

COP 3402 Systems Software

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People

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About Me

- New assistant professor this semester
- Research interests
 - Software engineering
 - Analyzing configurable systems
 - Program analysis for security
 - Side-channel attacks
 - Blockchain smart contracts
 - Concurrency and safety
- Teaching interests
 - Programming languages
 - Program analysis
 - Systems

Let me know if you
are interested in
conducting research!

Overview

- **What is systems software?**
- **Why Study it?**
- **Syllabus**
 - <https://github.com/cop3402fall18/syllabus>

What is Systems Software?

Systems Software is the set of programs that

- 1. support the operation of a computing machine**
- 2. create an environment to run application software efficiently, and**
- 3. simplify the programming process.**

Systems software can be classified in two groups:

1.- Software to create a program development environment

Text editor

Compiler

Assembler

Linker

Debugger (low-level)

2.- Software to create a run-time environment

Operating system

Loader

Dynamic Linker

Program libraries

Systems Software: Program Development Environment

- Text editor:** Software that permits the creation and editing of text files (i.e. application programs).
- Compiler:** Translates programs written in a high level language to machine code(assembly Language).
- Assembler:** Translates programs written in assembly language to object code(binary).
- Static Linker:** Combines and resolves references between object programs and creates the executable code.
- Debugger (low-level)** It is used to debug executable programs and their related object code and source program.

Systems Software: Run-Time Environment

Loader: Loads an executable code and starts its execution.

Libraries:

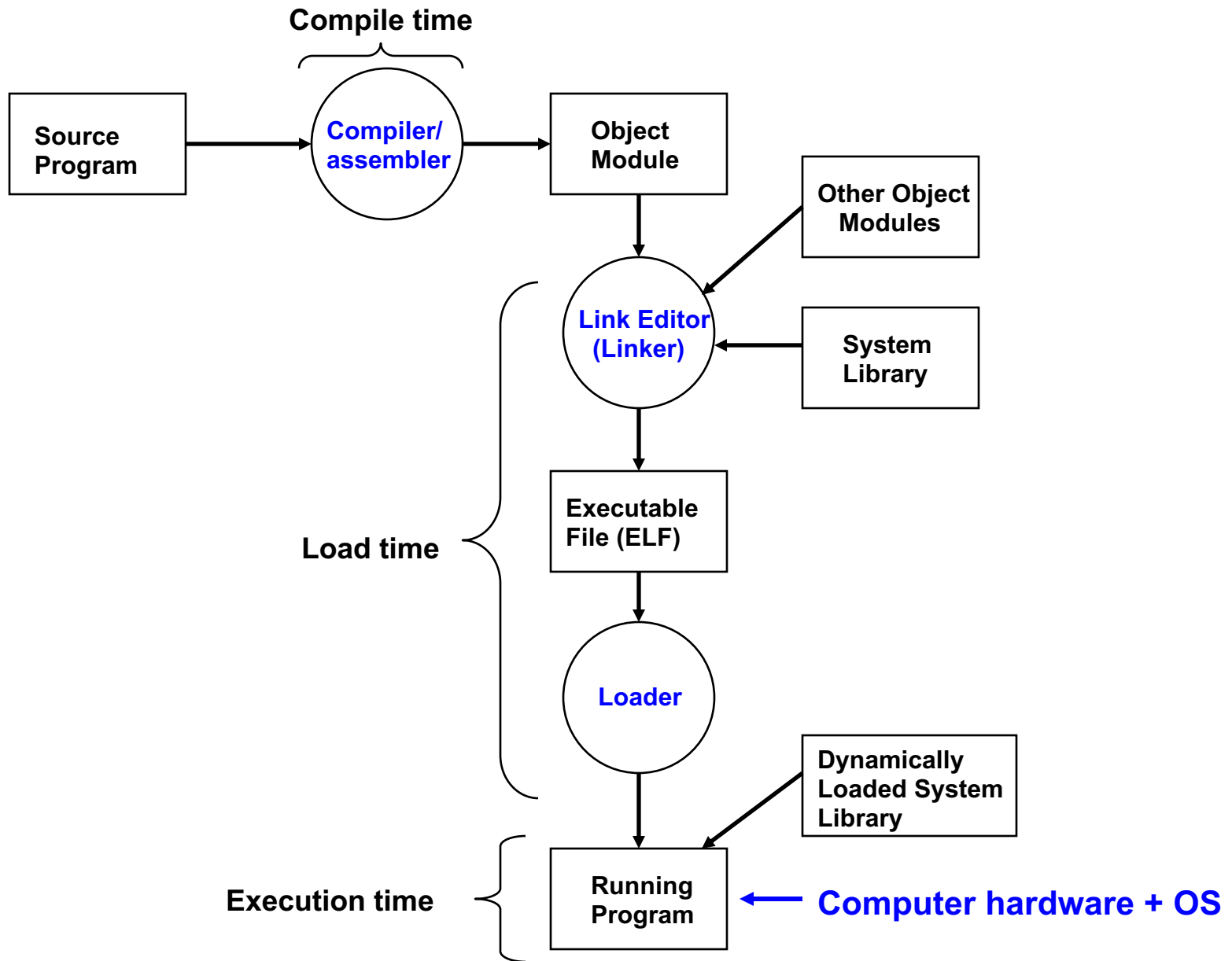
Precompiled programs that create a set of functions for use by other programs.

Dynamic Linker:

Loads and links shared libraries at run-time

Operating system:

An event driven program that make an abstraction of the computer system. The operating system handles all resources efficiently, creates an environment for application programs to run, and provides a friendly interface between the user and the computer system.



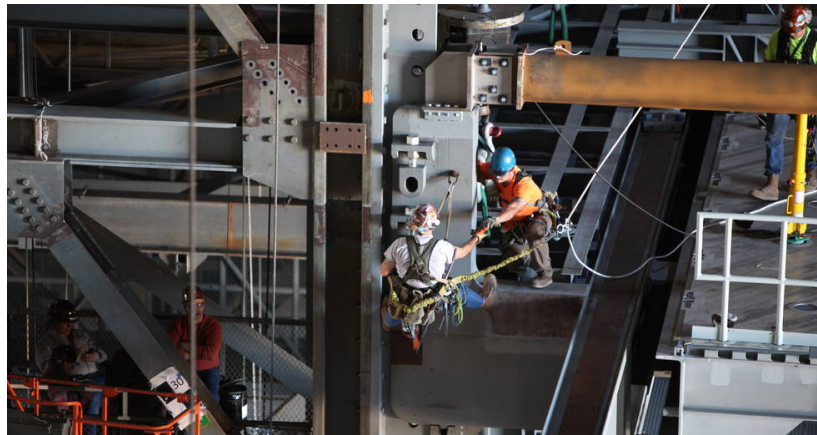
Why Study Systems Software?

Know your tools

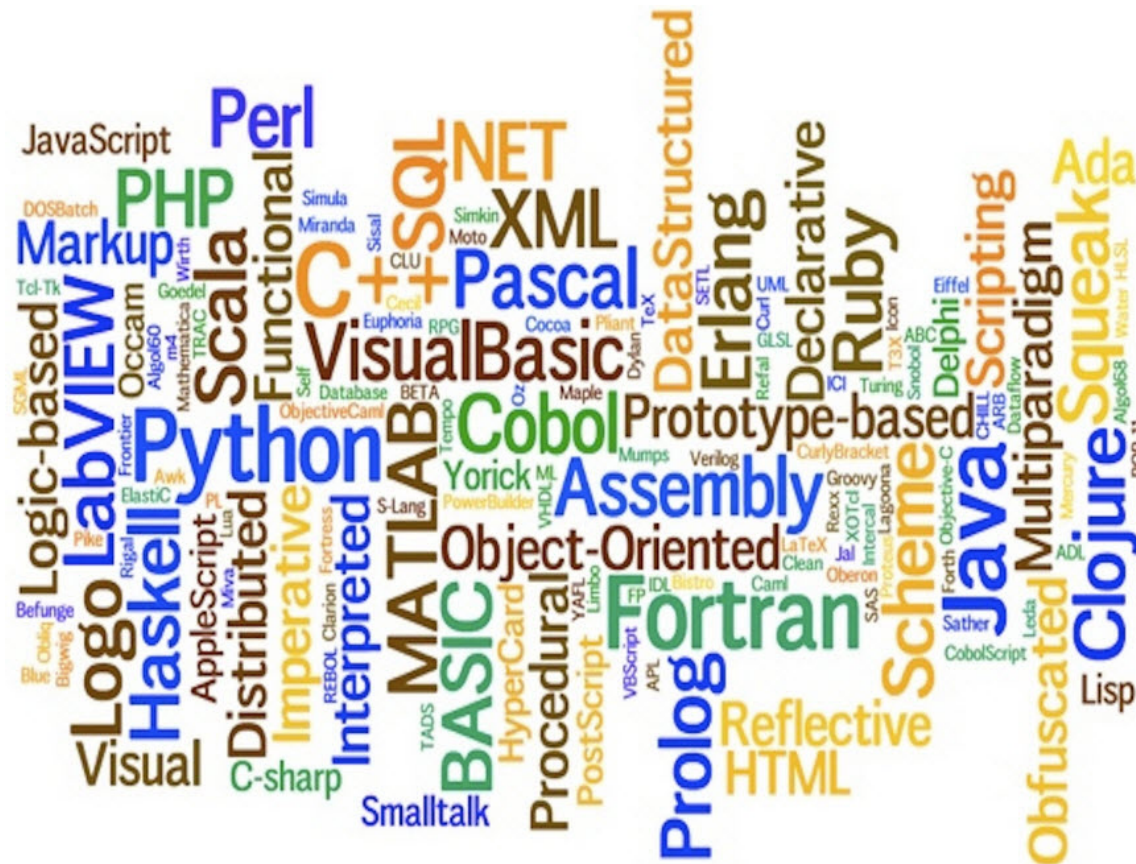
Be a better programmer

Satisfy curiosity

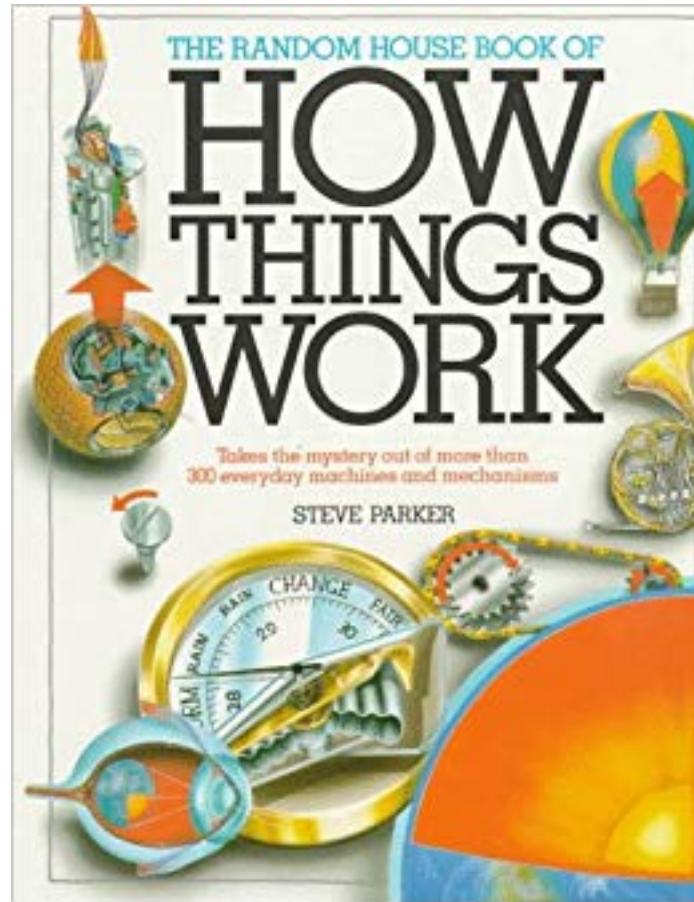
Know Your Tools



Be a Better Programmer



Satisfy Curiosity



This Course

Real and virtual machines

Compilers and assemblers

Linkers and loaders

Intro to operating systems

Build a virtual machine

Build a compiler

Syllabus

<https://github.com/cop3402fall18/syllabus>

Discussion

What systems software have you used?

What system tools make you curious about how they work?

What's your comfort with building substantial C programs?

What are your expectations? What do you hope to discover and achieve in this class?