# Lab 5 Report

**Name:**

**UT EID:**

**Section:**

## Checklist:

### Part 1 –

i. Design file (.v) for the Ripple Carry Adder
ii. Test-bench
iii. Complete Table 1 from the simulation

| A[3:0] | B[3:0] | Cin | Sum[3:0] | Cout |
|---|---|---|---|---|
| 0001 | 0101 | 0 | ? | ? |
| 0111 | 0111 | 0 | ? | ? |
| 1000 | 0111 | 1 | ? | ? |
| 1100 | 0100 | 0 | ? | ? |
| 1000 | 1000 | 1 | ? | ? |
| 1001 | 1010 | 1 | ? | ? |
| 1111 | 1111 | 0 | ? | ? |

**Table 1.** Testcases for Ripple Carry Adder Verification

iv. Constraints File (Just the uncommented portion)
v. Simulation waveform for the above test-cases

### Part 2 –

vi. All the equations for $C_i$'s and $S_i$'s
vii. Design files (.v) for the Carry Lookahead Adder and Register Logic
viii. Test-bench
ix. Complete Table 2 from the simulation

| A[3:0] | B[3:0] | Cin | Sum[3:0] | Cout |
|---|---|---|---|---|
| 0000 | 0101 | 0 | ? | ? |
| 0101 | 0111 | 0 | ? | ? |
| 1000 | 0111 | 1 | ? | ? |
| 1001 | 0100 | 0 | ? | ? |
| 1000 | 1000 | 1 | ? | ? |
| 1101 | 1010 | 1 | ? | ? |
| 1110 | 1111 | 0 | ? | ? |

**Table 2.** Testcases for Carry Lookahead Adder Verification

x. Constraints File (Just the uncommented portion)
xi. Simulation waveform for the above test-cases

## Part 3 –

xii. Screenshots of the gate-level schematics for both the adder techniques
xiii. Delay and area for both the adder techniques showing all the work
xiv. Brief conclusion regarding the pros and cons of each of the techniques

***Note*** *–> The Verilog codes and the uncommented portions of the constraint files should be copied in your lab report and the* ***actual Verilog (.v), Constraint (.xdc) files and Bitstream (.bit) files*** *need to be zipped and submitted as well on Canvas. You are not allowed to change your codes after final submission as the TAs may download the submitted codes or bitstream files from Canvas during checkouts. For the truth Table, K-maps minimizations and algebraic expressions, you are free to draw them on paper and then put the pictures in your lab report, but please make sure it is legible for the TAs to grade it properly.*