

Youtube Playlist titles parsing-removed API key

May 17, 2022

0.0.1 LESSONS - Youtube public playlists

- Youtube API outputs JSON objects
- They have MANY dictionaries WITHIN dictionaries == nested dictionaries
- Dictionaries very useful for human-readable LOOKUPS

Using API

- Google API requires developer credentials == like logging on
- Akin to Bloomberg terminal, where must log on to access the methods
- Accessing PUBLIC information does NOT require user OAuth key
- If wanted to access private playlist/ account details, would need permission from the user in the form of an authentication key.
- 2 keys would be needed: key to use API, key to access user data

Coding

- String split
- Looking at type of object in order to figure out how to access it
- Accessing dictionary by referencing almost like LIST ITEM
- Test small units to build up large method - all the chunks here were kept small
- Write code for 1 case, then plonk in for loop to generalise
- Messy first draft

0.1 Time taken

- 6hrs

0.1.1 Date: Fri 28/05/21

- This script aims to pull in the playlist tiles and times from Youtube playlist page

It will save time when looking to write out Youtube titles for topic familiarity acquisition for TASKS

- This task is using SEARCH functions to get public results, it is NOT looking at private data

- Hence it should not require LOGIN CREDENTIALS to run

```
[3]: #https://stackoverflow.com/questions/4302027/how-to-open-a-url-in-python

import webbrowser
```

```
[6]: url = "https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht"

ydl_opts = {
    'ignoreerrors': True,
    'quiet': True
}

input_file = webbrowser.open("url")
```

[6]: True

- View Youtube API to do this
- It is equivalent to SciKit - in that it contains all the methods of interest

0.1.2 Web scraping using Google sheets VBA

<https://www.youtube.com/watch?v=i8WUW-b2pmg>

- Timing: 20 mins to complete web scraper. Put on clock

1 Youtube API

- Watch video + get idea - adapt VBA for Python
- Quick search API + make mock up
- Youtube has SEARCH METHOD to return search results - <https://developers.google.com/youtube/v3/docs/search>
- Has PLAYLIST methods to return PLAYLIST - <https://developers.google.com/youtube/v3/docs/playlists>
- Maybe can input playlist location into search for all results

```
[ ]: # call youtube API method

searchResults = Youtube.Search.list('id, snippet')
```

1.1 Using Youtube API in Python

- <https://www.pythonforbeginners.com/api/using-the-youtube-api>

```
[14]: import requests          # we need to use this package to GET HTML pages. Other
      ↪ libraries include urllib2
import json
```

```

# Get the feed
url = "https://www.youtube.com/results?search_query=https%3A%2F%2Fwww.youtube.
→com%2Fplaylist%3Flist%3DPL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht"

r = requests.get(url)
print(r.text)

# r.text is currently a TEXT object of an HTML file. Not in JSON format
type(r.text)

```

```

<!DOCTYPE html><html lang="en-GB" dir="ltr"><head><style
nonce="aZ5E26srGWqnq6U3bp2w1Q">
a, a:link, a:visited, a:active, a:hover {
    color: #1a73e8;
    text-decoration: none;
}
body {
    font-family: Roboto,RobotoDraft,Helvetica,Arial,sans-serif;
    text-align: center;
    -ms-text-size-adjust: 100%;
    -moz-text-size-adjust: 100%;
    -webkit-text-size-adjust: 100%;
}
.box {
    border: 1px solid #dadce0;
    box-sizing: border-box;
    border-radius: 8px;
    margin: 24px auto 5px auto;
    max-width: 520px;
    padding: 24px;
}
h1 {
    color: #2c2c2c;
    font-size: 24px;
    hyphens: auto;
    margin: 24px 0;
}
p, .sub, .contentText {
    color: #5f6368;;
    font-size: 14px;
    line-height: 20px;
    letter-spacing: 0.2px;
    text-align: left;
}
.signin {
    text-align: right;
}
.image {

```

```

    display: block;
    margin: 14px auto;
}
a.button {
    color: #fff;
}
button, .button {
    border-radius: 4px;
    background-color: #1a73e8;
    border: none;
    color: #fff;
    cursor: pointer;
    font-family: Roboto,RobotoDraft,Helvetica,Arial,sans-serif;
    font-size: 14px;
    font-weight: 500;
    height: 36px;
    margin: 0 4px;
    padding: 10px 24px;
}
input.button {
    -webkit-appearance: none;
}
.error {
    border: 2px solid #d93025;
    border-radius: 5px;
    color: #d93025;
    margin: auto;
    padding: 5px;
}
.footer {
    margin-top: 16px;
}
.footer a {
    margin-left: 24px;
    white-space: nowrap;
}
.footer a, .footer select, .footer input {
    color: #757575;
    font-size: 12px;
}
.languagepicker {
    display: inline-flex;
    margin: 2px 0;
}
#languageform,
#languageselect {
    margin: 0 2px;
}

```

```

#languageselect {
  color: #757575;
}
.detailspage {
  margin: 24px auto 0 auto;
  max-width: 700px;
}
.detailspage h1, .detailspage h2 {
  font-size: 22px
}
.setting {
  border: 1px solid #dadce0;
  box-sizing: border-box;
  border-radius: 8px;
  margin-bottom: 11px;
  padding: 24px 24px 20px 24px;
  text-align: right;
}
.sub {
  padding: 24px 24px 20px 24px;
}
hr {
  margin: 12px -24px 12px;
  border: 0;
  border-top: 1px solid #dadce0;
}
fieldset {
  border: none;
  padding: 0;
}
label {
  margin: 24px;
}
td {
  vertical-align: top;
}
.setting h2, .setting h3, h4 {
  color: #3c4043;
  margin: 0;
  text-align: left;
}
.yt-text {
  color: #5f6368;
  font-size: 14px;
  font-weight: 300;
}
.productLogoContainer {
  margin: auto;
}

```

```

    max-width: 360px;
}

/** Narrow screen (for example a mobile device). */
@media only screen and (max-width: 480px) {
    body {
        margin: 18px 14px;
    }
    .imgContainer {
        min-width: 96px;
    }
    .hideOnSmallWidth {
        display: none;
    }
    .footer form {
        margin-bottom: 3px;
    }
}

@media only screen and (max-width: 380px) {
    .imgContainer {
        min-width: 72px;
    }
}

/** Normal/non-narrow screen. */
@media not screen and (max-width: 480px) {
    body {
        margin: 18px 25px;
    }
    .imgContainer {
        width: 51%;
    }
    .hideOnNormalWidth {
        display: none;
    }
    .footer form {
        display: inline;
    }
}

</style><title>Before you continue to YouTube</title><meta name="viewport"
content="initial-scale=1, maximum-scale=5, width=device-width"><link
rel="shortcut icon" href="//www.google.com/favicon.ico"></head><body><div
class="signin"><a href="https://accounts.google.com/ServiceLogin?hl=en-GB&co
ntinue=https://www.youtube.com/results?search_query%3Dhttps%253A%252F%252Fwww.yo
utube.com%252Fplaylist%253Flist%253DPL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht&gac=
b-23983172" class="button">Sign in</a></div><div class="box"> <span class="yt-text">a Google company</span><div class="productLogoContainer"></div><h1>Before you continue to YouTube</h1><div class="contentText">Google uses <a href="https://policies.google.com/technologies/cookies?hl=en-GB&utm\_source=ucb" target="\_blank">cookies</a> and data to:<ul><li>Deliver and maintain services, like tracking outages and protecting against spam, fraud and abuse</li><li>Measure audience engagement and site statistics to understand how our services are used</li></ul>If you agree, we'll also use cookies and data to:<ul><li>Improve the quality of our services and develop new ones</li><li>Deliver and measure the effectiveness of ads</li><li>Show personalised content, depending on your settings</li><li>Show personalised or generic ads, depending on your settings, on Google and across the web</li></ul>For non-personalised content and ads, what you see may be influenced by things like the content that you're currently viewing and your location (ad serving is based on general location). Personalised content and ads can be based on those things and your activity, like Google searches and videos that you watch on YouTube. Personalised content and ads include things like more relevant results and recommendations, a customised YouTube homepage, and ads that are tailored to your interests.<p>Click &#39;Customise&#39; to review options, including controls to reject the use of cookies for personalisation and information about browser-level controls to reject some or all cookies for other uses. You can also visit g.co/privacytools at any time.</p></div><div><a href="https://consent.youtube.com/dl?continue=https://www.youtube.com/results?search\_query%3Dhttps%253A%252F%252Fwww.youtube.com%252Fplaylist%253Flist%253DPL8\_xPU5epJdfCxbRzxuchTfg0H1I2Ibht&amp;gl=GB&amp;hl=en-GB&amp;pc=yt&amp;uxe=23983172&amp;src=1" class="button">Customise</a><form action="https://consent.youtube.com/s" method="POST" style="display:inline;"><input type="hidden" name="gl" value="GB"><input type="hidden" name="m" value="0"><input type="hidden" name="pc" value="yt"><input type="hidden" name="continue" value="https://www.youtube.com/results?search\_query=https%3A%2F%2Fwww.youtube.com%2Fplaylist%3Flist%3DPL8\_xPU5epJdfCxbRzxuchTfg0H1I2Ibht"><input type="hidden" name="ca" value="r"><input type="hidden" name="x" value="8"><input type="hidden" name="v" value="cb.20210523-18-p0.en-GB+FX+921"><input type="hidden" name="t" value="ADw3F8hx0mPNgc8Ug1Hg6CEn0fNX71uI\_w:1622182689957"><input type="hidden" name="hl" value="en-GB"><input type="hidden" name="src" value="1"><input type="hidden" name="uxe" value="23983172"><input type="submit" value="I agree" class="button" aria-label="Agree to the use of cookies and other data for the purposes described"/></form></div></div><div class="footer"><form action="https://consent.youtube.com/ml" method="get"><select id="languageselect" name="hl"><option value="af">Afrikaans</option><option value="az">azərbaycan</option><option value="bs">bosanski</option><option value="ca">català</option><option value="cs">Čeština</option><option value="cy">Cymraeg</option><option value="da">Dansk</option><option value="de">Deutsch</option><option value="et">eesti</option><option value="en-

GB" selected>English&nbsp;(United Kingdom)</option><option value="en">English&nbsp;(United States)</option><option value="es">Español&nbsp;(España)</option><option value="es-419">Español&nbsp;(Latinoamérica)</option><option value="eu">euskara</option><option value="fil">Filipino</option><option value="fr-CA">Français&nbsp;(Canada)</option><option value="fr">Français&nbsp;(France)</option><option value="ga">Gaeilge</option><option value="gl">galego</option><option value="hr">Hrvatski</option><option value="id">Indonesia</option><option value="zu">isiZulu</option><option value="is">íslenska</option><option value="it">Italiano</option><option value="sw">Kiswahili</option><option value="lv">latviešu</option><option value="lt">lietuvių</option><option value="hu">magyar</option><option value="ms">Melayu</option><option value="nl">Nederlands</option><option value="no">norsk</option><option value="uz">oʻzbek</option><option value="pl">polski</option><option value="pt-BR">Português&nbsp;(Brasil)</option><option value="pt-PT">Português&nbsp;(Portugal)</option><option value="ro">română</option><option value="sq">shqip</option><option value="sk">Slovenčina</option><option value="sl">slovenščina</option><option value="sr-Latn">srpski (latinica)</option><option value="fi">Suomi</option><option value="sv">Svenska</option><option value="vi">Tiếng Việt</option><option value="tr">Türkçe</option><option value="el">Ε</option><option value="be"></option><option value="bg"></option><option value="ky"></option><option value="kk"></option><option value="mk"></option><option value="mn"></option><option value="ru"></option><option value="sr"></option><option value="uk"></option><option value="ka"></option><option value="hy"></option><option value="iw"></option><option value="ur"></option><option value="ar"></option><option value="fa"></option><option value="am"></option><option value="ne"></option><option value="mr"></option><option value="hi"></option><option value="as"></option><option value="bn"></option><option value="pa"></option><option value="gu"></option><option value="or"></option><option value="ta"></option><option value="te"></option><option value="kn"></option><option value="ml"></option><option value="si"></option><option value="th"></option><option value="lo"></option><option value="my"></option><option value="km"></option><option value="ko"></option><option value="ja"></option><option value="zh-CN"></option><option value="zh-TW"></option><option value="zh-HK">&nbsp;( )</option></select><input type="hidden" name="oldhl" value="en-GB"><input type="hidden" name="gl" value="GB"><input type="hidden" name="m" value="0"><input type="hidden" name="pc" value="yt"><input type="hidden" name="continue" value="https://www.youtube.com/results?search\_query=https%3A%2F%2Fwww.youtube.com%2Fplaylist%3Flist%3DPL8\_xPU5epJdfCxbRzxuchTfgOH1I2Ibht"><input type="hidden" name="src" value="1"><input type="submit" value="Change language"></form><a href="https://policies.google.com/privacy?hl=en-GB&utm\_source=ucb">Privacy



```
Policy <a href="https://policies.google.com/terms?hl=en-
GB&utm_source=ucb">Terms of Service</div></body></html>
```

[14]: str

```
[42]: # Convert it to a Python dictionary
#

#https://stackoverflow.com/questions/43469412/
↳ convert-html-source-code-to-json-object
data = json.dumps(r.text) # now in JSON string notatio
type(data)
data

this method expects JSON data, it seems
```

```
↳ -----
AttributeError Traceback (most recent call↳
↳ last)
```

```
<ipython-input-42-aea0549a1dc0> in <module>
 7 data
 8
----> 9 data.json()
 10
 11 #jsonTest = r.json()
```

AttributeError: 'str' object has no attribute 'json'

```
[36]: # convert JSON string into JSON object
```

```
jsonL = json.loads(data)
```

```
[36]: '<!DOCTYPE html><html lang="en-GB" dir="ltr"><head><style
nonce="aZ5E26srGWqnq6U3bp2w1Q">\na, a:link, a:visited, a:active, a:hover {\n
color: #1a73e8;\n text-decoration: none;\n}\nbody {\n font-family:
Roboto,RobotoDraft,Helvetica,Arial,sans-serif;\n text-align: center;\n -ms-
text-size-adjust: 100%;\n -moz-text-size-adjust: 100%;\n -webkit-text-size-
adjust: 100%;\n}\n.box {\n border: 1px solid #dadce0;\n box-sizing: border-
box;\n border-radius: 8px;\n margin: 24px auto 5px auto;\n max-width:
520px;\n padding: 24px;\n}\nh1 {\n color: #2c2c2c;\n font-size: 24px;\n
hyphens: auto;\n margin: 24px 0;\n}\np, .sub, .contentText {\n color:
#5f6368;\n font-size: 14px;\n line-height: 20px;\n letter-spacing: 0.2px;\n
```

```

text-align: left;\n}\n.signin {\n text-align: right;\n}\n\n.image {\n display:
block;\n margin: 14px auto;\n}\na.button {\n color: #fff;\n}\n\nbutton, .button
{\n border-radius: 4px;\n background-color: #1a73e8;\n border: none;\n
color: #fff;\n cursor: pointer;\n font-family:
Roboto,RobotoDraft,Helvetica,Arial,sans-serif;\n font-size: 14px;\n font-
weight: 500;\n height: 36px;\n margin: 0 4px;\n padding: 10px
24px;\n}\n\ninput.button {\n -webkit-appearance: none;\n}\n\n.error {\n border:
2px solid #d93025;\n border-radius: 5px;\n color: #d93025;\n margin: auto;\n
padding: 5px;\n}\n\n.footer {\n margin-top: 16px;\n}\n\n.footer a {\n margin-left:
24px;\n white-space: nowrap;\n}\n\n.footer a, .footer select, .footer input {\n
color: #757575;\n font-size: 12px;\n}\n\n.languagepicker {\n display: inline-
flex;\n margin: 2px 0;\n}\n\n#languageform,\n#languageselect {\n margin: 0
2px;\n}\n\n#languageselect {\n color: #757575;\n}\n\n.detailspage {\n margin: 24px
auto 0 auto;\n max-width: 700px;\n}\n\n.detailspage h1, .detailspage h2 {\n
font-size: 22px\n}\n\n.setting {\n border: 1px solid #dadce0;\n box-sizing:
border-box;\n border-radius: 8px;\n margin-bottom: 11px;\n padding: 24px 24px
20px 24px;\n text-align: right;\n}\n\n.sub {\n padding: 24px 24px 20px
24px;\n}\n\nhr {\n margin: 12px -24px 12px;\n border: 0;\n border-top: 1px
solid #dadce0;\n}\n\n.nfieldset {\n border: none;\n padding: 0;\n}\n\n.nlabel {\n
margin: 24px;\n}\n\n.ntd {\n vertical-align: top;\n}\n\n.setting h2, .setting h3, h4
{\n color: #3c4043;\n margin: 0;\n text-align: left;\n}\n\n.yt-text {\n color:
#5f6368;\n font-size: 14px;\n font-weight: 300;\n}\n\n.productLogoContainer {\n
margin: auto;\n max-width: 360px;\n}\n\n\n/** Narrow screen (for example a mobile
device). */\n\n@media only screen and (max-width: 480px) {\n body {\n margin:
18px 14px;\n }\n .imgContainer {\n min-width: 96px;\n }\n .hideOnSmallWidth {\n
display: none;\n }\n .footer form {\n margin-
bottom: 3px;\n }\n}\n\n\n@media only screen and (max-width: 380px) {\n
.imgContainer {\n min-width: 72px;\n }\n}\n\n\n/** Normal/non-narrow screen.
*/\n\n@media not screen and (max-width: 480px) {\n body {\n margin: 18px
25px;\n }\n .imgContainer {\n width: 51%;\n }\n .hideOnNormalWidth {\n
display: none;\n }\n .footer form {\n display: inline;\n
}\n}\n\n</style><title>Before you continue to YouTube</title><meta name="viewport"
content="initial-scale=1, maximum-scale=5, width=device-width"><link
rel="shortcut icon" href="//www.google.com/favicon.ico"></head><body><div
class="signin"><a href="https://accounts.google.com/ServiceLogin?hl=en-GB&co
ntinue=https://www.youtube.com/results?search_query%3Dhttps%253A%252F%252Fwww.yo
utube.com%252Fplaylist%253Flist%253DPL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht&gac=
b-23983172" class="button">Sign in</div><div class="box"> <span class="yt-
text">a Google company<div class="productLogoContainer"></div><h1>Before you
continue to YouTube</h1><div class="contentText">Google uses <a
href="https://policies.google.com/technologies/cookies?hl=en-GB&utm_source=ucb"
target="_blank">cookies and data to:Deliver and maintain services,

```

like tracking outages against spam, fraud and abuse</li><li>Measure audience engagement and site statistics to understand how our services are used</li></ul>

If you agree, we'll also use cookies and data to:<ul><li>Improve the quality of our services and develop new ones</li><li>Deliver and measure the effectiveness of ads</li><li>Show personalised content, depending on your settings</li><li>Show personalised or generic ads, depending on your settings, on Google and across the web</li></ul>

For non-personalised content and ads, what you see may be influenced by things like the content that you're currently viewing and your location (ad serving is based on general location). Personalised content and ads can be based on those things and your activity, like Google searches and videos that you watch on YouTube. Personalised content and ads include things like more relevant results and recommendations, a customised YouTube homepage, and ads that are tailored to your interests.<p>Click &"Customise"; to review options, including controls to reject the use of cookies for personalisation and information about browser-level controls to reject some or all cookies for other uses. You can also visit g.co/privacytools at any time.</p></div><div><a href="https://consent.youtube.com/dl?continue=https://www.youtube.com/results?search\_query=3Dhttps%253A%252F%252Fwww.youtube.com%252Fplaylist%253Flist%253DPL8\_xPU5epJdfCxbRzxuchTfgOH1I2Ibht&amp;gl=GB&amp;hl=en-GB&amp;pc=y&amp;uxe=23983172&amp;src=1" class="button">Customise</a><form action="https://consent.youtube.com/s" method="POST" style="display:inline;"><input type="hidden" name="gl" value="GB"><input type="hidden" name="m" value="0"><input type="hidden" name="pc" value="yt"><input type="hidden" name="continue" value="https://www.youtube.com/r esults?search\_query=https%3A%2F%2Fwww.youtube.com%2Fplaylist%3Flist%3DPL8\_xPU5ep JdfCxbRzxuchTfgOH1I2Ibht"><input type="hidden" name="ca" value="r"><input type="hidden" name="x" value="8"><input type="hidden" name="v" value="cb.20210523-18-p0.en-GB+FX+921"><input type="hidden" name="t" value="ADw3F8hxOmPNgc8Ug1Hg6CEnOfNX71uI\_w:1622182689957"><input type="hidden" name="hl" value="en-GB"><input type="hidden" name="src" value="1"><input type="hidden" name="uxe" value="23983172"><input type="submit" value="I agree" class="button" aria-label="Agree to the use of cookies and other data for the purposes described"/></form></div></div><div class="footer"><form action="https://consent.youtube.com/ml" method="get"><select id="languageselect" name="hl"><option value="af">Afrikaans</option><option value="az">azerbaycan</option><option value="bs">bosanski</option><option value="ca">català</option><option value="cs">Čeština</option><option value="cy">Cymraeg</option><option value="da">Dansk</option><option value="de">Deutsch</option><option value="et">eesti</option><option value="en-GB" selected>English (United Kingdom)</option><option value="en">English (United States)</option><option value="es">Español (España)</option><option value="es-419">Español (Latinoamérica)</option><option value="eu">euskara</option><option value="fil">Filipino</option><option value="fr-CA">Français (Canada)</option><option value="fr">Français (France)</option><option

```

value="ga">Gaeilge</option><option value="gl">galego</option><option
value="hr">Hrvatski</option><option value="id">Indonesia</option><option
value="zu">isiZulu</option><option value="is">islenska</option><option
value="it">Italiano</option><option value="sw">Kiswahili</option><option
value="lv">latviešu</option><option value="lt">lietuvių</option><option
value="hu">magyar</option><option value="ms">Melayu</option><option
value="nl">Nederlands</option><option value="no">norsk</option><option
value="uz">o‘zbek</option><option value="pl">polski</option><option value="pt-
BR">Português (Brasil)</option><option value="pt-
PT">Português (Portugal)</option><option value="ro">română</option><option
value="sq">shqip</option><option value="sk">Slovenčina</option><option
value="sl">slovenščina</option><option value="sr-Latn">srpski
(latinica)</option><option value="fi">Suomi</option><option
value="sv">Svenska</option><option value="vi">Tiếng Việt</option><option
value="tr">Türkçe</option><option value="el">E </option><option
value="be"> </option><option value="bg"> </option><option
value="ky"> </option><option value="kk"> </option><option
value="mk"> </option><option value="mn"> </option><option
value="ru"> </option><option value="sr"> </option><option
value="uk"> </option><option value="ka"> </option><option
value="hy"> </option><option value="iw" </option><option
value="ur" </option><option value="ar" </option><option
value="fa" </option><option value="am"> </option><option
value="ne"> </option><option value="mr"> </option><option
value="hi"> </option><option value="as"> </option><option
value="bn"> </option><option value="pa"> </option><option
value="gu"> </option><option value="or"> </option><option
value="ta"> </option><option value="te"> </option><option
value="kn"> </option><option value="ml"> </option><option
value="si"> </option><option value="th"> </option><option
value="lo"> </option><option value="my"> </option><option
value="km"> </option><option value="ko"> </option><option
value="ja"> </option><option value="zh-CN"> </option><option value="zh-
TW"> </option><option value="zh-HK"> ()</option></select><input
type="hidden" name="oldhl" value="en-GB"><input type="hidden" name="gl"
value="GB"><input type="hidden" name="m" value="0"><input type="hidden"
name="pc" value="yt"><input type="hidden" name="continue" value="https://www.you
tube.com/results?search_query=https%3A%2F%2Fwww.youtube.com%2Fplaylist%3Flist%3D
PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht"><input type="hidden" name="src"
value="1"><input type="submit" value="Change language"></form>Privacy
Policy <a href="https://policies.google.com/terms?hl=en-
GB&utm_source=ucb">Terms of Service</div></body></html>'

```

```

[17]: # From https://developers.google.com/youtube/v3/quickstart/
 ↪python#step_2_set_up_and_run_the_sample
 # Quickstarts sections

```

```
#pip install --upgrade google-api-python-client
```

```
File "<ipython-input-17-b1db0275732f>", line 5
pip install --upgrade google-auth-oauthlib google-auth-httplib2
~
```

```
SyntaxError: invalid syntax
```

```
[18]: pip install --upgrade google-auth-oauthlib google-auth-httplib2
```

```
Collecting google-auth-oauthlib
 Downloading google_auth_oauthlib-0.4.4-py2.py3-none-any.whl (18 kB)
Requirement already up-to-date: google-auth-httplib2 in
c:\programdata\anaconda3\lib\site-packages (0.1.0)
Requirement already satisfied, skipping upgrade: google-auth>=1.0.0 in
c:\programdata\anaconda3\lib\site-packages (from google-auth-oauthlib) (1.30.1)
Collecting requests-oauthlib>=0.7.0
 Downloading requests_oauthlib-1.3.0-py2.py3-none-any.whl (23 kB)
Requirement already satisfied, skipping upgrade: httplib2>=0.15.0 in
c:\programdata\anaconda3\lib\site-packages (from google-auth-httplib2) (0.19.1)
Requirement already satisfied, skipping upgrade: six in
c:\programdata\anaconda3\lib\site-packages (from google-auth-httplib2) (1.15.0)
Requirement already satisfied, skipping upgrade: cachetools<5.0,>=2.0.0 in
c:\programdata\anaconda3\lib\site-packages (from google-auth>=1.0.0->google-
auth-oauthlib) (4.2.2)
Requirement already satisfied, skipping upgrade: rsa<5,>=3.1.4; python_version
>= "3.6" in c:\programdata\anaconda3\lib\site-packages (from google-
auth>=1.0.0->google-auth-oauthlib) (4.7.2)
Requirement already satisfied, skipping upgrade: pyasn1-modules>=0.2.1 in
c:\programdata\anaconda3\lib\site-packages (from google-auth>=1.0.0->google-
auth-oauthlib) (0.2.8)
Requirement already satisfied, skipping upgrade: setuptools>=40.3.0 in
c:\programdata\anaconda3\lib\site-packages (from google-auth>=1.0.0->google-
auth-oauthlib) (49.2.0.post20200714)
Requirement already satisfied, skipping upgrade: requests>=2.0.0 in
c:\programdata\anaconda3\lib\site-packages (from requests-
oauthlib>=0.7.0->google-auth-oauthlib) (2.24.0)
Collecting oauthlib>=3.0.0
 Downloading oauthlib-3.1.0-py2.py3-none-any.whl (147 kB)
Requirement already satisfied, skipping upgrade: pyparsing<3,>=2.4.2 in
c:\programdata\anaconda3\lib\site-packages (from httplib2>=0.15.0->google-auth-
httplib2) (2.4.7)
Requirement already satisfied, skipping upgrade: pyasn1>=0.1.3 in
c:\programdata\anaconda3\lib\site-packages (from rsa<5,>=3.1.4; python_version
>= "3.6"->google-auth>=1.0.0->google-auth-oauthlib) (0.4.8)
```

Requirement already satisfied, skipping upgrade: chardet<4,>=3.0.2 in c:\programdata\anaconda3\lib\site-packages (from requests>=2.0.0->requests-oauthlib>=0.7.0->google-auth-oauthlib) (3.0.4)

Requirement already satisfied, skipping upgrade: idna<3,>=2.5 in c:\programdata\anaconda3\lib\site-packages (from requests>=2.0.0->requests-oauthlib>=0.7.0->google-auth-oauthlib) (2.10)

Requirement already satisfied, skipping upgrade: urllib3!=1.25.0,!1.25.1,<1.26,>=1.21.1 in c:\programdata\anaconda3\lib\site-packages (from requests>=2.0.0->requests-oauthlib>=0.7.0->google-auth-oauthlib) (1.25.9)

Requirement already satisfied, skipping upgrade: certifi>=2017.4.17 in c:\programdata\anaconda3\lib\site-packages (from requests>=2.0.0->requests-oauthlib>=0.7.0->google-auth-oauthlib) (2020.6.20)

Installing collected packages: oauthlib, requests-oauthlib, google-auth-oauthlib

Successfully installed google-auth-oauthlib-0.4.4 oauthlib-3.1.0 requests-oauthlib-1.3.0

Note: you may need to restart the kernel to use updated packages.

[20]: *# https://medium.com/daily-python/  
 ↳python-script-to-search-content-using-youtube-data-api-daily-python-8-1084776a6578*

```
api_key = input("Enter API key:") # key required to access API like key fobr_
↳door!!
```

```
from apiclient.discovery import build
youtube = build('youtube','v3',developerKey = api_key)
print(type(youtube))
```

```
<class 'googleapiclient.discovery.Resource'>
```

```
https://www.youtube.com/results?search_query=https%3A%2F%2Fwww.youtube.com%2Fplaylist%3Flist%3DP
```

```
https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht
```

- Extracted the search query from the URL -> can see “?search\_query”

[27]: *# https://developers.google.com/youtube/v3/docs/search/list*

```
request = youtube.search().list(
 q='https://www.youtube.com/playlist?
↳list=PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht',
 part='snippet',
 type='video'
)
```

```
youtube API returns JSON object
```

```
print(type(request))
```

```
res = request.execute()
```

```

from pprint import PrettyPrinter
pp = PrettyPrinter() # initialised the object. It has now been created +
 ↳ can later be accessed/ manipulated using its methods. It is like making the
 ↳ printer for later use
pp.pprint(res)

```

```

<class 'googleapiclient.http.HttpRequest'>
{'etag': 'ZIqBEsh-C8rIMBbDZqm3L0rXX5I',
 'items': [{ 'etag': '2K0Q8W6WbU6ohtZGwr7LsrCU2rI',
 'id': {'kind': 'youtube#video', 'videoId': '8ONSc_tG4Hg'},
 'kind': 'youtube#searchResult',
 'snippet': {'channelId': 'UC1GTZDyz3CSl92TgDqIr0nw',
 'channelTitle': 'caltech',
 'description': 'Produced in association with Caltech '
 'Academic Media Technologies. ©2020 '
 'California Institute of Technology.',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-09T17:35:16Z',
 'publishedAt': '2020-10-09T17:35:16Z',
 'thumbnails': {'default': {'height': 90,
 'url':
'https://i.ytimg.com/vi/8ONSc_tG4Hg/default.jpg',
 'width': 120},
 'high': {'height': 360,
 'url':
'https://i.ytimg.com/vi/8ONSc_tG4Hg/hqdefault.jpg',
 'width': 480},
 'medium': {'height': 180,
 'url':
'https://i.ytimg.com/vi/8ONSc_tG4Hg/mqdefault.jpg',
 'width': 320}},
 'title': '1 5 Swaps'}}},
 { 'etag': '6QscfXUmP70AjqB15Urg03eFcb4',
 'id': {'kind': 'youtube#video', 'videoId': '77cRgL0L2p8'},
 'kind': 'youtube#searchResult',
 'snippet': {'channelId': 'UC1GTZDyz3CSl92TgDqIr0nw',
 'channelTitle': 'caltech',
 'description': 'Produced in association with Caltech '
 'Academic Media Technologies. ©2020 '
 'California Institute of Technology.',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-09T17:37:32Z',
 'publishedAt': '2020-10-09T17:37:32Z',
 'thumbnails': {'default': {'height': 90,
 'url':
'https://i.ytimg.com/vi/77cRgL0L2p8/default.jpg',
 'width': 120},
 'high': {'height': 360,

```

```

 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/hqdefault.jpg',
 'width': 480},
 'medium': {'height': 180,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/mqdefault.jpg',
 'width': 320}},
 'title': '1 1 Welcome to my course - BEM1105x Course - '
 'Prof. Jakša Cvitanović'}},
{'etag': 'irUh50b0lS6bgx9Kl-ICClMsoDQ',
'id': {'kind': 'youtube#video', 'videoId': '2H3Dtcr1x4E'},
'kind': 'youtube#searchResult',
'snippet': {'channelId': 'UCLGTZDyz3CSl92TgDqIr0nw',
'channelTitle': 'caltech',
'description': 'Produced in association with Caltech '
'Academic Media Technologies. ©2020 '
'California Institute of Technology.',
'liveBroadcastContent': 'none',
'publishTime': '2020-10-09T17:30:30Z',
'publishedAt': '2020-10-09T17:30:30Z',
'thumbnails': {'default': {'height': 90,
'url':
'https://i.ytimg.com/vi/2H3Dtcr1x4E/default.jpg',
'width': 120},
'high': {'height': 360,
'url':
'https://i.ytimg.com/vi/2H3Dtcr1x4E/hqdefault.jpg',
'width': 480},
'medium': {'height': 180,
'url':
'https://i.ytimg.com/vi/2H3Dtcr1x4E/mqdefault.jpg',
'width': 320}},
'title': '8 1 Stochastic Volatility Part 1'}},
{'etag': 'hd7z7z0w8-GYnoDcYvDYc-x1zFM',
'id': {'kind': 'youtube#video', 'videoId': 'Z-Jg_HUr4Dc'},
'kind': 'youtube#searchResult',
'snippet': {'channelId': 'UCLGTZDyz3CSl92TgDqIr0nw',
'channelTitle': 'caltech',
'description': 'Produced in association with Caltech '
'Academic Media Technologies. ©2020 '
'California Institute of Technology.',
'liveBroadcastContent': 'none',
'publishTime': '2020-10-09T17:30:50Z',
'publishedAt': '2020-10-09T17:30:50Z',
'thumbnails': {'default': {'height': 90,
'url':
'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/default.jpg',
'width': 120},

```



```

 'high': {'height': 360,
 'url':
'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/hqdefault.jpg',
 'width': 480},
 'medium': {'height': 180,
 'url':
'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/mqdefault.jpg',
 'width': 320}},
 'title': '1 2 Overview'}}},
{'etag': 'yeNyHRsxMcyiYF60cp7oX9ER708',
 'id': {'kind': 'youtube#video', 'videoId': 'xu-PfROF3C8'},
 'kind': 'youtube#searchResult',
 'snippet': {'channelId': 'UC1GTZDyz3CSl92TgDqIr0nw',
 'channelTitle': 'caltech',
 'description': 'Produced in association with Caltech '
 'Academic Media Technologies. ©2020 '
 'California Institute of Technology.',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-09T17:32:57Z',
 'publishedAt': '2020-10-09T17:32:57Z',
 'thumbnails': {'default': {'height': 90,
 'url':
'https://i.ytimg.com/vi/xu-PfROF3C8/default.jpg',
 'width': 120},
 'high': {'height': 360,
 'url':
'https://i.ytimg.com/vi/xu-PfROF3C8/hqdefault.jpg',
 'width': 480},
 'medium': {'height': 180,
 'url':
'https://i.ytimg.com/vi/xu-PfROF3C8/mqdefault.jpg',
 'width': 320}},
 'title': '5 3 Stochastic integral Part 1'}}}],
'kind': 'youtube#searchListResponse',
'nextPageToken': 'CAUQAA',
'pageInfo': {'resultsPerPage': 5, 'totalResults': 72},
'regionCode': 'GB'}

```

## 1.2 Extract relevant info from JSON

Want: - Description - Duration - URL

```
[29]: type(res)
```

```
[29]: dict
```

```
[43]: len(res)
```

[43]: 6

```
[45]: # get keys
```

```
res.keys()
```

```
[45]: dict_keys(['kind', 'etag', 'nextPageToken', 'regionCode', 'pageInfo', 'items'])
```

```
[47]: res.get('etag')
```

```
[47]: 'ZIqBESh-C8rIMBbDZqm3L0rXX5I'
```

```
[50]: print(res.get('items'))
```

```
print(type(res.get('items')))
```

```
[{'kind': 'youtube#searchResult', 'etag': '2K0Q8W6WbU6ohtZGwr7LsrCU2rI', 'id':
{'kind': 'youtube#video', 'videoId': '8ONSc_tG4Hg'}, 'snippet': {'publishedAt':
'2020-10-09T17:35:16Z', 'channelId': 'UC1GTZDyz3CS192TgDqIr0nw', 'title': '1 5
Swaps', 'description': 'Produced in association with Caltech Academic Media
Technologies. ©2020 California Institute of Technology.', 'thumbnails':
{'default': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/default.jpg', 'width':
120, 'height': 90}, 'medium': {'url':
'https://i.ytimg.com/vi/8ONSc_tG4Hg/mqdefault.jpg', 'width': 320, 'height':
180}, 'high': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/hqdefault.jpg',
'width': 480, 'height': 360}}, 'channelTitle': 'caltech',
'liveBroadcastContent': 'none', 'publishTime': '2020-10-09T17:35:16Z'}},
{'kind': 'youtube#searchResult', 'etag': '6QscfXUmP70AjqB15Urg03eFcb4', 'id':
{'kind': 'youtube#video', 'videoId': '77cRgL0L2p8'}, 'snippet': {'publishedAt':
'2020-10-09T17:37:32Z', 'channelId': 'UC1GTZDyz3CS192TgDqIr0nw', 'title': '1 1
Welcome to my course - BEM1105x Course - Prof. Jakša Cvitanić', 'description':
'Produced in association with Caltech Academic Media Technologies. ©2020
California Institute of Technology.', 'thumbnails': {'default': {'url':
'https://i.ytimg.com/vi/77cRgL0L2p8/default.jpg', 'width': 120, 'height': 90},
'medium': {'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/mqdefault.jpg', 'width':
320, 'height': 180}, 'high': {'url':
'https://i.ytimg.com/vi/77cRgL0L2p8/hqdefault.jpg', 'width': 480, 'height':
360}}, 'channelTitle': 'caltech', 'liveBroadcastContent': 'none', 'publishTime':
'2020-10-09T17:37:32Z'}}, {'kind': 'youtube#searchResult', 'etag':
'irUh50b0lS6bgx9Kl-ICClMsoDQ', 'id': {'kind': 'youtube#video', 'videoId':
'2H3DtcrLx4E'}, 'snippet': {'publishedAt': '2020-10-09T17:30:30Z', 'channelId':
'UC1GTZDyz3CS192TgDqIr0nw', 'title': '8 1 Stochastic Volatility Part 1',
'description': 'Produced in association with Caltech Academic Media
Technologies. ©2020 California Institute of Technology.', 'thumbnails':
{'default': {'url': 'https://i.ytimg.com/vi/2H3DtcrLx4E/default.jpg', 'width':
120, 'height': 90}, 'medium': {'url':
'https://i.ytimg.com/vi/2H3DtcrLx4E/mqdefault.jpg', 'width': 320, 'height':
180}, 'high': {'url': 'https://i.ytimg.com/vi/2H3DtcrLx4E/hqdefault.jpg',
```

```
'width': 480, 'height': 360}}, 'channelTitle': 'caltech',
'liveBroadcastContent': 'none', 'publishTime': '2020-10-09T17:30:30Z'}}},
{'kind': 'youtube#searchResult', 'etag': 'hd7z7z0w8-GYnoDcYvDYc-x1zFM', 'id':
{'kind': 'youtube#video', 'videoId': 'Z-Jg_HUr4Dc'}, 'snippet': {'publishedAt':
'2020-10-09T17:30:50Z', 'channelId': 'UClGTZDyz3CSl92TgDqIr0nw', 'title': '1 2
Overview', 'description': 'Produced in association with Caltech Academic Media
Technologies. ©2020 California Institute of Technology.', 'thumbnails':
{'default': {'url': 'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/default.jpg', 'width':
120, 'height': 90}, 'medium': {'url':
'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/mqdefault.jpg', 'width': 320, 'height':
180}, 'high': {'url': 'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/hqdefault.jpg',
'width': 480, 'height': 360}}, 'channelTitle': 'caltech',
'liveBroadcastContent': 'none', 'publishTime': '2020-10-09T17:30:50Z'}}},
{'kind': 'youtube#searchResult', 'etag': 'yeNyHRsxMcyiYF60cp7oX9ER708', 'id':
{'kind': 'youtube#video', 'videoId': 'xu-PfROF3C8'}, 'snippet': {'publishedAt':
'2020-10-09T17:32:57Z', 'channelId': 'UClGTZDyz3CSl92TgDqIr0nw', 'title': '5 3
Stochastic integral Part 1', 'description': 'Produced in association with
Caltech Academic Media Technologies. ©2020 California Institute of Technology.',
'thumbnails': {'default': {'url': 'https://i.ytimg.com/vi/xu-
PfROF3C8/default.jpg', 'width': 120, 'height': 90}, 'medium': {'url':
'https://i.ytimg.com/vi/xu-PfROF3C8/mqdefault.jpg', 'width': 320, 'height':
180}, 'high': {'url': 'https://i.ytimg.com/vi/xu-PfROF3C8/hqdefault.jpg',
'width': 480, 'height': 360}}, 'channelTitle': 'caltech',
'liveBroadcastContent': 'none', 'publishTime': '2020-10-09T17:32:57Z'}}]
<class 'list'>
```

```
[54]: for i,v in enumerate(res):
 print(v)
 print(i)
```

```
kind
0
etag
1
nextPageToken
2
regionCode
3
pageInfo
4
items
5
```

```
[60]: for i in res:
 print(str(i) + ' data type is ' + str(type(res.get(i))))
```

```
kind data type is <class 'str'>
```

```
etag data type is <class 'str'>
nextPageToken data type is <class 'str'>
regionCode data type is <class 'str'>
pageInfo data type is <class 'dict'>
items data type is <class 'list'>
```

```
[61]: # so items contains list object!!!
```

```
[65]: for item in res['items']:
 print(type(item))
 print(item.keys())
```

```
<class 'dict'>
dict_keys(['kind', 'etag', 'id', 'snippet'])
<class 'dict'>
dict_keys(['kind', 'etag', 'id', 'snippet'])
<class 'dict'>
dict_keys(['kind', 'etag', 'id', 'snippet'])
<class 'dict'>
dict_keys(['kind', 'etag', 'id', 'snippet'])
<class 'dict'>
dict_keys(['kind', 'etag', 'id', 'snippet'])
```

Each of the objects in the items list contains a dictionary of kind, etag, id and snippet

```
[74]: for item in res['items']:
 print(item.get('snippet').keys())
 print(type(item.get('snippet')))
```

```
dict_keys(['publishedAt', 'channelId', 'title', 'description', 'thumbnails',
'channelTitle', 'liveBroadcastContent', 'publishTime'])
<class 'dict'>
dict_keys(['publishedAt', 'channelId', 'title', 'description', 'thumbnails',
'channelTitle', 'liveBroadcastContent', 'publishTime'])
<class 'dict'>
dict_keys(['publishedAt', 'channelId', 'title', 'description', 'thumbnails',
'channelTitle', 'liveBroadcastContent', 'publishTime'])
<class 'dict'>
dict_keys(['publishedAt', 'channelId', 'title', 'description', 'thumbnails',
'channelTitle', 'liveBroadcastContent', 'publishTime'])
<class 'dict'>
dict_keys(['publishedAt', 'channelId', 'title', 'description', 'thumbnails',
'channelTitle', 'liveBroadcastContent', 'publishTime'])
<class 'dict'>
```

```
[76]: for item in res['items']:
 details = item.get('snippet')

 title = details.get('title'))
```

```

1 5 Swaps
1 1 Welcome to my course - BEM1105x Course - Prof. Jakša Cvitanić
8 1 Stochastic Volatility Part 1
1 2 Overview
5 3 Stochastic integral Part 1

```

### 1.3 Deconstructing the URL

[https://www.youtube.com/playlist?list=PL8\\_xPU5epJdfCxbRzxuchTfgOH1I2Ibht](https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht)

- Youtube PLAYLIST query, NOT search query
- Returns list

```
[88]: all_data = res['items'] # accessing items key of dictionary
 all_data[0]
```

```
[88]: {'kind': 'youtube#searchResult',
 'etag': '2K0Q8W6WbU6ohtZGwr7LsrCU2rI',
 'id': {'kind': 'youtube#video', 'videoId': '8ONSc_tG4Hg'},
 'snippet': {'publishedAt': '2020-10-09T17:35:16Z',
 'channelId': 'UC1GTZDyz3CSl92TgDqIrOnw',
 'title': '1 5 Swaps',
 'description': 'Produced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology.',
 'thumbnails': {'default': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/default.jpg',
 'width': 120,
 'height': 90},
 'medium': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/mqdefault.jpg',
 'width': 320,
 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/hqdefault.jpg',
 'width': 480,
 'height': 360}}},
 'channelTitle': 'caltech',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-09T17:35:16Z'}}
```

```
[]:
```

- Description
- Duration
- URL

```
[90]: <class 'googleapiclient.http.HttpRequest'>
 {'etag': 'EoE9SB9hb82IZ9xwSzwa04ExjGc',
```

```

'items': [{ 'etag': 'X7juseCs-rfMspxo2nFDdYHVFx0',
 'id': { 'kind': 'youtube#playlist',
 'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht' },
 'kind': 'youtube#searchResult',
 'snippet': { 'channelId': 'UC1GTZDyz3CSl92TgDqIr0nw',
 'channelTitle': 'caltech',
 'description': 'Produced in association with Caltech '
 'Academic Media Technologies. ©2020 '
 'California Institute of Technology.',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-07T16:51:02Z',
 'publishedAt': '2020-10-07T16:51:02Z',
 'thumbnails': { 'default': { 'height': 90,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/default.jpg',
 'width': 120 },
 'high': { 'height': 360,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/hqdefault.jpg',
 'width': 480 },
 'medium': { 'height': 180,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/mqdefault.jpg',
 'width': 320 } } },
 'title': 'BEM1105x Course - Prof. Jakša Cvitanić' }]],
'kind': 'youtube#searchListResponse',
'pageInfo': { 'resultsPerPage': 1, 'totalResults': 1 },
'regionCode': 'GB' }

```

## 1.4 Reading + understanding the API

- Search library overview - list method within list
- List: Returns a collection of search results that match the query parameters specified in the API request. By default, a search result set identifies

matching video, channel, and playlist resources

, but you can also configure queries to only retrieve a specific type of resource. Try it now.

<https://developers.google.com/youtube/v3/docs/search>

- So return search results that match query parameters in API REQUEST
- Request is the user method. It has parameters that the user sets
- Within the parameters, can specify the type of search results want back
- Want to get back a playlist object and then select the playlist and dive into it

[102]:

```
https://developers.google.com/youtube/v3/docs/search/list
```

```

request = youtube.search().list(
 q='https://www.youtube.com/playlist?
 ↪list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht',
 part='id, snippet',
 type='playlist', # this was previously set to VIDEO. But list of
 ↪videos != playlist object
 maxResults = 100 # default value is 5
)

youtube API returns JSON object

print(type(request))

res = request.execute()
from pprint import PrettyPrinter
pp = PrettyPrinter() # initialised the object. It has now been created +
 ↪can later be accessed/ manipulated using its methods. It is like making the
 ↪printer for later use
pp.pprint(res)

```

```

<class 'googleapiclient.http.HttpRequest'>
{'etag': 'EoE9SB9hb82IZ9xwSzwa04ExjGc',
 'items': [{ 'etag': 'X7juseCs-rfMspxo2nFDdYHVFx0',
 'id': {'kind': 'youtube#playlist',
 'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht'},
 'kind': 'youtube#searchResult',
 'snippet': {'channelId': 'UC1GTZDyz3CSl92TgDqIr0nw',
 'channelTitle': 'caltech',
 'description': 'Produced in association with Caltech '
 'Academic Media Technologies. ©2020 '
 'California Institute of Technology.',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-07T16:51:02Z',
 'publishedAt': '2020-10-07T16:51:02Z',
 'thumbnails': {'default': {'height': 90,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/default.jpg',
 'width': 120},
 'high': {'height': 360,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/hqdefault.jpg',
 'width': 480},
 'medium': {'height': 180,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/mqdefault.jpg',
 'width': 320}},
 'title': 'BEM1105x Course - Prof. Jakša Cvitanić'}}],

```

```
'kind': 'youtube#searchListResponse',
'pageInfo': {'resultsPerPage': 1, 'totalResults': 1},
'regionCode': 'GB'}
```

- This QUERY returns many objects, BUT only 1 playlist object
- Here, trying to extract VIDEO results, not playlist details.
- Using playlist query to get SEARCH results of what is within it

[111]:

```
https://developers.google.com/youtube/v3/docs/search/list
request = youtube.search().list(
 q='https://www.youtube.com/playlist?
 ↪list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht',
 part='id, snippet',
 type='playlist', # this was previously set to VIDEO. But list of
 ↪videos != playlist object
 maxResults = 100 # default value is 5
)

youtube API returns JSON object

print(type(request))

res2 = request.execute()
from pprint import PrettyPrinter
pp = PrettyPrinter() # initialised the object. It has now been created +
 ↪can later be accessed/ manipulated using its methods. It is like making the
 ↪printer for later use
pp.pprint(res2)
```

```
<class 'googleapiclient.http.HttpRequest'>
{'etag': 'EoE9SB9hb82IZ9xwSzwa04ExjGc',
 'items': [{'etag': 'X7juseCs-rfMspxo2nFDdYHVFx0',
 'id': {'kind': 'youtube#playlist',
 'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht'},
 'kind': 'youtube#searchResult',
 'snippet': {'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
 'channelTitle': 'caltech',
 'description': 'Produced in association with Caltech '
 'Academic Media Technologies. ©2020 '
 'California Institute of Technology.',
 'liveBroadcastContent': 'none',
 'publishTime': '2020-10-07T16:51:02Z',
 'publishedAt': '2020-10-07T16:51:02Z',
 'thumbnails': {'default': {'height': 90,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/default.jpg',
```



```

 'width': 120},
 'high': {'height': 360,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/hqdefault.jpg',
 'width': 480},
 'medium': {'height': 180,
 'url':
'https://i.ytimg.com/vi/77cRgLOL2p8/mqdefault.jpg',
 'width': 320}},
 'title': 'BEM1105x Course - Prof. Jakša Cvitanić'}}],
'kind': 'youtube#searchListResponse',
'pageInfo': {'resultsPerPage': 1, 'totalResults': 1},
'regionCode': 'GB'}

```

```
[125]: playlistID = res['items'][0]['id']['playlistId']
```

```
[109]: res['items'][5]
```

```

[109]: {'kind': 'youtube#searchResult',
'etag': 'c5CuHG5v9IxIL1GlutjvysKmTTQ',
'id': {'kind': 'youtube#video', 'videoId': 'IwWEywlKGcg'},
'snippet': {'publishedAt': '2020-10-09T17:33:24Z',
'channelId': 'UC1GTZDyz3CSl92TgDqIrOnw',
'title': '9 4 Perfect hedging replication Part 1',
'description': 'Produced in association with Caltech Academic Media
Technologies. ©2020 California Institute of Technology.',
'thumbnails': {'default': {'url':
'https://i.ytimg.com/vi/IwWEywlKGcg/default.jpg',
'width': 120,
'height': 90},
'medium': {'url': 'https://i.ytimg.com/vi/IwWEywlKGcg/mqdefault.jpg',
'width': 320,
'height': 180},
'high': {'url': 'https://i.ytimg.com/vi/IwWEywlKGcg/hqdefault.jpg',
'width': 480,
'height': 360}},
'channelTitle': 'caltech',
'liveBroadcastContent': 'none',
'publishTime': '2020-10-09T17:33:24Z'}}

```

```

[214]: # BOILERPLATE CODE.
#https://stackoverflow.com/questions/18804904/
→retrieve-all-videos-from-youtube-playlist-using-youtube-v3-api

from apiclient.discovery import build

def fetch_all_youtube_videos(playlistId):

```

```

"""
Fetches a playlist of videos from youtube
We splice the results together in no particular order

Parameters:
 parm1 - (string) playlistId
Returns:
 playlistItem Dict
"""

api_key = "AIzaSyDOSvLn5HKCNqorxzFvpZZJbdp7xSpHXPc" # key required to
↳access API like key for door!!

youtube = build('youtube','v3',developerKey = api_key)

res = youtube.playlistItems().list(
part="snippet, contentDetails",
playlistId=playlistId,
maxResults="50"
).execute()

nextPageToken = res.get('nextPageToken')
while ('nextPageToken' in res):
 nextPage = youtube.playlistItems().list(
part="snippet",
playlistId=playlistId,
maxResults="50",
pageToken=nextPageToken
).execute()
 res['items'] = res['items'] + nextPage['items']

 if 'nextPageToken' not in nextPage:
 res.pop('nextPageToken', None)
 else:
 nextPageToken = nextPage['nextPageToken']

return res

```

```
[215]: playListVideos = fetch_all_youtube_videos(playlistID)
```

```
[222]: # get list of all VIDEOS in playlist and their video IDs
```

```

titles = []
videoIds = []
a = []

count = 0
for i in playListVideos['items']:

```

```

 #contentDetails.videoId

 #print(i['snippet']['title'])

 titles.append(i['snippet']['title'])
 videoIds.append(i['snippet']['resourceId']['videoId'])

 #print(i.get('contentDetails').get('videoId'))

 #count += 1
 #print(count)
 len(videoIds)
 videoIds

```

```

[222]: ['77cRgL0L2p8',
 'Z-Jg_HUr4Dc',
 'RGI7rLIAn7A',
 'EEzHNNCVx6A',
 '8ONSc_tG4Hg',
 '3REjWQYcIzg',
 'EQ4MRa6ySM4',
 'rb5S6FgqIcA',
 'Ytlgcf16gCw',
 '10eM0GreZes',
 'BuxGarL2Iu8',
 '98OHlQvTnf4',
 'q5FXKCsRA44',
 'A-VmGNFugok',
 '7dL5HZZkGzo',
 'k-5SjgTQrfc',
 'Q1ZFXW0bOfM',
 'uQ4vugxQ2Bg',
 'rDHnuAByxso',
 'DoeK_1Pm0HQ',
 'vGgNEb3m6Uc',
 'MJy0J4_N8U0',
 'VhGeuKsCdKM',
 '6feKMBADptE',
 'bc642xwy0Y8',
 '6JqtSa1vqzs',
 's0Hh182NvWM',
 'xD04kRYQ4UE',
 'iVNu06mmPuA',
 '45BDDywaxL0',

```

'DrtkkWfeMPE',  
'qoJEpUHHJzi8',  
'xu-PfROF3C8',  
'si4pRUFCHo4',  
'mA0tobJ7Ats',  
'YJlplLxzh1c',  
'jnsh7xYpJTc',  
'lji5z0YJ\_ZY',  
'jALuBGWRVy8',  
'7NOX2kdKfyA',  
'u2aiPSASMNQ',  
'1whZLVlXNWU',  
'j5fAZNc7FpU',  
'j8TbtdHiNC4',  
'Xu77dfWy6rc',  
'xGBynU7dnVI',  
'ZWOKePY8i7M',  
'OQp6Qsrwyzo',  
'QXw2M6uzKuo',  
'LLypf8UC0EU',  
'2H3Dtcr1x4E',  
'TUc50mmvIuw',  
'cFgA7Bz8eMg',  
'ZVHnSthFFUI',  
'J5SH4bjk15M',  
'IaPkhV7gPtU',  
'11GiCz5Lc8Q',  
'IwWEywlKGcg',  
'YNEQDFALdMk',  
'vMPFGaH8hZ4',  
'wNktQ3SMFUA',  
'qz-h8YUwvvk',  
'hxMF3UW\_WRs',  
'9dtAzt8sb1w',  
'QHH8p\_o2BcU',  
'L53dzqFIyEI',  
'mgufKez1IVM',  
'6qvNolhfeFM',  
'Z-YdaInnqeI',  
'Ve2PqQs4RLM',  
'DnwAFehmNNI',  
'9kGB4WmSyro',  
'OwWC8g4S94A',  
'KU-Cuyak4Z8',  
'fXWhkJQ\_88I',  
'UuYgrxqGnFw']

```
[218]: playlistVideos['items']
```

```
[218]: [{ 'kind': 'youtube#playlistItem',
 'etag': '40i7QXpZU6MZB69uJIYbdq1VD6c',
 'id': 'UEw4X3hQVTVlcEpkZkN4YlJ6eHVjaFRmZ09IMUkySWJodC4xNTZBNUQxMDZBQzFGMjkw',
 'snippet': { 'publishedAt': '2020-10-13T23:46:24Z',
 'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
 'title': '1 1 Welcome to my course - BEM1105x Course - Prof. Jakša Cvitanić',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
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 'medium': { 'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/mqdefault.jpg',
 'width': 320,
 'height': 180},
 'high': { 'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': { 'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': { 'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/maxresdefault.jpg',
 'width': 1280,
 'height': 720}},
 'channelTitle': 'caltech',
 'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht',
 'position': 0,
 'resourceId': { 'kind': 'youtube#video', 'videoId': '77cRgL0L2p8'},
 'videoOwnerChannelTitle': 'caltech',
 'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIrOnw'},
 'contentDetails': { 'videoId': '77cRgL0L2p8',
 'videoPublishedAt': '2020-10-09T17:37:32Z' }},
 { 'kind': 'youtube#playlistItem',
 'etag': 'hF-l3flqybYqNUF3nIFP-cRG1Yw',
 'id': 'UEw4X3hQVTVlcEpkZkN4YlJ6eHVjaFRmZ09IMUkySWJodC42MTI4Njc2QjM1RjU1MjIjG',
 'snippet': { 'publishedAt': '2020-10-07T16:52:26Z',
 'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
 'title': '1 2 Overview',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
 'thumbnails': { 'default': { 'url': 'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/default.jpg',
 'width': 120,
```

```

 'height': 90},
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 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/Z-Jg_HUr4Dc/maxresdefault.jpg',
 'width': 1280,
 'height': 720}},
 'channelTitle': 'caltech',
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 'videoOwnerChannelTitle': 'caltech',
 'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIrOnw'},
 'contentDetails': {'videoId': 'Z-Jg_HUr4Dc',
 'videoPublishedAt': '2020-10-09T17:30:50Z'}},
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 'etag': '64jhf5iUwZfmlXkylXQ90qh7zX0',
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 'snippet': {'publishedAt': '2020-10-13T23:46:24Z',
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 'title': '1 3 Stocks, bonds, forwards Part I',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
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'https://i.ytimg.com/vi/RGI7rLIAn7A/default.jpg',
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 'width': 320,
 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/RGI7rLIAn7A/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/RGI7rLIAn7A/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/RGI7rLIAn7A/maxresdefault.jpg',
 'width': 1280,
 'height': 720}},
 'channelTitle': 'caltech',

```

```

'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht',
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'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIrOnw'},
'contentDetails': {'videoId': 'RGI7rLIAn7A',
'videoPublishedAt': '2020-10-09T17:34:55Z'}},
{'kind': 'youtube#playlistItem',
'etag': 'mKqsz-sVm1xwSzTmdJ71fMJCUis',
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'snippet': {'publishedAt': '2020-10-07T16:52:26Z',
'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
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'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
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'contentDetails': {'videoId': 'EEzHNNCVx6A',
'videoPublishedAt': '2020-10-09T17:30:30Z'}},
{'kind': 'youtube#playlistItem',
'etag': 'Czq0HmAU6oBdCfyHEJ_lysGM7Gw',
'id': 'UEw4X3hQVTVlcEpkZkN4YlJ6eHVjaFRmZ09IMUkySWJodC4wQUE0QzM4MkJKGQ0YwQjUx',
'snippet': {'publishedAt': '2020-10-13T23:46:24Z',
'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
'title': '1 5 Swaps',
'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?l

```

```

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Academic Media Technologies. ©2020 California Institute of Technology',
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 'width': 320,
 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/8ONSc_tG4Hg/maxresdefault.jpg',
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 'height': 720}},
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 'position': 4,
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 'videoOwnerChannelTitle': 'caltech',
 'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIr0nw'},
 'contentDetails': {'videoId': '8ONSc_tG4Hg',
 'videoPublishedAt': '2020-10-09T17:35:16Z'}},
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 'id': 'UEw4X3hQVTVlcEpKZkN4YlJ6eHVjaFRmZ09IMUkySWJodC40QTA3NTU2RkM1Qz1CMzYx',
 'snippet': {'publishedAt': '2020-10-07T16:52:26Z',
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Academic Media Technologies. ©2020 California Institute of Technology',
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 'width': 320,
 'height': 180},
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 'height': 360},
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 'width': 640,

```



```

 'height': 480},
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 'width': 1280,
 'height': 720}},
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 'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIrOnw'},
 'contentDetails': {'videoId': '3REjWQYcIzg',
 'videoPublishedAt': '2020-10-09T17:30:50Z'}},
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 'id': 'UEw4X3hQVTV1cEpkZkN4YlJ6eHVjaFRmZ09IMUkySWJodC4yOTZGRTNEQ0ZGNUM5RDgw',
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 'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
 'title': '1 7 Call and Put Options Part II',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
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 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/EQ4MRa6ySM4/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/EQ4MRa6ySM4/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/EQ4MRa6ySM4/maxresdefault.jpg',
 'width': 1280,
 'height': 720}},
 'channelTitle': 'caltech',
 'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht',
 'position': 6,
 'resourceId': {'kind': 'youtube#video', 'videoId': 'EQ4MRa6ySM4'},
 'videoOwnerChannelTitle': 'caltech',
 'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIrOnw'},
 'contentDetails': {'videoId': 'EQ4MRa6ySM4',
 'videoPublishedAt': '2020-10-09T17:34:55Z'}},
 {'kind': 'youtube#playlistItem',
 'etag': 'k_j_OgPsEqX76xPjEiVDTk3mnMo',

```

```

'id': 'UEw4X3hQVTVlcEpkZkN4YlJ6eHVjaFRmZ09IMUkySWJodC5FRjdGNDMzNOI2RTI3MDlG',
'snippet': {'publishedAt': '2020-10-13T23:46:24Z',
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#### 1.4.1 Video duration contained in VIDEOS objects - <https://stackoverflow.com/questions/15596753/how-do-i-get-video-durations-with-youtube-api-version-3>

<https://developers.google.com/youtube/v3/docs/videos?hl=en>

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'https://i.ytimg.com/vi/fXWhkJQ_88I/default.jpg',
 'width': 120,
 'height': 90},
 'medium': {'url': 'https://i.ytimg.com/vi/fXWhkJQ_88I/mqdefault.jpg',
 'width': 320,
 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/fXWhkJQ_88I/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/fXWhkJQ_88I/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/fXWhkJQ_88I/maxresdefault.jpg',
 'width': 1280,
 'height': 720}}},
 'channelTitle': 'caltech',
 'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht',
 'position': 74,
 'resourceId': {'kind': 'youtube#video', 'videoId': 'fXWhkJQ_88I'},
 'videoOwnerChannelTitle': 'caltech',
 'videoOwnerChannelId': 'UC1GTZDyz3CS192TgDqIrOnw'}}},
{'kind': 'youtube#playlistItem',
 'etag': 'SqMFZTMJPnBYTK7p54WMOzCEVw8',
 'id': 'UEw4X3hQVTV1cEpkZkN4YlJ6eHVjaFRmZ09IMUkySWJodC4wMTYxQzVBRDI1NEVDQUZE',
 'snippet': {'publishedAt': '2020-10-13T23:45:44Z',
 'channelId': 'UC1GTZDyz3CS192TgDqIrOnw',
 'title': '10 14 Introduction to credit risk models Part 2',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
 'thumbnails': {'default': {'url':
'https://i.ytimg.com/vi/UuYgrxqGnFw/default.jpg',

```

```

'width': 120,
'height': 90},
'medium': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/mqdefault.jpg',
'width': 320,
'height': 180},
'high': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/hqdefault.jpg',
'width': 480,
'height': 360},
'standard': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/sddefault.jpg',
'width': 640,
'height': 480},
'maxres': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/maxresdefault.jpg',
'width': 1280,
'height': 720}},
'channelTitle': 'caltech',
'playlistId': 'PL8_xPU5epJdfCxbRzxuchTfgOH1I2Ibht',
'position': 75,
'resourceId': {'kind': 'youtube#video', 'videoId': 'UuYgrxqGnFw'},
'videoOwnerChannelTitle': 'caltech',
'videoOwnerChannelId': 'UC1GTZDyz3CSl92TgDqIr0nw'}}}]

```

[223]: *# now use API to retrieve specific info on video using videoID*

```

BOILERPLATE CODE.
#https://stackoverflow.com/questions/18804904/
↪retrieve-all-videos-from-youtube-playlist-using-youtube-v3-api

from apiclient.discovery import build

def fetch_video_details(VideoId):
 """
 Fetches a playlist of videos from youtube
 We splice the results together in no particular order

 Parameters:
 parm1 - (string) playlistId
 Returns:
 playListItem Dict
 """
 api_key = "AIzaSyDOSvLn5HKCNqorxzFvpZZJbdp7xSpHXPc" # key required to
 ↪access API like key for door!!

 youtube = build('youtube', 'v3', developerKey = api_key)

 res = youtube.videos().list(
 part="snippet,contentDetails",

```

```

 id=VideoId
).execute()

 return res

```

```

[224]: print(videoIds[0])
 fetch_video_details(videoIds[0])

 #for i in videoIds:
 # fetch_video_details(videoIds[0])

```

77cRgL0L2p8

```

[224]: {'kind': 'youtube#videoListResponse',
 'etag': 'AWKBskl_HokwhD7U9HeUfnNIBno',
 'items': [{'kind': 'youtube#video',
 'etag': 'iLtjgi00-3fbhUDH1S41-mB-ctE',
 'id': '77cRgL0L2p8',
 'snippet': {'publishedAt': '2020-10-09T17:37:32Z',
 'channelId': 'UC1GTZDyz3CSl92TgDqIr0nw',
 'title': '1 1 Welcome to my course - BEM1105x Course - Prof. Jakša Cvitanić',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht\\n\\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology',
 'thumbnails': {'default': {'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/default.jpg',
 'width': 120,
 'height': 90},
 'medium': {'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/mqdefault.jpg',
 'width': 320,
 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/77cRgL0L2p8/maxresdefault.jpg',
 'width': 1280,
 'height': 720}}},
 'channelTitle': 'caltech',
 'tags': ['Caltech', 'science', 'technology', 'research'],
 'categoryId': '28',
 'liveBroadcastContent': 'none',
 'localized': {'title': '1 1 Welcome to my course - BEM1105x Course - Prof.

```

```

Jakša Cvitanić',
 'description': 'BEM1105x Course Playlist - https://www.youtube.com/playlist?list=PL8_xPU5epJdfCxbRzxuchTfg0H1I2Ibht\n\nProduced in association with Caltech Academic Media Technologies. ©2020 California Institute of Technology'},
 'defaultAudioLanguage': 'en'},
 'contentDetails': {'duration': 'PT3M7S',
 'dimension': '2d',
 'definition': 'hd',
 'caption': 'false',
 'licensedContent': False,
 'contentRating': {},
 'projection': 'rectangular'}}],
 'pageInfo': {'totalResults': 1, 'resultsPerPage': 1}}

```

#### 1.4.2 We inspect the videos LIST object to see how can get duration data

this is NIFTY can get TOPIC tags

```

[228]: print(videoIds[0])
 fetch_video_details(videoIds[0]).keys()

```

77cRgL0L2p8

```

[228]: dict_keys(['kind', 'etag', 'items', 'pageInfo'])

```

```

[245]: outputDurations = []

for i in videoIds:
 vidDetails = fetch_video_details(i)
 duration = vidDetails['items'][0]['contentDetails']['duration']

 #print (duration)
 time = duration.split("M")
 mins = time[0]
 secs = time[1]

 # this is slow because it needs to search
 mins = mins.replace("PT", '')
 secs = secs[:-1] #https://stackoverflow.com/questions/
 ↪15478127/remove-final-character-from-string

 # cast as int
 mins = int(mins)
 secs = int(secs)

 durationString = ''

 if secs >= 30:

```

```

 durationString = str(mins + 1) + 'mins'
 else:
 durationString = str(mins) + 'mins'

 outputDurations.append(durationString)

#minutes =
#seconds =
SPLIT STRING ON M in to 2

#remove S convert last
#remove PT

```

[246]: outputDurations

```

[246]: ['3mins',
 '11mins',
 '14mins',
 '10mins',
 '15mins',
 '13mins',
 '15mins',
 '18mins',
 '16mins',
 '17mins',
 '18mins',
 '22mins',
 '12mins',
 '20mins',
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 '15mins',
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 '15mins',
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 '23mins',
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 '13mins',
 '8mins',
 '8mins',
 '16mins',
 '19mins',
 '16mins',
 '9mins',
 '18mins',

```

'11mins',  
'13mins',  
'18mins',  
'21mins',  
'14mins',  
'14mins',  
'10mins',  
'17mins',  
'14mins',  
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'15mins',  
'12mins',  
'12mins',  
'9mins',  
'17mins',  
'12mins',  
'15mins',  
'14mins']

## 1.5 Now get urls

```
[251]: vidDetails['items'][0]['snippet']['thumbnails']
```

```
[251]: {'default': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/default.jpg',
 'width': 120,
 'height': 90},
 'medium': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/mqdefault.jpg',
 'width': 320,
 'height': 180},
 'high': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/hqdefault.jpg',
 'width': 480,
 'height': 360},
 'standard': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/sddefault.jpg',
 'width': 640,
 'height': 480},
 'maxres': {'url': 'https://i.ytimg.com/vi/UuYgrxqGnFw/maxresdefault.jpg',
 'width': 1280,
 'height': 720}}
```

```
[258]: videoIds[1]
```

```
[258]: 'Z-Jg_HUr4Dc'
```

```
[261]: urlsList = []

for i in videoIds:
 urlsStr = 'https://www.youtube.com/watch?v=' + i
 urlsList.append(urlsStr)

#https://www.youtube.com/watch?v=Z-Jg_HUr4Dc
```

```
[262]: urlsList
```

```
[262]: ['https://www.youtube.com/watch?v=77cRgL0L2p8',
 'https://www.youtube.com/watch?v=Z-Jg_HUr4Dc',
 'https://www.youtube.com/watch?v=RGI7rLIAn7A',
 'https://www.youtube.com/watch?v=EEzHNNCVx6A',
 'https://www.youtube.com/watch?v=8ONSc_tG4Hg',
 'https://www.youtube.com/watch?v=3REjWQYcIzg',
 'https://www.youtube.com/watch?v=EQ4MRa6ySM4',
 'https://www.youtube.com/watch?v=rb5S6FgqIcA',
 'https://www.youtube.com/watch?v=YTlgcfl6gCw',
 'https://www.youtube.com/watch?v=10eMOGreZes',
 'https://www.youtube.com/watch?v=BuxGarL2Iu8',
 'https://www.youtube.com/watch?v=980HlQvTnf4',
 'https://www.youtube.com/watch?v=q5FXKCsRA44',
 'https://www.youtube.com/watch?v=A-VmGNFugok',
```



'https://www.youtube.com/watch?v=7dL5HZZkGzo',  
'https://www.youtube.com/watch?v=k-5SjgTQrfc',  
'https://www.youtube.com/watch?v=Q1ZFXW0bOfM',  
'https://www.youtube.com/watch?v=uQ4vugxQ2Bg',  
'https://www.youtube.com/watch?v=rDHnuAByxso',  
'https://www.youtube.com/watch?v=DoeK\_1PmOHQ',  
'https://www.youtube.com/watch?v=vGgNEb3m6Uc',  
'https://www.youtube.com/watch?v=MJy0J4\_N8U0',  
'https://www.youtube.com/watch?v=VhGeuKsCdKM',  
'https://www.youtube.com/watch?v=6feKMBADptE',  
'https://www.youtube.com/watch?v=bc642xwy0Y8',  
'https://www.youtube.com/watch?v=6JqtSa1vqzs',  
'https://www.youtube.com/watch?v=s0Hh182NvWM',  
'https://www.youtube.com/watch?v=xD04kRYQ4UE',  
'https://www.youtube.com/watch?v=iVNu06mmPuA',  
'https://www.youtube.com/watch?v=45BDDywaxL0',  
'https://www.youtube.com/watch?v=DrtkkWfeMPE',  
'https://www.youtube.com/watch?v=qoJEpUHJzi8',  
'https://www.youtube.com/watch?v=xu-PfROF3C8',  
'https://www.youtube.com/watch?v=si4pRUFCHo4',  
'https://www.youtube.com/watch?v=mA0tobJ7Ats',  
'https://www.youtube.com/watch?v=YJlplLxzh1c',  
'https://www.youtube.com/watch?v=jnsh7xYpJTc',  
'https://www.youtube.com/watch?v=lji5z0YJ\_ZY',  
'https://www.youtube.com/watch?v=jLuBGWRVy8',  
'https://www.youtube.com/watch?v=7NOX2kdKfyA',  
'https://www.youtube.com/watch?v=u2aiPSASMNQ',  
'https://www.youtube.com/watch?v=1whZLV1XNWU',  
'https://www.youtube.com/watch?v=j5fAZNc7FpU',  
'https://www.youtube.com/watch?v=j8TbtdHiNC4',  
'https://www.youtube.com/watch?v=Xu77dfWy6rc',  
'https://www.youtube.com/watch?v=xGBynU7dnVI',  
'https://www.youtube.com/watch?v=ZW0KePY8i7M',  
'https://www.youtube.com/watch?v=0Qp6Qsrwyzo',  
'https://www.youtube.com/watch?v=QXw2M6uzKuo',  
'https://www.youtube.com/watch?v=LLypf8UC0EU',  
'https://www.youtube.com/watch?v=2H3Dtcrlx4E',  
'https://www.youtube.com/watch?v=TUc50mmvIuw',  
'https://www.youtube.com/watch?v=cFgA7Bz8eMg',  
'https://www.youtube.com/watch?v=ZVHnSthFFUI',  
'https://www.youtube.com/watch?v=J5SH4bjk15M',  
'https://www.youtube.com/watch?v=IaPkhV7gPtU',  
'https://www.youtube.com/watch?v=11GiCz5Lc8Q',  
'https://www.youtube.com/watch?v=IwWEywlKGcg',  
'https://www.youtube.com/watch?v=YNEQDFALdMk',  
'https://www.youtube.com/watch?v=vMPFGaH8hZ4',  
'https://www.youtube.com/watch?v=wNktQ3SMFUA',

```
'https://www.youtube.com/watch?v=qz-h8YUwwvk',
'https://www.youtube.com/watch?v=hxMF3UW_WRs',
'https://www.youtube.com/watch?v=9dtAzt8sb1w',
'https://www.youtube.com/watch?v=QHH8p_o2BcU',
'https://www.youtube.com/watch?v=L53dzqFIyEI',
'https://www.youtube.com/watch?v=mgufKez1IVM',
'https://www.youtube.com/watch?v=6qvNolhfeFM',
'https://www.youtube.com/watch?v=Z-YdaInnqeI',
'https://www.youtube.com/watch?v=Ve2PqQs4RLM',
'https://www.youtube.com/watch?v=DnwAFehmNNI',
'https://www.youtube.com/watch?v=9kGB4WmSyro',
'https://www.youtube.com/watch?v=0wWC8g4S94A',
'https://www.youtube.com/watch?v=KU-Cuyak4Z8',
'https://www.youtube.com/watch?v=fXWhkJQ_88I',
'https://www.youtube.com/watch?v=UuYgrxqGnFw']
```

[263]: outputDurations

```
['3mins',
 '11mins',
 '14mins',
 '10mins',
 '15mins',
 '13mins',
 '15mins',
 '18mins',
 '16mins',
 '17mins',
 '18mins',
 '22mins',
 '12mins',
 '20mins',
 '16mins',
 '17mins',
 '15mins',
 '14mins',
 '25mins',
 '12mins',
 '15mins',
 '13mins',
 '23mins',
 '22mins',
 '13mins',
 '8mins',
 '8mins',
 '16mins',
 '19mins']
```

'16mins',  
'9mins',  
'18mins',  
'11mins',  
'13mins',  
'18mins',  
'21mins',  
'14mins',  
'14mins',  
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'12mins',  
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'12mins',  
'15mins',  
'14mins']

[264]: titles

```
[264]: ['1 1 Welcome to my course - BEM1105x Course - Prof. Jakša Cvitanić',
'1 2 Overview',
'1 3 Stocks, bonds, forwards Part I',
'1 4 Stocks, bonds, forwards Part II',
'1 5 Swaps',
'1 6 Call and Put Options Part I',
'1 7 Call and Put Options Part II',
'1 8 Call and Put Options Part III',
'1 9 Options combinations Part I',
'1 10 Options combinations Part II',
'2 1 Pricing deterministic payoffs Part 1',
'2 2 Pricing deterministic payoffs Part 2',
'2 3 Bonds Part 1',
'2 4 Bonds Part 2',
'2 5 Bonds Part 3',
'3 1 Model independent relations forwards, futures and swaps Part 1',
'3 2 Model independent relations forwards, futures and swaps Part 2',
'3 3 Model independent relations forwards, futures and swaps Part 3',
'3 4 Model independent relations forwards, futures and swaps Part IV',
'3 5 Model independent relations options Part 1',
'3 6 Model independent relations options Part 2',
'3 7 Model independent relations options Part 3',
'4 1 Discrete time models',
'4 2 Risk neutral pricing Part 1',
'4 3 Risk neutral pricing Part 2',
'4 4 Risk neutral pricing Part 3',
'4 5 Fundamental theorems of asset pricing Part 1',
'4 6 Fundamental theorems of asset pricing Part 2',
'4 7 Binomial tree pricing Part 1',
'4 8 Binomial tree pricing Part 2',
'5 1 Brownian motion process Part 1',
'5 2 Brownian motion process Part 2',
'5 3 Stochastic integral Part 1',
'5 4 Stochastic integral Part 2',
'5 5 Ito s Rule, Ito s Lemma Part 1',
'5 6 Ito s Rule, Ito s Lemma Part 2',
'6 1 Black Scholes Merton pricing Part 1',
'6 2 Black Scholes Merton pricing Part 2',
'6 3 Black Scholes Merton pricing Part 3',
'6 4 Risk neutral pricing Black Scholes Merton model Part 1',
'6 5 Risk neutral pricing Black Scholes Merton model Part 2',
'6 6 Black Scholes Merton pricing Part 3',
'7 1 Variations on Black Scholes Merton Part 1',
'7 2 Variations on Black Scholes Merton Part 2',
'7 3 Currency options Part 1',
```

```
'7 4 Currency options Part 2',
'7 5 Exotic options Part 1',
'7 6 Exotic options Part 2',
'7 7 Pricing options on more underlyings Part 1',
'7 8 Pricing options on more underlyings Part 2',
'8 1 Stochastic Volatility Part 1',
'8 2 Stochastic Volatility Part 2',
'8 3 Stochastic Volatility Part 3',
'8 4 Jump diffusion models',
'9 1 Static hedging with futures Part 1',
'9 2 Static hedging with futures Part 2',
'9 3 Static hedging with bonds',
'9 4 Perfect hedging replication Part 1',
'9 5 Perfect hedging replication Part 2',
'9 6 Hedging portfolio sensitivities Part 1',
'9 7 Hedging portfolio sensitivities Part 2',
'9 8 Hedging portfolio sensitivities Part 3',
'10 1 Introduction to interest rate models Part 1',
'10 2 Introduction to interest rate models Part 2',
'10 3 Continuous time interest rate models Part 1',
'10 4 Continuous time interest rate models Part 2',
'10 5 Continuous time interest rate models Part 3',
'10 6 Continuous time interest rate models Part 4',
'10 7 Forward rates models Part 1',
'10 8 Forward rates models Part 2',
'10 9 Forward rates models Part 3',
'10 10 Forward rates models Part 4',
'10 11 Change of numeraire method Part 1',
'10 12 Change of numeraire method Part 2',
'10 13 Introduction to credit risk models Part 1',
'10 14 Introduction to credit risk models Part 2']
```

```
[268]: import pandas as pd
```

```
outputDict = {'titles': titles, 'durations': outputDurations, 'Link': urlsList}
desiredOutput = pd.DataFrame(outputDict)
```

```
[269]: desiredOutput.to_csv('caltechQuantFinance.csv', index = False)
```

```
[]:
```