Bits and Colors 1

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This series of puzzles provides practice in using bits and crossovers: Part 1 consists of 9 challenges and is more tutorial; part 2 consists of 6 challenges and involves logical problem solving. It is recommended that you complete part 1 before attempting part 2 and that you solve the challenges in order without skipping over any. Hopefully, you will find this to be a good preparation for TT Puzzle Book challenge 39.

For each challenge set your bits to the desired values, load 10 balls of each color, and then trigger the blue lever. The first ball will always be a blue ball and will end up at the right side of the output line. After an objective has been reached, there is one more ball that falls and it ends up in the intercept.

In all of these puzzles more than one sollution is possible. As long as your output matches the challenge, you have solved the puzzle correctly. But afterward, you may need to modify your setup so that it matches the given solution.

1) Use one bit (we'll call it, B1) and an intercept. Add ramps as needed. When B1 = 0, no balls will fall to the output line. When B1 = 1, only one ball will fall to the output line. Check your work and then (if needed) modify your setup to match picture 1.

2) Add another bit (call it, B2) to the setup. Set the bits to 10 in binary notation, that is B2 = 1 and B1 = 0. Recall that 10 in binary is 2 in decimal. Your setup will drop two balls to the output line. Which one of the bits drops the first ball? Is it B1 or B2?

3) Using the same setup, set the bits to 11 (that's 3 in decimal). Your setup will now drop three balls to the output line. Which bit drops the third ball?

4) Create the setup shown in picture 3. Next, set the bits so that 4 balls will drop to the output line, (and then, 1 additional ball will drop into the intercept). What is the binary notation for your bit settings?
OUTPUT: BBBB

5) Drop five balls: **OUTPUT:** BBBBB   What is the binary notation for 5?

6) Drop seven balls: **OUTPUT:** BBBBBBB What is the binary notation for 7?

7) Set the bits to 100 and add crossovers to the setup such that whenever a ball drops from B1 (that is, whenever B1 = 1) the ball will trigger the red lever. Run the program and check your work.
OUTPUT: BRBB Picture 7 shows one of several possible solutions.

8) Set the bits to 100 and add or remove crossovers as needed, such that whenever a ball drops from B2 (that is, whenever B2 = 1) the ball will trigger the red lever. Run the program and check your work. **OUTPUT:** RBBB Picture 8 shows one of several possible solutions.

9) Set the bits to 100 and add or remove crossovers as needed, such that whenever a ball drops from B3 (that is, whenever B3 = 1) the ball will trigger the red lever. Run the program and check your work. **OUTPUT:** BBRB