

Lab Handout

Lab 4.1: The Bernoulli Distribution Model

The instructions below are keyed to the lab instructions found on pp. 220-222 of the text. Please use those instructions as well in preparing your report.

Experimental Procedure

Data Generation and Display

By Hand

1. If you were born in the months January through September, let N be the number of your birth month. Otherwise let it be the number of your birth month modulo 9 (i.e. January=1, February=2, ..., September=9, October=1, November=2 and December=3).
- 2.-5. Run the macro DICE (*Solutions: EIS/OLAP Application Builder: Applications*) to simulate ten rolls of a 10-sided die. Each of the ten outcomes is an integer between 1 and 10 inclusive, and will appear in the SAS Output window. Use the second part of Table 1 to record your data (The first part gives you an example for a student with $N = 7$). Record the outcome as {success} if the number showing on the die is less or equal N . Otherwise, record it as {failure}. Create the measurement Y and record it in Table 1: $Y = 1$ if the outcome is {success}, $Y = 0$, otherwise. Finally, compute the Cumulative Proportion of trials for which $Y = 1$, and record the results in the last column of Table 1.
6. Input the columns of your table for Trial, y , and cumulative proportion into SAS/INSIGHT.
 - (a) Use SAS/INSIGHT to draw a density histogram of Y , as follows:
 - i. Generate a distribution analysis of Y : (*Analyze: Distribution(Y)*).
 - ii. Click on the triangle in the lower left of the density histogram.
 - iii. In the dialog box that pops up, select *Ticks*
 - iv. In the next dialog box, specify both the First Tick and Axis Minimum to be -0.5 , the Last Tick and Axis Maximum to be 1.5 , the Tick Increment to be 1 , and the Minor Ticks to be 0 .You can print just this histogram by clicking on its border before selecting *File: Print...*
 - (b) Use a line plot to plot the cumulative proportion versus trial.

By Computer

Run macro LAB4_1 to get a density histogram and lineplot from 10000 Bernoulli trials (print both). This time you have 10000 trials. Compare the results with the 10 trials you had earlier.

Analysis

Conduct the analysis as indicated on pp. 221-222 of the text.

SAMPLE DATA TABLE

Trial	Die Roll	Outcome	y	Cumulative Proportion of $Y = 1$
1	3	{success}	1	$1/1 = 1.00$
2	6	{success}	1	$2/2 = 1.00$
3	2	{success}	1	$3/3 = 1.00$
4	8	{failure}	0	$3/4 = 0.75$
5	7	{success}	1	$4/5 = 0.80$
6	10	{failure}	0	$4/6 = 0.\overline{66}$
7	3	{success}	1	$5/7 = 0.71$
8	5	{success}	1	$6/8 = 0.75$
9	6	{success}	1	$7/9 = 0.78$
10	4	{success}	1	$8/10 = 0.80$

YOUR DATA TABLE

1				
2				
3				
4				
5				
6				
7				
8				
9				
10				

Table 1: