CS 342000 / CS343000  
Instructor: Professor Izidor Gertner

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Midterm Lab

Table of Contents

[Objective 2](#_Toc98601570)

[Description of Specifications and Functionality 2](#_Toc98601571)

[Specifications: 2](#_Toc98601572)

[Functionality: 3](#_Toc98601573)

# **Objective**

The purpose of the adder lab was to design adders and all the intricacies that go along with it. In order to accomplish this task, we designed several adders with different inputs and outputs. For each task, we designed an adder or a testbench for an adder with variations to it.

# **Description of Specifications and Functionality**

## **Specifications**:

1. Shameem\_03\_06\_22\_HalfAdder:

Shameem\_03\_06\_22\_A: Input A

Shameem\_03\_06\_22\_B: Input B

Shameem\_03\_06\_22\_Sum: The output from the circuit

Shameem\_03\_06\_22\_Carry: The carry output left over by the circuit

## **Functionality:**

### *Assignment 1:*

#### Design 32-bit word Data Memory module based on LPM tutorial attached. Data memory size 16 words.

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

#### Design 32-bit word INSTRUCTION Memory module based on LPM tutorial attached. Instruction memory size 32 words.

Graphical user interface, text, application

Description automatically generated Graphical user interface, text, application

Description automatically generated

Graphical user interface, text, application

Description automatically generated

#### Design 32-bit register DUAL PORTED REGISTER FILE module based on 2-port RAM LPM tutorial attached. EACH register is 32 bits.

Graphical user interface, text, application

Description automatically generated

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Graphical user interface, text, application

Description automatically generated

### Assignment 2:

#### Design 32-bit Add/Sub unit as described in the seconds attached tutorial from scratch.

#### Design 32-bit Add/Sub unit as described in the seconds attached tutorial using LPM.

# **Simulation**

### *Assignment 1:*

#### Design 32-bit word Data Memory module based on LPM tutorial attached. Data memory size 16 words.

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### Assignment 2:

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