

HW p 398

④ Problem: What is the probability that a basketball player misses at least 3 out of 5 free throws shot late in a game?

Assumptions: The basketball player makes 70% of her free throws in a long season.
One shot at a basket is independent of the next shot.

Model: Randomly generate single digit numbers 0 to 9.
Assign 0 to 6 as shot made (success),
Assign 7 to 9 as shot missed (failure).

Read 5 consecutive single digit numbers to simulate the 5 shots taken.

Simulation: Use Line 125 from Table B. Run 5 trials.

T1	<u>9</u> <u>6</u> <u>7</u> <u>4</u> <u>6</u>	Made = 3	Miss = 2	
T2	<u>1</u> <u>2</u> <u>1</u> <u>4</u> <u>9</u>	Made = 4	Miss = 1	
T3	<u>3</u> <u>7</u> <u>8</u> <u>2</u> <u>3</u>	Made = 3	Miss = 2	
T4	<u>7</u> <u>1</u> <u>8</u> <u>6</u> <u>8</u>	Made = 2	Miss = 3	✓
T4	<u>1</u> <u>8</u> <u>4</u> <u>4</u> <u>2</u>	Made = 4	Miss = 1	

Conclusion:

Based on this simulation, the probability that the basketball player misses at least 3 out of 5 free throws is 20%.

HW p. 402

① Problem: What is the probability a couple will have at least 1 girl among their no-more-than four children?

Assumptions: • The probability of having a girl (success) is 50%.

• The gender of one child is independent of the gender of the next child.

Model: • Assign digits 0, 1, 2, 3, 4 as girl (success) and 5, 6, 7, 8, 9 as boy (failure).
• Use an random digit table, reading one digit numbers (represents a child) at the time. A trial will consist of 4 children. Run 10 trials. Replication is allowed.

Simulation: Use Line 125 from Table B

T1	<u>1445</u>	③	T6	<u>6510</u>	②
T2	<u>9260</u>	②	T7	<u>3622</u>	③
T3	<u>5631</u>	②	T8	<u>5350</u>	②
T4	<u>4248</u>	③	T9	<u>4906</u>	②
T5	<u>0371</u>	③	T10	<u>1181</u>	③

Conclusion: Based on our simulation, a couple will have at least 1 girl among their no-more-than four children is 100%.

HW p. 402

⑧ Problem: How many games should it take to name a World Series Champion?

Assumptions: • AL baseball teams have a 60% probability of beating a NL team for a given year.

• The outcome of one World Series game is independent of the outcome of the next World Series game.

Model: • Assign digits 0 to 5 as AL wins ^(success) and 6 to 9 as NL wins (failure)
• Use a random digit table, reading one digit number (representing the winner) at the time.
• A trial will consist of reading digits until AL or NL has 4 wins. Run 10 trials

Simulation: Use Line 132 from Table B

T1	6 8 7 3 2 5 5	AL	T6	6 8 5 9 7	NL
	N N N A A A A	7		N N A N N	5
T2	2 5 9 8 4 2	AL	T7	5 0 4 5	AL
	A A N N A A	6		A A A A	4
T3	9 2 0 8 7 9	NL	T8	7 4 0 4 1	AL
	N A A N N N	6		N A A A A	5
T4	6 4 3 1 6 5	AL	T9	8 0 7 6 5 5 6	NL
	N A A A N A	6		N A N N A A N	7
T5	9 3 7 3 9 3 1	AL	T10	1 3 3 3	AL
	N A N A N A A	7		A A A A	4

Conclusion: Based on our simulation, we should expect to play 5.7 games in the World Series before a winner is determined.

b) other factors: weather, injuries, starting pitchers, etc.

HW p 402

⑩ Problem: What is the probability of having exactly 0, 1, 2, 3, or 4 girls in a family of four children?

Assumptions: • The probability of having a girl (success) is 50%.

• The gender of one child is independent of the gender of the next child.

Model: • Assign digits 0 to 4 as girl. (Success) Assign digits 5 to 9 as boy (failure)
• Use random digit table to randomly generate single digit numbers representing each child.
• A trial consists of 4 single digit numbers. Run 10 trials.

Simulation: Use Line 109 from Table B

T1	8 <u>2</u> 7 <u>3</u>	②	T6	8 <u>1</u> 6 <u>7</u>	①
T2	9578	①	T7	655 <u>3</u>	①
T3	9 <u>0</u> <u>2</u> <u>0</u>	③	T8	<u>0</u> <u>0</u> 9 <u>4</u>	③
T4	8 <u>0</u> 7 <u>4</u>	②	T9	<u>3</u> 8 <u>3</u> <u>1</u>	③
T5	75 <u>1</u> <u>1</u>	②	T10	<u>4</u> 8 <u>9</u> <u>3</u>	②

Conclusion: Based on this simulation, in families having exactly 4 children the probability of having

0 girls is 10% 1 girl is 20%

2 girls is 40% 3 girls is 30%

4 girls is 0%