

Calculator

## Design Description:

- This design is a simple calculator capable of 4 different operations. (such as: \*, +,  $x^2$ , ++)
- The design will take one number (from switches) at a time and validate the number by a 'valid' input from a push button.
- Depending on the operation, the circuit will need one or two operands, which will result in either 2 or 3 states per calculation.
- Led outputs should output the input number or operand until the result is calculated.
- Note that we don't provide initial code for the top module, so you should generate new verilog file and instantiate debounce module in your design.

## Tasks:

- Implement top module and connect the valid in signal to debounce
- Implement addition (as operation 1) and incrementation (as operation 3) operations inside the calculator
- Extend the testbench so it covers the new operations
- Upload all the modified files to LMS

## Design I/O:

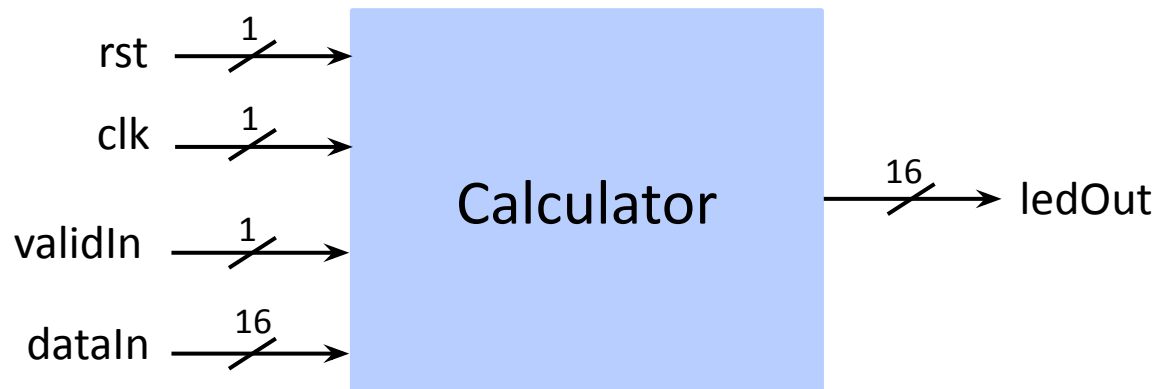
**rst:** 1-bit input for reset

**clk:** 1-bit input for clock

**validIn:** 1-bit input coming from a push-button

**dataIn:** 16-bit output

**ledOut:** 16-bit output



## Current Design Behavior:

- The calculator uses the state machine that is depicted on the right-hand side.
- At every state, whenever the situations shown in its brackets are satisfied, the circuit will go to the intended state and output the equation below brackets.

