SW 0 - Intro to LogicWorks

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Section 003L

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**Circuit 2 Data Table:**

|  | D | C | B | A |  | H | G | F | E |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Input: | 0 | 0 | 0 | 0 | Output: | 0 | 0 | 0 | 0 |
| Input: | 0 | 0 | 0 | 1 | Output: | 0 | 0 | 0 | 1 |
| Input: | 0 | 0 | 1 | 0 | Output: | 0 | 0 | 1 | 0 |
| Input: | 0 | 0 | 1 | 1 | Output: | 0 | 0 | 1 | 1 |
| Input: | 0 | 1 | 0 | 0 | Output: | 0 | 1 | 0 | 0 |
| Input: | 0 | 1 | 0 | 1 | Output: | 0 | 1 | 0 | 1 |
| Input: | 0 | 1 | 1 | 0 | Output: | 0 | 1 | 1 | 0 |
| Input: | 0 | 1 | 1 | 1 | Output: | 1 | 0 | 0 | 0 |
| Input: | 1 | 0 | 0 | 0 | Output: | 1 | 0 | 0 | 1 |
| Input: | 1 | 0 | 0 | 1 | Output: | 1 | 0 | 1 | 0 |
| Input: | 1 | 0 | 1 | 0 | Output: | 1 | 0 | 1 | 1 |
| Input: | 1 | 0 | 1 | 1 | Output: | 1 | 1 | 0 | 0 |
| Input: | 1 | 1 | 0 | 0 | Output: | 1 | 1 | 0 | 1 |
| Input: | 1 | 1 | 0 | 1 | Output: | 1 | 1 | 1 | 0 |
| Input: | 1 | 1 | 1 | 0 | Output: | 1 | 1 | 1 | 1 |
| Input: | 1 | 1 | 1 | 1 | Output: | 1 | 1 | 0 | 0 |

**Red Background: Input = Output**

**Blue Background: Input + 1 = Output**

**Green Background: Outside Domain of Circuit**

**Question 1: What value is output on HGFE for DCBA = 1111?**

The output HGFE for DCBA = 1111 is 1100. This input is outside the range of the circuit as there is no fifth output bit to represent a value of 16, so the output will have to be represented incorrectly with the given output bits.

**Question 2: Why do you use DCBA as the inputs rather than ABCD?**

We use DCBA as the inputs rather than ABCD because of the most and least significant bits. The most significant bit will be the leftmost bit because the leftmost bit will hold the highest value and be able to change the output by a larger number as well (exponential increase of 2n). By putting the first bit, A as the rightmost bit, it becomes the least significant bit with the smallest impact on the output (1 or 0), and B is the second least significant bit representing 2 (or 0). The C binary switch represents the second most significant bit with a value of 4 (or 0), and D is the most significant bit with a value of 8 (or 0) and thus is the leftmost bit, being the final one. We reverse the order so that the final bit, also known as the most significant bit, is the leftmost bit.