CSc 1350: Lecture # 1 - Supplement

Introduction

- To understand what constitutes computer science and its roots
- To become familiar with the architecture of a computer

1 What is computer science?

Computer science is an academic discipline with its roots in the fields of applied mathematics and logic, and initially it was not even considered a new discipline. Computer science is not about the study of computers, nor is it the study of programming. Programming is a tool that computer science uses to explore new ideas and solutions to problems.

Definition 1. An algorithm is a step-by-step procedure for solving a problem in a finite amount of time.

Definition 2. Computer science is primarily about the study of algorithms, which includes their mathematical properties, their hardware realizations, their linguistic realizations, and their applications.

2 Measuring Storage

The most basic unit of storage is the 'bit'. Eight bits make one 'byte'. 1 kilobyte(KB) = 2^{10} bytes. 1 megabyte(MB) = 2^{20} bytes. 1 gigabyte(GB) = 2^{30} bytes. The *motherboard* usually contains the CPU, the RAM, and connectors to peripheral devices. These and other devices are interconnected through a set of electrical lines called a *bus*. The CPU, RAM, motherboard and other physical components of a computer are *hardware*. On the other hand, *software* are the programs available on a computer.

3 The Java Programming Language

Java is a relatively new programming language. It was developed in the early 1990s by James Gosling at Sun Microsystems. It was introduced to the public in 1995. Java is an object-oriented programming language. Objects are the fundamental elements that make up a java program.

Definition 3. A **object** is an abstraction that encapsulates both data, and a set of operations that can be applied by the data. Alternatively, a object is a member (instance) of a class.

Definition 4. A **class** is abstraction that describes attributes of an object and a set of operations that can be applied to those attributes. Alternatively, a class may be viewed as a collection of objects that have the same attributes and perform the same operations.

Definition 5. Object-oriented programming, OOP for short, is a computer programming paradigm that regards a computer program as a collection of individual units, or objects, as opposed to a traditional view in which a program is a list of instructions to the computer. Each object is capable of receiving messages, processing data, and sending messages to other objects. Object-oriented programming allows the programmer tremendous flexibility, easing changes to programs, and is widely popular in large scale software engineering.