COMP311: Logic Circuit Design

Spring 2022, Prof. Taigon Song

Project 2. Due: May 26 7:59pm [Total: 90 points]

[Your Student ID]

Your Name

No.	Checksheet item	Done?	Points
1.	ascii code (part 1)	(Message)	10
2.	Base64 code (part 2)	(Message)	10
3.	Part 1 ascii (iVerilog)	(Y/N)	20
4.	Part 2 6-bit printing	(Y/N)	25
5.	Part 2 Base64 printing	(Y/N)	15
6.	Synthesizable	(Y/N)	10

Goal: Design systems that converts between ASCII and BASE64.

[Part 1]

Design a system (module) that converts 1-bit binary into ASCII. Given a 1-bit bitstream, this bitstream should be merged to 7-bits, then be printed out in the command console (or the Transcript box).

Use the bitstream below.

```
84'b10010001100101110110011011001101111101111110101111101111111001011011001100100010101
11
```

(Note: you may add additional zeros in the back of the bitstream if necessary)

The ordering of the bitstream should be something like the following example:

e.g., 724_592_847 → (first) 7 2 4 _ 5 9 2 _ 8 4 7 (last)

Condition:

1. Print out the message (in ASCII) in the command console and screen capture your results.
2. You must design a MODULE for merging the 1-bit input to 7-bit output.

[Part 2]

Given a 1-bit bitstream of ASCII, design two systems (modules) that

1) prints 7-bit ASCII (one-bit input, 7-bit output: same as part 1)

2-1) given the 7-bit clusters, converts into 6-bit BASE64 (7-bit input, 6-bit output)

2-2) 'print' the characters of 6-bit BASE64 (print the actual characters in any way)

For example, if 4 ASCII characters are ABCD, then the corresponding BASE64 is gwocQ (short digits filled with 0s)

Regarding the information of ASCII and BASE64, plz refer to the links below:

https://ko.wikipedia.org/wiki/ASCII
https://en.wikipedia.org/wiki/Base64

If you need some additional information, you can always search the web and gain understanding of the basic concepts.

Visualize the output BASE64 code in your waveform.

Use the bitstream below:

98'b10000111001111100110110100000110011011000101100011011111110100111100111011111111001
1011101011101110

[Grading]

- Hand-coding and confirming the results will give you 20 points in total

- Actual RTL/testbench confirmation will give you 60 points in total

- For those who successfully decode and print the necessary codes are eligible for synthesis checking.