Introduction to Programming Software Systems

Definitions

Syntax - a set of rules to regulate the structure of programs and their parts
Semantics - the meaning of the constructs

Syntax << Semantics

Example:

```
int x = a + b
```

Syntax:

- `int` is a spec type
- `x` is a name
- `= and +` are operators
- `a + b` is expression

Semantics:

- Allocate memory
- Calculate the expression
- Perform type conversion
- Store the value of the expression
- Make `x` available in the current context

Memory

Kinds of memory:

- Program - cannot be modified
- Dynamic memory ("Heap") - defined by dynamic semantics
- Stack - defined by static program structure

Program Execution Layers

- High Level Language
- Assembly Language Program
- Machine Language Program
- Machine Interpretation
- Architecture Implementation

C Language:

Authors: **Brian Kernighan** and **Dennis Ritchie**

- Syntactically, a C program consists of a sequence of **declarations**.
- Each declaration introduces an entity:
  - Variable
  - Array

- Type
- Function

*Note: 0 before a number means that number is in **octal system***