



Microprocessors

COE 381

WEEK 1: INTRODUCTION



About Instructor

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Research Interests: Internet of Things, Networks and Application Security, Applied Artificial Intelligence, Applied Cryptography, Reverse Engineering.



About This Course

This course is aimed at:

- Foundations of microprocessor and microcomputer systems including memory and input/output interfacing.
- Techniques to interpret, analyze, verify and troubleshoot microprocessor circuits and programs as well as low-level language programming and other related topics.



About This Course

Course Grading:

Assignments	10%
Mid-Semester Exams	20%
Semester Project	20%
End of Semester Exams (Theory & Practicals)	50%
Total	100%



Recommended Books

- "Microprocessors and Microcontrollers" by Pablo Mary, Panda Jeebananda. ISBN: 8120352319.
- "Microprocessors and Microcontrollers: Architecture, Programming and System Design" by K. Kant.

NB: Not limited to the above books.



Course Outline

- ⦿ Basic Computer Organization.
- ⦿ Microprocessors (8085 Architecture).
- ⦿ Microcontrollers (8051 Architectures).
- ⦿ ARM.
- ⦿ PIC & AVR.
- ⦿ Interfacing.
- ⦿ x86 & x64 Architecture.



Microprocessors & Microcontrollers



Introduction

Microprocessors

Microcontrollers

They form part of Computing Systems.



Introduction

Microcontrollers

For small applications; due to their smaller size, space and power requirements, **microcontrollers** are mostly used.



Introduction

Microprocessors

For computational power, **microprocessors** are used. They have the flexibility and capacity to work at a higher rate generally as compared to microcontrollers.



Introduction

Microprocessors

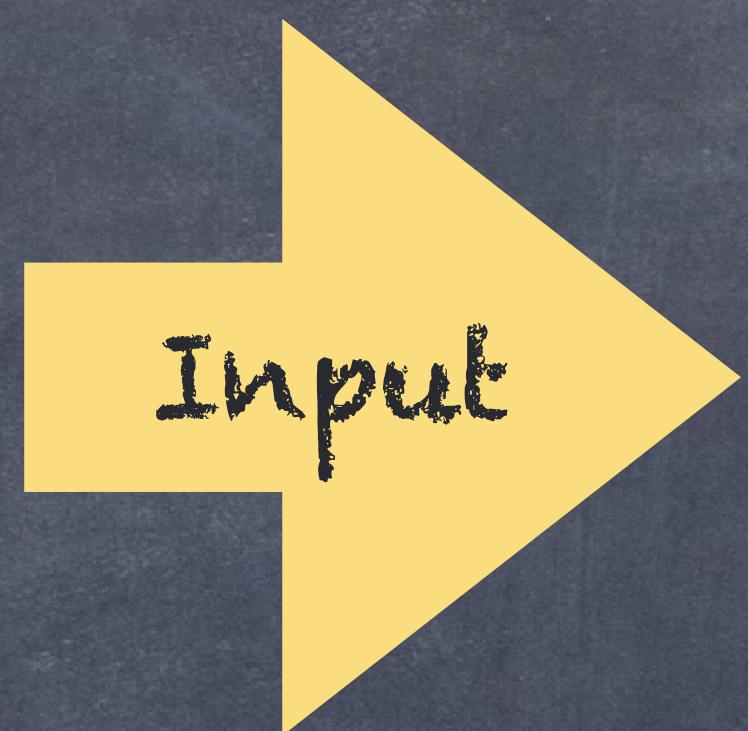
Microcontrollers

They are computing elements.

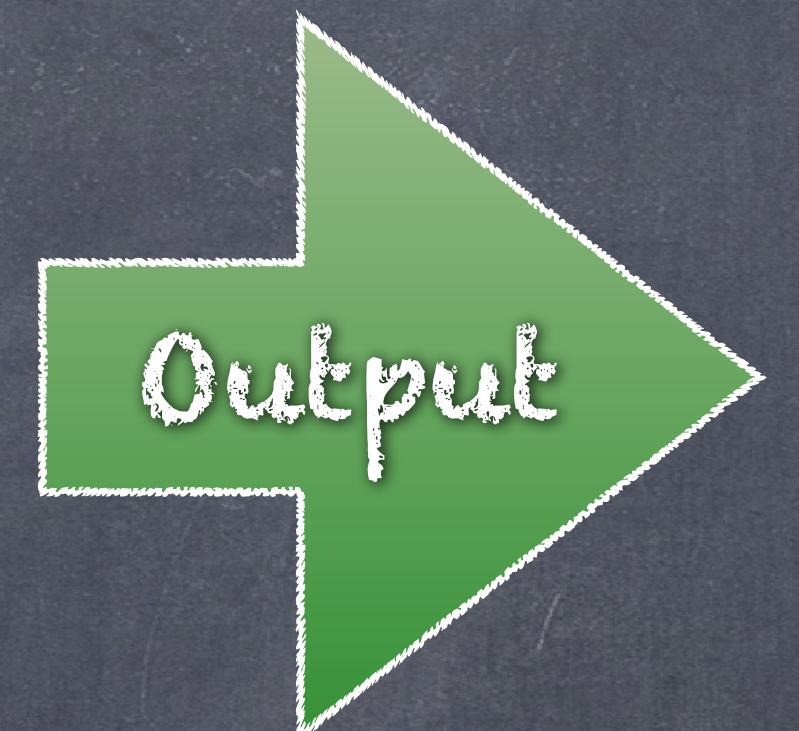


Introduction

MP/MC



Perform
computation over
some data element



The data element is represented
inside the system in a particular
fashion.



Introduction

The data element is represented inside the system in a particular fashion.

Representation of Numbers



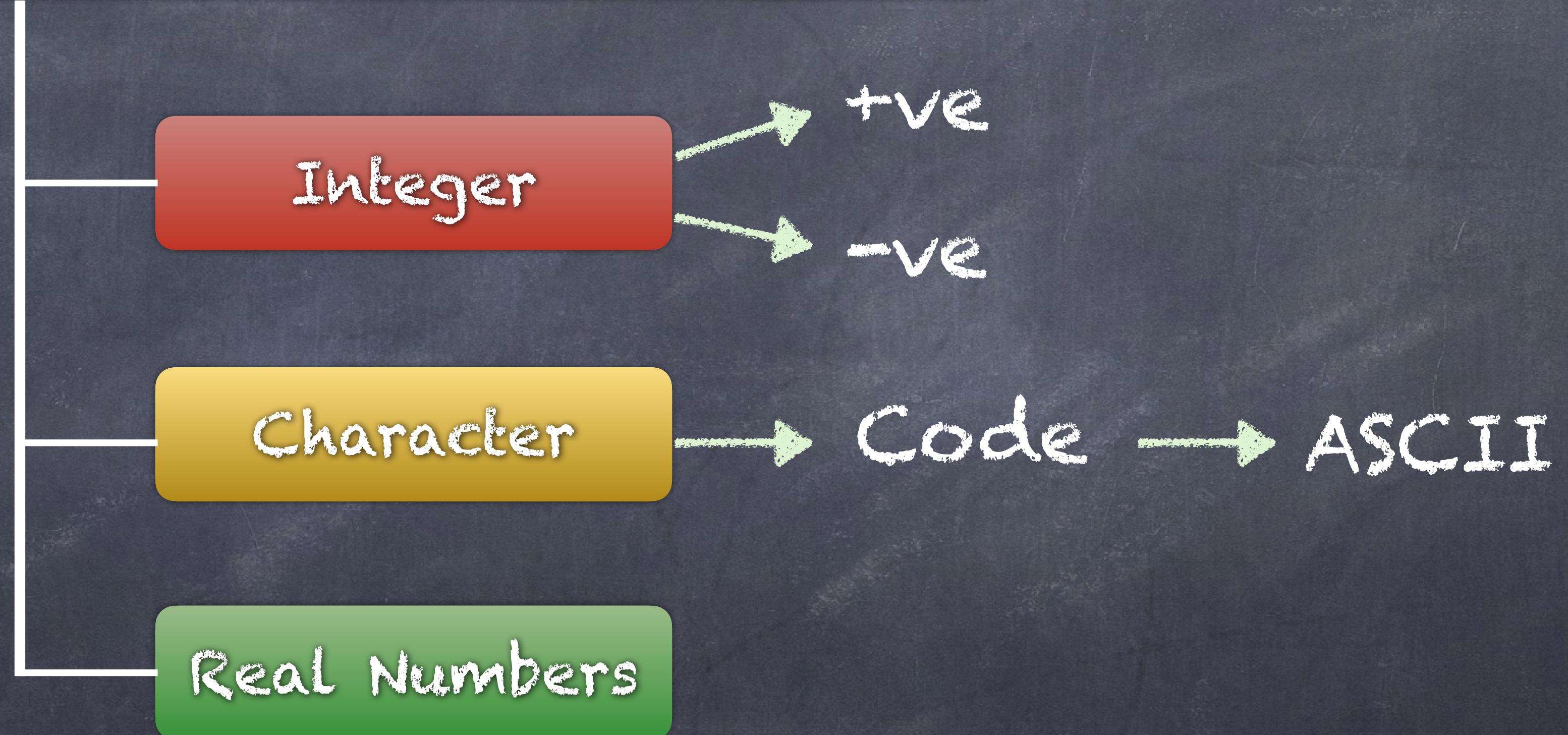
Number System Representation

Fundamental



Introduction

Number System Representation





Introduction

- Using the number system, you can represent numbers in a proper format.
- So far, whatever representation of real numbers we have shown is the **fixed point number system**.
- Another representation of real numbers is the **floating point representation**.



Introduction

Analyze:

$$(1011)_2 + (0101)_2 = (10000)_2$$

- In computer systems, we cannot give arbitrary length to individual numbers.
- There's something we call the **word size** of the processor and this **word size** determines the data size on which the processor will operate.



Next ...

Representation of Negative Numbers