Problem of the Week

Problem C

Count Down to Zero

Every year there is a countdown to the New Year in Problemville. The timer starts at 20 and counts down to 0.

The display for the digits on the timer is made up of seven segments that are either lit or unlit. When the digit 8 is displayed, all seven segments are lit.

When the digit 1 is displayed, only two segments are lit and five segments are unlit.

In changing from digit to digit, a segment can change from lit to unlit, from unlit to lit, or could remain unchanged. For example, in changing from 5 to 4, three of the segments that were lit stay lit, one segment that was unlit stays unlit, one segment that was unlit becomes lit, and two of the segments that were lit become unlit. Therefore, there is a total of three changes of state when the timer changes from 5 to 4.

In counting down from 20 to 0, how many changes of state are there? In other words, determine the number of times segments are turned from unlit to lit plus the number of times segments are turned from lit to unlit. (Note that, in changing from 10 to 9, the left digit is turned completely off.)

The ten digits are shown below for your reference.

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