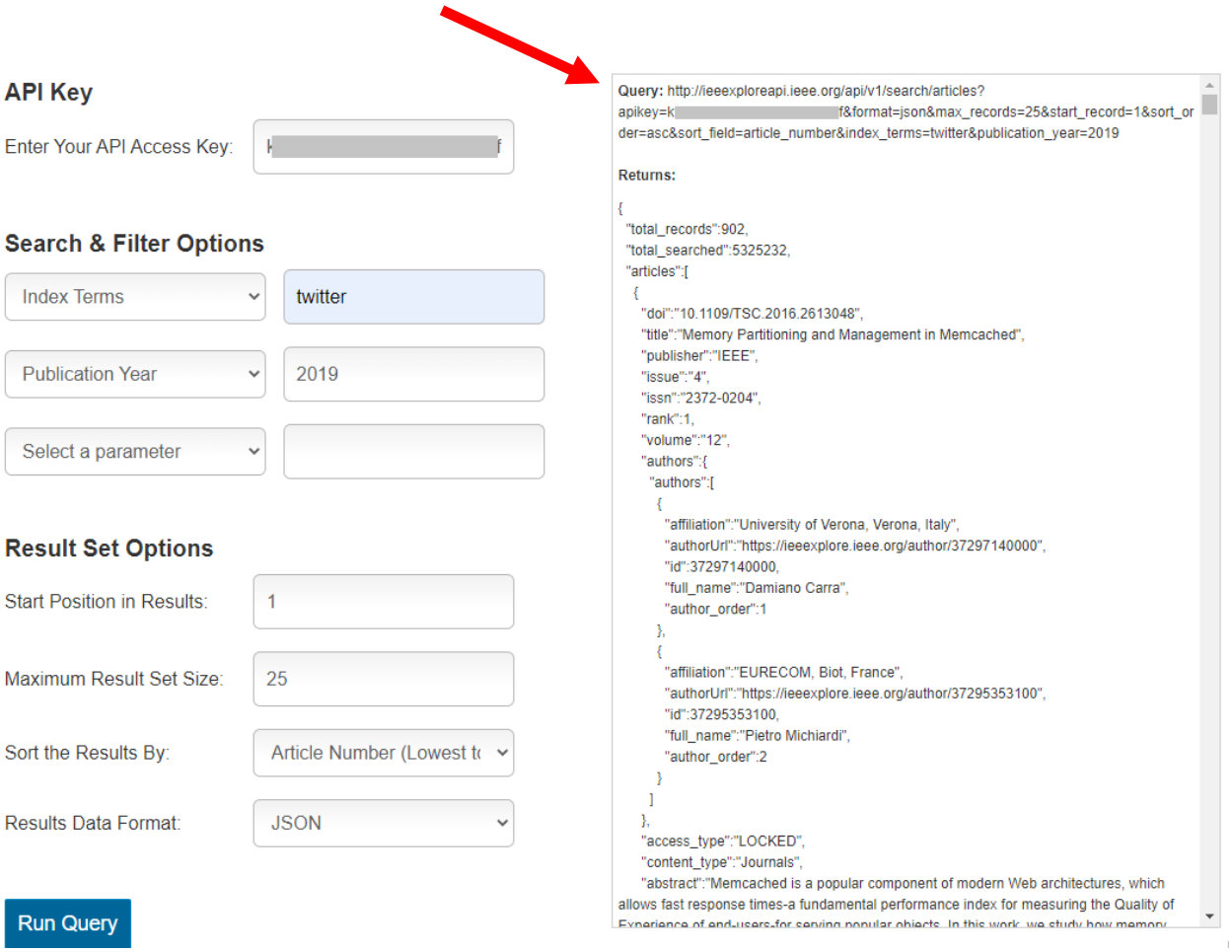
Step 2: Using your key, go to the Dynamic Query Tool

`https://developer.ieee.org/Dynamic_Query_Tool`

and search for articles containing the Index Term = "twitter" and Publication Year = 2019. Set the data format to JSON. Run the query.

Pay attention to the results

(this gives the format of the query)



Step # 3 Replicate your Dynamic Query Tool from above query using R

To do this:

a. Open R Studio and install the needed packages

```
install.packages(c("httr", "jsonlite"))
```

Now you are ready to use R to connect to the IEEE Xplore API

```
# b. Load the needed packages
library(httr)
library(jsonlite)

# c. Use the results query to recreate your request

url <- "http://ieeexploreapi.ieee.org/api/v1/search/articles?"
key <- "apikey=k654wxu5huyqs9fxvjm4p9cf"
format <- "&format=json&max_records=25&start_record=1&sort_order=asc&sort_field=article_number"
search.terms <- "&index_terms=twitter&publication_year=2019"

# we will use the paste0 package to pull everything into a single string

z <- paste0(url,key,format,search.terms)

# we will now use the httr package GET function to connect to the IEEE API
# GET is upper case – R is case sensitive

y <- GET(z)

get_text <- content(y, "text")

# check the output to see that we obtained data

get_text

# convert the JSON data to a data frame

get_text_json <- fromJSON(get_text, flatten = TRUE)
get_text_df <- as.data.frame(get_text_json)

# check the output to see our new dataframe


str(get_text_df)
head(get_text_df$articles.title)
```

Step 4:

Do steps 2-3 for 4 additional queries

1. affiliation= Illinois State University
   author=Tang

2. publication_title= IEEE Transactions on Visualization and Computer Graphics
   publication_year=2018

3. index_terms=python
   publication_year=2019

4. index_terms=javascript
   publication_year=2019

Step 5: Use the data from above and `ggplot2` and create a barchart to show which topic (javascript or python) was more popular in 2019.

Finally, for more additional help using R and API's check out the following article.

https://www.programmableweb.com/news/how-to-access-any-restful-api-using-r-language/how-to/2017/07/21

Submit the R code for steps 4 and 5.