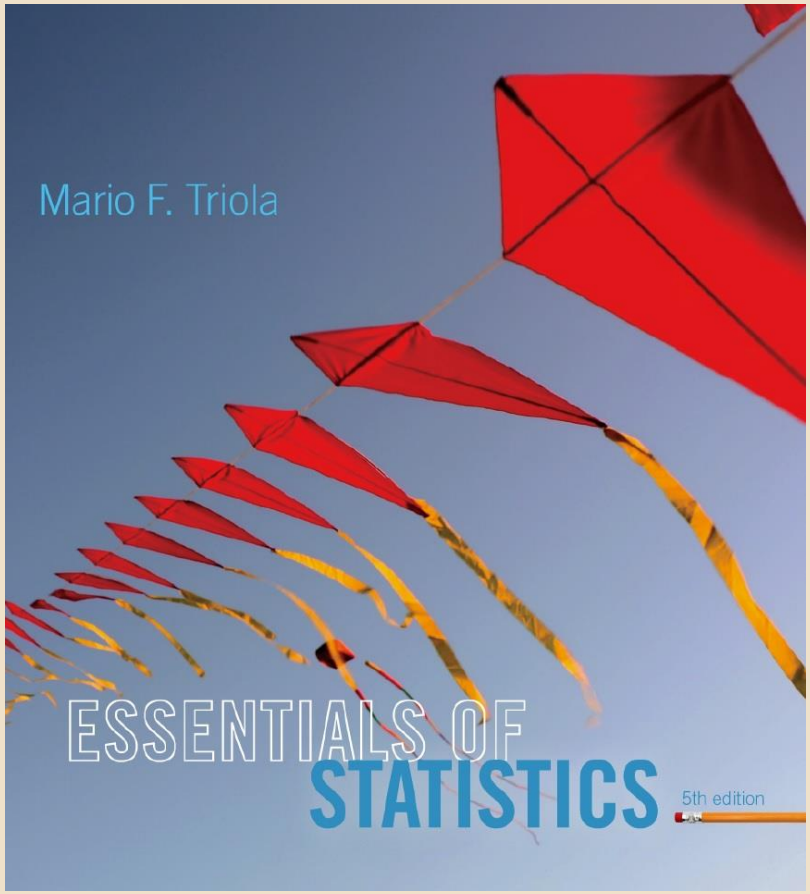
Lecture Slides



Essentials of Statistics
5th Edition

and the Triola Statistics Series

by Mario F. Triola

Chapter 4
Probability

Key Concept

In this section we use simulations as an alternative approach to finding probabilities.

The advantage to using simulations is that we can overcome much of the difficulty encountered when using the formal rules discussed in the preceding sections.

Simulation

A simulation of a procedure is a process that behaves the same way as the procedure, so that similar results are produced.

Simulation Example

Gender Selection In a test of the MicroSort method of gender selection developed by the Genetics & IVF Institute, 127 boys were born among 152 babies born to parents who used the YSORT method for trying to have a baby boy.

In order to properly evaluate these results, we need to know the probability of getting at least 127 boys among 152 births, assuming that boys and girls are equally likely.

Assuming that male and female births are equally likely, describe a simulation that results in the genders of 152 newborn babies.

Solution

One approach is simply to flip a fair coin 152 times, with heads representing females and tails representing males.

Another approach is to use a calculator or computer to randomly generate 152 numbers that are 0s and 1s, with 0 representing a male and 1 representing a female.

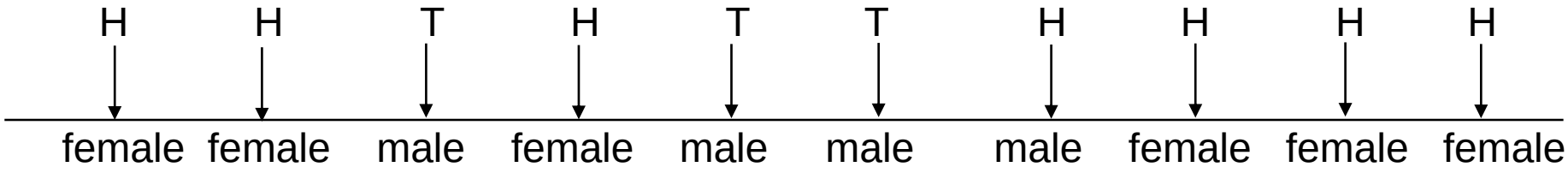
The numbers must be generated in such a way that they are equally likely.

Here are typical results:

Simulation Examples

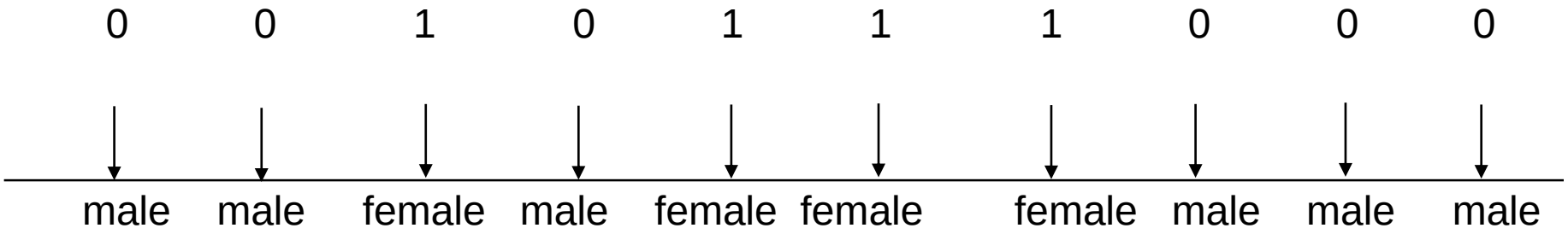
Solution 1:

- Flipping a fair coin 100 times where heads = female
  tails = male



Solution 2:

- Generating 0's and 1's with a computer or calculator where
  0 = male
  1 = female



Random Numbers

In many experiments, random numbers are used in the simulation of naturally occurring events. Below are some ways to generate random numbers:

- A table of random of digits
- STATDISK
- Minitab
- Excel
- TI-83/84 Plus calculator

Random Numbers

STATDISK

Row	1 Ran...
1	7
2	8
3	16
4	38
5	42
6	46
7	68
8	68
9	104
10	117
11	140
12	195
13	204
14	244
15	271
16	274

Minitab

↓	C1	C2
1	38	
2	48	
3	59	
4	71	
5	101	
6	107	
7	122	
8	129	
9	153	
10	153	
11	163	

Random Numbers

Excel

	A
1	15
2	3
3	15
4	362
5	164
6	184
7	158
8	59
9	143
10	85
11	134

TI-83/84 Plus calculator