

Thermometer (a.k.a. unary) coding is frequently used in digital systems applications to represent a natural number. In a thermometer code, a N-bit binary number is represented by a $(2 \cdot N)$ -bit digital word, which has m zeros followed by $(N - m)$ ones or vice-versa.

In this question, implement a binary to thermometer decoder circuit using Verilog. The input, `din`, is an 8-bit unsigned binary word, and the output `dout` is the thermometer code representation of the input at any time. The output is 256-bit long; `dout` has m zeros followed by $(256 - m)$ ones.

Input and Output Signals

`din` - Binary, unsigned input word

`dout` - Thermometer output word

The example below shows a sequence of 8-bit binary inputs and their respective thermometer codes. Note that when `din = 8'b0000_0000`, the thermometer representation has a single one at the least significant bit (LSB) position (select `dout` and change the radix from Hex to Bin in order to better visualize it).

<code>din</code>	<code>h0</code>	<code>h0</code>	<code>h1</code>	<code>h2</code>	<code>h3</code>	<code>h4</code>	<code>h5</code>	<code>h6</code>	<code>h7</code>	<code>h8</code>
<code>dout</code>	<code>h1</code>	<code>h1</code>	<code>h3</code>	<code>h7</code>	<code>hf</code>	<code>h1f</code>	<code>h3f</code>	<code>h7f</code>	<code>hff</code>	<code>h1ff</code>