Lab5 Preparation

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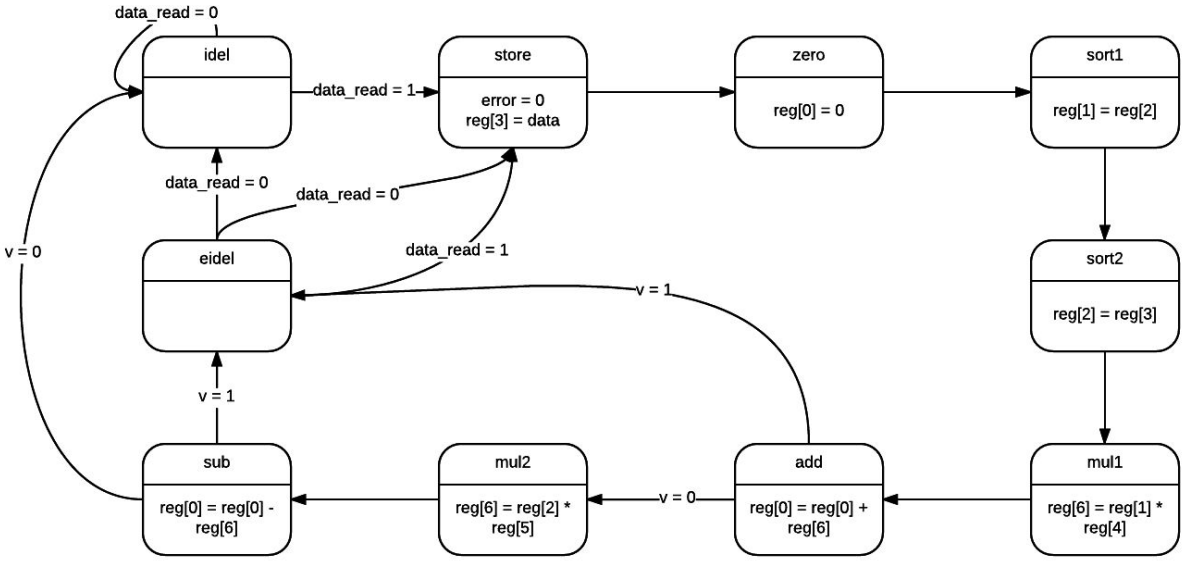
Two-point High-Pass FIR filter controller FSM

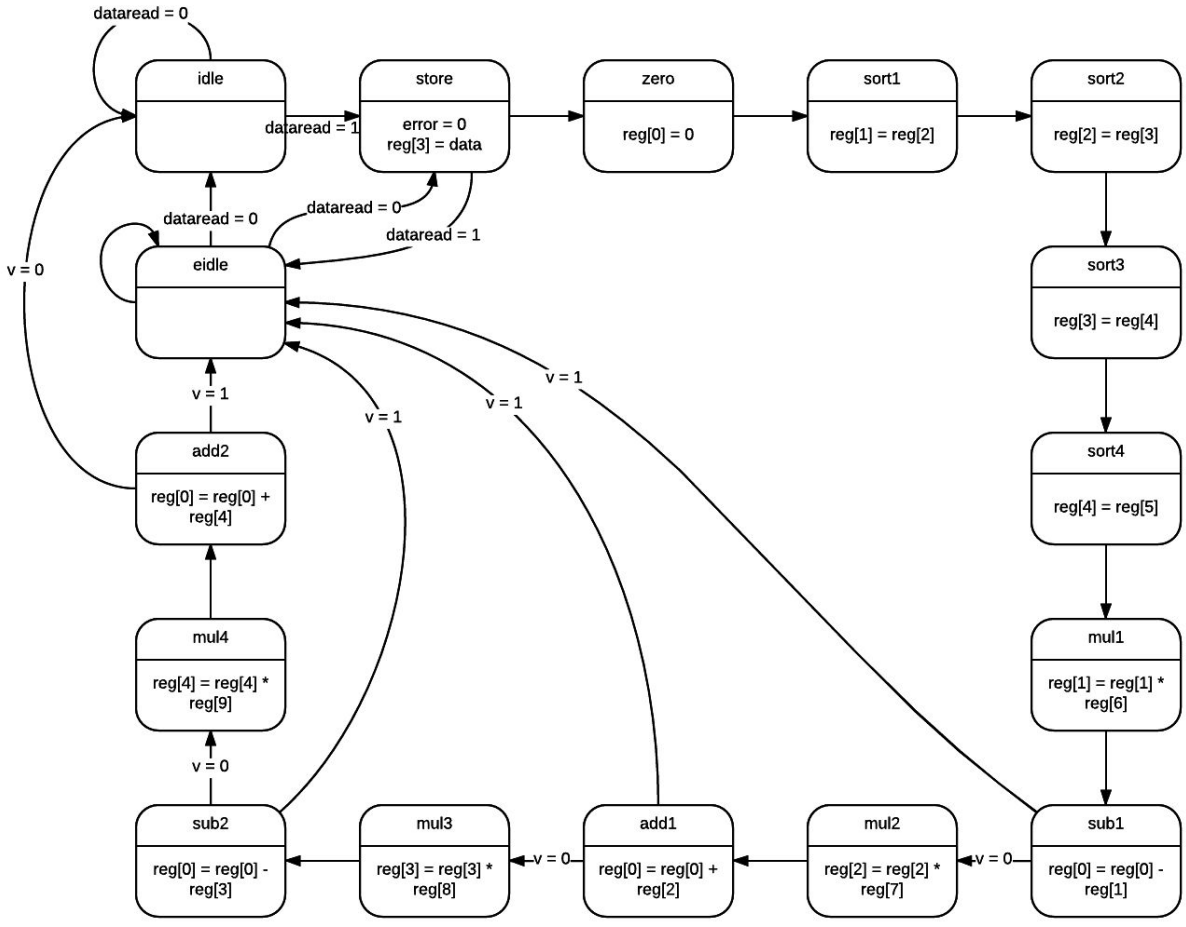


Four-point High-Pass FIR filter controller Pseudo Code

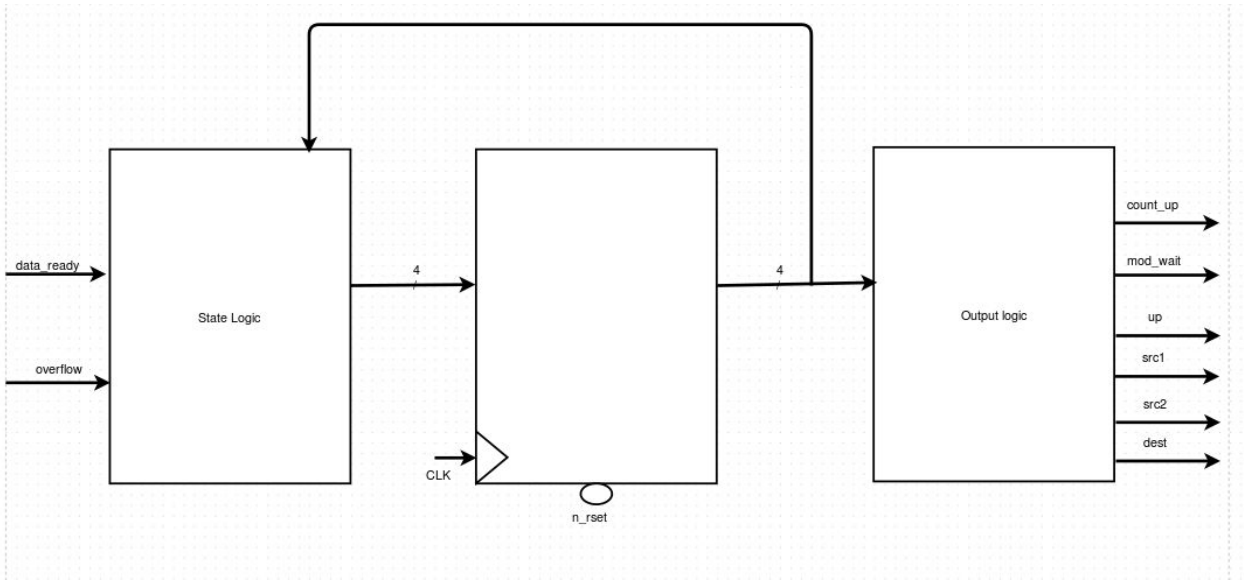
```
idle:  if (data_ready=0) goto idle  ; wait until data_ready=1
store: if (data_ready=0) goto eidle
       reg[5] = data; Store data in a register
       err = 0; reset error
zero:  reg[0] = 0                   ; zero out accumulator

sort1: reg[1] = reg[2]; Reorder registers
sort2: reg[2] = reg[3]; Reorder registers
sort3: reg[3] = reg[4]; Reorder registers
sort4: reg[4] = reg[5]; Reorder registers

mul1:  reg[1] = reg[1] * reg[6] ; sample2* F2
sub1:   reg[0] = reg[0] - reg[1]    ; add Large pos. coefficient
       if (V) goto eidle; On overflow, err condition
mul2:  reg[2] = reg[2] * reg[7]    ; sample1* F1
add1:   reg[0] = reg[0] +reg[2]    ; sub Large neg. coefficient
       if (V) goto eidle; On overflow, err condition
       else goto idle

mul3:  reg[3] = reg[3] * reg[8] ; sample2* F2
```

```
sub2:   reg[0] = reg[0] - reg[3]    ; add Large pos. coefficient
       if (V) goto eidle; On overflow, err condition
mul4:  reg[4] = reg[4] * reg[9]    ; sample1* F1
add2:   reg[0] = reg[0] +reg[4]    ; sub Large neg. coefficient
       if (V) goto eidle; On overflow, err condition
       else goto idle


eidle: err =1
       if (data_ready=1) goto store; wait until data_ready=1
       if (data_ready=0) goto eidl
```

Four-point High-Pass FIR filter controller FSM



RTL for controller block



RTL for magnitude block