

CS 232 - Assignment 2

Design Rules:

- 1) *For all questions, only structural VHDL code is permitted.*
- 2) *Also for every question, the top-level entity description is given in the question itself. It must be used exactly as it is in your code without changing the entity name or any of the port names and the port names must be in the same order.*
- 3) *Use the ieee.std_logic_1164 library data types. (Bit and bit vector are not permitted.)*

- 1) Design an 8x3 Encoder. Vector 'i' is the input, 'en' is the enable pin and 'z' is the output. **This entire circuit must be designed using only 2x1 MUXES. The MUXES themselves can be designed using either basic gates or behavioural code can be used.**

```
entity EightbyThreeEncode is
    port ( i : in std_logic_vector(7 downto 0);
          en: in std_logic;
          z : out std_logic_vector(2 downto 0));
end entity;
```

- 2) Design a 3x8 Decoder. Vector 'i' is the input, 'en' is the enable pin and 'z' is the output. **This entire circuit must be designed using only NAND gates in a structural way. The NAND gates themselves must be designed using only structural code.**

```
entity ThreebyEightDecode is
    port ( i : in std_logic_vector(2 downto 0);
          en: in std_logic;
          z : out std_logic_vector(7 downto 0));
end entity;
```

Things required in Submission:

1. All VHDL files of top-level and sub-components (.vhd or .vhd files).
2. Screenshot of Waveforms (Few input patterns are sufficient).
3. A report explaining how you designed (pdf format).

Submission rules:

1. **Deadline:** Saturday (22nd Jan 2022), 23:59 pm.
2. Create a folder named **lab2** (all small letters and no spaces).
3. Inside the above-mentioned folder create 2 more folders named **q1** and **q2** (all small letters and no spaces).

4. Inside the folder, **q1** put all the .vhd or .vhdl files of both top-level entity and sub-components. Also in the same folder put the related waveform screenshots and pdf report related question1. Do the same thing for **q2**.
5. Finally, before you submit the lab1 folder on moodle you will be zipping it. The zip file should have your id number as the name. For eg: if your id is 184070026 then your zip file will be 184070026.zip