



School of Computing
Computer Science Program

CDA 3101

Introduction to Computer Logic

Lab # 5



Student Name			
Lab Name	Lab 5: Decoders, Multiplexers		
Lab Checklist	Available Points	Received Points	Information
Printed Schematics	20		See note 7 below
Proper operation of Decoder circuit	20		
Proper operation of Multiplexer circuit	20		
Required documents	40		Truth tables & Printed lab
Circuit Demo (worked correctly)	Yes / No		Must fully function to receive a grade above zero. Note 1 below
Date:			
Verified by:			
Final Lab Grade			



Notes for Scoring:

Note 1: A final grade of “0” will be assigned if the circuit demonstration fails to work completely.

Note 2: Lab assignments will not be accepted late.

Note 3: Any assigned quizzes that are associated with this lab will be taken on Canvas unless otherwise noted.

Note 4: All submitted documents from CAD software (ex: Multisim) must contain the student’s name and UNF n-number printed via the software (insert text). No name and number; no points!!!!

Note 5: No "print screens" will be accepted from CAD software. Print all documents using the print function within the software.

Note 6: The entire lab assignment must be printed and submitted with any other required documents.

Note 7: *A wiring diagram (schematic) must reflect what is actually built on your hardware trainer. All chip pin numbers, switches, lights, and etc. must be labeled. All input and output signals must be labeled as well as all input and output bit-weights. Do not include any equipment or components that are not used with your lab (ex: logic analyzer).*

Note 8: The lab must be demonstrated and submitted to either a lab TA or the instructor during a scheduled lab session. Labs will not be graded outside of this time unless authorized by the instructor.



Lab 5: Decoders, Multiplexers

The purpose of this lab is to help the student become familiar with circuit design using decoder, and multiplexer.

Equipment needed:

74151 & 74138
Other Assorted TTL chips
Logic Trainer
CAD Software

Pre-lab:

A) Design a circuit using a single *multiplexer chip (74151)* and any other required logic gates to implement the Boolean function given below.

$$F_{(a,b,c,d)} = \sum_m (1,7,10,11,12)$$

B) Design a circuit using a *decoder chip (74138)* and any other needed logic gates to implement the Boolean function given below.

$$F_{(x,y,z)} = \sum_m (0,3,5,7)$$

C) Create the truth tables for both circuits. These tables will be used to prove that your lab circuit is operating correctly. Attach these documents for grading.

D) These two functions will be constructed on the hardware trainer; therefore, use CAD software to create wiring schematics for both of these circuits.

E) Print the schematics for use when building your circuits. The printed schematics must also be attached to this document for final grading.



Note: *Your prelab material should be complete prior to the lab session!*

Using the Hardware Trainer:

A) Implement the two Boolean function designs using the logic trainer and the required integrated circuits. Use the previously derived truth table to prove that your circuits are working correctly.

Grading:

A) Be prepared to demonstrate your working project in class. You must provide all required documents at the time of inspection or the lab will not be graded.

Notes:

1) The slide switches can feed multiple circuits without a problem.