COMP 204

A world of possibilities... and iPython Notebooks

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Preparing for the final exam

Look at past exams on MyCourses (Content):

- COMP 204 Final exam - Fall 2018 (Blanchette), with solutions
- COMP 204 Midterm exam - Fall 2018 (Blanchette), with solutions
- COMP 204 Midterm exam - Fall 2019 (Blanchette), with solutions
- COMP 204 Final exam - Winter 2019 (Li), with solutions
- COMP 364 Midterm and final exams

Solutions to assignments on MyCourses (Content):

- Solutions to assignment 1-4 are posted
- Solutions to assignment 5 will be posted on Dec. 4

Past quizzes and their solutions

Additional practice material

Preparing for the final exam

Schedule of in-class review:

- Nov 27: Midterm Fall 2019
- Nov 29: Final exam Fall 2018, Questions 1-15
- Dec 2: Final exam Fall 2018, Questions 16-22
- Dec 3: Final exam Winter 2019

IMPORTANT:

- I will assume that you have tried to answer the questions ahead of the review session.
- For programming questions, write your solution on paper, then write/test in Spyder.
- Come to review sessions with your questions.

Preparing for the final exam

Need extra help? My extended office hours (Trottier 3107)

- Monday Nov 25: 12:30-3:00pm
- Thursday Nov 28: 11:30-2:00pm
- Monday Dec 2: 12:30-3:00pm
- Tuesday Dec 3: 12:30-3:00pm
- Thursday Dec 5: 11:30-2:00pm

TA's office hours:

- Octavia: Friday, 14:30-16:00, TR 3090
- Samy: Friday, 9:30-11:00, TR 3090
- Airin: Wednesday 14:00-15:30, TR 3090
- Elliot: Thursday 11:00-12:30, TR 3090
- Sandy: Tuesday 9:30-11:00, TR 3090

A world of possibilities

Now that you know how to code in Python, you can do pretty much anything you want with a computer.
You have access to thousands of free, usually open-source Python modules that you can use in your own programs.
Today, we do two examples:

- Speech recognition
- Geographical data visualization

Disclaimer: I know very little about these two topics - and yet I was able to do cool things very quickly, simply by:

- Googling what I was trying to do
- Installing new modules
- Looking at examples online
- A little bit of trial and error

Speech recognition

Goal:

- You have an audio recording of a person speaking
- You want to convert sound to a string that corresponds to the word spoken

Approach:

- Do a google search for "speech recognition python", to find `https://pypi.org/project/SpeechRecognition/`
- Identify that you need to install the SpeechRecognition package
  - From Anaconda Navigator, Environment, Base (root), open terminal, type "conda install SpeechRecognition"
- Look at page, identify that what you want to do is called "transcription of an audio file"
- Find this example of code: `https://github.com/Uberi/speech_recognition/blob/master/examples/write_audio.py`
- adapt code to your own needs

Speech recognition

```
import speech_recognition as sr

r = sr.Recognizer()
with sr.AudioFile("test1.wav") as source:
    audio1 = r.record(source)  # read test1.wav

with sr.AudioFile("test2.wav") as source:
    audio2 = r.record(source)  # read test2.wav

# recognize speech using Google Speech Recognition
try:
    print("Google Speech Recognition thinks you said: ")
    print(r.recognize_google(audio1))
    # hello my name is Matthew

    print(r.recognize_google(audio2))
    # the man who passes the sentence should swing the sword
except sr.UnknownValueError:
    print("Google Speech Recognition could not understand
    audio")
except sr.RequestError as e:
    print("Could not request results from Google Speech
    Recognition service; {0}".format(e))
```

iPython Jupyter Notebooks

An iPython Jupyer Notebook is a document that can contain text, images, and Python code (aka markdown document).

Very useful in data science, where one needs to follow a sequence a step to analyze some data, produce some plots along the way, and write text to explain what they are doing.

To start a Jupyter Notebook, Open the Anaconda-Navigator, click on Jupyter Notebook.

This opens a web browser where you can write code and accompanying text.

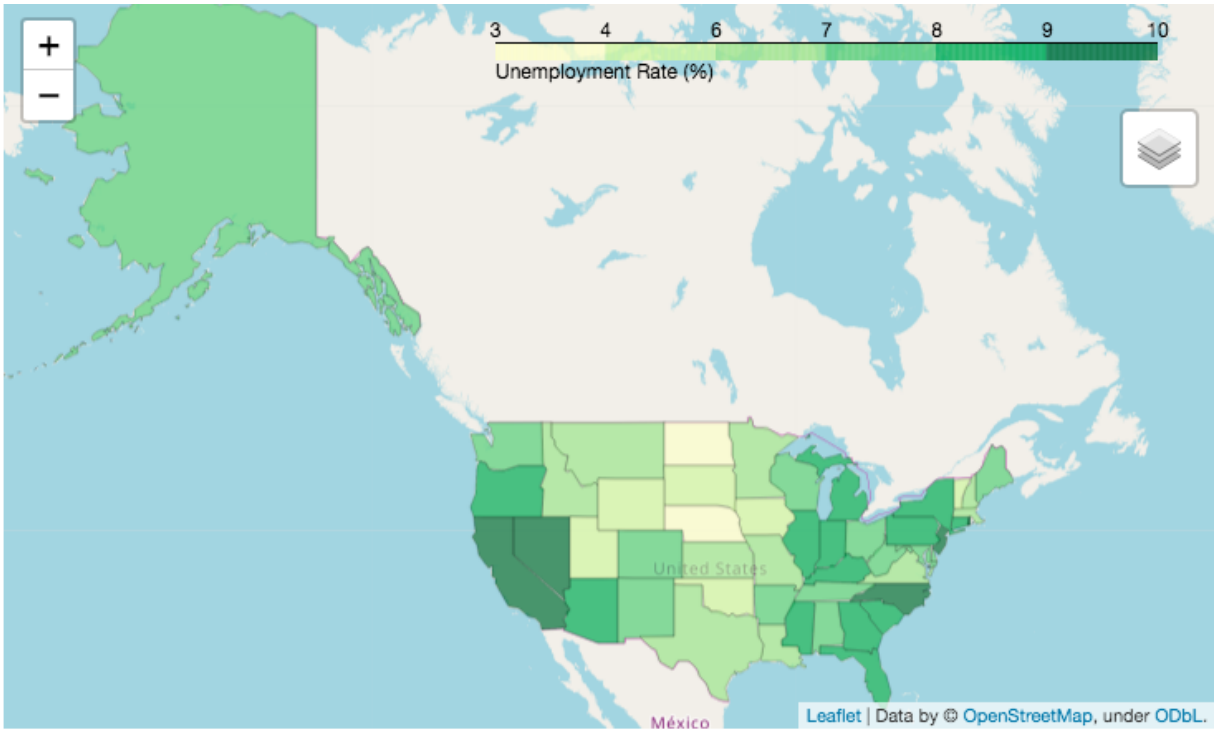
iPython Jupyter Notebooks

Example live...

Visualize geographical data

Goal: Display data onto geographical map
Examples:

- Birth rate by country, color-coded
- Biodiversity at specific locations in the world
- Unemployment rate per state



Visualize geographical data

Google: "data visualization on geographical maps in python"
Find: Many packages, including folium.

- conda install folium
- Look at examples of code and results at `https://python-visualization.github.io/folium/quickstart.html`
- Find what matches what you want to do

Example: Last year's COMP 204 HW5

See `http://www.cs.mcgill.ca/~blanchem/204/Slides/33/Hw5_solution.ipynb`