

Example 1

Find the **PROBABILITY** of getting a
run of at least 3 consecutive “heads” or
run of at least 3 consecutive “tails”
in the experiment where **fair coin is tossed 10 times**

- Step 1 Give a probability model
 - Each toss has a probability
0.5 of “heads” and
0.5 of “tails”
 - Tosses are independent of one another
(*recall: independence – outcome of one toss of the coin does
not change the probability of the outcome of any other toss*)

Example 1

- Step 2 Assign digits to represent outcomes
 - Goal: assign digits in a way that matches the probabilities from Step 1
 - Solution: (one of several possibilities)
 - Use Table of Random Digits (Table A in text)
 - Let one digit represent 1 toss of the coin
 - Odd digit represents heads
 - Even digit represents tails
 - *Rationale:*
 - *Works because each digit in the table has a 1/10 chance to be the next digit and successive digits are independent, so 5/10 = half the digits are odd and 5/10 = half the digits are even*
- Step 3 Simulate many repetitions

We'll do two together:

Line 101: 19223 95034 05756 28713 96409 12531 42544 82858

Line 121: 71487 09984 29077 14863 61683 47052 62224 51025

Line 140: 12975 13258 13048 45144 72321 81940 00360 02428

Line 150: 07511 88915 41267 16853 84569 79367 32337 03316

- Odd digit represents heads / Even digit represents tails
- 48 45144 723 ☐ T T T H H T T H T H
- YES, we have a string of 3 tails
- 32337 03316 ☐ H T H H H T H H H T ☐ YES, string of 3 (2 actually)

Now you do one!

- Choose a starting point
- Choose a string of 10 consecutive digits
- Assign H or T to each digit using rule:
“Odd digit represents heads / Even digit represents tails”
- Determine whether you have a string of 3 heads or 3 tails