1. *Traffic light controller*

The traffic light-controller, in general, is a sequential circuit, as it should keep the time and each state depends on the previous states and some input signals. However, most of the functionalities in a traffic light controller can be implemented by a combinational circuit. An example will clarify that, later in this section.

2. *4-bit integer multiplier*

A combinational circuit can implement this operation.

3. *Binary counter*

A counter in its general form is a sequential circuit as each output at each state depends on the previous circuit states. However, a limited version of a counter circuit can be combinational.

4. *A three-layer perceptron neural network*

Conceptually a three-layer perceptron neural network can be implemented by a combinational circuit. However, it depends on the resources available on the target FPGA and the desired performance and throughput. Usually, a pipelined version of a large three-layer perceptron neural network can provide higher throughput.

5. *A recurrent neural network*

Based on the definition, the outputs of a recurrent neural network depend not only on the current inputs but also on the previous inputs via the circuit states. Therefore, its design will not be combinational.