Chapter 1.6 Assigning Probabilities

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Chapter 1 Probability, A Measure of Uncertainty

Example - Choosing an Ice Cream Flavor

- To illustrate different assignments of probabilities, suppose a school girl goes to an ice cream parlor and plans to order a single-dip ice cream cone. This parlor has four different ice cream flavors. Which flavor will the school girl order?
- First, one writes down the sample space – the possible flavors that the school girl can order.

Flavor	Vanilla	Chocolate	Butter Pecan	Maple Walnut
Probability				

Basic Facts About Probabilities

Here are some basic facts about probabilities:

- Any probability that is assigned must fall between 0 and 1
- The sum of the probabilities across all outcomes must be equal to 1.
- An outcome will be assigned a probability of 0 if one is sure that that outcome will never occur.
- Likewise, if one assigns a probability of 1 to an event, then that event must occur all the time.

Scenario 1

Schoolgirl has brought a hat in which she has placed many slips of paper – 10 slips are labeled “vanilla”, 10 slips are labeled “chocolate”, and 10 slips are “butter pecan”, and 10 are “maple walnut”. She makes her ice cream choice by choosing a slip at random.

Flavor	Vanilla	Chocolate	Butter Pecan	Maple Walnut
Probability	1/4	1/4	1/4	1/4

Scenario 2

Let's consider a different set of probabilities based on different assumptions. A person knows that she really doesn't like "plain" flavors like vanilla or chocolate, and she really likes ice creams with nut flavors.

Flavor	Vanilla	Chocolate	Butter Pecan	Maple Walnut
Probability	0	0	0.7	0.3

Scenario 3

The worker at the ice cream shop has no idea what flavor the school girl will order. But the worker has kept a record of how many cones of each type have been ordered – of 50 cones ordered, 10 are vanilla, 14 are chocolate, 20 are butter pecan, and 6 are maple walnut. She believes that the school girl has similar tastes to the previous customers.

Flavor	Vanilla	Chocolate	Butter Pecan	Maple Walnut
Probability	10/50	14/50	20/50	6/50

Comments

- Each of the probability assignments used a different viewpoint of probability as described in previous sections.
- The first assignment used the classical viewpoint using equally likely outcomes.
- The second assignment was an illustration of the subjective view where one's assignment was based on one's opinion about the favorite flavors of one's daughter.
- The last assignment was based on the frequency viewpoint where the probabilities were estimated from the observed flavor preferences of 50 previous customers.