Programming

and python review

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Lectures : https://github.com/COGS108/Lectures-Wi23

Course announcements

- Zoom idea dropped -> too many problems, podcast lectures anyway, participation points on canvas
- A1_Q5 issues
- Discussion Lab: for finding group mates
- Group formation deadline is end of week 2. The signup form is up. Form error we need to correct I hear
- My OH: by appt. thus far
- datahub: where discussion labs and assignments will be released
- Problems with datahub seem to be resolved finally
- Practice Assignment is up
- D1 and A1 are up

What is a program?

- Generally a **program** is a **set of instructions** the programmer defines for a device or entity (usually a computer but not always) to follow
- Regarding computers-> programmer writes a set of instructions (“program”) that tells the computer to perform a set of operations
- When the program is executed, the instructions are carried out

Have to be careful what you tell it to do!

- NASA example - 1999 Climate Orbiter spacecraft, 286 days to Mars. Miscalculations due to a conversion error sent the craft off course gradually, so this $125M piece of technology smashed itself into the surface of Mars.
  - A program must have reasonable inputs and outputs
  - Just because a function works, it does not mean nothing can go wrong!

Why write a program?

- Many reasons you may want to write a program
- This can be anything:
  - Processing data
  - Making a robot walk
  - Controlling traffic lights to meter traffic during rush hour in an optimal way
  - Displaying a photo, etc

Why python?

- It’s free
- Tremendous library support
- Easy interpreted language, quick for prototyping
- Highly optimized computational libraries
- Cross platform/portability
- Strong user community for answering questions/knowledgebase

When python?

- Web app development
- Data science
- Scripting
- Database programming
- Quick prototyping

Why Jupyter Notebooks

- Mixed media is excellent for data exploration and communication
- Don’t have to write a separate program from your notes, results, etc
- Easy to experiment in nonlinear and compartmentalized ways

JN use cases

- Prototyping
- Data ingestion
- Exploratory data analysis
- Feature engineering
- Model comparison
- Final model

How do you write a program in Jupyer notebooks and python?

- To the notebook!