

Week 10, LEC02 - November 23th
Discrete Mathematics, Fall 2018

CSCA67 - Lecture Notes

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Q. Consider the experiment of rolling two dice and the probability of their sum being 7. What is the elementary sample space?

A.

$$D_1 = \{1, 2, 3, 4, 5, 6\}$$

$$D_2 = \{1, 2, 3, 4, 5, 6\}$$

$$S = \{(i, j) : i, j \in [1, 6]\}$$

$$S = \{(1, 1), (1, 2), (1, 3), (1, 4), (1, 5), (1, 6), (2, 1), (2, 2), (2, 3), (2, 4), \dots, (6, 5), (6, 6)\}$$

$$|S| = 36$$

Q. Would $S = \{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$ also be an appropriate sample space?

A. No (maybe yes if you are careful).

Q. Why?

A. There are 36 elementary events, this sample space does not distinguish (1,2) and (2,1).

If we consider the sum 2, it can only happen one way where as the sum 3 can happen two ways.

Q. $Prob(sum = 7)$?

A.

We can scan the sample space to see that there are only 6 rolls that result in the sum 7.

$$P(sum = 7) = \frac{6}{36} = \frac{1}{6}$$

Q. What is $prob(sum=7)$ if we use S as the sample space?

A. $P(sum = 7) = \frac{1}{11}$

Q. Why doesnt this make sense?

A. Because there are multiple ways of rolling a sum of 7.