

The following pseudo-code illustrates the behavior of the bit difference calculator. If there are X more 1s than 0s in the input, then the output is X. If there are Y more 0s than 1s, then the output is -Y.

Inputs: *go*, *data* (WIDTH bits)

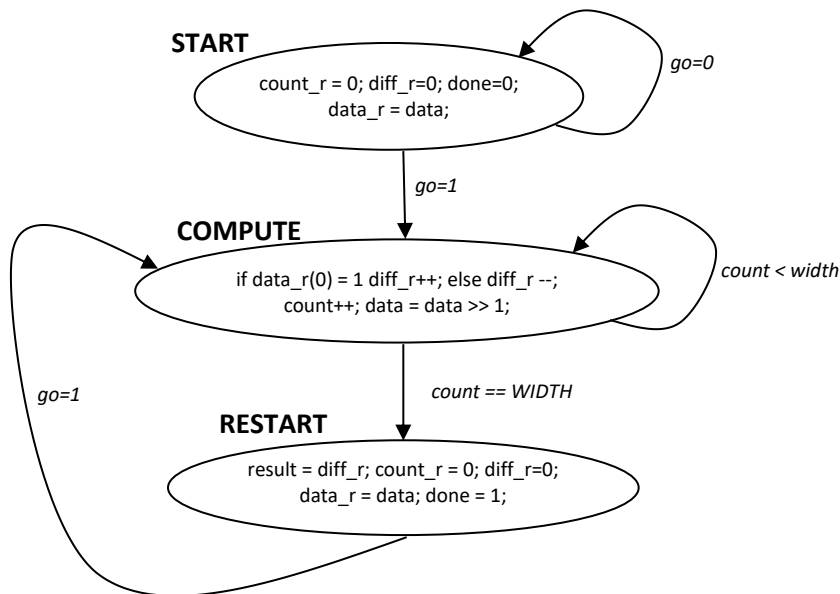
Outputs: *result* (2*WIDTH+1 bits), *done*

Reset values: *done* = 0, *result* = 0, *diff* = 0, *data_r* = 0

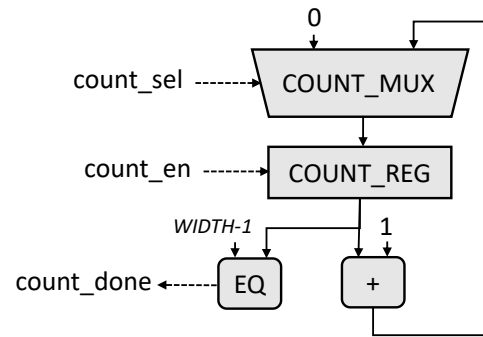
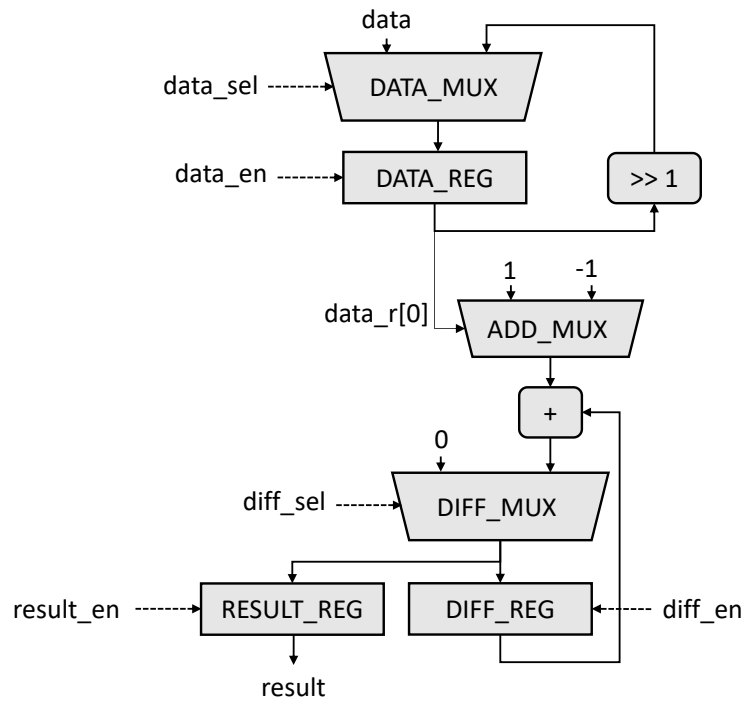
```
while(1) {
    while (go == 0);
    done = 0;
    data_r = data; // Store input in a register.
                    // This ensures that the code will still
                    // work if the input changes during the loop.

    diff = 0;
    for width iterations {
        if data_r[0] == 1
            diff ++;
        else
            diff --;
        data = data >> 1; // Shift right by 1
    }
    result = diff;
    done = 1;
}
```

One possible FSMD (used by the FSMD modules):



DATAPATH 1 & 2



DATAPATH 3

