Exp#8

Programmable Sequence Detector
(Data Path and Control Unit)

COE203
Digital Logic Laboratory

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Programmable Sequence Detector

- Receives continuous serial input and compares with stored 4-bit number, asserts **Match**
- User can change stored number (re-programm)
- Inputs: Clock, Reset, Prog, Sin
- Outputs: Match
Data-Path/Control Unit

Control Unit (CU)

Data Path (DP)

ext. control signals

ext. status signals

DP status signals

DP control signals

Data
Design

PROG

Match

Sin

CONTROL UNIT

DATA-PATH
Design (Control Unit)

Hint: Check Lab7
Design (Control Unit)

module controlUnit(clk, reset, countdone, prog, shifta, shiftb, enable3, clr3);
    input clk, reset, countdone, prog;
    output shifta, shiftb, enable3, clr3;
    reg shifta, shiftb, enable3, clr3;
    reg CS, NS;
    parameter s0 = 0, s1 = 1;

    // register (Current State)
    always @ (posedge clk or posedge reset)
    begin:
        ...
    end

    // next state logic (Transition)
    always @ (countdone or prog or CS)
    begin: Transitions
        case (CS)
            s0: ....
            s1: ....
            default: ...
        endcase
    end

    // output logic
    always @ (prog or CS)
    begin: Output
        case (CS)
            s0: ....
            s1: ....
            default: ...
        endcase
    end
Design (Complete)

Data Path

Debounce

Control Unit

serial

prog

reset

shiftA
shiftB
enable3
clr3

match
countDone

reset