



# EE 200- Digital Logic Circuit Design

## Introduction to Digital Systems

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Dr. Muhammad Mahmoud

Section 3 (9:00 am - 9:50 am)

Section 5 (11:00 am - 11:50 am)

Office hours: UMT: 10:00 - 11:00 AM

Or by appointment



## Objectives

1. Course topics.
2. Course policies .
3. “Digital Logic”



## Course Description

- Number systems & codes.
- Logic gates, Boolean Algebra and Boolean functions.
- Boolean functions simplification, Karnaugh maps.
- Analysis and synthesis of combinational systems, decoders, multiplexers, adders and subtractors, PLA's.
- Types of flip-flops.
- Memory concept and Registers.
- Introduction to sequential circuit design.



## Grading

- Classwork (15%)\*
- Design Project (5%) \*
- Major Exams (15% + 15%)
- Final (30%)
- Laboratory (20%)\*

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\* Averaged to 75%



## Recipe for Success

- Attend the class (8 unexcused absences = DN).
- Read the book.
- Do the homework.
- Take the exams.
- Attend lab sessions.

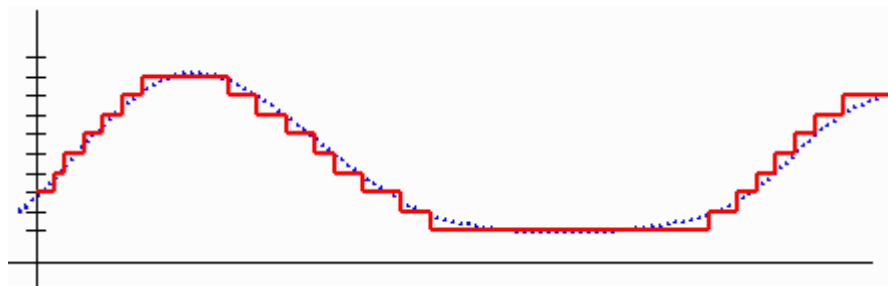
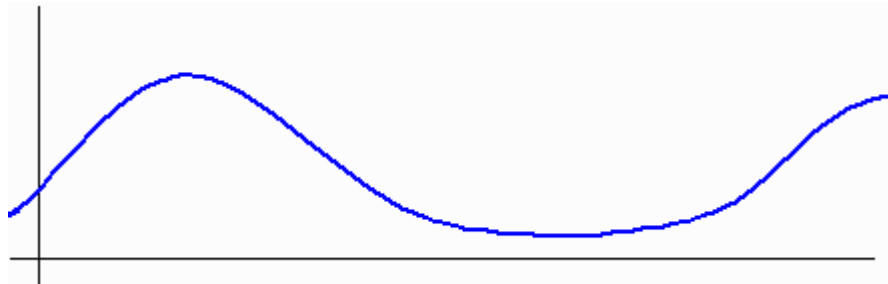


## Digital?

1. Can you name a few digital devices?
2. Is real life digital?
3. Digital vs. ....!



# Analog and Digital Signals







## What is “Digital Logic?”

- Digital logic consists of circuits which process signals of two possible values.
- These values are typically represented by voltage (e.g., 0 or 5 volts)
- With one signal you can represent two possible conditions: on/off, open/closed, true/false, 0/1, high/low.



## What is “Digital Logic?”

**Q. How many bits are needed to represent the primary and secondary compass points?**

**(e.g., N, S, E, W, NE, SE, NW, SW)**

**A. To represent eight possible values requires at least 3 bits.**

$$(2^3 = 8)$$

**With n bits you can represent  $2^n$  possible values.**



## What is “Digital Logic?”

Q. How many bits you need to represent the English Alphabet?

Q. How many bits you need to represent a gray scale photo?



## Analog and Digital Signals

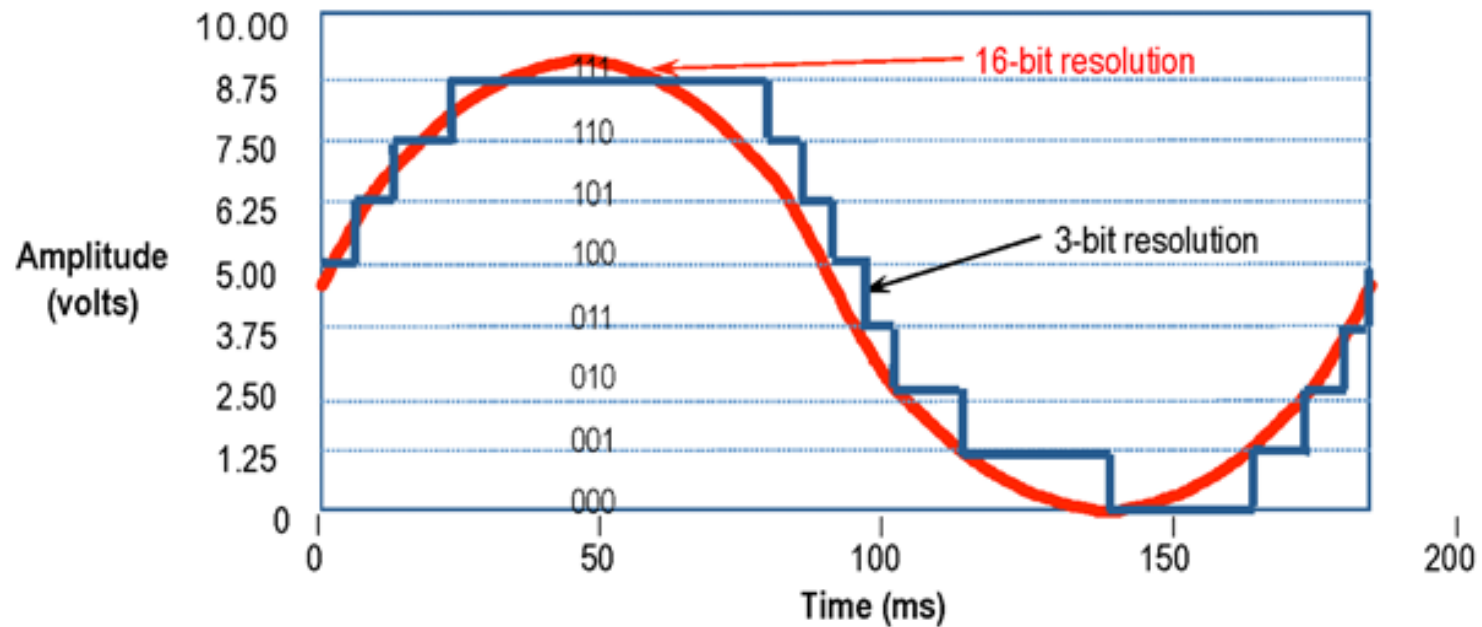


Figure 2. 16-Bit resolution versus 3-Bit resolution chart of a sine wave



## Summary

1. Course topics.
2. Course policies .
3. “Digital Logic”



## Next Classes

- Numbering systems, history and definitions.
- Decimal, Binary, Octal & Hexadecimal numbering systems.
- Number base conversion.