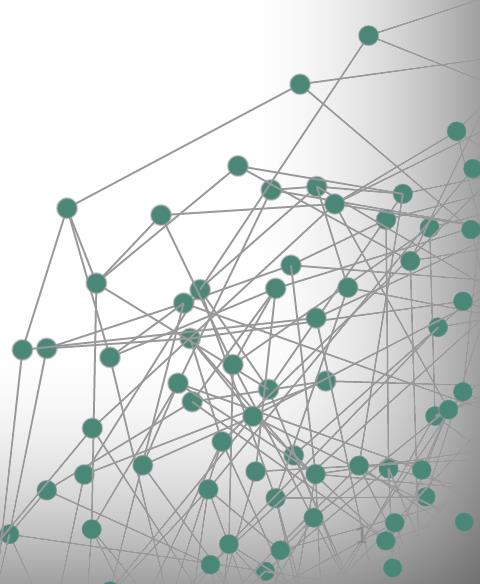




Packing

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Data Visualization MOOC Overview,
as summarized by wordle.net




Area as a Measure

Quantitative

Position
Length
Angle
Slope
Area
Volume
Density
Saturation
Hue

Ordinal

Position
Density
Saturation
Hue
Texture
Connection
Containment
Length
Angle
Slope
Area
Volume





Area as a Measure

Quantitative

Position

Length

Angle

Slope

Area

Volume

Density

Saturation

Hue

Ordinal

Position

Density

Saturation

Hue

Texture

Connection

Containment

Length

Angle

Slope

Area

Volume



Area as a Measure

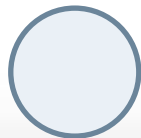
Quantitative

Position
Length
Angle
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Volume
Density
Saturation
Hue

Ordinal

Position
Density
Saturation
Hue
Texture
Connection
Containment
Length
Angle
Slope
Area
Volume

*consistent
shapes*

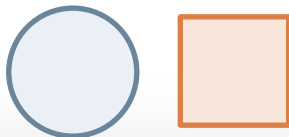


Area as a Measure

Quantitative

Position
Length
Angle
Slope
Area
Volume
Density
Saturation
Hue

*consistent
shapes*

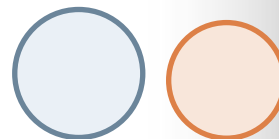


Ordinal

Position
Density
Saturation
Hue
Texture
Connection
Containment

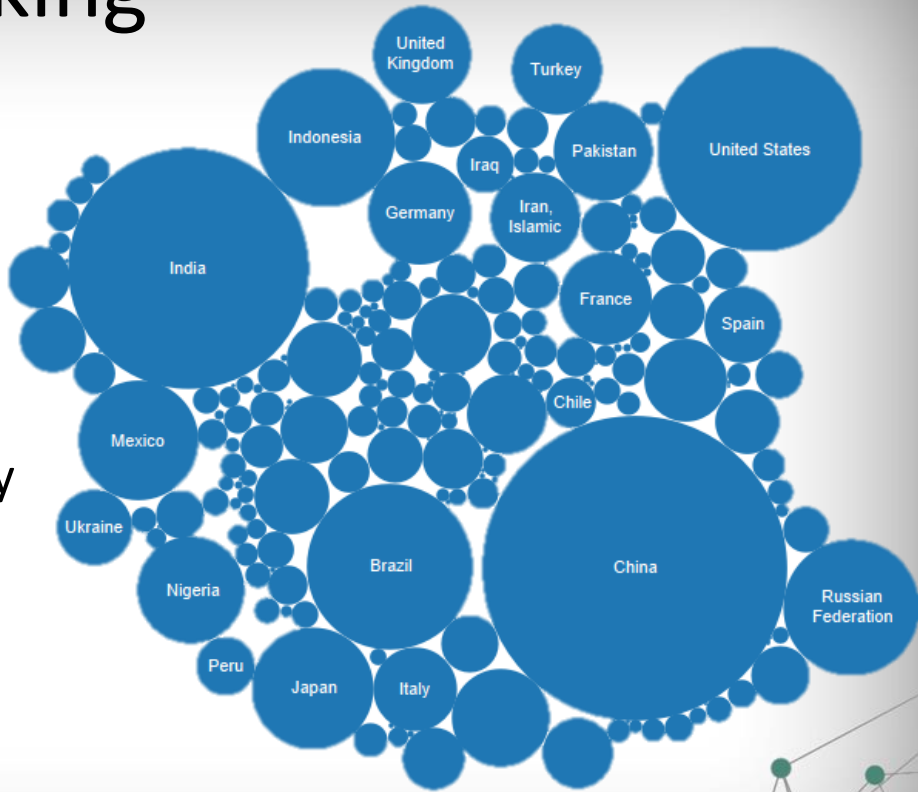
Length
Angle
Slope
Area
Volume

*aligned
shapes*



Packing

- Like graph visualization, uses 2-D canvas to visually separate data items
- Unlike graph visualization, no need to draw explicit edge relationships, though proximity can still matter (e.g. hierarchy, MDS)



WDI Population (as area via Tableau)

Cartogram

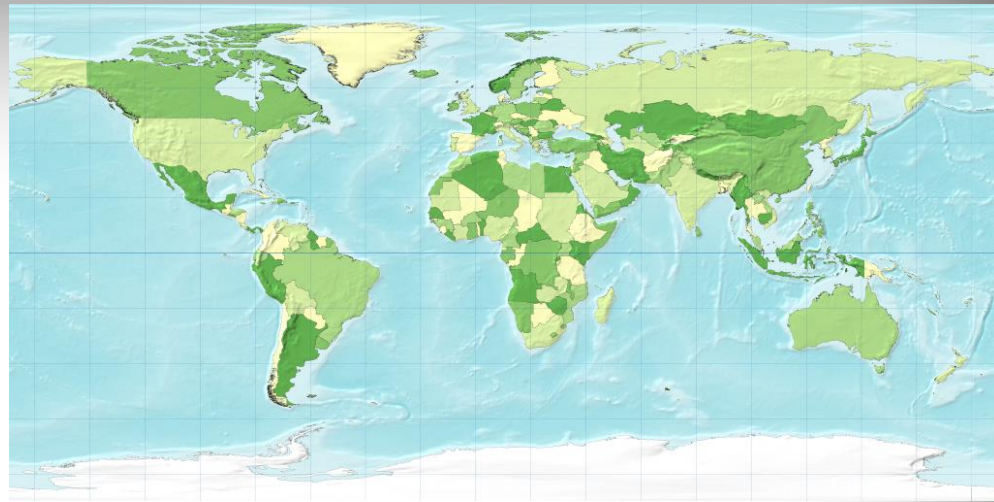
- Area of (vector) region outline shape scaled by data value
- Region outline shape data available from:

<http://www.mappinghacks.com/data/>

Regions scaled by population.

Courtesy Prof. Mark Newman, U. Mich.

<http://www-personal.umich.edu/~mejn/cartograms/>



Creating a Cartogram

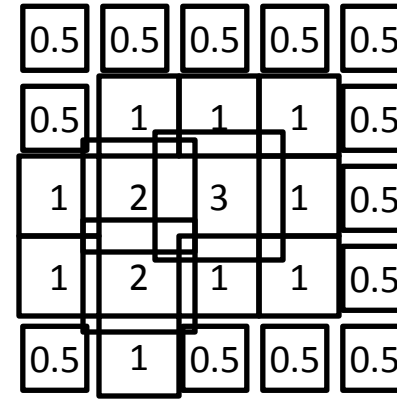
- Fill a grid with density data
(e.g. local population density)

0.5	0.5	0.5	0.5	0.5
0.5	1	1	1	0.5
1	2	3	1	0.5
1	2	1	1	0.5
0.5	1	0.5	0.5	0.5

Tobler, "Geographic area and map projections". Geog. Rev. 53(1), 1963

Creating a Cartogram

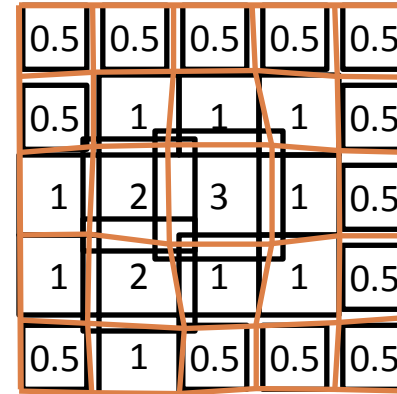
- Fill a grid with density data (e.g. local population density)
- Expand grid cells individually so area represents density



Tobler, "Geographic area and map projections". Geog. Rev. 53(1), 1963

Creating a Cartogram

- Fill a grid with density data (e.g. local population density)
- Expand grid cells individually so area represents density
- Create new grid vertices at centroid of cell corners



A 5x5 grid of density values. The values are: Row 1: 0.5, 0.5, 0.5, 0.5, 0.5; Row 2: 0.5, 1, 1, 1, 0.5; Row 3: 1, 2, 3, 1, 0.5; Row 4: 1, 2, 1, 1, 0.5; Row 5: 0.5, 1, 0.5, 0.5, 0.5. An orange outline shows the original grid, while a black outline shows the expanded cartogram where cells with higher density values (like the central '3') are larger. The vertices of the black grid are connected by lines, illustrating the new grid structure.

0.5	0.5	0.5	0.5	0.5
0.5	1	1	1	0.5
1	2	3	1	0.5
1	2	1	1	0.5
0.5	1	0.5	0.5	0.5

Tobler, "Geographic area and map projections". Geog. Rev. 53(1), 1963

Creating a Cartogram

- Fill a grid with density data (e.g. local population density)
- Expand grid cells individually so area represents density
- Create new grid vertices at centroid of cell corners
- Repeat until area equals density

0.5	0.5	0.5	0.5	0.5
0.5	1	1	1	0.5
1	2	3	1	0.5
1	2	1	1	0.5
0.5	1	0.5	0.5	0.5

Tobler, "Geographic area and map projections". Geog. Rev. 53(1), 1963

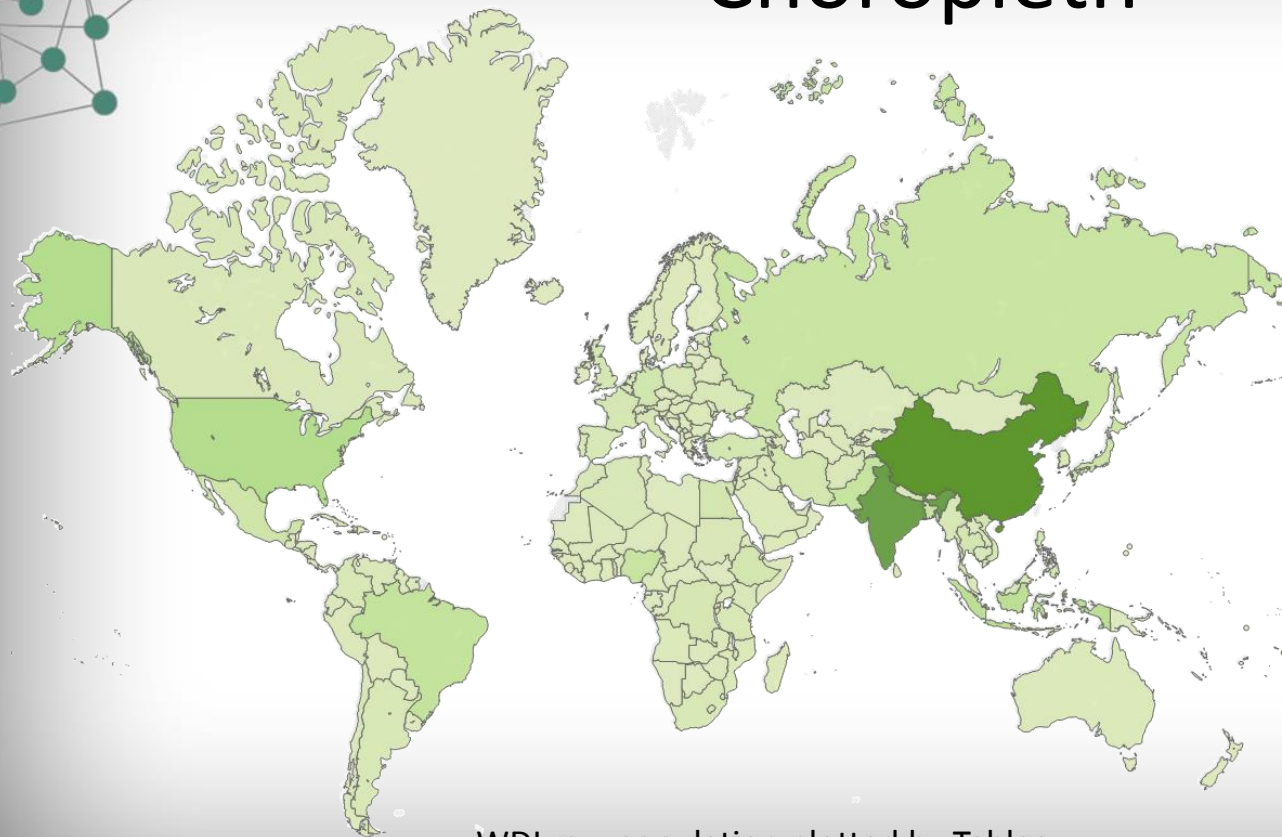
Creating a Cartogram

- Fill a grid with density data (e.g. local population density)
- Expand grid cells individually so area represents density
- Create new grid vertices at centroid of cell corners
- Repeat until area equals density
- Results in a deformation used to reposition shape vertices

0.5	0.5	0.5	0.5	0.5
0.5	1	1	1	0.5
1	2	3	1	0.5
1	2	1	1	0.5
0.5	1	0.5	0.5	0.5

Tobler, "Geographic area and map projections". Geog. Rev. 53(1), 1963

Choropleth



WDI raw population plotted by Tableau

P: Population (count)

0.0M

1,302.4M

Ordinal

Position

Density

Saturation

Hue

Texture

Connection

Containment

Length

Angle

Slope

Area

Volume