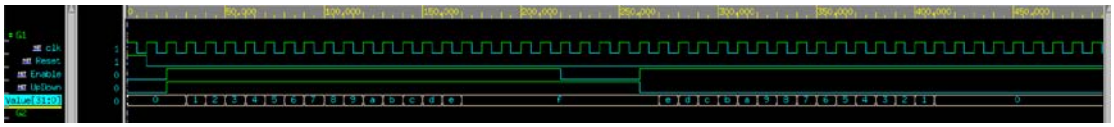
Problem 1

Waveform of the counter example



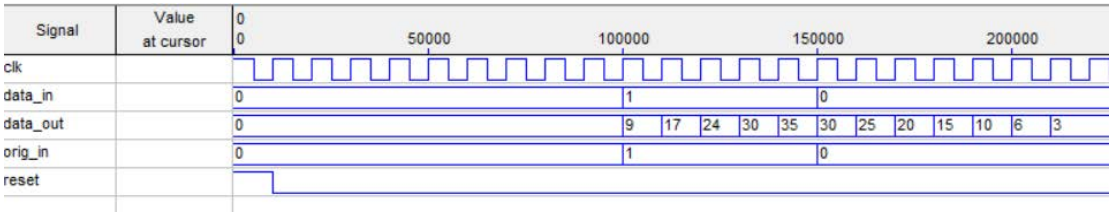
Problem 2

(Part 1) Console output and waveform

```
Info: (I702) default timescale unit used for tracing: 1 ps (waveform.vcd)
DATA: [ 1]=   0.00000   0.00000
DATA: [ 2]=   0.00000   0.00000
DATA: [ 3]=   0.00000   0.00000
DATA: [ 4]=   0.00000   0.00000
DATA: [ 5]=   0.00000   0.00000
DATA: [ 6]=   0.00000   0.00000
DATA: [ 7]=   0.00000   0.00000
DATA: [ 8]=   1.00000   9.00000
DATA: [ 9]=   1.00000  17.00000
DATA: [10]=   1.00000  24.00000
DATA: [11]=   1.00000  30.00000
DATA: [12]=   1.00000  35.00000
DATA: [13]=   0.00000  30.00000
DATA: [14]=   0.00000  25.00000
DATA: [15]=   0.00000  20.00000
DATA: [16]=   0.00000  15.00000
DATA: [17]=   0.00000  10.00000
DATA: [18]=   0.00000   6.00000
DATA: [19]=   0.00000   3.00000
DATA: [20]=   0.00000   1.00000
DATA: [21]=   0.00000   0.00000
DATA: [22]=   0.00000   0.00000
DATA: [23]=   0.00000   0.00000
INFO: Exiting fifo_fir simulation
INFO: Simulation fifo_fir PASSED with 0 errors
```

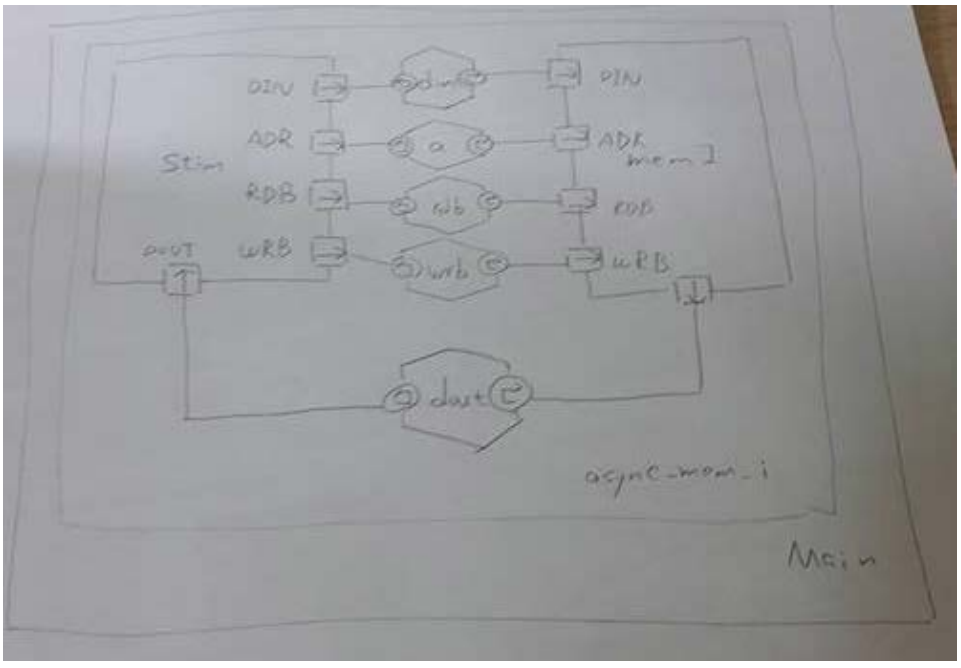
(Part 2) Console output and waveform

```
Info: (I702) default timescale unit used for tracing: 1 ps (wave.vcd)
DATA: [ 0]=   0.00000   0.00000
DATA: [ 1]=   0.00000   0.00000
DATA: [ 2]=   0.00000   0.00000
DATA: [ 3]=   0.00000   0.00000
DATA: [ 4]=   0.00000   0.00000
DATA: [ 5]=   0.00000   0.00000
DATA: [ 6]=   0.00000   0.00000
DATA: [ 7]=   0.00000   0.00000
DATA: [ 8]=   1.00000   9.00000
DATA: [ 9]=   1.00000  17.00000
DATA: [10]=   1.00000  24.00000
DATA: [11]=   1.00000  30.00000
DATA: [12]=   1.00000  35.00000
DATA: [13]=   0.00000  30.00000
DATA: [14]=   0.00000  25.00000
DATA: [15]=   0.00000  20.00000
DATA: [16]=   0.00000  15.00000
DATA: [17]=   0.00000  10.00000
DATA: [18]=   0.00000   6.00000
DATA: [19]=   0.00000   3.00000
INFO: Exiting fifo_fir simulation
INFO: Simulation fifo_fir PASSED with 0 errors
```



Problem 3

Architecture for the system



(Part 3) Console output and waveform

```
Info: (I702) default timescale unit used for tracing: 1 ps (wave.vcd)
DATA: [ 0]=   0.00000   0.00000
DATA: [ 1]=   0.00000   0.00000
DATA: [ 2]=   0.00000   0.00000
DATA: [ 3]=   0.00000   0.00000
DATA: [ 4]=   0.00000   0.00000
DATA: [ 5]=   0.00000   0.00000
DATA: [ 6]=   0.00000   0.00000
DATA: [ 7]=   0.00000   0.00000
DATA: [ 8]=   1.00000   9.00000
DATA: [ 9]=   1.00000  17.00000
DATA: [10]=   1.00000  24.00000
DATA: [11]=   1.00000  30.00000
DATA: [12]=   1.00000  35.00000
DATA: [13]=   0.00000  30.00000
DATA: [14]=   0.00000  25.00000
DATA: [15]=   0.00000  20.00000
DATA: [16]=   0.00000  15.00000
DATA: [17]=   0.00000  10.00000
DATA: [18]=   0.00000   6.00000
DATA: [19]=   0.00000   3.00000
INFO: Exiting fifo_fir simulation
INFO: Simulation fifo_fir PASSED with 0 errors
```