

Probability

| Basic Ideas - Example

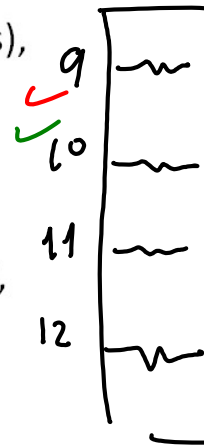
Prof. Dr. Mostafa Elhosseini

<https://youtube.com/drmelhosseini>

Example

- An electrical engineer has on hand two boxes of resistors, with four resistors in each box. The resistors in the first box are labeled 10 Ω (ohms), but in fact their resistances are 9, 10, 11, and 12 Ω . The resistors in the second box are labeled 20 Ω , but in fact their resistances are 18, 19, 20, and 21 Ω . The engineer chooses one resistor from each box and determines the resistance of each.
- Let A be the event that the first resistor has a resistance greater than 10, let B be the event that the second resistor has a resistance less than 19, and let C be the event that the sum of the resistances is equal to 28.
- Find a sample space for this experiment, and specify the subsets corresponding to the events A, B, and C.

Box 1



Box 2



$$S = \{ (9, 18), (9, 19), (9, 20), (9, 21), \\ (10, 18), (10, 19), (10, 20), (10, 21), \\ (11, 18), (11, 19), (11, 20), (11, 21), \\ (12, 18), (12, 19), (12, 20), (12, 21) \}$$

$$A = \{ (11, 18), (11, 19), (11, 20), (11, 21), \\ (12, 18), (12, 19), (12, 20), (12, 21) \}$$

$$B = \{ (9, 18), (10, 18), (11, 18), (12, 18) \}$$

$$C = \{ (9, 19), (10, 18) \}$$

| References

- Understanding Boxplots <https://towardsdatascience.com/understanding-boxplots-5e2df7bcbd51>
- What does a box plot tell you?
<https://www.simplypsychology.org/boxplots.html>
- Statistics for Engineers and Scientists, Fourth Edition, William Navidi
Colorado School of Mines
- Khan Academy
<https://www.khanacademy.org/math/cc-sixth-grade-math/cc-6th-data-statistics/cc-6th-box-whisker-plots/v/constructing-a-box-and-whisker-plot>