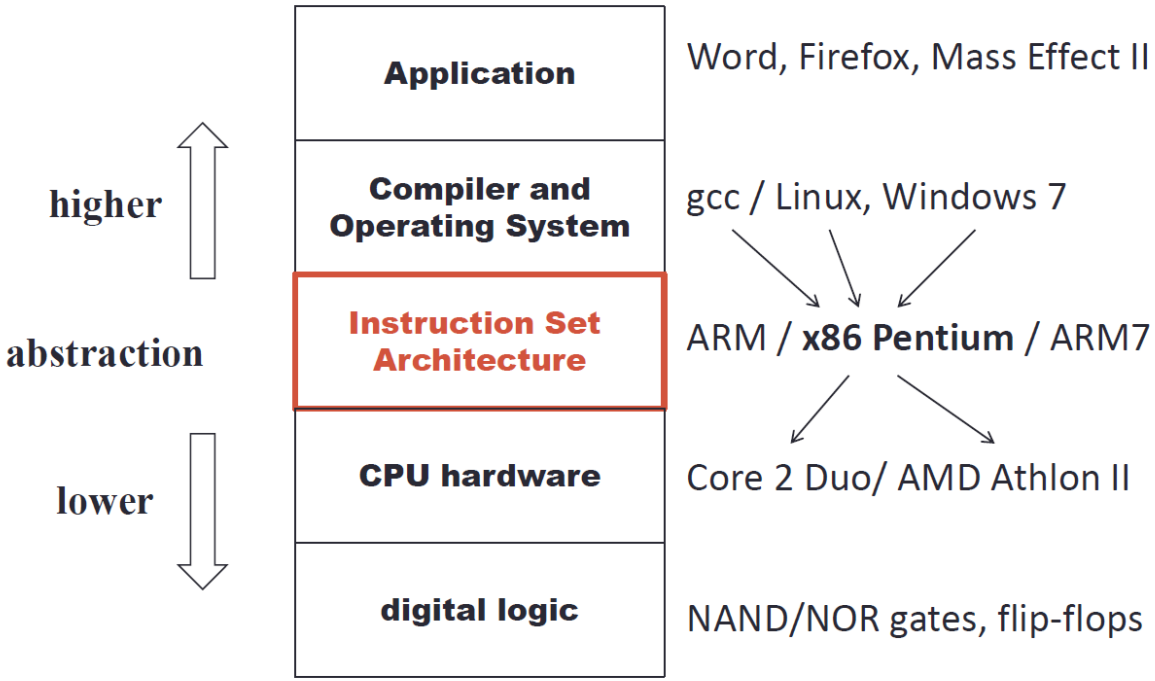
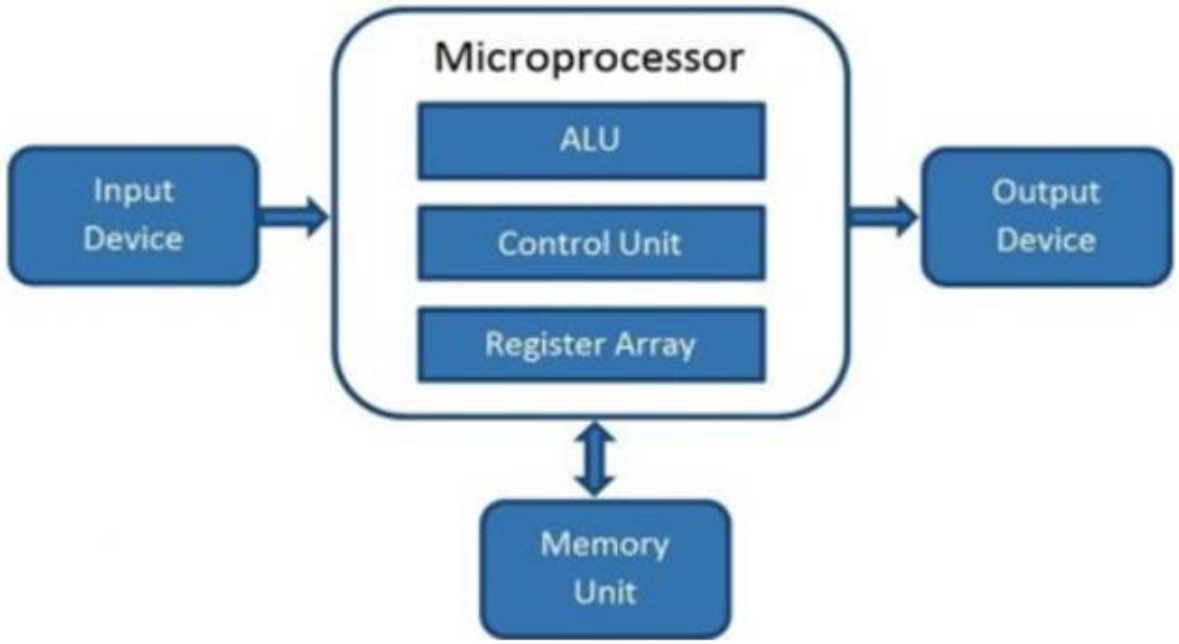
Microprocessor Systems

Lecture 2

What is a microprocessor system?





Evolution of microprocessor

History of Microprocessor

MP	Introduction	Data Bus	Address Bus
4004	1971	4	8
8008	1972	8	8
8080	1974	8	16
8085	1977	8	16
8086	1978	16	20
80186	1982	16	20
80286	1983	16	24
80386	1986	32	32
80486	1989	32	32
Pentium	1993 onwards	32	
Core solo	2006	32	
Dual Core	2006	32	
Core 2 Duo	2006	32	
Core to Quad	2008	32	
I3,i5,i7	2010	64	

Programming language in computers

- Formal language designed to communicate with the computer

- Two types: low-level and high-level languages

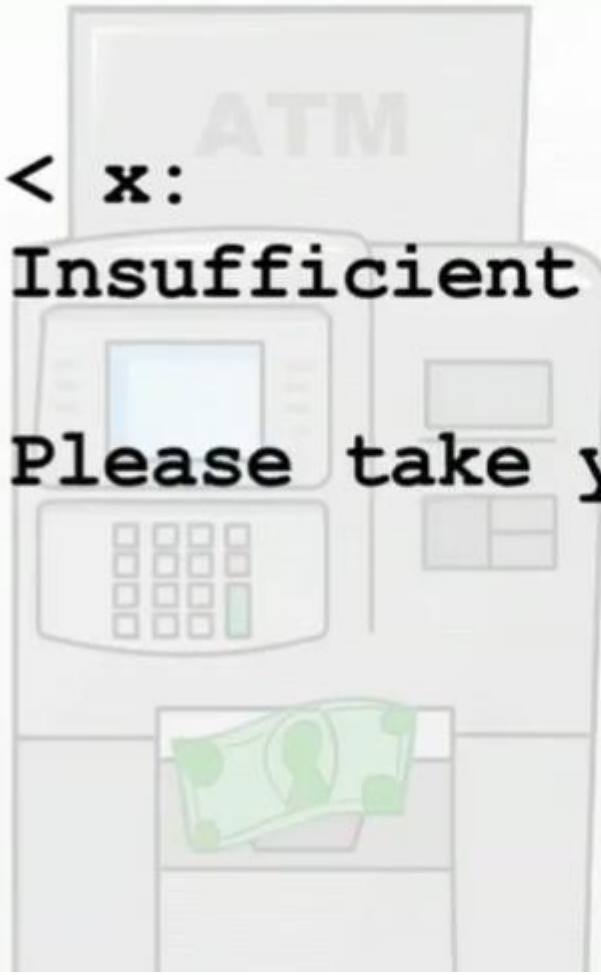
- Low-level language
  – machine oriented and require extensive knowledge of computer hardware

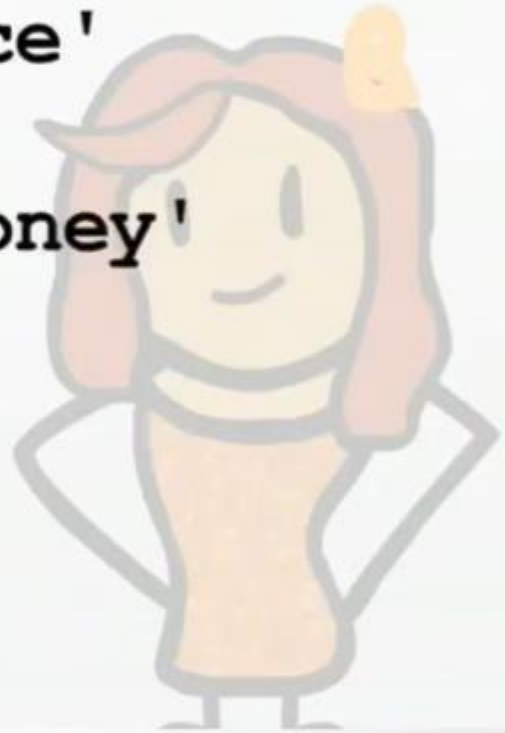
  1) machine language – directly understood by the computer, no need to translate (0,1)
  2) assembly – set of symbols and letters. An assembler is required to translate assembly language to machine language (terms like MOVE, ADD, SUB, END)

- High-level language – most people often use
  – uses English and mathematical symbols (+, -, % etc) in its instructions
  – Ex: C++, Fortran, Java, Python

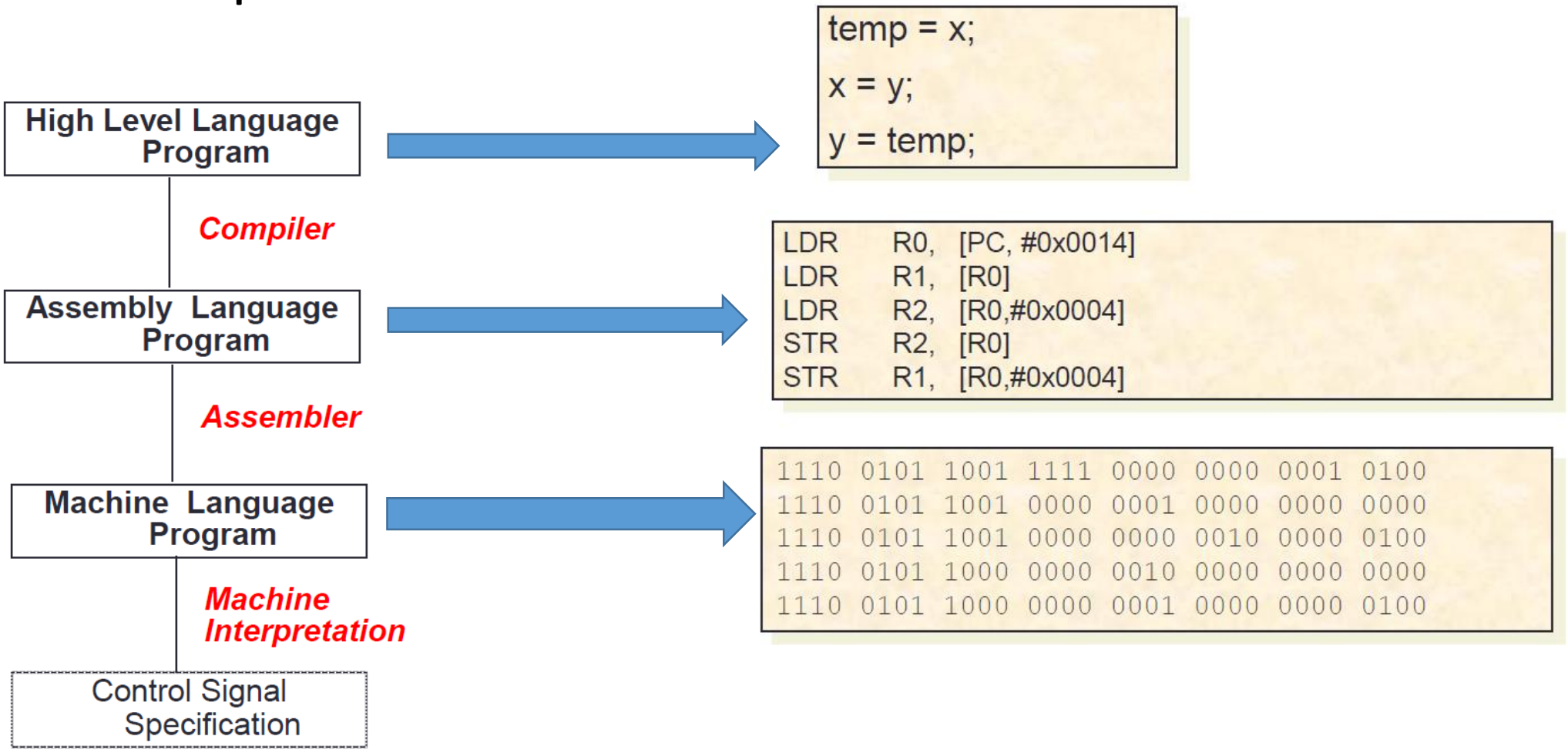
Example of ATM Machine withdrawal

```
x = 100
if balance < x:
    print 'Insufficient balance'
else:
    print 'Please take your money'
```



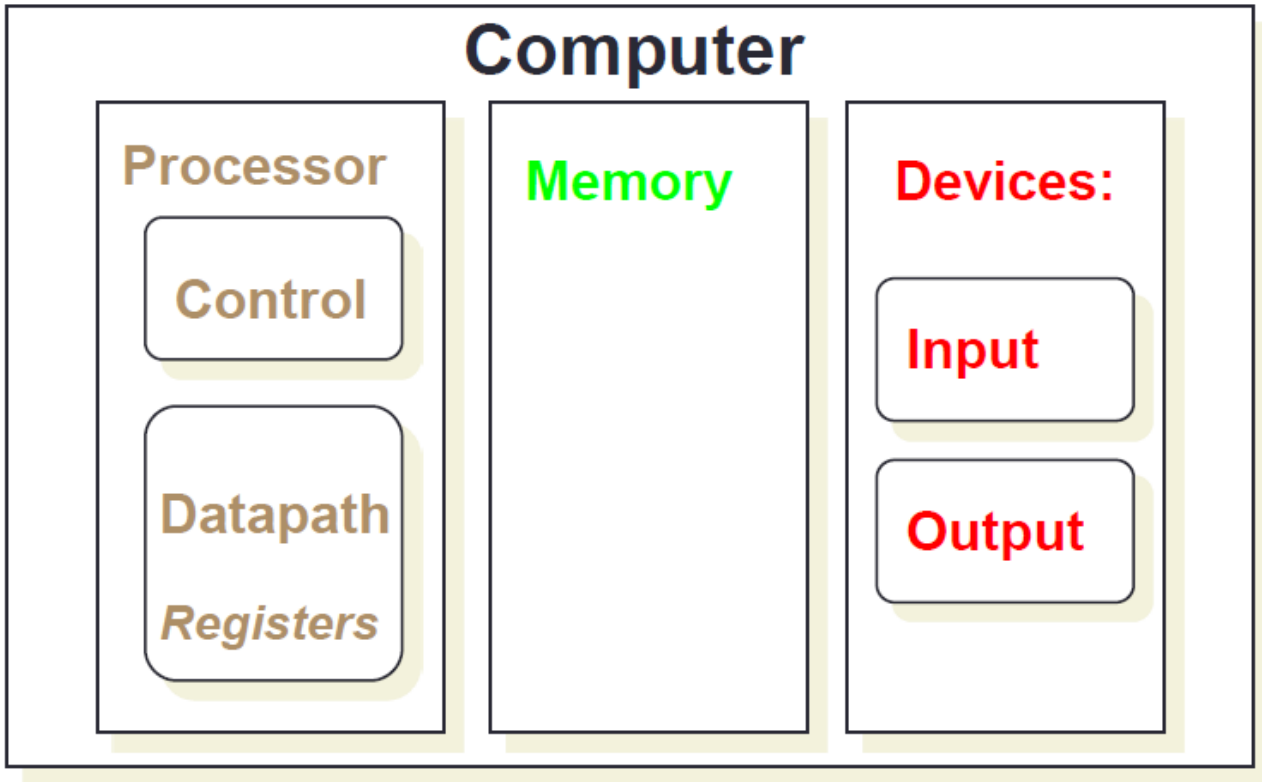


Levels of representation in computers



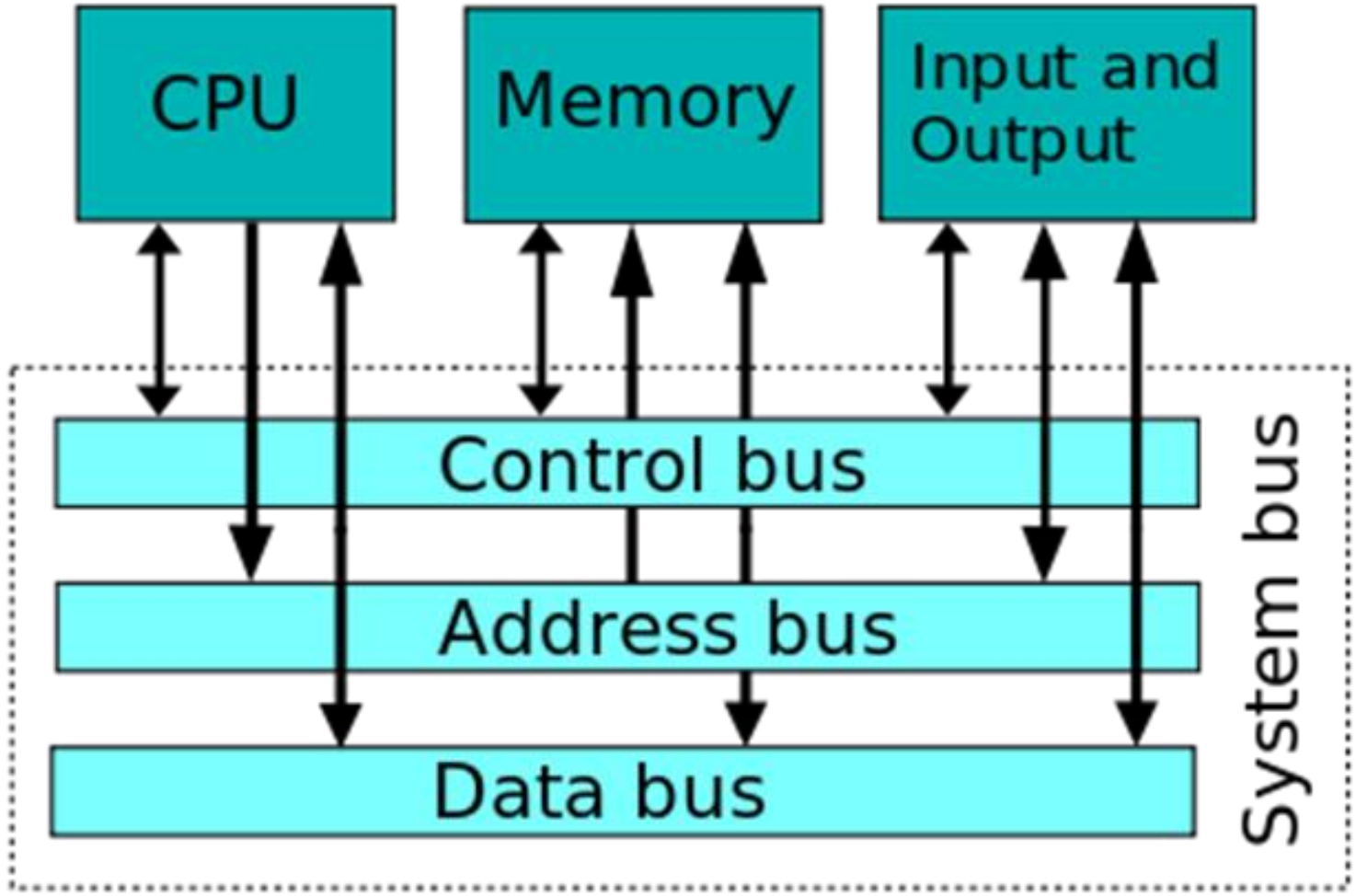
Internal Organisation of Computer

Processor aka CPU (Central Processing Unit)



- Major components of Typical Computer System
- Data is mostly stored in the computer memory separate from the Processor, however **registers** in the processor datapath can also store small amounts of data

A bit more detail:



A bit more detail:

- **Input unit:** accepts the list of instructions and data from the outside world. For instance, data enters from keyboard, mouse etc.
- **Output unit:** supplies information and results of computation to the outside world. Since results produced in binary form, it must be converted to human acceptable form.
- **Memory:** data and instructions that enter into computer thru input unit have to be stored inside computer before the actual processing starts. Similarly, results produced also stored
- **Central processing unit:** It is the main unit and controls all internal and external devices, performs “arithmetic and logical operations”.

Summary:

- Every computer consists of 5 components

  Central Processor Unit (CPU)

  1. Datapath
  2. Control

  3. Memory
  4. Input Devices
  5. Output Devices