In this recitation, please help the students with the basics of combinatorial circuit design.

You may first ask them to draw the circuit to implement the following function. A circuit has three inputs (X2,X1,X0). The output should be 1 if the three bits regarded as an unsigned integer is within [2,5]. Ask them to first fill the truth table, then use the standard way, i.e., use an AND gate for each “true row” in the truth table, to implement the circuit with 4 AND gates followed by 1 OR gate. Then use the Karnaugh map to simplify the circuit (for recitations after Monday).

If there is time left, you may tease them with the following problem. How to implement an AND gate with one 2-1 selector (a 2-1 selector has 3 inputs: S, a, b. If S=0, output=a; if S=1, output=b.)? Answer: suppose the inputs to the AND gate are A and B. Use A as S, connect input a to 0 and input b to B.