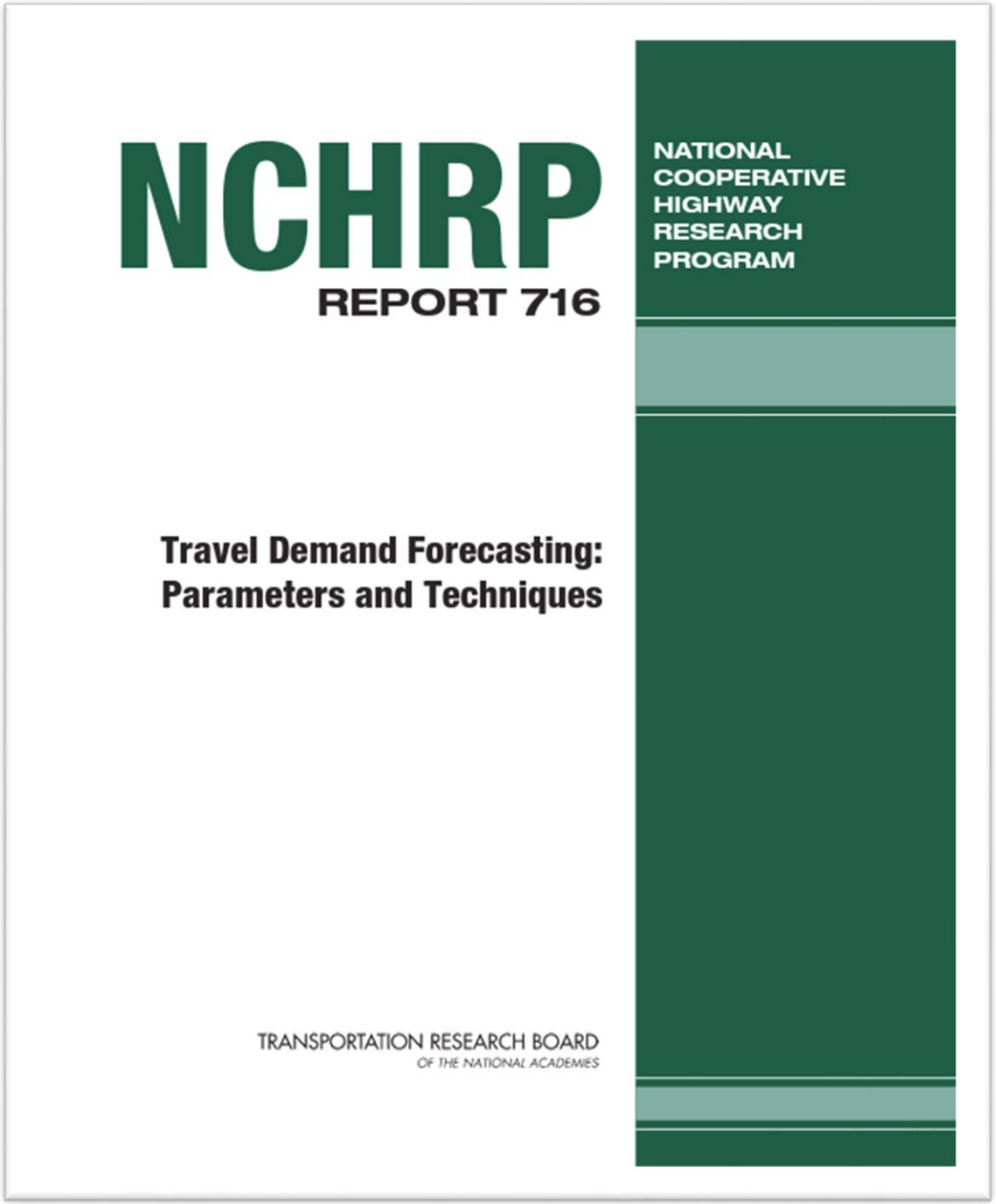
Welcome Back!

SES 5394: Travel Behavior and Forecasting (Day 3)

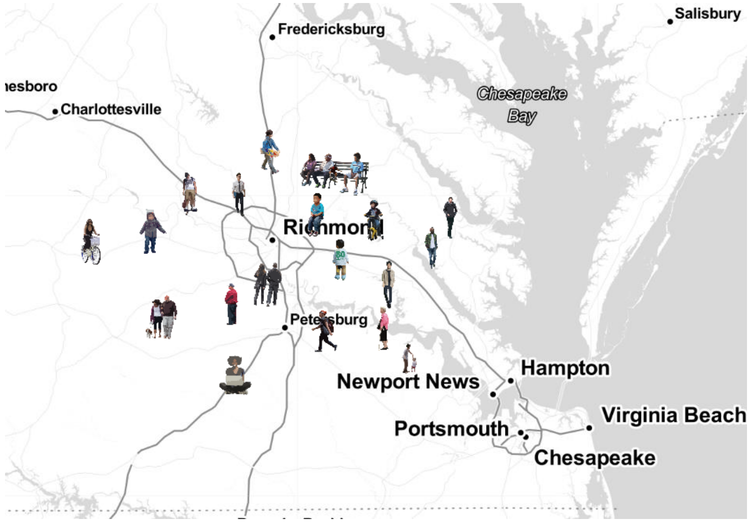
A useful resource

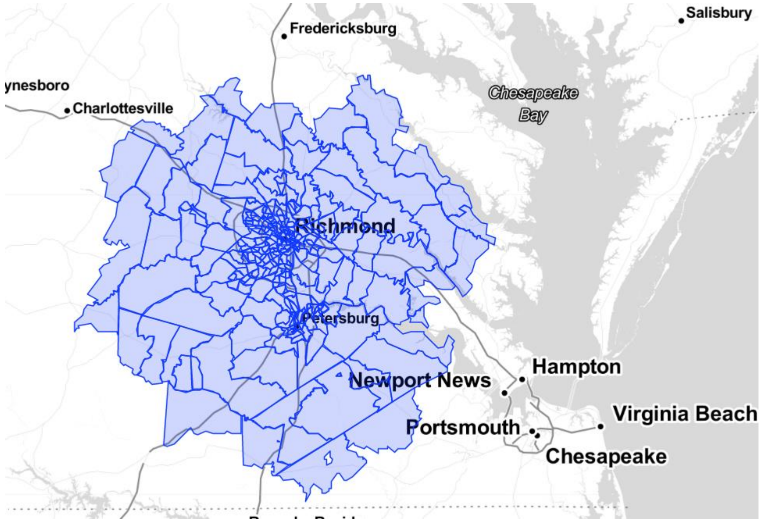
[NCHRP 716]

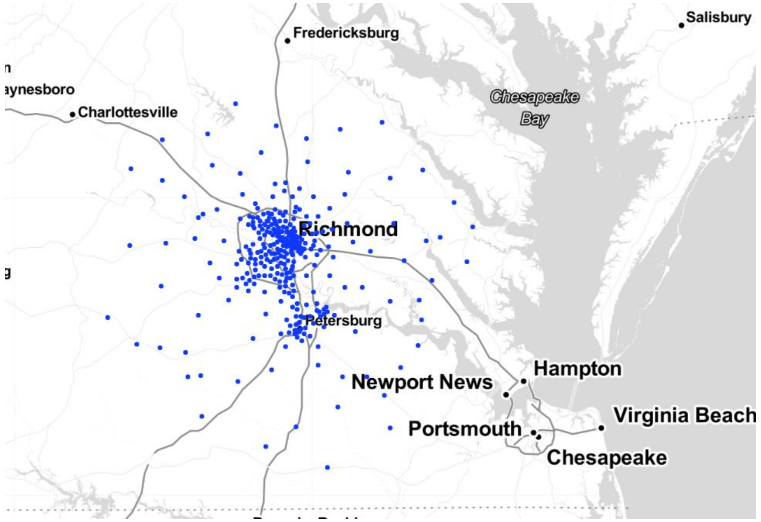


Spatial (dis)aggregation

We aggregate everything to zones and represent them in the spatial model as centroids.



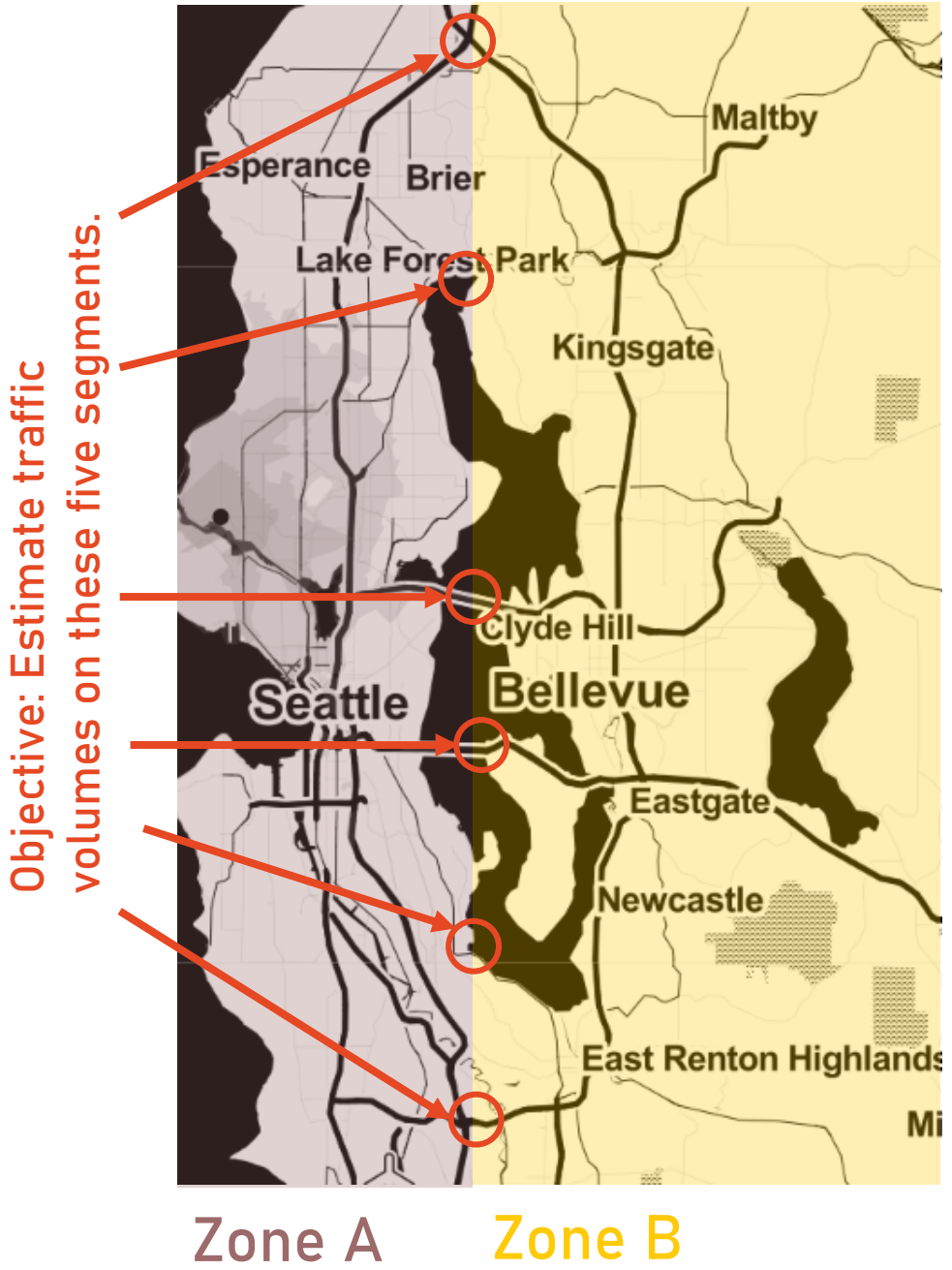




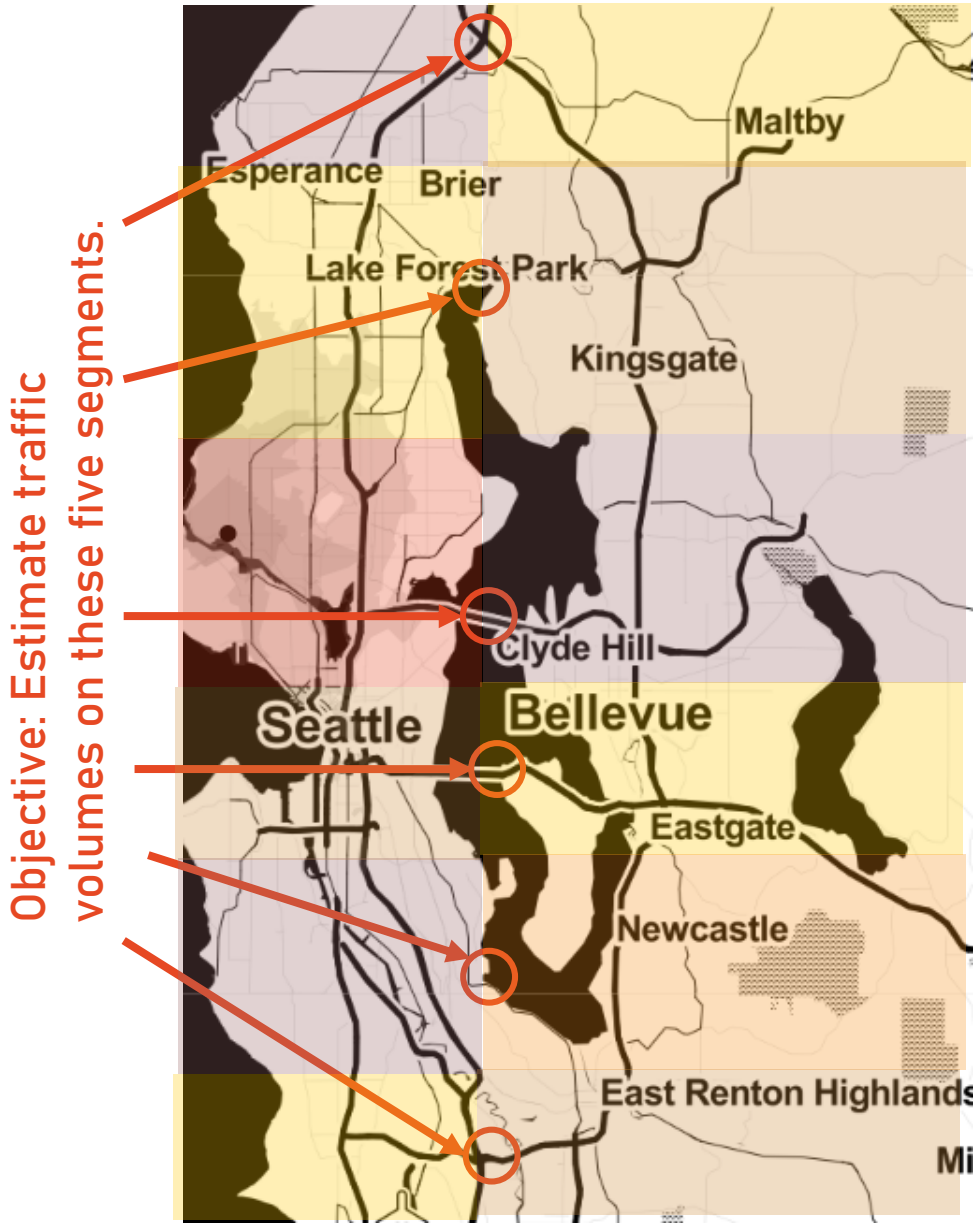
How should I define my zones?

- It depends on what questions you're interested in answering
- There are also some practical considerations

Two giant zones might be kind of okay in this case, although trips from Renton to Seatac will be modeled as artificially long.



This is probably better.



Considerations

- All trips begin and end at zone centroids
- A network link that isn't part of a path between two zone centroids is –for all intents and purposes– not in your model.

Problems with zones that are too big

- Undercount short trips
- Undercount pedestrian/bicycle trips
- Trips that begin or end near zone boundaries will be modeled as longer than they really are.

Can my zones just be individual parcels?

- Sure (not for assignments in this class, but in general).

Problems with zones that are too small

- Inadequate computing power (large data files, long processing times)
  - Computers are getting better all the time though
  - Could be a problem if you want to test a lot of different scenarios or do a lot of sensitivity analysis.
- Lack of data (privacy) / adequate sample sizes
  - Simulation with synthetic populations offers a workaround here

Best practices

Rules of thumb from NCHRP 716

- 1,200 to 3,000 residents per TAZ
- Less than 15,000 daily person trips per day per TAZ
- TAZ sizes between 0.25 and 1.0 square miles
- TAZ should be based on census geography

General goals:

- Minimize intrazonal trips (they won't show up in the model)
- Maximize data availability

Other dimensions for (dis)aggregation

What population/employment data is used for

- Calculating accessibility
  - As an outcome
  - As an input to vehicle ownership/access models
- Estimating vehicle ownership/access
- Estimating numbers of daily trips beginning/ending in each zone
- Estimating trip distribution (matching up trip ends)

Population

- Source: Decennial Census or American Community Survey
- Disaggregate by
  - Vehicle ownership/availability
    - Presence of any household vehicle? (binary)
    - Number of household vehicles? (count)
    - Number of household vehicles per household worker? (ratio)
    - Number of household vehicles per household driver? (ratio)
    - Number of household vehicles per household adult? (ratio)
  - Income
    - Median income by tract?
    - Number of households in each of multiple income categories?
  - Household size (number of people)
  - Number of household workers
  - Anything else you think is likely to have an important effect on trip-making

Employment

- Source: LEHD (tax records aggregated by the Census Bureau)
- Disaggregate by
  - Industry
    - Basic
    - Service
    - Retail

What employment data means for travel

- All employment categories: Attract trips to go to work
- Service employment: Also attracts customer trips
- Retail employment: Also attracts shopping trips
- Basic employment: Also attracts some non-employee trips
  - Agriculture
  - Mining/extraction
  - Manufacturing
  - Wholesale trade

School enrollment (optional)

- Source: Local school districts
- You could disaggregate by grade level, type.

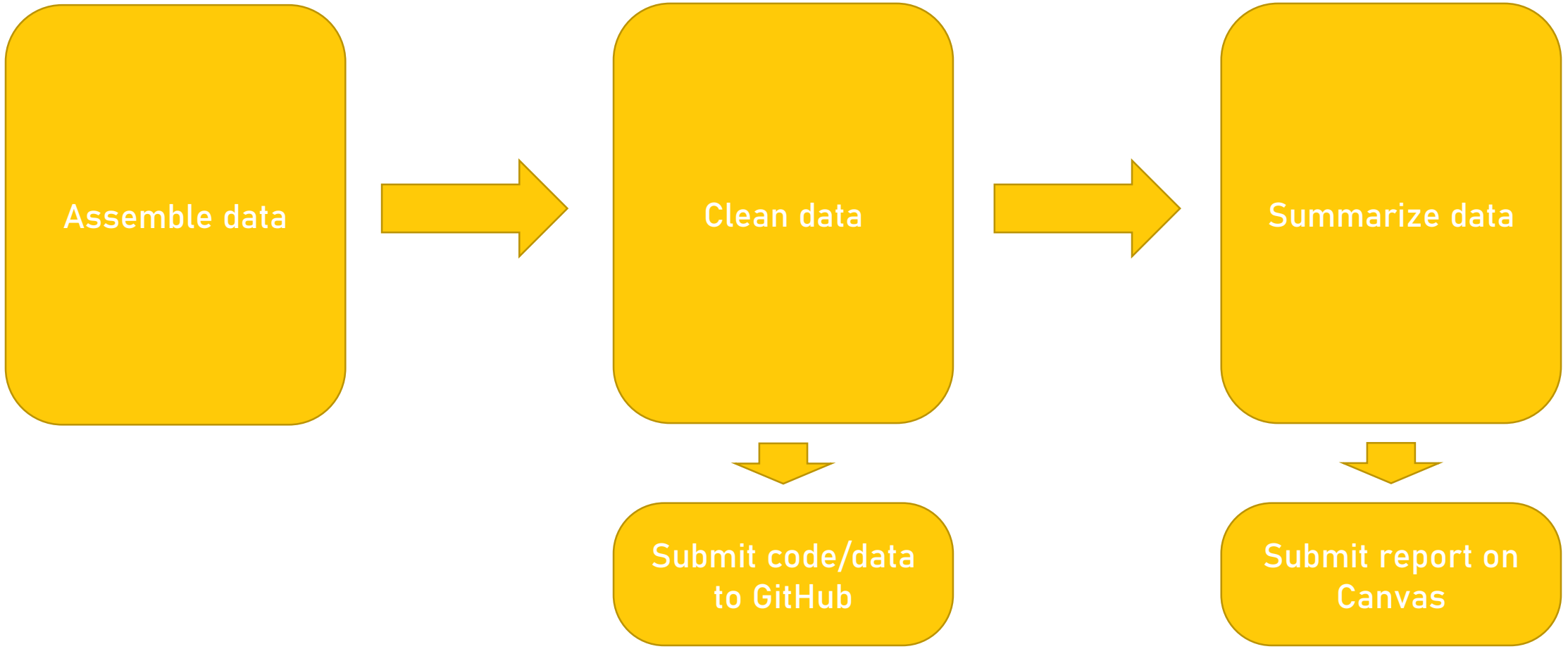
Potential final exam questions

- What is a TAZ?
- What are some problems with large TAZs?
- What are some problems with small TAZs?
- What is NCHRP 716?
- What data do you need to gather before you can start building a regional travel demand model?

Assignment due next week

- Generate zone-level population and employment estimates for both alternatives (it's possible that they will be the same for both alternatives).
- At minimum:
  - Population estimates should be disaggregated by income and vehicle ownership (at least one other dimension would be helpful/interesting).
  - Employment estimates should be disaggregated by industry (no reason to go beyond this for this class).
    - Basic (NAICS codes 1 – 42 and 48 – 51)
    - Retail (NAICS codes 44-45)
    - Service (NAICS codes 52-92)
- Submit a nice summary report

Workflow


Assemble data
Clean data
Summarize data
Submit code/data to GitHub
Submit report on Canvas