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CHAPTER 1

Introduction to Data Visualization

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Learning Outcomes

This chapter aims for learner to be able to:-

1. Review existing definitions of data visualization.
2. Recognize the roles of data visualization in various fields.



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Data Visualization

Data

the **quantities, characters, or symbols** on which operations are performed by a **computer**, being stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media.

Source : [Google](#)

Visualization

the **representation** of an object, situation, or set of information as a chart or other image.

Source : [Google](#)



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Data

	Items	Amount (MYR)
1	Study fee	1900
2	Food	600
3	Mobile phone	500
4	Books	300
5	Printing	200

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ABC 象形字

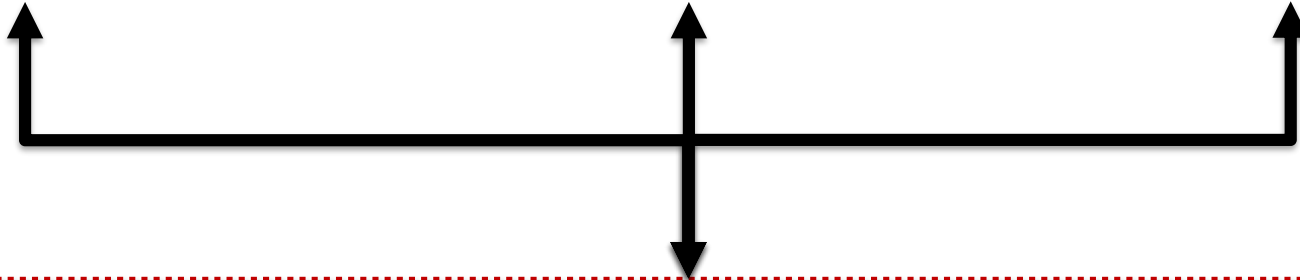
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Quantities

Characters

Symbols



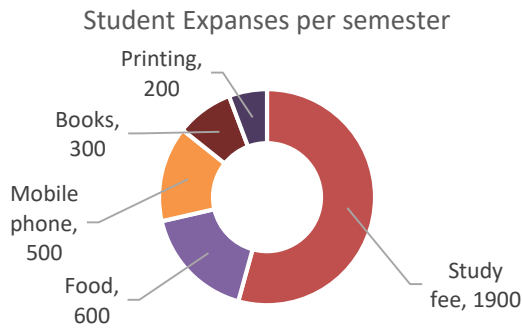
Computer



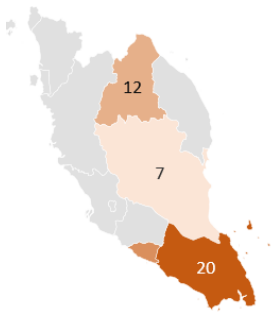
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Visualization

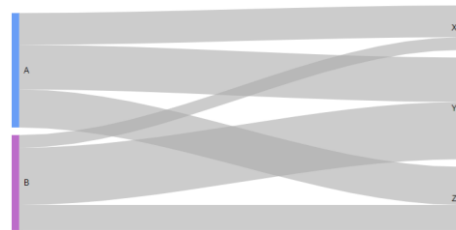
Distribution analysis created with MS Excel 2016



Text analysis generated with <https://www.wordclouds.com/>



Location analysis with map created with MS Excel 2016



Network analysis with Sankey diagram generated with [Google Charts](#)

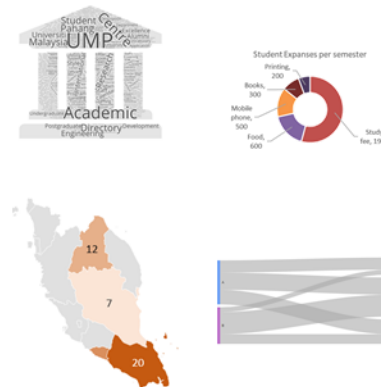


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Data Visualization

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Data

Visualization

Decision



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Definitions by others

*“Data visualization is defined as the use of data presented in a **graphical** or pictorial manner.”*

([T. J. Bringham, 2016](#))

*“Visualization is the **graphic** presentation of data - portrayals meant to reveal complex information at a glance.”*

([J. Steele & N. Iliinsky, 2010](#))



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Definitions by others

*“Data visualization is the presentation of data in a pictorial or **graphical** format.”*

[\(SAS, 2017\)](#)

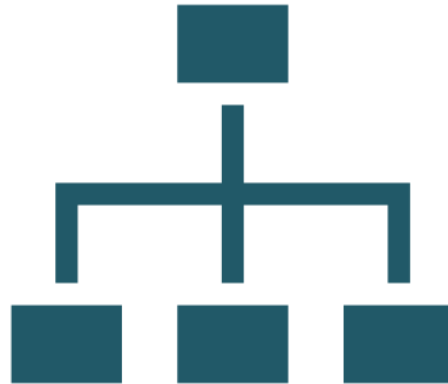
*“Data visualization tells multilayered stories to engage **decision** makers in deep exploration.”*

[\(IBM, 2017\)](#)



Why Data Visualization?

- Making decisions is a needs for everybody at all layers – personal, organizational, regional, national and global.



Application of Data Visualization

3D ultrasound scan in health industry.

“ultrasound transducers send pulses of high frequency sound into the body and then listen for the echo.”

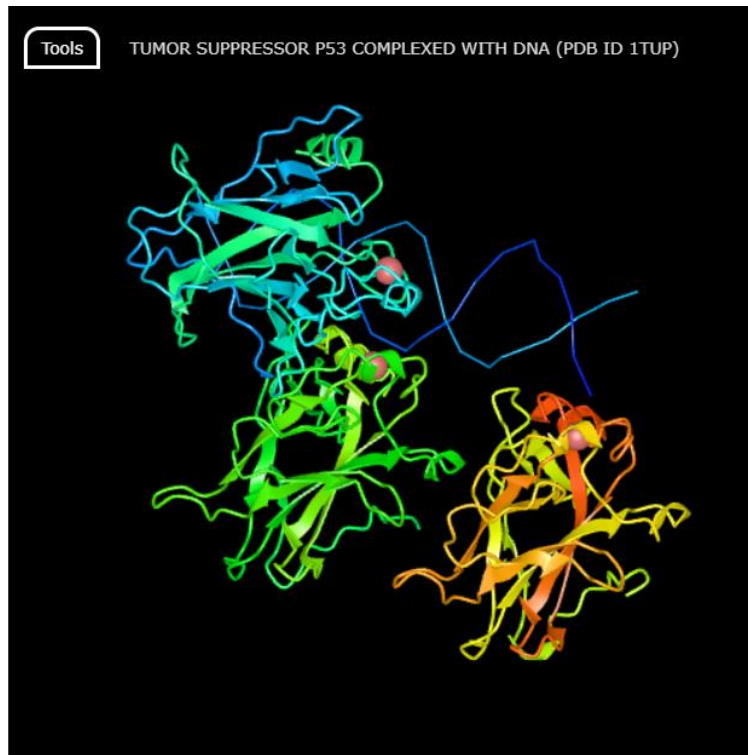


[Source : Staecker](#)



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Application of Data Visualization



3D structure of Tumor Suppressor P53 complexed with DNA, PDB ID 1TUP, with corresponding sequence data.



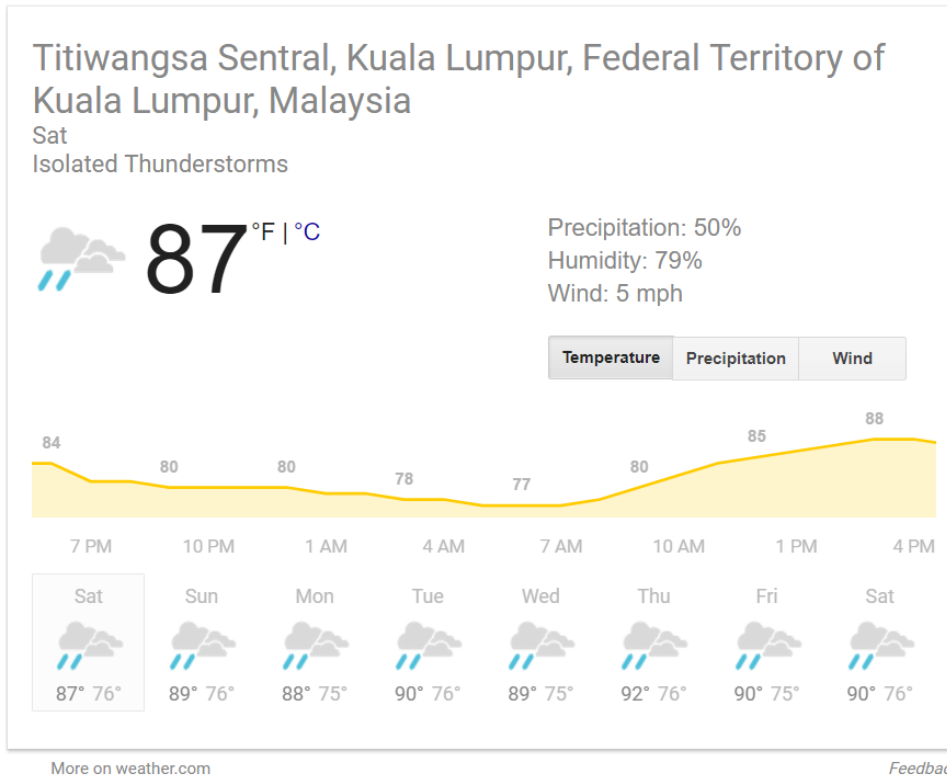
Source : [National Center for Biotechnology Information, U.S. National Library of Medicine](https://www.ncbi.nlm.nih.gov/3d/Structure/DSS/1TUP/)



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Application of Data Visualization

Weather forecasting.



Source : weather.com



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Application of Data Visualization

Stock exchange.



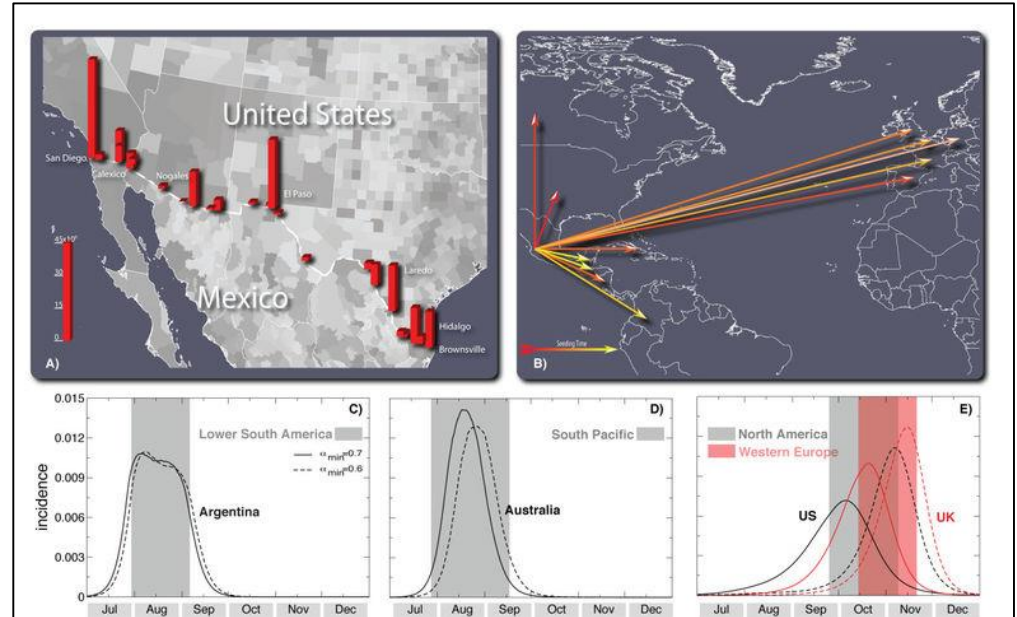
Source : Google Finance



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Application of Data Visualization

Influenza pandemic prediction.

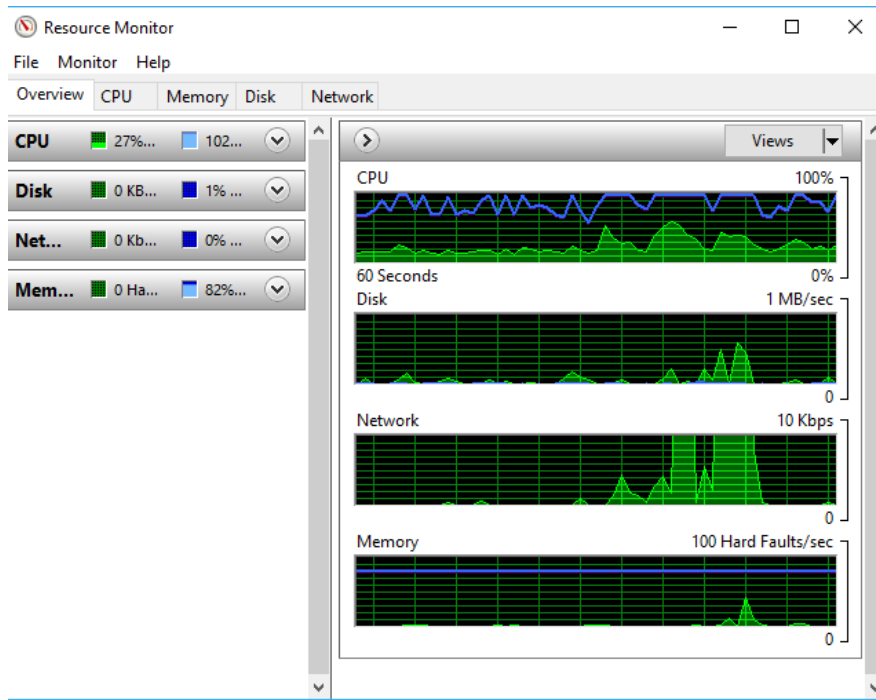


Source : Balcan et al; licensee BioMed Central Ltd. 2009



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Application of Data Visualization



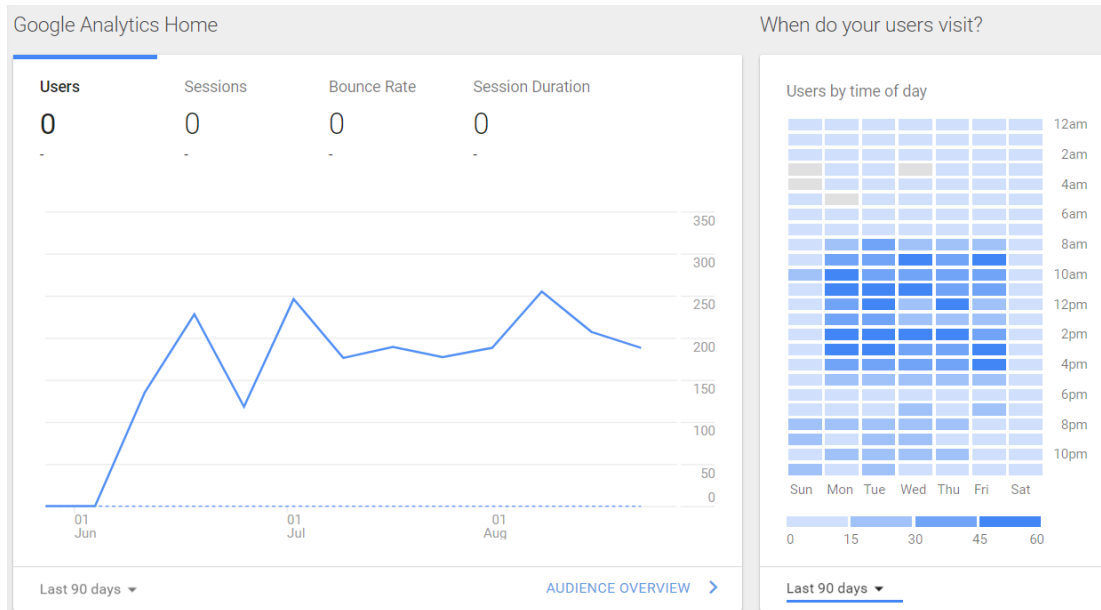
Resource monitoring
in Windows
Operating System.

Source : Microsoft Windows 10 Task Manager Dashboard



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Application of Data Visualization



Web analytics.

Source : Google Analytics



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Summary

- Various data visualization definitions share similar key word, 'graphics'.
- The aim is to facilitate decision making by human.



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Last accessed : 26th August 2017



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- https://youtu.be/P3kEni_xxTU



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