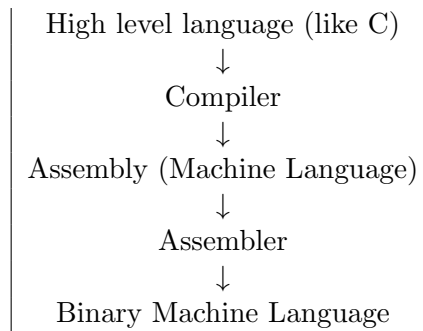


**January 13, 2023**

Computer Systems

Spring 2023

## 1 Whats Below Programs



## 2 What is a Computer System?

**Five classical components:**

1. Input
2. Output
3. Memory
4. Datapath
5. Control

Same components for all kinds of computers:

Desktops, servers, etc

PostPC era:

Tablets, smartphones, supercedes keyboard/mouse input

- Volatile Main Memory

- Loses instruction and data when power off
- Communication
- Local area network
- Datapath
- Control
- Memory

## Abstractions in Computer Systems

- Abstractions - suppress certain details to emphasize others
- instruction set architecture
  - HW/SW Interface
- application binary interface
  - Architecture + System Services (OS)

## Understanding Performance

- Challenging to assess
- Need
  - Ways to measure performance
  - Metrics to evaluate performance
  - POV of comp user
    - \* POV of designer
    - \* processor performance equation

Define metrics, measurement methods, understand sources of error, and implement results

- Processor executes a stored program
- A stored program is a sequence of instructions
- Each instruction has operators and operands
- Each instruction is a binary pattern
- The binary pattern of each instruction is directly interpreted and executed by digital logic
  - Hardware, Electronics

Response time

- How *long* it takes to do a task

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Throughput

- Total work done *per unit time*

How are response time and throughput affected by:

- Replacing the processor with a faster versions?
- Adding more processors?