NCTU-EE DCS – 2017

Lab01 Exercise

Design: BCD

Data Preparation

1. Extract test data from TA's directory:

   % tar -xvf ~dcsta02/ Lab01.tar

2. The extracted LAB director contains:

   a. 01_RTL/   : your exercise

Design Description

This exercise is a design for Binary-Coded Decimal(BCD).

There are 3 outputs in this design, each represents hundreds, tens, and units digit.

Inputs

1. There is only 1 input, and the value is from 0 to 511.

Outputs

1. Three outputs **out_hundred [2:0]**, **out_ten[3:0],** and **out_unit[3:0]** represent hundreds, tens, and units digit of input signal.

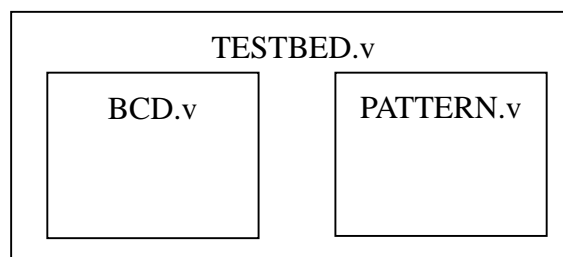2. When **input** signal is given, outputs should change at the same cycle.

Specifications

1.   Top module name : **BCD**(File name : **BCD.v**)

2.   Input pins: **in_bin [8:0].**

3.   Output pins: **out_hundred [2:0], out_ten [3:0], out_unit [3:0].**

Block Diagram

```
┌─────────────────────────────────────────┐
│              TESTBED.v                   │
│  ┌──────────────┐   ┌──────────────┐     │
│  │   BCD.v      │   │  PATTERN.v   │     │
│  │              │   │              │     │
│  │              │   │              │     │
│  └──────────────┘   └──────────────┘     │
└─────────────────────────────────────────┘
```

Note

1.   Grading policy:

      In this bonus lab, pattern are already given. You have to make sure you pass the

pattern before demo , TAs will test your design with the given pattern again during demo.

Design: 100%

2. Template folders and reference commands:

    01_RTL/   (RTL simulation) ➜   **./01_run**

    You can type   **./09_clean_up** in 01_RTL/ to clear all log files and dump files.

    02_SYN/   (RTL synthesis) ➜   **./01_run_dc**

3. Sample Waveform: