There are two types of digital logic circuits: combinational logic circuits and sequential logic circuits.

Combinational Logic

With **combinational logic**, the output depends ONLY on the values of the current inputs. In **sequential logic** circuits, you also have the concept of “state,” where you’re storing some information, and that state also impacts the output. We’ll look at sequential logic later in the course.

With **combinational logic** there’s no sense of state, no sense of past history. You only have the current inputs. Those inputs are applied to the circuit. Then after some delay (every circuit has some delay -- it takes some amount of time for the transistors to switch; it takes some amount of time for the bits to pass from one transistor to another on the wires) you will see a change in the outputs.

The simplest combinational logic circuits are these simple gates that we have already discussed. Combining these simple gates, we can create more complex functions. There are a number of more complex combinational functions, such as decoders, multiplexers, adders, and comparators. In this course we will look at decoders, multiplexers, and adders.

We can take these complex functions and use them to design things such as chips, microprocessors, and memories. Again we see this concept of hierarchy. We have transistors that form these basic logic gates, we have these logic gates that form more complex functions, and then we use these complex functions to design things such as microprocessors and memories.

DECODERS

9:03 / 9:03 1.0x

Download transcript .txt

Show Discussion

New Post

Help

1. CHECK YOUR UNDERSTANDING (2/2 points)

Fill in the truth table values below for a 3-to-8 decoder. The notation Outx means that that output is a 1 only when the decimal equivalent value x appears on the input. (**You only have ONE try for this problem**)

X	Y	Z	Out0	Out1	Out2	Out3	Out4	Out5	Out6	Out7
0	0	0	1	0 **Answer:** 0	0 **Answer:** 0	0	0	0	0 **Answer:** 0	0
0	0	1	0	1 **Answer:** 1	0 **Answer:** 0	0	0	0	0 **Answer:** 0	0
0	1	0	0	0 **Answer:** 0	1 **Answer:** 1	0	0	0	0 **Answer:** 0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

SOLUTION OR EXPLANATION HEADING

For each input combination, exactly one output is a 1. The notation **Outx** means that **output is a 1** only when the **decimal equivalent** value x appears on the input and the others 0. For example, when the input is 0 1 0 (decimal number 2) and Out2=1, all the other outputs are 0.

Hide Answer

You have used 1 of 1 submissions

Show Discussion

New Post