

According to our HLS code, two registers implement the counter and state variable.

```
static ap_uint<N> state_reg = 0;  
static unsigned int counter = N;
```

and two variable hold their intermediate values.

```
unsigned int next_counter;  
ap_uint<N> next_state = state_reg;
```

In addition, the registers get their value at the end of the code.

```
counter = next_counter;  
state_reg = next_state;
```

The following figure depicts the relationship between these two groups of variables



Therefore, the state and counter register get their values which are on the temporary variables on the next rising edge of the clock signal.