

Week 1 Notes – setting the framework for this course

Core Principles:

1. Communication & Cooperation – we need to be able to communicate with each other, we need to be able to communicate with the computer, and we need to be able to get our computer programs to communicate with each other. Think about all methods, occasions, and modes of communication and cooperation as we proceed through the semester.

Communications is often characterized as consisting of a sender, a receiver, a message, and a medium. https://en.wikipedia.org/wiki/Models_of_communication

2. Problem Solving – you should strive to become and to be known as a Problem Solver. Companies hire new employees when they have a problem. If you would like to get hired, you need to convince someone that you can help them with their problem. Be a Problem Solver.

Our initial exploration of Computational Thinking is a step in the direction of solving problems by the informed and effective usage of computers.

3. Ethics – We will strive to always make ethical choices and always consider the ethical implications in our use of computers. https://en.wikipedia.org/wiki/Computer_ethics
4. Professionalism – the expectations, standards and mindsets.

<https://career.vt.edu/develop/professionalism.html>

<http://homes.sice.indiana.edu/nensmeng/files/ensmenger2001.pdf>

Components of a Digital Computer -- the von Neumann model:

1. Input
2. Processing
3. Storage
4. Output

https://en.wikipedia.org/wiki/Von_Neumann_architecture

The 3 Pillars of Programming:

We will study both the theoretic and practical aspects of these three fundamental programming concepts.

1. Sequence (Chapter 2 in our text)
2. Selection (Chapter 3 in our text)
3. Repetition (Chapter 4 in our text)

The definition of an Algorithm:

An algorithm is a step-by-step procedure that takes us from a problem statement to a problem solution. The steps must satisfy the following criteria

1. The steps are ordered
2. The steps are unambiguous
3. The steps are executable
4. There exist halting criteria so that the steps eventually terminate

Notes:

When an algorithm is implemented via a high-level programming language (such as Java, C++, or Python) on a computer we say that we have created a **program**. That is to say, a program (or code, or software) is the implementation of one or more algorithms on a computer.

Semantics refers to the meaning of something.

Syntax refers to the rules of using something.

When we write code, we must consider both syntax and semantics.

Pseudocode is a code-like construction that uses a variety of techniques to convey the semantics of the situation without being concerned with the syntax. <https://en.wikipedia.org/wiki/Pseudocode>