Scatter plot matrix

Angles in linegraph (45° are better visible than narrow or wide angles)

Multidimensional x-axis

Barplot for nominal data,

Linechart for ordinal data (e.g. time)

1. Histograms over time: how many cars are in camp/gate/general gate/ranger-stop/entrance during the morning, midday and evening (3 or more histograms each). To show passing cars vs. campers relation.

Stacked linechart: show **traffic density** over whole day or multiple days. (Stream graphs each vehicle-type has its own color).

small multiples: show time using space

– overview: show each time step in array

– compare: side-by-side easier than temporal

– external cognition instead of internal memory

– general technique, not just for temporal

Tversky argument: intuition that

animation helps is wrong

– meta-review of previous studies

– often more info shown in animation view so

not a fair comparison

– carefully chosen segmentation into small

multiples better than animation if equivalent

information shown

**Eyes Beat Memory**

Using our eyes to switch between different views that are visible

simultaneously has much lower cognitive load than consulting our

memory to compare a current view with what was seen before.

Many interaction idioms implicitly rely on the internal use of mem-

ory and thus impose cognitive load on the viewer. Consider navi-

gation within a single view, where the display changes to show the

scene from a different viewpoint. Maintaining a sense of orienta-

tion implicitly relies on using internal resources, either by keeping

track of past navigation choices (for example, I zoomed into the

nucleus) or by remembering past views (for example, earlier all the

stock options in the tech sector were in the top corner of the view). In

contrast, having a small overview window with a rectangle within

it showing the position and size of the current camera viewport for

the main view is a way to show that information through an exter-

nal representation easily consulted by looking at that region of the

screen, so that it can be read off by the perceptual system instead

of remembered.

1. Flowmap: show **traffic flow** for all days.  
   Barchart: show number of cars, trucks, busses and augment (highlight) flow for selected bars (colormap for type of cars (check color blindness)).

Popup histogram at locations that shows amount of each vehicle-type.

1. Overall **duration** vs duration at camps -> scatterplot (for each vehicle type)

Dur. at gates, dur. at camps, dur. at ranger-stops, dur. at entrance, dur. at gen. gates scatterplot matrix showing correlation between time spent at camps, stations, gates, etc.

Parallel coordinates

- Only a small number of colors can be used effectively as **categorical** labels  
- Keep the number of colors for **categorical** data to less than eight and use quiet medium grey backgrounds.  
  
- Lightness and saturation are effective for **ordinal** data because they have an implicit perceptual ordering.  
- Show **ordinal** data with a discrete set of color values that change in lightness or saturation.

- **Quantitative** data can be shown with a discrete or continuous colormap   
- Use colormaps with a limited hue palette and redundantly vary lightness and saturation and use discrete colormaps for accuracy.

**Designs (10 points each/30 points)**

Each design must contain at least 3 different visualization types. Be sure to describe how you will use interaction to coordinate between the views.

**comparison (50 points)**

We are looking for good argumentation about the strengths and weaknesses of the various designs based on the design principles discussed in class. How did you balance using the most effective visual encodings with the number of attributes in the data? Which views are overview views and which are detail views? What tradeoffs in interactions did you make? Be careful about $quot;dead horse" arguments and visual encodings.

**conclusion (20 points)**

Again, please argue, based on the design principles and tradeoffs discussed in class which overall design you think will be best.