

WHAT IS A SAMPLE SPACE?*

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Abstract

This module defines what a sample space is and its examples.

A **sample space** is a set or collection of outcome¹ of a particular random experiment².

For example, imagine a dart board. You are trying to find the probability of getting a bullseye. The dart board is the sample space. The probability of a dart hitting the dart board is 1.0. For another example, imagine rolling a six sided die. The sample space is {1, 2, 3, 4, 5, 6}.

The following list consists of sample spaces of examples of random experiments³ and their respective outcomes⁴.

- The tossing of a coin, sample space is {Heads, Tails}
- The roll of a die, sample space is {1, 2, 3, 4, 5, 6}
- The selection of a numbered ball (1-50) in an urn, sample space is {1, 2, 3, 4, 5, ..., 50}
- Percentage of calls dropped due to errors over a particular time period, sample space is {2%, 14%, 23%,}
- The time difference between two messages arriving at a message centre, sample space is {0, ..., infinity}
- The time difference between two different voice calls over a particular network, sample space is {0, ..., infinity}

Exercise 1

(Solution on p. 2.)

What is the sample space of the buttered toast random experiment?

1 Reference

1. Ali M. **Probalistic system analyses: Part I**. University of the witwatersrand, 2000.
2. http://www.atsweb.neu.edu/chance/book/basic_definitions.html ⁵

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¹"What is an outcome?" <<http://cnx.org/content/m13471/latest/>>

²"What is a Random Experiment?" <<http://cnx.org/content/m13470/latest/>>

³"What is a Random Experiment?" <<http://cnx.org/content/m13470/latest/>>

⁴"What is an outcome?" <<http://cnx.org/content/m13471/latest/>>

⁵http://www.atsweb.neu.edu/chance/book/basic_definitions.html

Solutions to Exercises in this Module

Solution to Exercise 1 (p. 1)

The sample space of the buttered toast example will be:

{Buttered side up, Buttered side down}