**Booth Multiplier**

Report of CA1

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# Controller Design

### State Machine

The state Machine of our controller can be seen in Figure 1 (based on Booth Algorithm shown in Figure 3)

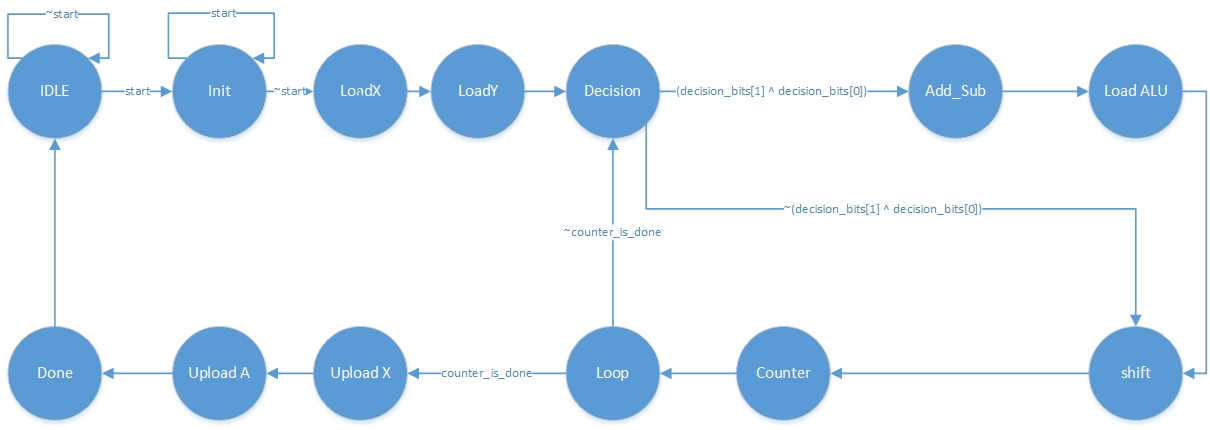


Figure : State Machine of Controller

And All of Controller Signals Shown in Figure 2 and also we show that what happens to these signals in each state

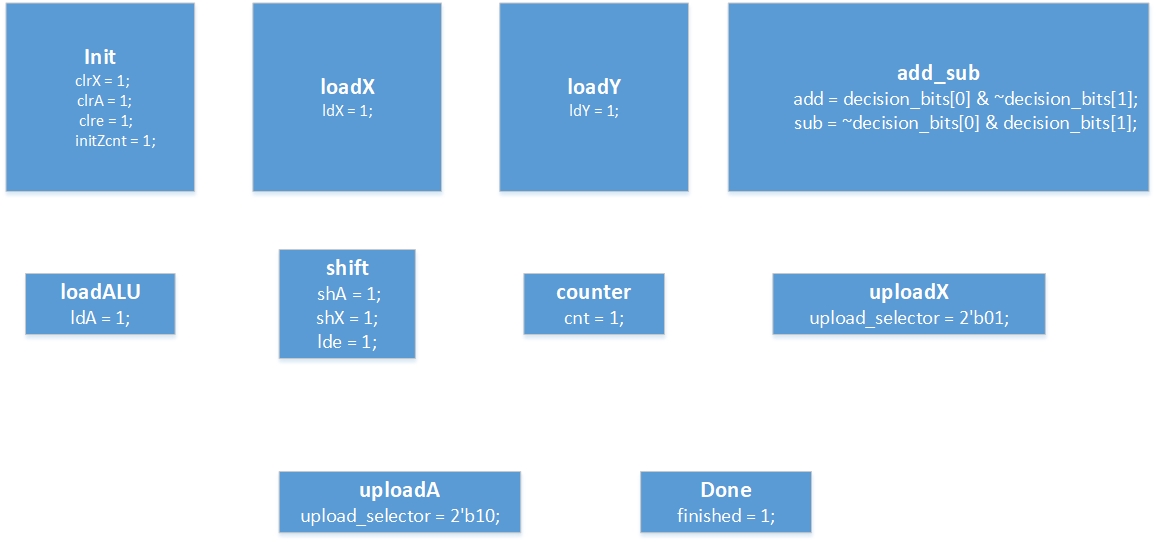


Figure : Controller Signals

### Counter

A Counter has been added to this controller to control the loop state and finish the procedure in right time. Because the Multiplier has 6 bits (n in Figure 3) so based on Booth Algorithm the iteration should be completed 6 time and this counter controls it properly.

# Data Path

### Circuit

This data path consist of 5 parts;

#### ALU

This ALU only add or subtract its operands based on controller signal.

#### Registers

* 1 bit Register
* 6 bit Register
* 6 bit Register with shifting
* 6 bit Register with shifting and carry-in

Figure : Booth Algorithm

