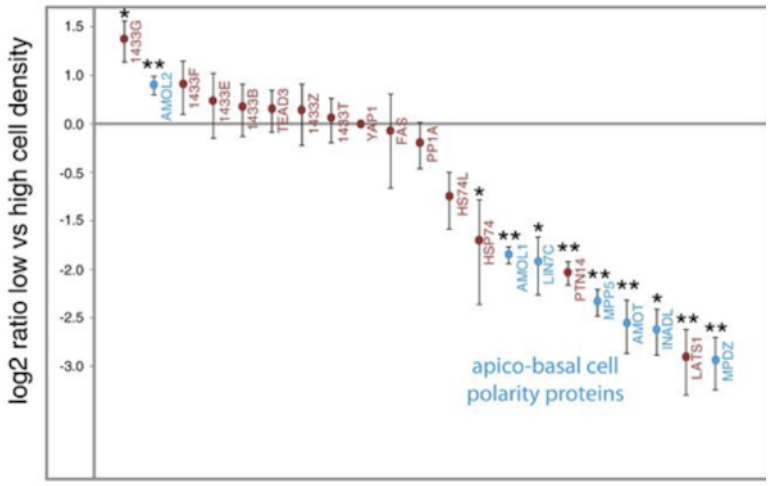
Variables, Glyphs and Attributes

Data & Computing Fundamentals

September 17, 2014

Graph One

Consider this graphic:



Suppose the glyph-ready data underlying the graphic were structured as follows:

protein	center	low	high	polarity	signif
1433G	1.35	1.18	1.54	plus	1
AMOL2	0.78	0.63	1.01	minus	2
1433F	0.79	0.18	1.19	plus	0
1433E	0.42	-0.15	1.01	plus	0
⋮	⋮	⋮	⋮	⋮	⋮

Consider these two kinds of glyph present in the graph:  and 

Tasks:

1. For each of the two glyphs, list the set of graphical attributes both geometrically (e.g. "dot") and in terms of the variable from the table that is mapped to that attribute (e.g., `polarity`).
2. Which variables define the frame? Give variables for both the horizontal and vertical coordinates.
3. Is color an attribute of the  glyph?
4. What guides (if any) are displayed?

Graph Two

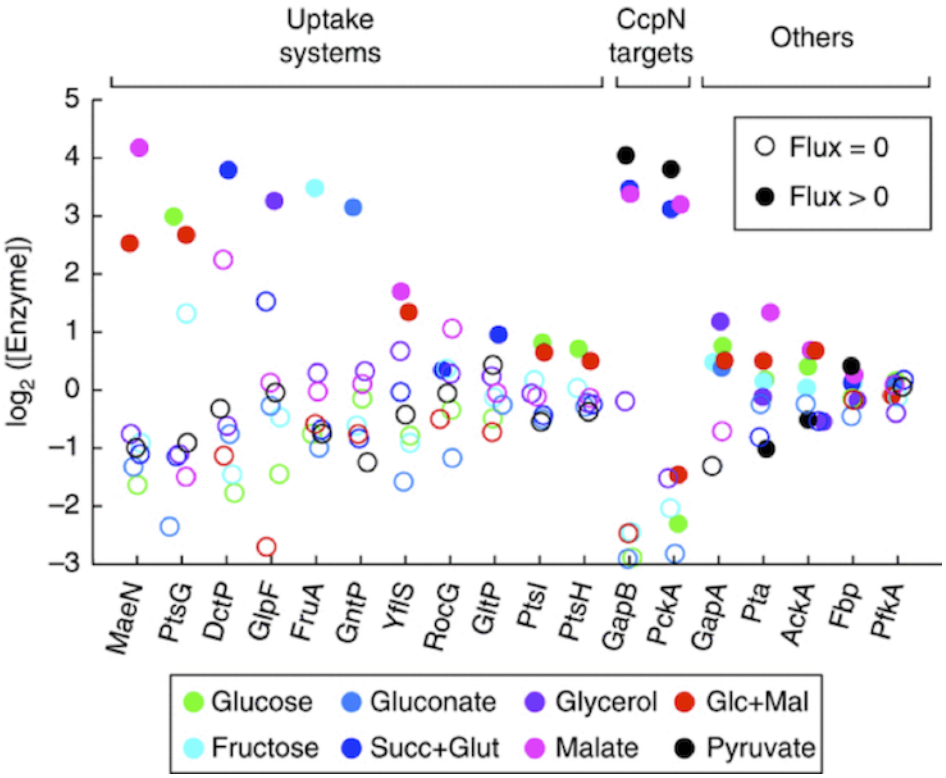
The `ZipGeography` data table in the DCF package gives information about each postal code ("ZIP code") in the US. Here's an excerpt of the 42741 cases

```
     ZIP      State Population LandArea
1  20912   Maryland      24498      6.6
2  56032  Minnesota        332      1.6
3  56283  Minnesota       7099    446.1
4  56474  Minnesota       3792    618.1
5  56727  Minnesota        787   1962.5
6  90277 California      34174      9.4
7  91406 California      50041     21.1
8  92102 California      47123     12.0
9  92384 California         70    658.8
10 93225 California       4481    229.8
```

Here's a graphic showing the mean population of all the ZIP codes in each state.

1. Are the `ZipGeography` data in glyph-ready form for this graphic?
   - If so, explain which variable in `ZipGeography` is being mapped to which graphical attribute.
   - If not, explain in words how the `ZipGeography` data might have been transfigured to create a glyph ready data table for this graphic.
2. The variable mapped to the horizontal axis is, obviously, `State`. Explain what other variable is being used to set the scale for the horizontal axis, that is, how each level of `State` is mapped to a position on the axis.
3. What are the three guides in the graphic?

Graph Three



Here are some of the variables and their levels:

- Log enyzme `concentration`: numerical −3 to 5
- `target`: CcpN, Uptake, Other
- `flux`: zero or positive
- `gene`: MaeN, PtsG, DctP, ...
- `molecule`: Glocose, Fructose, Gluconate, ...

1. List all of the **guides** in the graph. For each one, say which variable is being mapped to which graphical attribute.
2. The basic glyph is a dot. Say what are the graphical attributes of the dot (e.g. color, size, ...). For each graphical attribute found in the graph, say which variable is mapped to that attribute.
3. Which two variables set the frame?
4. The scaling of the horizontal variable (e.g. the translation of position to variable levels) is set by a combination of two variables. Which two?