STA 674

Regression Analysis And Design Of Experiments

Measuring Association between Two Variables – Lecture 4

STA 674, RADOE:
Measuring Association between Two Variables

- Interpretation of Correlation
  - Last time – sign
  - This time – magnitude

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- The correlation, $R_{X,Y} = \frac{\sum_{i=1}^{n}[(x_i - \bar{x})(y_i - \bar{y})]}{(n-1)s_X s_Y}$, always lies between -1 and 1, inclusive.
- Suggested language:

If $R_{X,Y}$ is between	then we may say* X and Y have …
$0.5 \leq R_{X,Y} \leq 1$	a strong positive correlation
$0 < R_{X,Y} < 0.5$	a weak positive correlation
$-0.5 < R_{X,Y} < 0$	a weak negative correlation
$-1 \leq R_{X,Y} \leq -0.5$	a strong negative correlation

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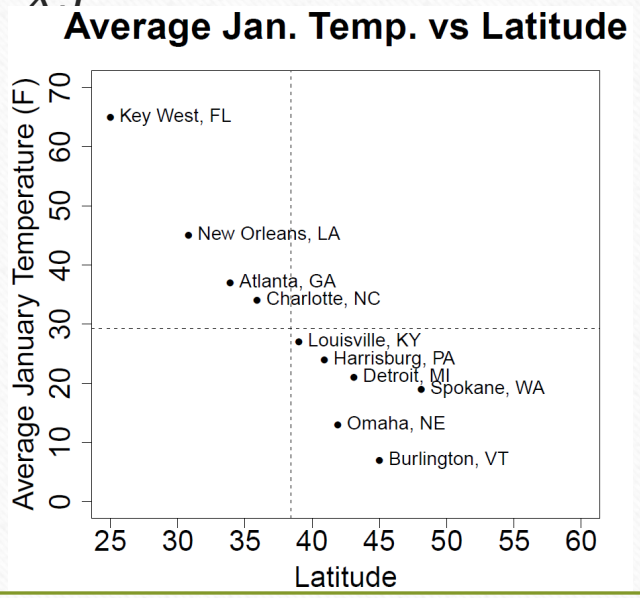
- Example: Average January temperature in US cities

Previously, we found $R_{XY} = -0.94$



City		Latitude	Average Jan Temp
Louisville,	KY	39	27
Key West,	FL	25	65
New Orleans,	LA	30.8	45
Atlanta,	GA	33.9	37
Charlotte,	NC	35.9	34
Harrisburg,	PA	40.9	24
Omaha,	NE	41.9	13
Detroit,	MI	43.1	21
Burlington,	VT	45	7
Spokane,	WA	48.1	19
Means		38.4	29.2
Standard deviations		7	16.9

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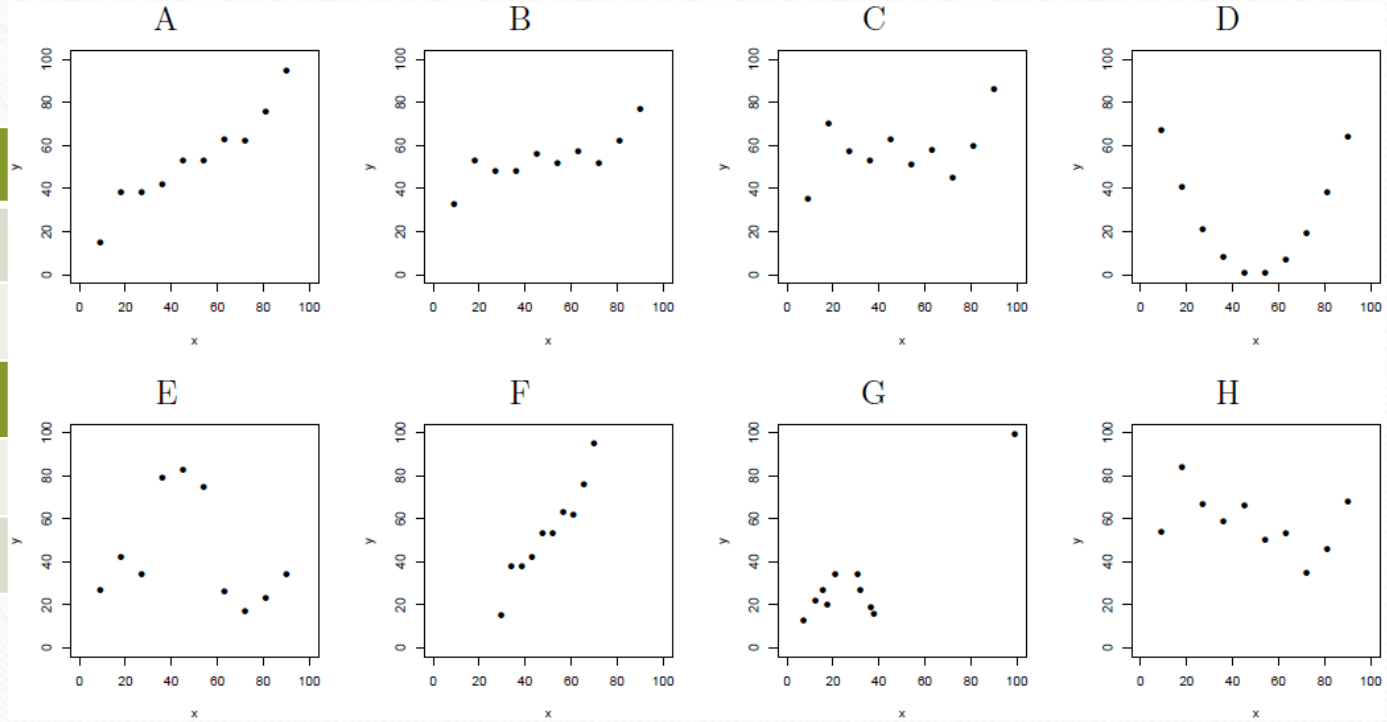
- Practice (?)

Graph	A	B	C	D
$\bar{x}$	50	50	50	50
$\bar{y}$	54	54	58	27
Graph	E	F	G	H
$\bar{x}$	50	50	31	50
$\bar{y}$	44	54	31	58



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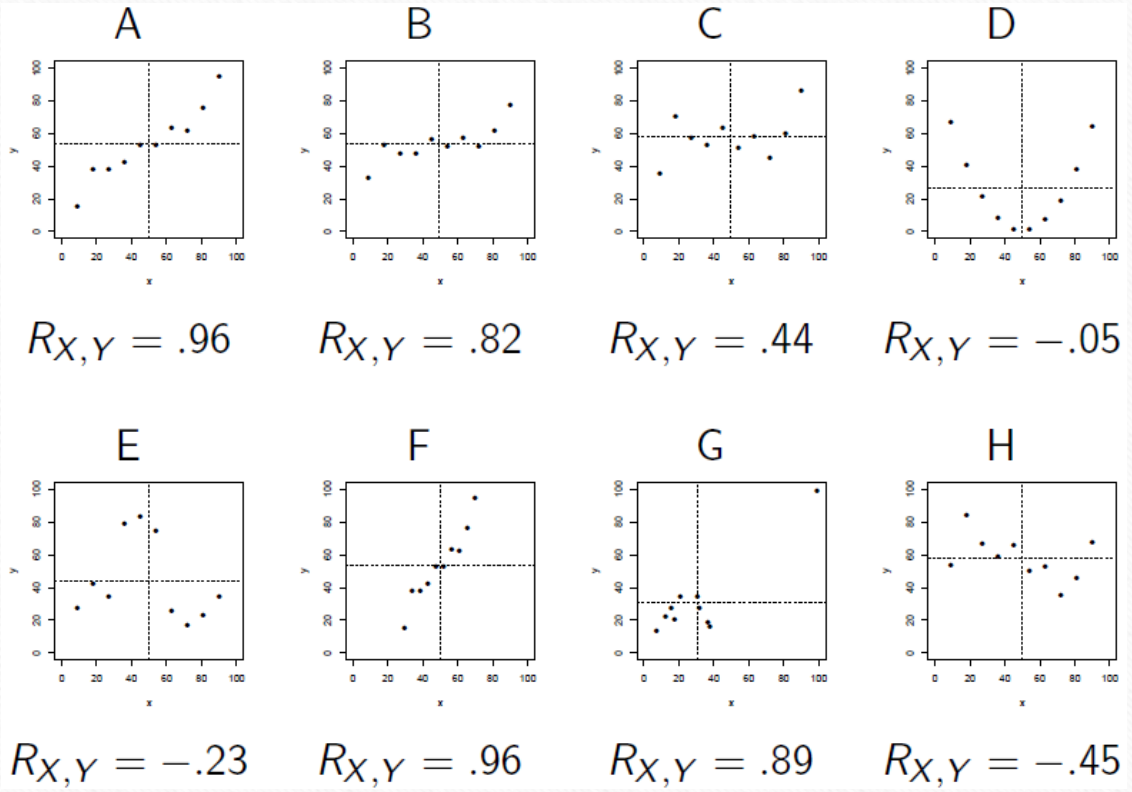
- True values:



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- Next time – *cautions* about interpretations of the correlation coefficient.