

# Data Structures



## Introduction

**Subin Sahayam, Assistant Professor,  
Department of Computer Science and Engineering  
Shiv Nadar University**

# Class Timings

## **Theory:**

- 1. Wednesday – 8.10 am to 9.00 am**
- 2. Wednesday – 2.40 pm to 3.30 pm**
- 3. Thursday – 8.10 am to 9.00 am**

## **Lab:**

- 1. Friday – 02.40 pm to 3.30 pm (Tutorial)**
- 2. Tuesday – 9.00 am to 11.50 am (Batch A)**
- 3. Thursday – 12.50 pm to 3.30 pm (Batch B)**

# Marks Split-up

## 1. Theory

- **Mid Semester - 30 marks**
- **End Semester - 50 marks**
- **CIA/Assignment - 20 marks**

## 2. Lab

- **Lab and Model Exam - 50 marks**
- **End Semester Exams – 50 marks**

# Prerequisites

English

# Syllabus

## **C PROGRAMMING BASICS: 12**

Introduction to C programming: fundamentals - structure of a C program - compilation and linking processes - Constants, Variables, Data Types - Expressions using operators in C - Managing Input and Output operations - Decision Making and Branching - looping statements - solving simple scientific and statistical problems

## **ARRAYS AND STRINGS: 10**

Arrays - Initialization - Declaration - One dimensional and Two-dimensional arrays - Strings: String operations - String Arrays - Simple programs: sorting, searching, matrix operations

## **FUNCTIONS AND POINTERS: 8**

Function: Definition of function - Declaration of function - Pass by value - Pass by reference - Recursion - Pointers: Definition - Initialization - Pointers arithmetic - Pointers and arrays

## **STRUCTURES AND UNION: 8**

Introduction - need for Structure data type - Structure definition - Structure declaration - Structure within a structure - Union - Programs using Structures and Unions - Storage classes - Preprocessor directives - Simple programs: singly linked list, doubly linked list

## **FILE HANDLING AND ADDITIONAL FEATURES IN C: 7**

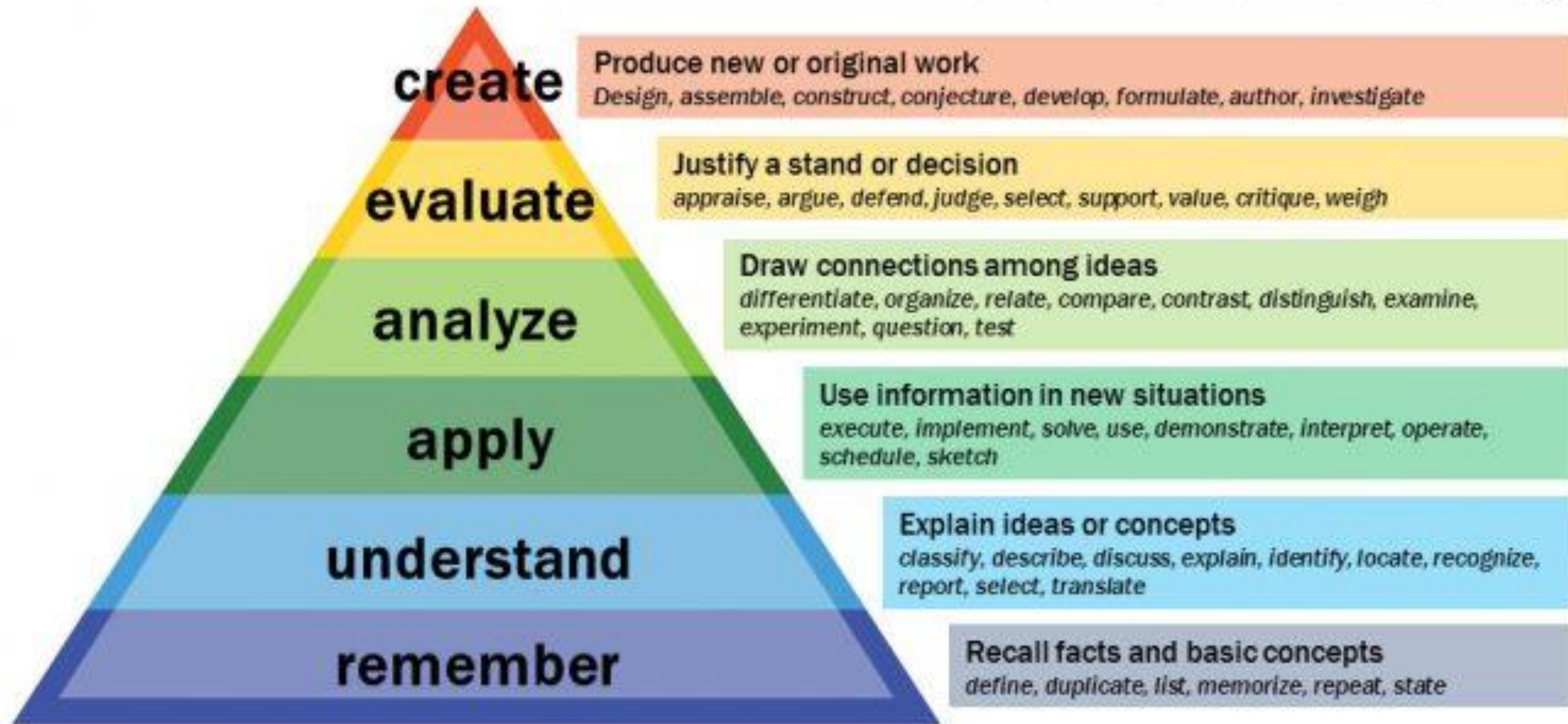
Console input output functions - disk input output functions - data files - Additional Features in C: command line arguments, bit wise operators, enumerated data types, type-casting

**TOTAL PERIODS: 45**



# Bloom's Taxonomy

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# Course Outcomes

- **CO1 – Implement C programs from algorithms and flowcharts with error handling. – K3**
- **CO2 – Implement programming fundamentals, decision and looping statements – K3**
- **CO3 – Implement C programs with pointers, arrays, and strings – K3**
- **CO4 – Implement C programs with structures, union, file-handling concepts, and additional features – K3**
- **CO5 – Analyze, breakdown, and solve large computational problems using functions – K4**

# Questions?

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# Fundamentals

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  - **One Who Computes**
  - **Mathematical Operations**
    - **Fixed Rules + No deviation from authority**

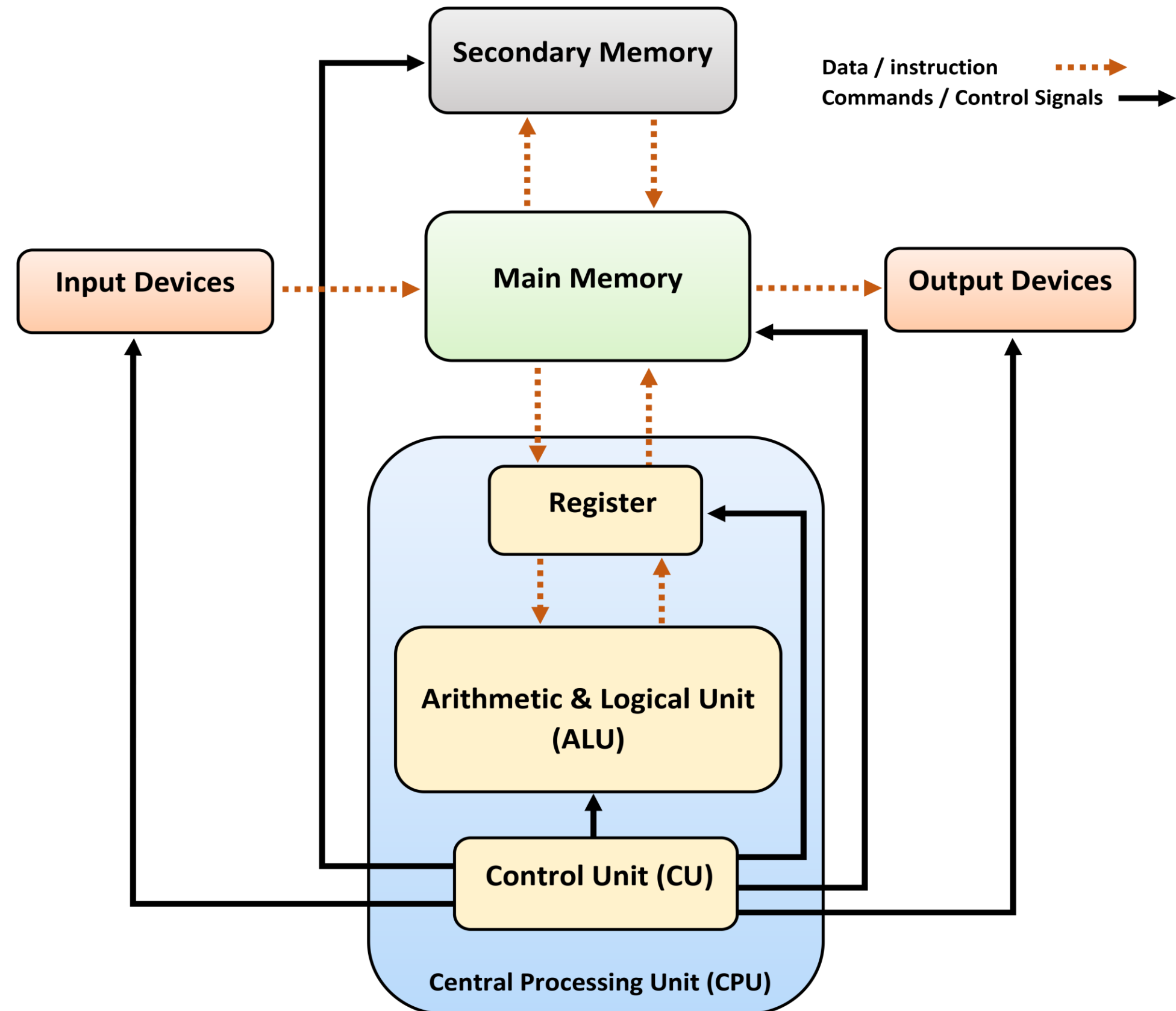
# General Parts of a Computer

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- **Processor**
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- **Input**
- **Output**

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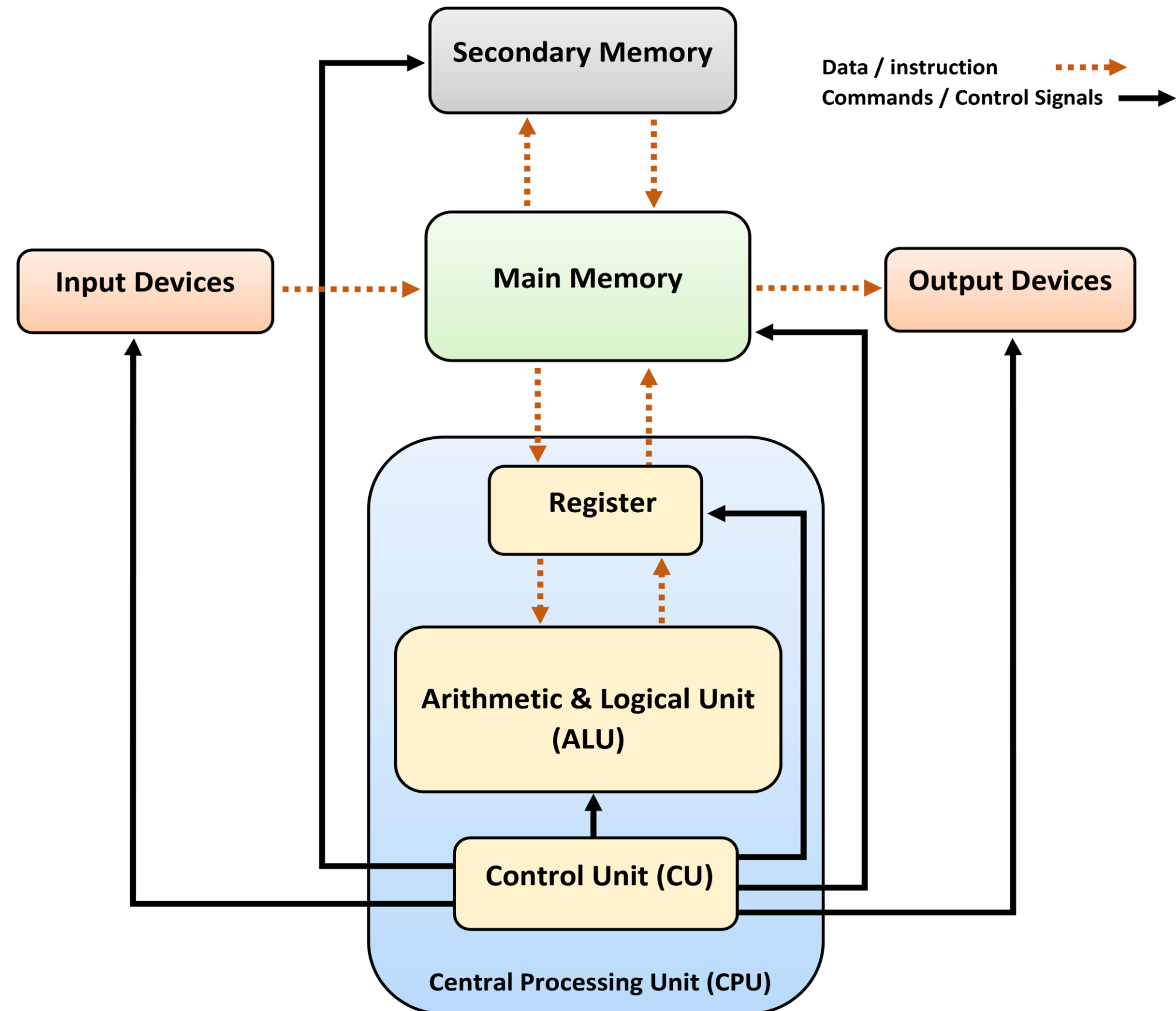
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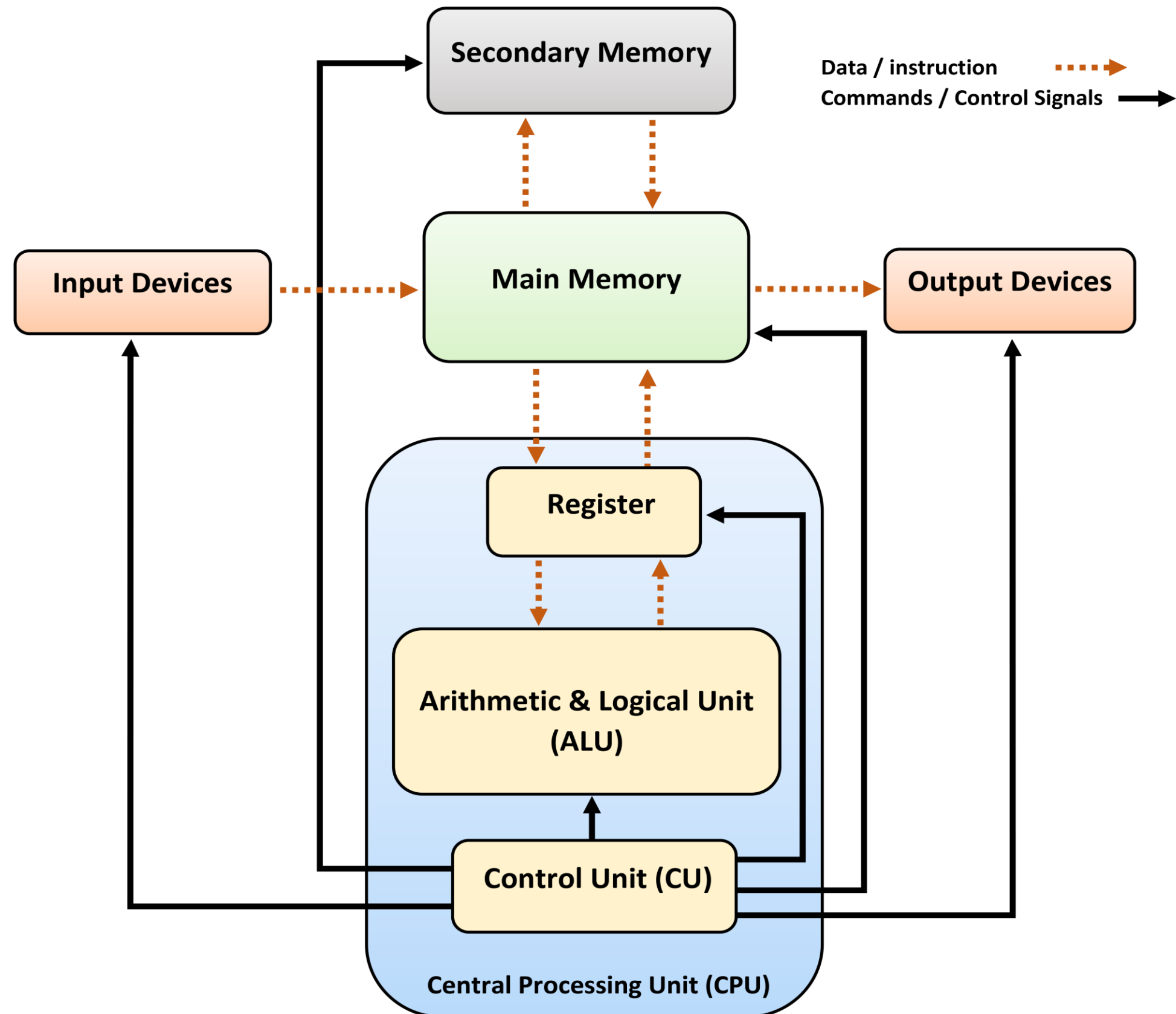
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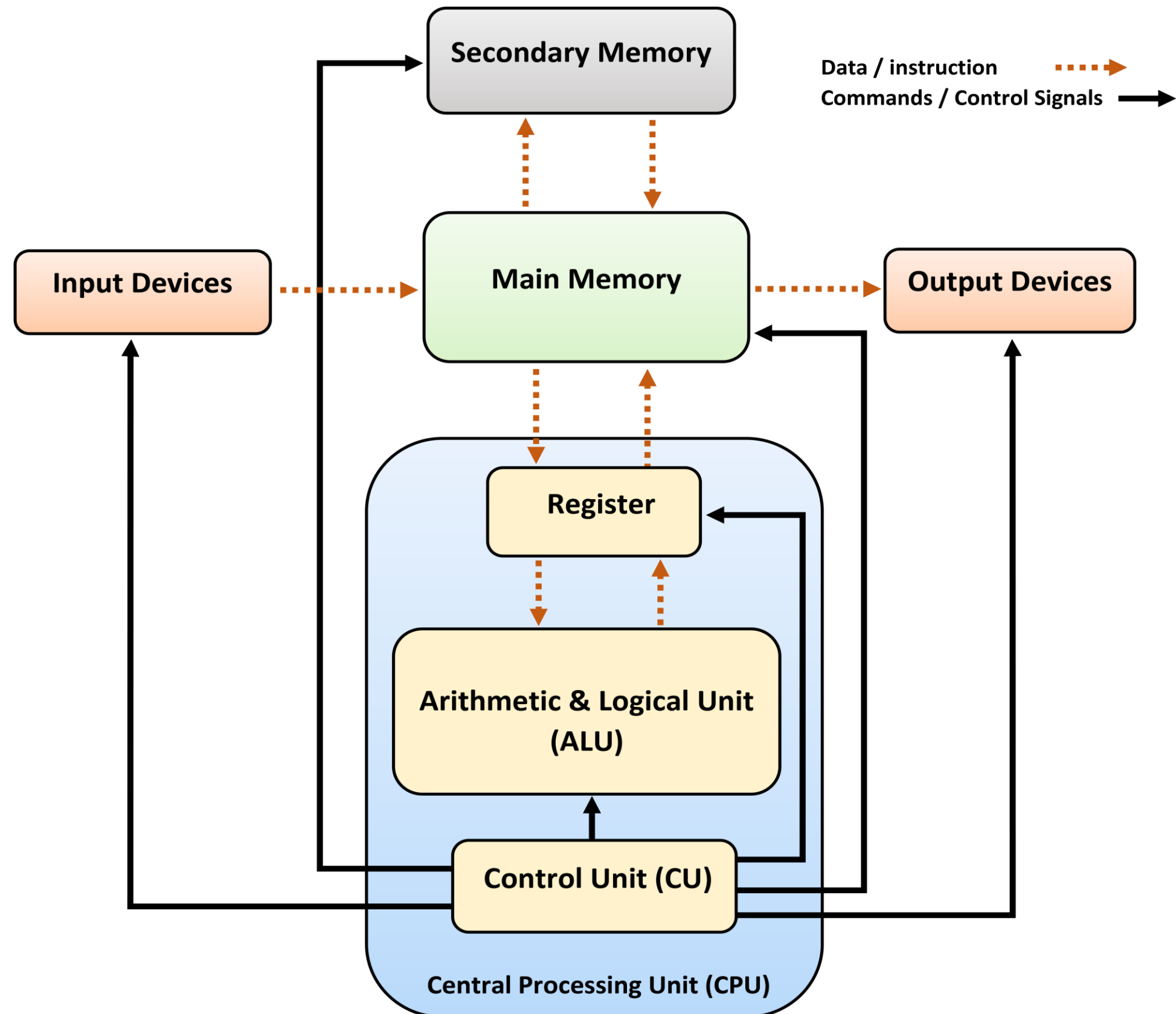
# General Parts of a Computer

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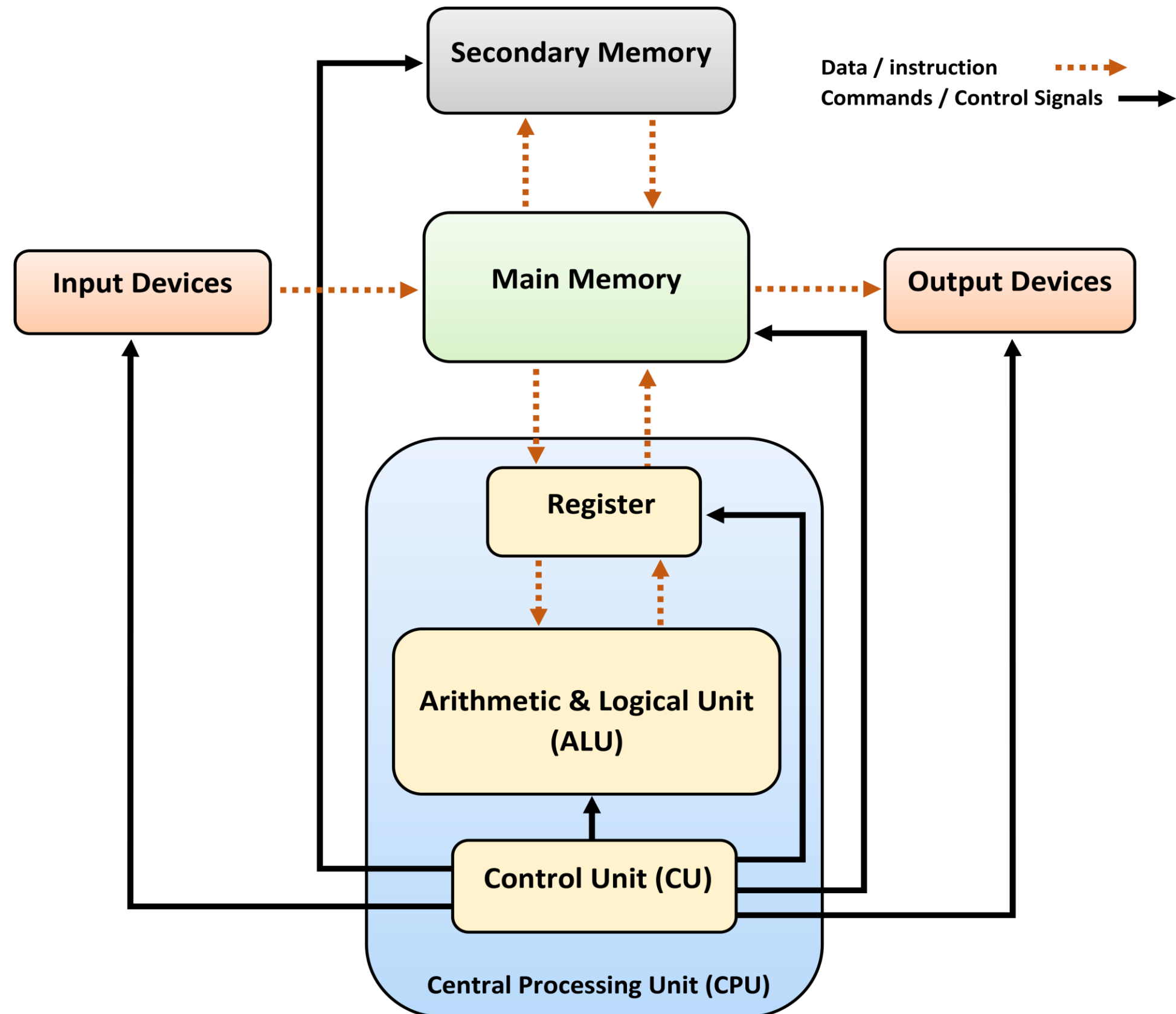
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- **Processor**
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  - **Secondary**
    - HDD, SSD, CD, Pen drive
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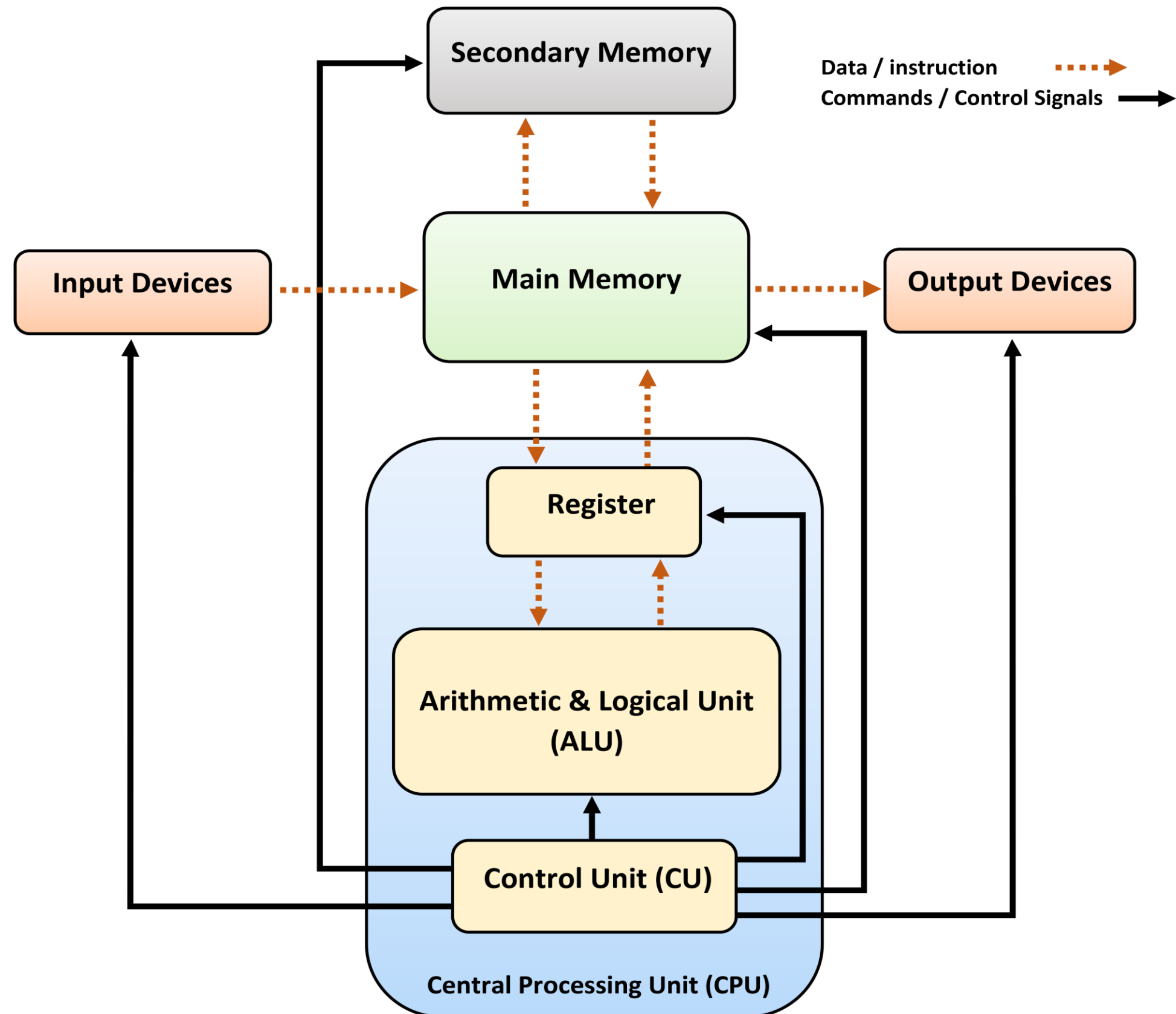
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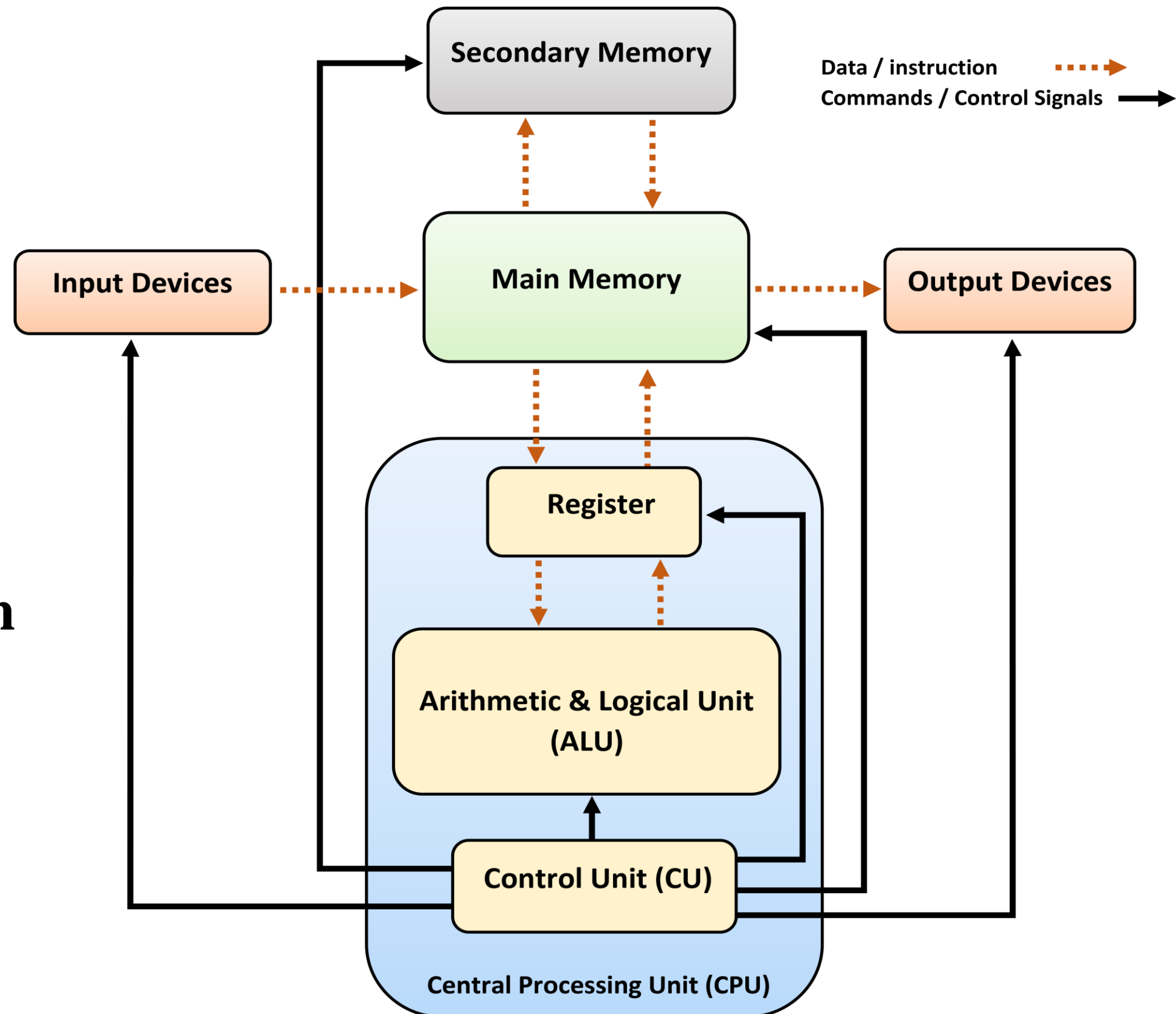
- **Processor**
  - CPU, GPU, TPU
- **Memory**
  - **Primary**
    - RAM, Register, Cache
    - Volatile, Costly, Fast
  - **Secondary**
    - HDD, SSD, CD, Pen drive
    - Non-Volatile, Cheap, Slow
- **Input**
- **Output**





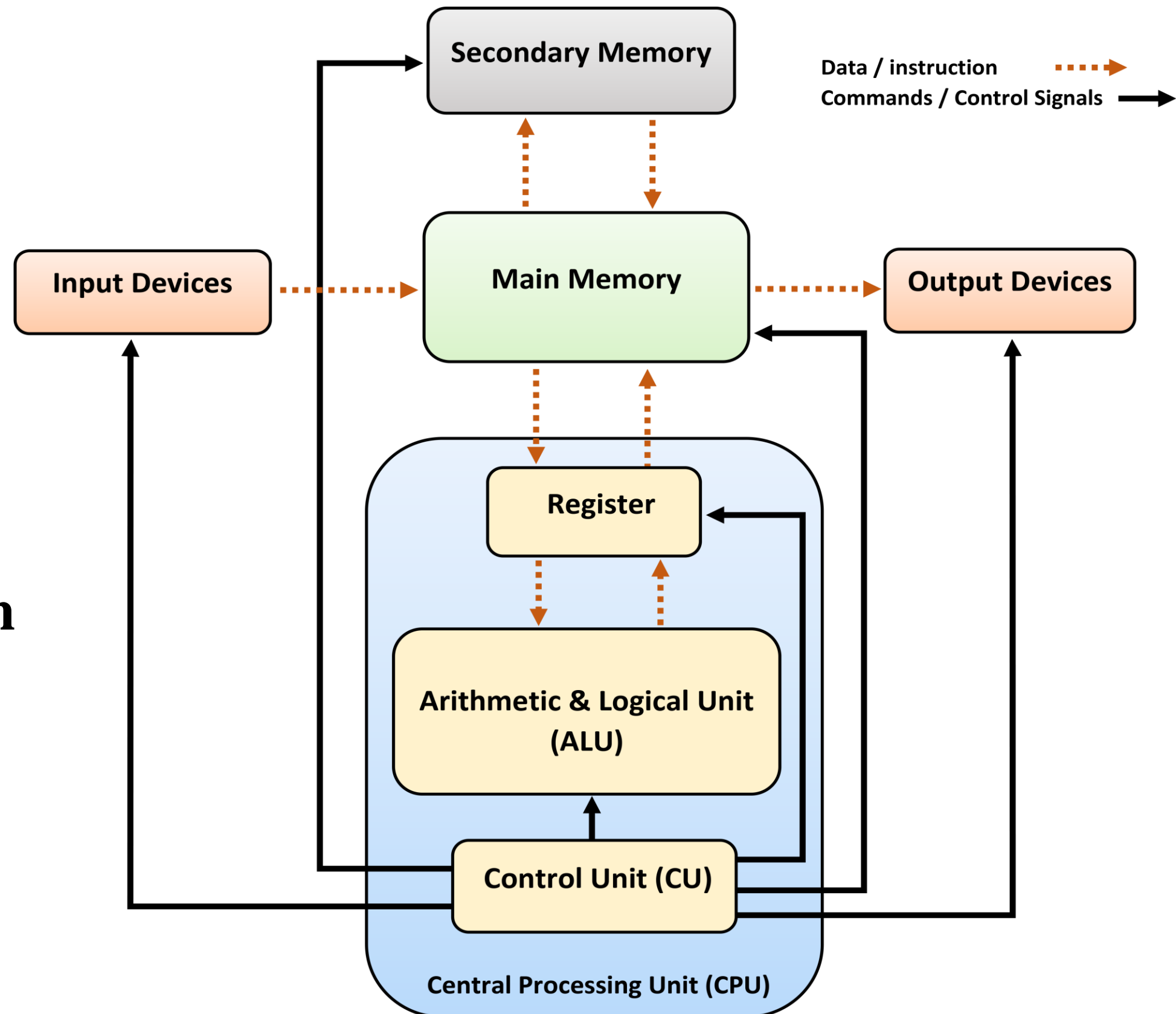
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- **Input**
  - Mouse, Scanner, Touchscreen
- **Output**



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  - Monitor, Printer, Speaker



# Loading

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- **Moving data/instruction from secondary memory to primary memory**

# Loading

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- **Demonstrate loading – Task manager**



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# Summary

- **Class Timings**
- **Mark Split-Up**
- **Pre-requisites**
- **Syllabus**
- **Bloom's Taxonomy**
- **Course Outcomes**
- **Fundamentals**
- **General Parts of a Computer**
- **Today's Course Outcome**

- **Kernighan, B.W and Ritchie, D. M, “The C Programming language”, 2nd edition, Pearson Education, 2006**

THANK YOU

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