



Northeastern  
University

# Lecture 1: Fundamentals of Programming - 1

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Materials are edited by Prof. Jones Yu from Prof. Charlie Wiseman's materials.

# Outline

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- Introduction to Computation and Programming
- Variables, I/O, Types and Strings
- Control Flow and Conditions
- Methods
- Arrays
- File I/O

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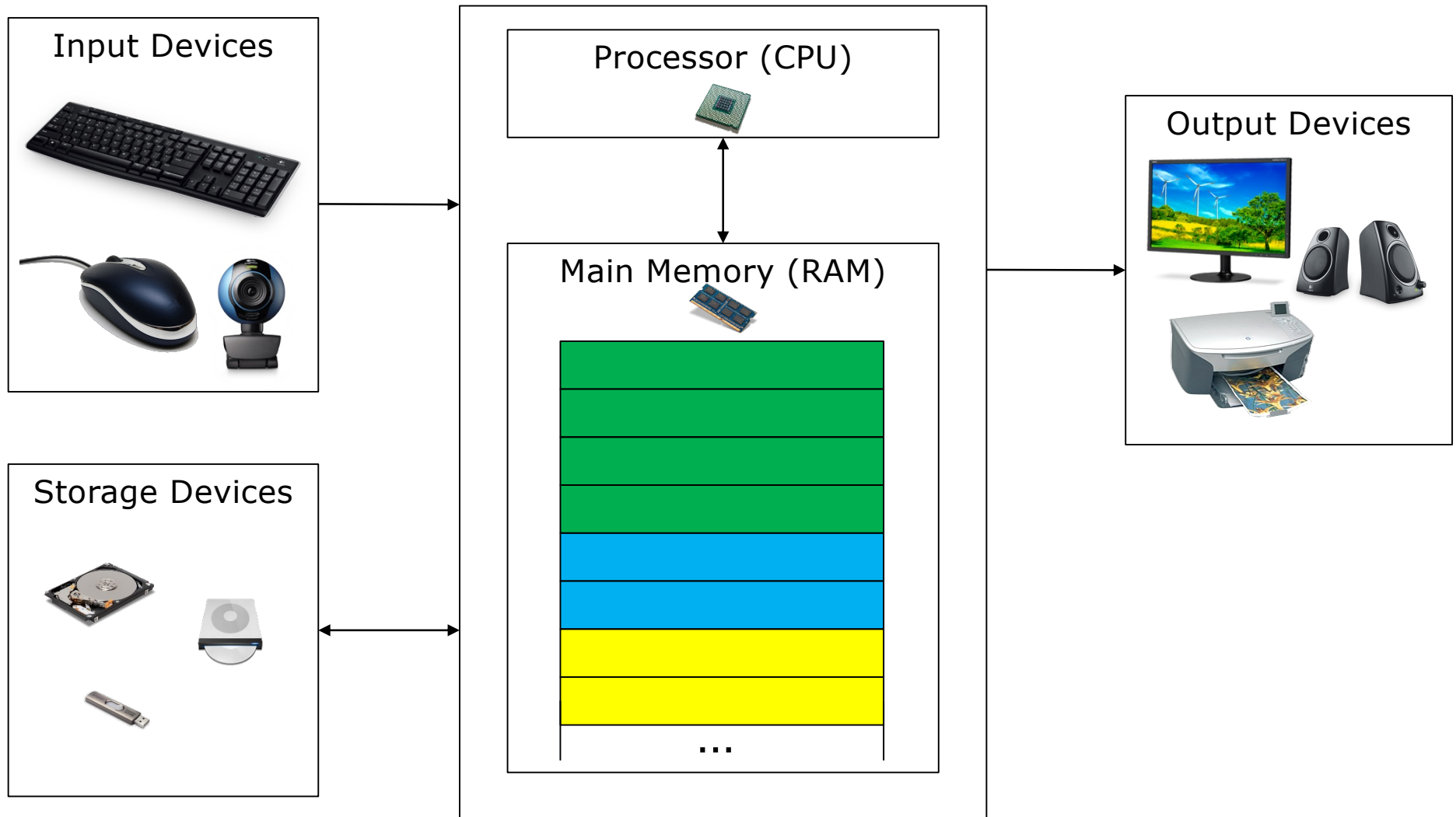
# Introduction to Computation and Programming

# What Makes Up a Computer?

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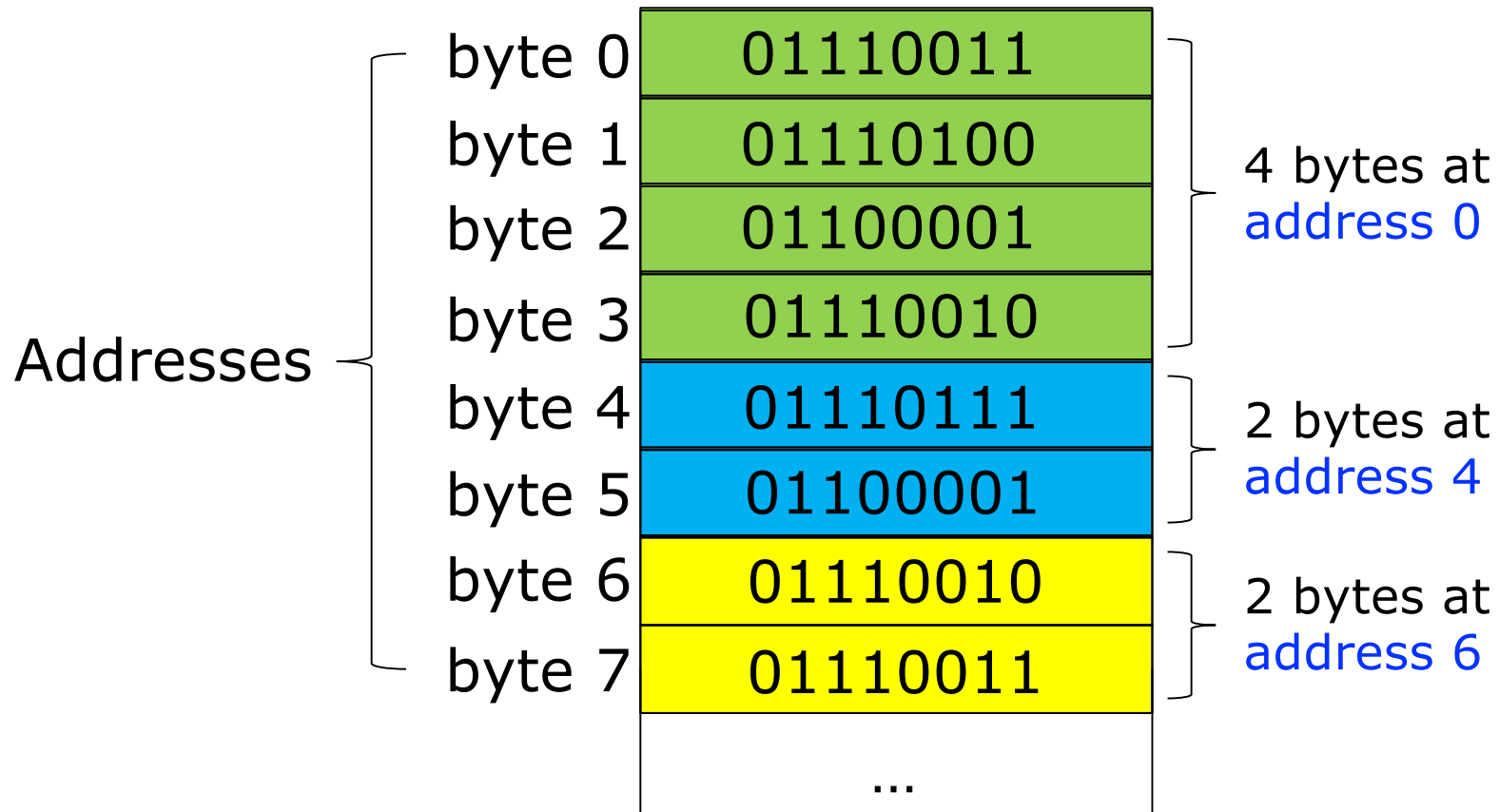
- Hardware
  - » Physical components
  - » Wide variety of types and manufacturers
  - » Abstracted to a simple set of ideas for Computer Science
- Software
  - » Programs (i.e., instructions)
  - » Wide variety of purposes
  - » The focus of this course

# High Level View



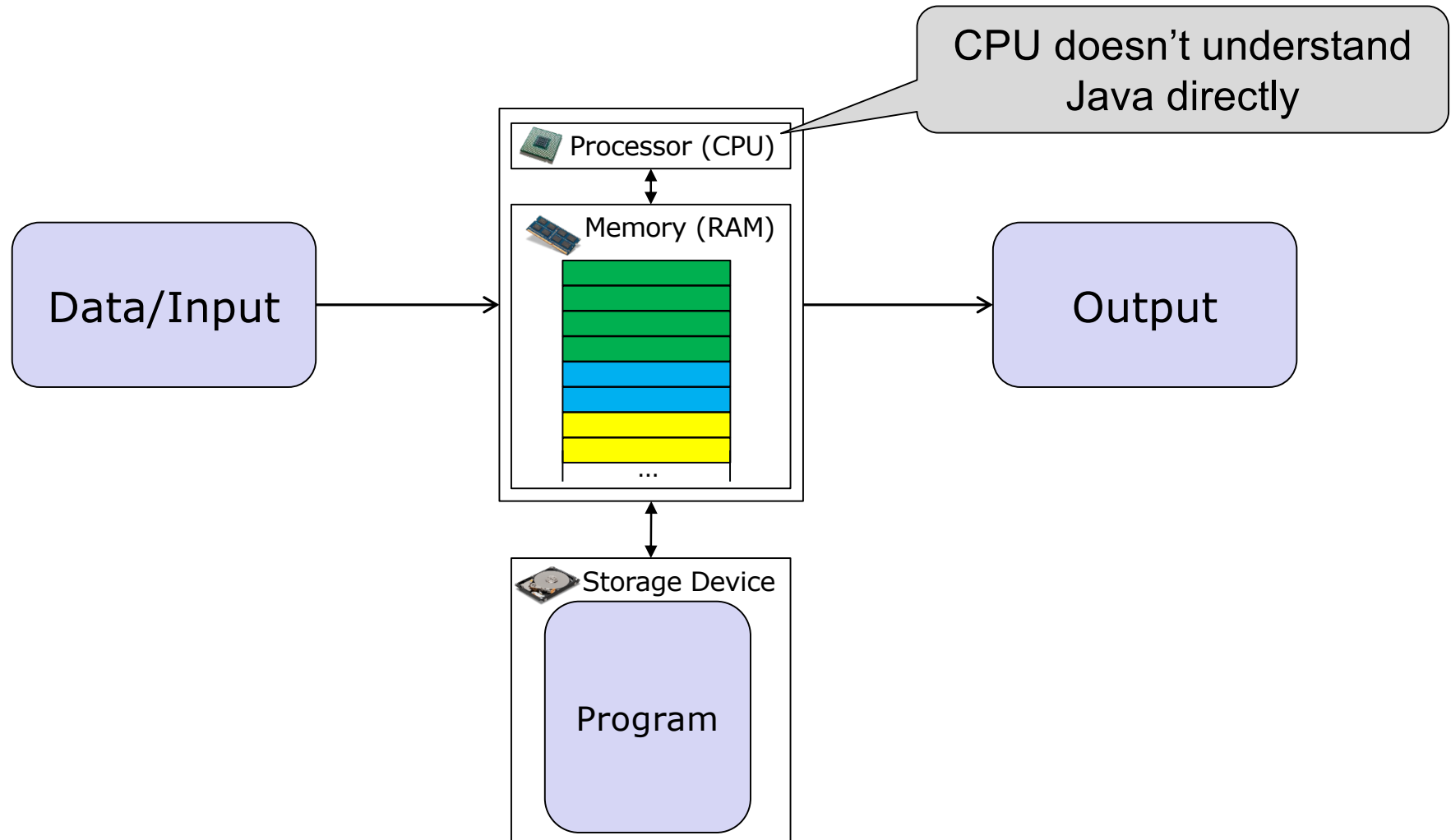
# Main Memory (RAM)

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# Running a Program

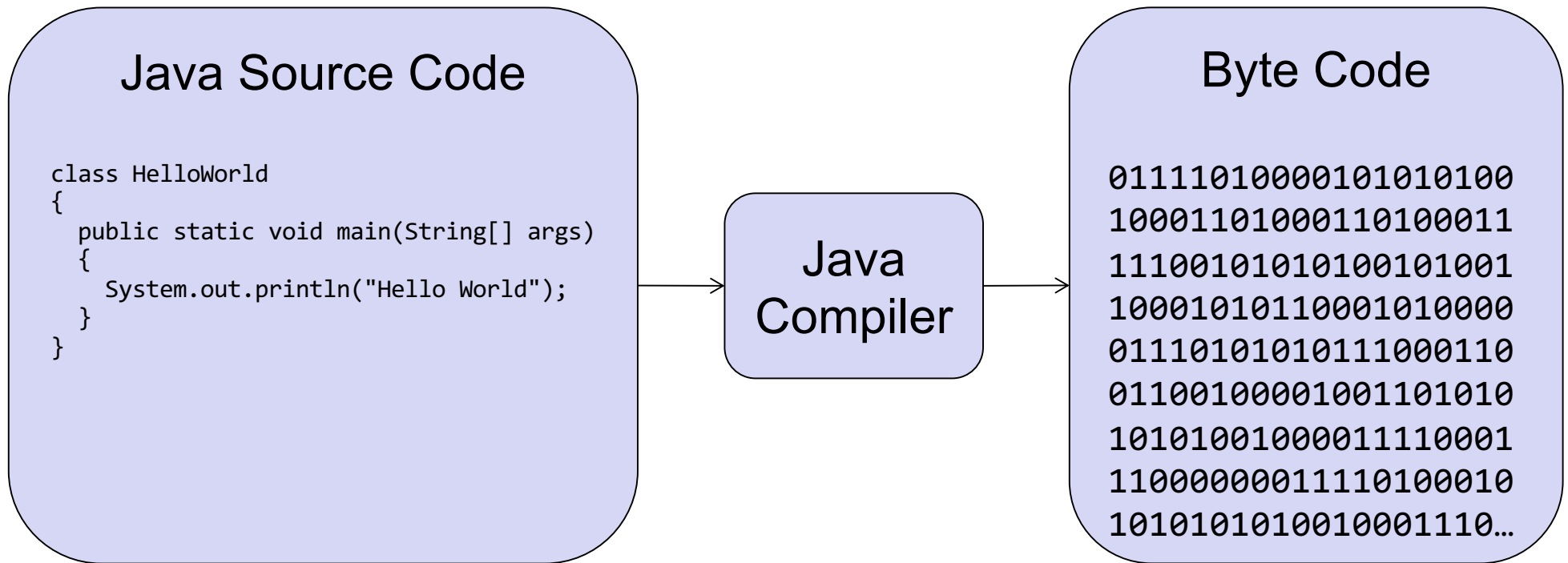
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# Compilers

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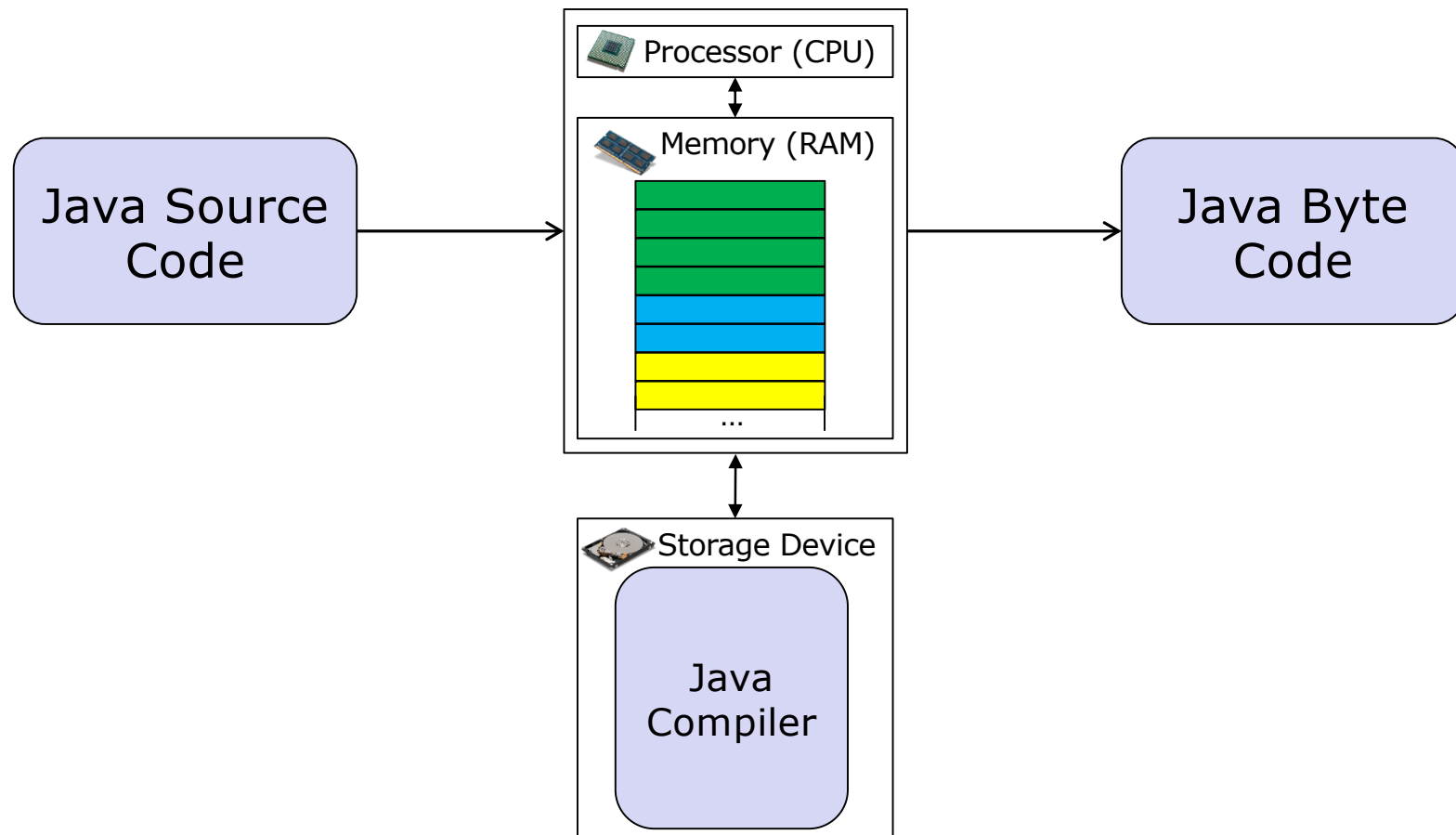
# Java Virtual Machine

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- Java byte code also can't be executed by a CPU directly.
- Instead, the **Java Virtual Machine (JVM)** is another program that **interprets** the byte code and **translates** it into the native CPU language.
  - » Allows a program to be compiled once and run on all types of computers (that have a JVM available and installed)
- Other high level languages work differently.

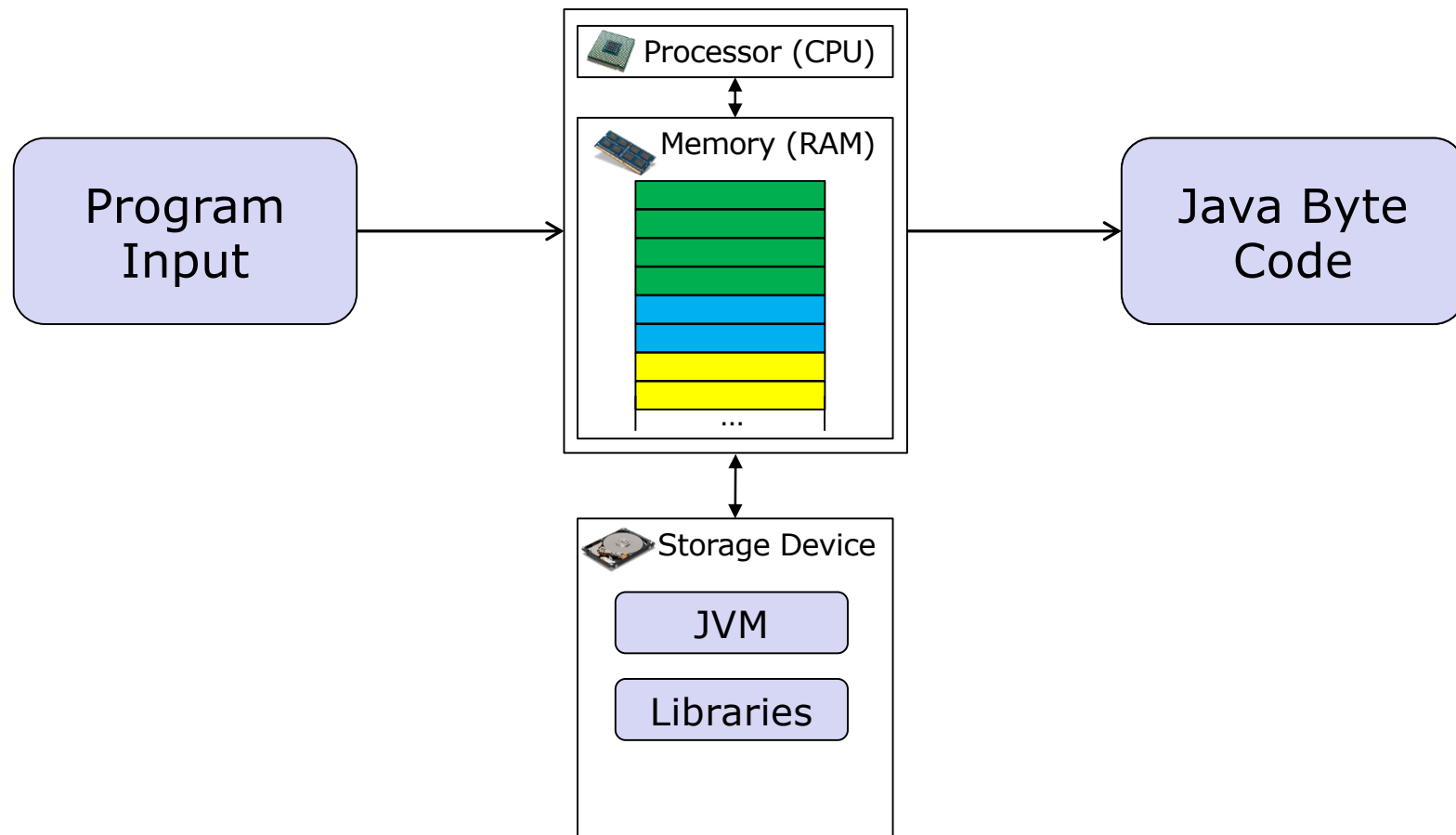
# Building a Java Program

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# Running a Java Program

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## Take Home Points

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- Computers have 5 main components: **Processor**, **Main Memory**, **Input Devices**, **Output Devices**, **Storage Devices**
- 1 byte = 8 bits (binary digits)
- Main Memory is a sequence of bytes, each with a memory address
- **The Java compiler** turns source code into **byte code**.
- **The JVM** uses byte code along with additional libraries to execute your program.