This is a relatively simple assignment, since there is so little time left.

**Part 1. Draw an 8-way set-associative cache with 4-word cache blocks**

Similar to the set-associative cache I drew in class, draw an 8-way set associative cache containing 4-word cache blocks. Assume the cache holds a total of 512K (i.e. $2^{19}$) words (not including tags and valid bits). Be sure to include the necessary multiplexors, comparators (i.e. for comparing the tag in an address to a tag associated with a cache block), and the “encoder” that I drew. The cache should take a 32-bit address as input and, as output, should have a “cache hit” line indicating if a cache hit occurred and a 32-bit data output containing the data retrieved from the cache. Be sure to identify the number of bits that each internal line is carrying. If possible, please draw the cache using Word or some drawing program (e.g. PowerPoint) for neatness. You might want to draw in landscape mode as well.

**Part 2. Implement the “encoder” in Logisim**

Implement in Logisim the encoder device used in your cache (above). This device is the reverse of a decoder, in that it has $n$ inputs and $\log(n)$ outputs. Only one of the inputs should be asserted and, when the $i$th input is asserted, the binary value of the output should be $i$. For example, if input line #5 is asserted, then the output should be 0.0101. Your encoder should have the appropriate number of inputs and outputs for your cache.