Advanced Data Visualization Lecture Notes (Lecture 2-5 - 8 Hours)

Best practices in Data visualization:

Line Charts:

- **Usage:** Trends and changes over time.
- **Purpose:** Shows relationships within a continuous data set.
- **Limit:** No more than 5 to 7 lines.

Bar Charts and Histograms:

- **Usage:** Used when there are more than 10 items to compare.
- **Purpose:** Quantitative data of different categories.

Scatter Plots:

- **Purpose:** Display values for two variables in a data set.

Pie Charts:

- **Usage:** Shows parts of a whole.
- **Purpose:** Proportion.
- **Limit:** No more than 7 categories.

Proportional Maps:

- **Usage:** Shows parts of a whole.
- **Purpose:** Allows trends to be seen.

Area Charts:

- **Usage:** Change over time, general trends, continuity within a data set.

Pyramid Charts:

- **Usage:** Hierarchy or order of steps.

Word Clouds:

- **Usage:** Display frequencies or categories.
- **Purpose:** Trends and recurrences.

Column Chart:

- **Purpose:** Compare various categories with subcategories.

Area Chart:

- **Purpose:** Show how values develop over time.

Continuous Data:

- **Chart Type:** Histogram (bars touch).

Categorical or Discontinuous Data:

- **Chart Type:** Bar plot (bars do not touch).

1 Binary Measure:

- **Chart Types:** Histogram, (novice: pie chart).

1 Quantitative Measure:

- **Purpose:** Understand distribution.
- **Chart Types:** Histogram, Density Plot (pay attention to bins).
- **Expert:** Boxplot, violin plot.

1 Categorical Measure:

- **Chart Types:** Bar plot, (optionally: pie chart).

1 Binary Factor, 1 Quantitative Measure:

- **Chart Type:** Violin plot.

1 Quantitative Factor, 1 Quantitative Measure:

- **Ordered Data:**
    - **Chart Type:** Area chart.
    - **Few Points:** Connected Scatter plot.

2 Quantitative Measures:

- **Few Points:** Scatter plot (+ linear regression for trend, + interactivity).
- **Many Points:** 2D Density plot.

2 Categorical Measures:

- **Chart Type:** Bar plot.

1 Binary Factor, 2 Categorical Measures:

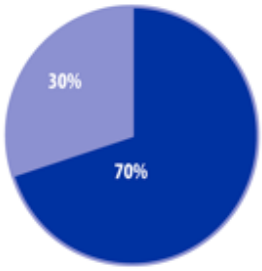
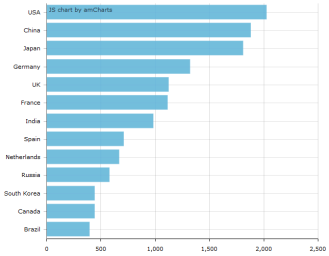
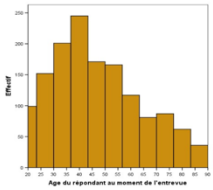
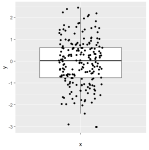
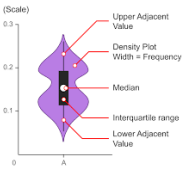
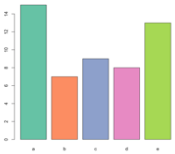
- **Chart Types:** Bar plot, Histogram.

2 Numeric Variables:

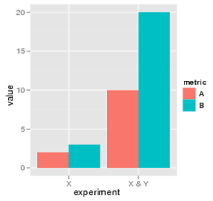
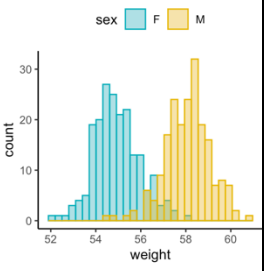
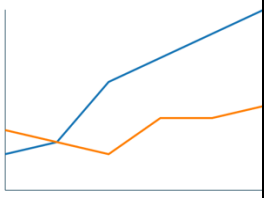
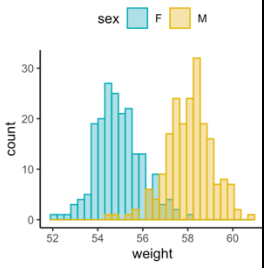
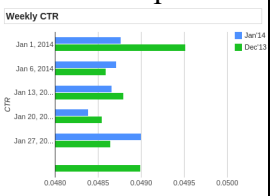
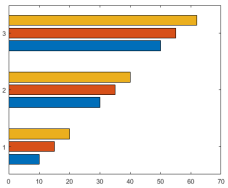
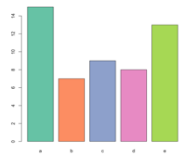
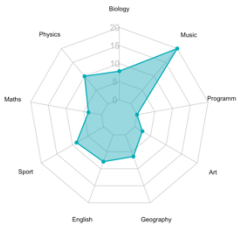
- **Chart Type:** Scatter plot.

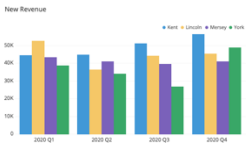
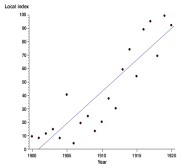
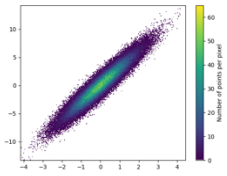
One variable :

Show the distribution

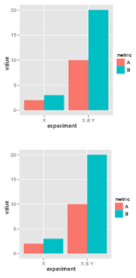
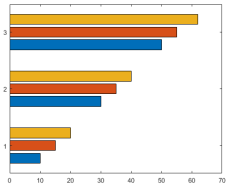
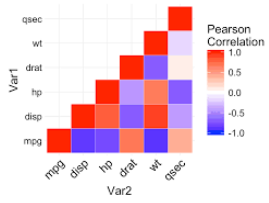
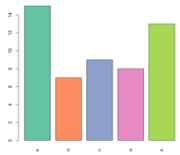
Measure		
Binary	**Categorical**	**Quantitative**
Pie chart 	Horizontal bar plot 	Variable continue: Novice: Histogram  Expert: Boxplot with jitter  Large sample size: Violin Plot  Variable discontinue : Bar plot 

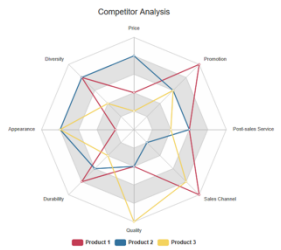
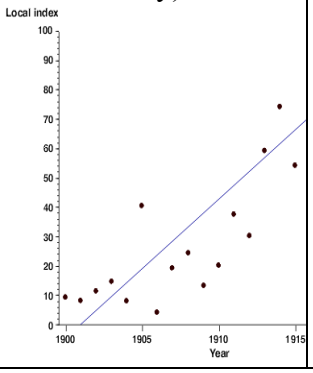
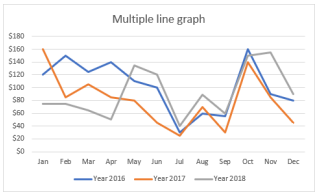
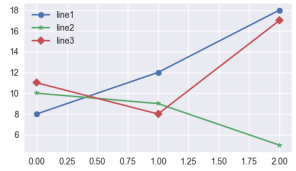
2 variables :

		Measures variable dépendante		
		Binary	**Categorical**	**Quanti**
Factor **Variable indépendante**	**Binary**	Bar plot  	Ordinal : Double histogram  	Line chart :  Double histogram 
	Categorical	Vertical bar plot  	Ordinal: If Geographic Factor: Chloropeth Maps  Not ordinal: Grouped barplot 	Ordinal category: Histogram Non-ordered: Barplot  Spider chart 

	Quanti	Grouped bar plot Not too much quanti 		Ordered: Evolution (time): Line/Area Chart  Few points: connected Scatter  Correlation: Not ordered: Few points : Scatterplot (+régression linéaire pour la tendance, +interactivity)  Many points : Novice : Expert : Density 2d 

3 variables or plus :

		Measures		
		Binary	**Categorical**	**Quanti**
Factor	**Binary**			2 variables quanti : Scatter Plot 
	Categorical		Grouped barplot  Heatmap 	Ordinal category : Histogram Non-ordered: Barplot 
	Quanti	violin	Radar	Ordered: Time : Line/Area Chart

			 **Relationships between 2 factors:** Few points : Scatterplot (+régression linéaire pour la tendance, +interactivity) 	 Few points: connected Scatter 

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https://mrmint.fr/data-visualisation-plot