

## Intro to Binary: The Count

### INTRODUCTION:

The Determinator determines how many balls will fall.

The Count counts how many balls have fallen.

With The Determinator you examine the bit setting on the panel before you start.

With The Count you examine the bit setting after all the balls have fallen.

With The Determinator you insert a whole bunch of balls at the top.

With The Count you insert only the number of balls that you wish to be counted.

### OBJECTIVE:

Children will convert decimal numbers to binary for numbers 0 through 15.

Children will read the bit setting in a TT register as a binary number.

DURATION: approximately 40 minutes. I suggest that you break it up into two sessions.

### MATERIALS:

TT panel setup for The Count. Use the setup diagram or refer to **TT Puzzle Book** challenge 21.

The Count Worksheet

The Count Answers

### PROCEDURE:

- 1) On the worksheet, test 0001:
  - Place one blue ball in the area at the top.
  - Set the bits on the panel to 0000.
  - Press the trigger to start the action. Ball falls.
  - Read the resulting bit setting from the bottom up: “Zero, zero, zero, one.”
  - In the *setting* column on the worksheet, fill in the bit setting shown on the panel.
  - Because the binary number 0001 matches the bit setting, write “ok” in the *check* column.
- 2) On the worksheet in the *binary* column, fill in the binary equivalent of decimal 2.
  - Place two blue balls in the area at the top.
  - Set the bits on the panel to 0000 (IMPORTANT: Remember to set the bits before you trigger).
  - Press the trigger to start the action. Two balls fall.
  - Read the resulting bit setting from the bottom up: “zero, zero, one, zero”.
  - In the *setting* column on the worksheet, fill in the bit setting shown on the panel.
  - If the binary number matches the bit setting, write “ok” in the *check* column, otherwise, in the *check* column, write the binary digits the way they appear on the panel.
- 3) Repeat step 2 above, for the numbers 3 through 15.