Sophie Samuels

VHDL Portfolio

11/2023

A 1-bit Full Adder to add 2 binary bits (A, B) and a 1-bit Carry-in (Cin) and results in a 1-bit Sum and 1-bit Carry-out (Cout) with only NAND gates.

A screenshot of a computer program

Description automatically generatedA table with numbers and symbols

Description automatically generated

**Truth Table**

**Project Settings**

A close-up of a diagram

Description automatically generated

**K-maps and Simplest Sum of Products**

A diagram of a circuit

Description automatically generated

**Drawing Simplest NAND Circuit equivalent the Simplest Sum of Products**

A 16-bit Adder to add 2 16-bit binary numbers(A15,A14,A13,A12,A11,A10,A9,A8,A7,A6,A5,A4,A3,A2,A1,A0 and B15,B14,B13,B12,B11,B10,B9,B8,B7,B6, B5,B4,B3,B2,B1,B0 with A0 and B0 being least significant bits) and a 1-bit Carry-in (Cin), and results in a 16-bit Sum (S15,S14,S13,S12,S11,S10,S9,S8,S7,S6,S5,S4, S3,S2,S1,S0) and 1-bit Carry-out (Cout) with component you built.

A screenshot of a computer program

Description automatically generated

**Project Settings**

**Drawing of Circuit**

A diagram of a number system

Description automatically generated

\*\*Amended project settings after completing initial project settings to allow greater number of pins

A screenshot of a computer program

Description automatically generated

**VHDL Code**

A screenshot of a computer

Description automatically generated

**Timing Diagram**

**16-Bit Register**

A screenshot of a computer program

Description automatically generated **Project Settings**

A screenshot of a computer program

Description automatically generated**VHDL Code Successful Compilation**

A screenshot of a computer

Description automatically generated**Timing Diagram**

**Arithmetic Logic unit -ALU**

A screenshot of a computer program

Description automatically generated**Project Settings**

A computer screen shot of a program

Description automatically generated **VHDL Code**

A screenshot of a computer

Description automatically generated**VHDL Code Cont.**

**Timing Diagram**

A screenshot of a computer

Description automatically generated

A screenshot of a computer

Description automatically generated