

Problem 1: Solve 2018 Final Exam Problem 3, in which the inferred hardware for a `misc` module is to be found (a) and the state of the event queue over time simulating `misc` (b) is to be found.

Problem 2: Appearing below is a solution to Homework 4 Problem 1. Show the hardware that will be inferred for this module after some optimization. Show the pop module as a box.

- Clearly show all input and output ports.
- Please don't get parameters and ports confused.

```

module best_match
#( int wv = 32, int wk = 10, int wvb = $clog2(wv), int wkv = $clog2(wk+1) )
( output logic [wvb:1] pos, output logic [wkv:1] err, output logic ready,
  input uwire [wv-1:0] val, input uwire [wk-1:0] k, input uwire start, clk );

logic [wvb-1:0] curr_pos;
logic [wv-1:0] sh_val;
uwire [wkv-1:0] e;
pop #(wk,wkv) p( e, k ^ sh_val[wk-1:0] );

always_ff @( posedge clk )

  if ( start == 1 ) begin

    ready = 0;
    curr_pos = 0;
    sh_val = val;
    err = ~0;

  end else if ( !ready ) begin

    if ( e < err ) begin err = e; pos = curr_pos; end
    ready = curr_pos == wv - wk;
    curr_pos++;
    sh_val >>= 1;

  end

end

endmodule

```