Lesson 5-3 Simulating Experiments

**Definition**: A ***simulation***imitates chance behavior based on a model that accurately reflects the experiment under consideration.

**Example**: *A couple plans to have children until they have a girl or until they have four children, which comes first. Use a simulation to estimate the likelihood that the couple is successful.*

**Step 1: State the problem or describe the experiment**

How likely is it that a couple will have a girl in their first four children?

**Step 2: State the assumptions**

* Each child has a probability of .5 of being a boy and .5 of being a girl.
* The genders of the children are independent of each other

**Step 3: Assign digits to represent outcomes**

Only one digit need be assigned since the probabilities of the outcomes have only one significant digit.

0, 1, 2, 3, 4= girl

5, 6, 7, 8, 9= boy

**Step 4: Simulate many repetitions**

Obtain one digit at a time until the couple has a girl or the couple has four children. Using line 130 from table B, we obtain the results:

690 51 64 81 7871 74 0 951 784 53 4 0

BBG BG BG BG BBBG BG G BBG BBG BG G G

64 8987

BG BBBB

**Step 5: State your conclusions**

Of the 14 repetitions performed, 13 resulted in the couple having a girl. Therefore, we conclude that the couple has a 93% chance of having a girl in their first four children.