```
State_Decider: process (Clock, Rst, Fail) -- Controls the States
   begin
      If Rst = '1' then -- Reset takes precedence, over anything else
         PS <= "0000";
      elsif Fail = '1' then -- Fail only goes live if the timer reaches 100 seconds
         PS <= "1011";
      elsif (Rising_edge(Clock)) then -- the Basys board has a 100MHz Clock, which on every
rising edge of the square wave pulse, we assign our stages
            PS <= NS;
      end if;
   end process;

Switch_Logic: process (PS, Switch, Ein) -- Logic controlling the switches, which is dependant
on the stages. LED will light up, telling you what number to count to next
   begin
      NS <= PS; --fixes a PS and NS latch
      Case (PS) is
         When "0000" => --Pre-set Stage
            LED <= "0000000000000000";
            Play <= '0'; -- Play must be defined in every case here, or else creates a latch
            if Switch = "000" and Ein = '1' then
               NS <= "0001";
            end if;
         when "0001" => -- Set Stage
            LED <= "0000000000000001";
            Play <= '0';
            if Switch = "001" then
               NS <= "0010";
            end if;
         when "0010" => --1
            LED <= "0000000000000011";
            Play <= '1';
            if Switch = "010" then
               NS <= "0011";
            end if;
         when "0011" => --2
            LED <= "00000000000111";
            Play <= '1';
            if Switch = "011" then
               NS <= "0100";
            end if;
         when "0100" => --3
            LED <= "0000000000001111";
```

```
            Play <= '1';
            if Switch = "100" then
                NS <= "0101";
            end if;
        when "0101" => --4
            LED <= "0000000000011111";
            Play <= '1';
            if Switch = "101" then
                NS <= "0110";
            end if;
        when "0110" => --5
            LED <= "0000000000111111";
            Play <= '1';
            if Switch = "110" then
                NS <= "0111";
            end if;
        when "0111" => --6
            LED <= "0000000001111111";
            Play <= '1';
            if Switch = "111" then
                NS <= "1000";
            end if;
        when "1011" => -- Failed Stage, only occurs when timer reaches 10 seconds
            LED <= "1010101010101010";
            Play <= '0';
        when others => -- Failsafe
            LED <= "0000000000000000";
            Play <= '0';
    end case;
end process;
```