

Formal verification

Coverage

CERN training - July 2025

Context

We are verifying a blackbox sequencer who has the responsibility of generating certain sequences. Its entity is the following :

```
entity blackbox_sequencer is
  port (
    clk : in  std_logic;
    a   : out std_logic;
    b   : out std_logic;
    c   : out std_logic;
    d   : out std_logic;
    e   : out std_logic
  );
end blackbox_sequencer;
```

- What we know is that we should observe twice the $d; e; d$ sequence. Can we do something to check that?
- We also know that if e holds twice, then immediately after we should see d holding three times. Can you check that?
- What we also know is that if a is high, then, if c is high during two clock cycles (starting from the same cycle a is high), then we should, on the next clock cycle, observe $b; \bar{b}; b$.
Let's start by writing an assertion that just checks that with a double implication, as in this previous sentence.
Sounds good?
Let's talk about what we can do.