



AAB University

Faculty of Computer Sciences

Object Oriented Programming

Week 2:

Introduction to Object Oriented Programming

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▪ An Introduction To Computer Science

MISCONCEPTION 1: Computer science is the study of computers

MISCONCEPTION 2: Computer science is the study of how to write computer programs

MISCONCEPTION 3: Computer science is the study of the uses and applications of computers and software



▪ **An Introduction To Computer Science**

Concepts such as:

- Computers,
- Programming languages,
- Software, and
- Applications

are part of the discipline of computer science, but individually they do not capture the richness and diversity of this new field.



▪ The Definition of Computer Science

Computer science the study of **algorithms**

, *including*

1. Their formal and mathematical properties
2. Their hardware realizations
3. Their linguistic realizations
4. Their applications



- **The Formal Definition of an Algorithm**

Algorithm:

a well-ordered collection of unambiguous and effectively computable operations that, when executed, produces a result and halts in a finite amount of time.



- **The Informal Definition of an Algorithm**

Algorithm is an ordered sequence of instructions that is guaranteed to solve a specific problem.

It is a list that looks something like this:

STEP 1 *Do something*

STEP 2 *Do something*

STEP 3 *Do something*

.

.

.

STEP N *STOP, you are finished*



- The operations used to construct algorithms all belong to one of only three categories:
 1. *Sequential operations*
 2. *Conditional operations*
 3. *Iterative operations*



al·go·rithm *n.* A procedure for solving a mathematical problem in a finite number of steps that frequently involves repetition of an operation; broadly: a **step-by-step** method for accomplishing some task.

Abu Ja'far Muhammad ibn-Musa Al-Khowarizmi
(A.D. 780-850)

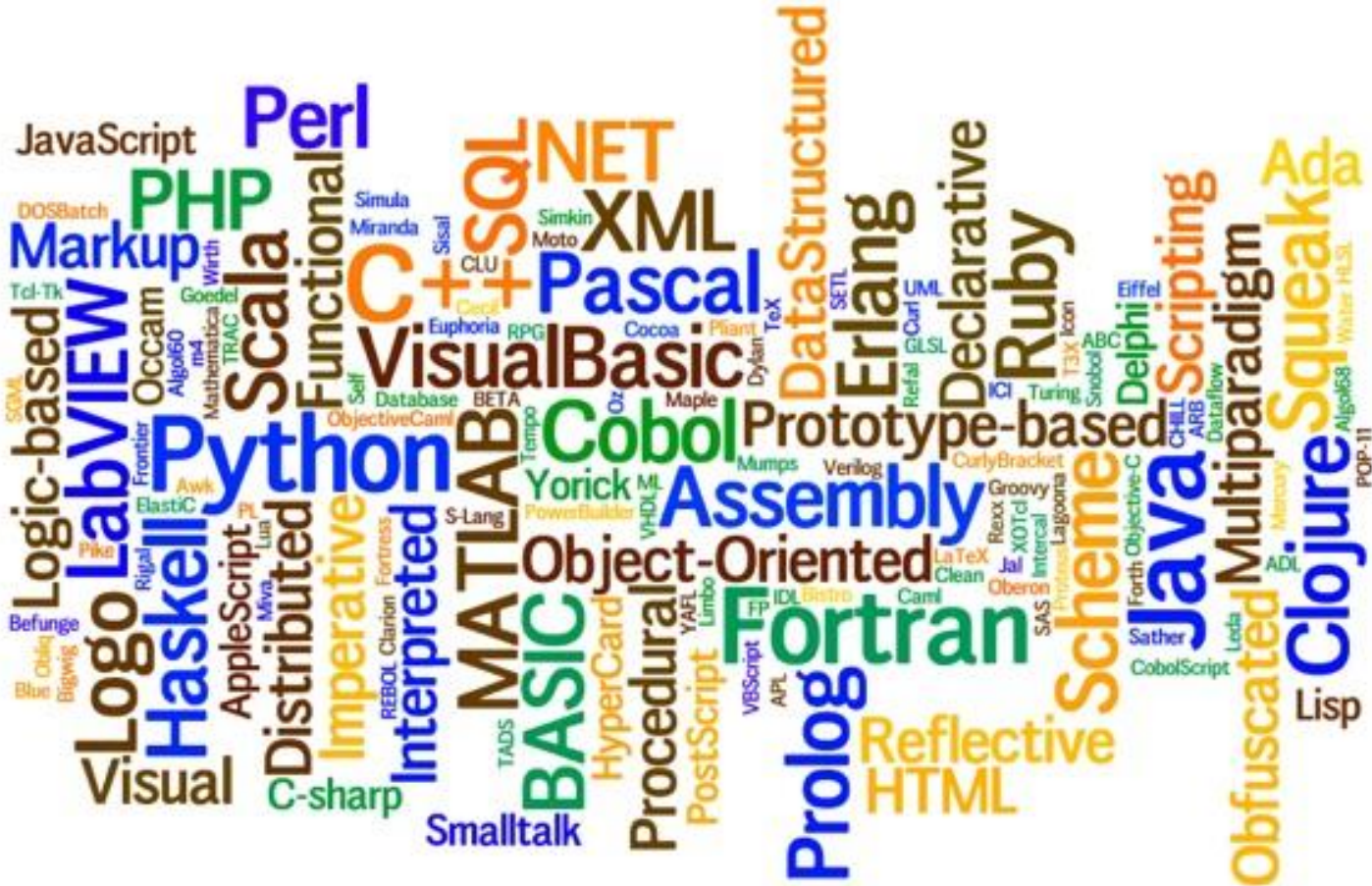
- a famous Persian Mathematician
- a teacher at the Mathematical Institute in Bagdat
- “algebra” (Arabic world *al jabr* means “reduction”)
- step-by-step procedures for doing arithmetic operations, on numbers represented in new decimal system
- XII century, trans. Into Latin, introd. The base 10 Hindu-Arabic numbering system to Europe



Object Oriented Programming

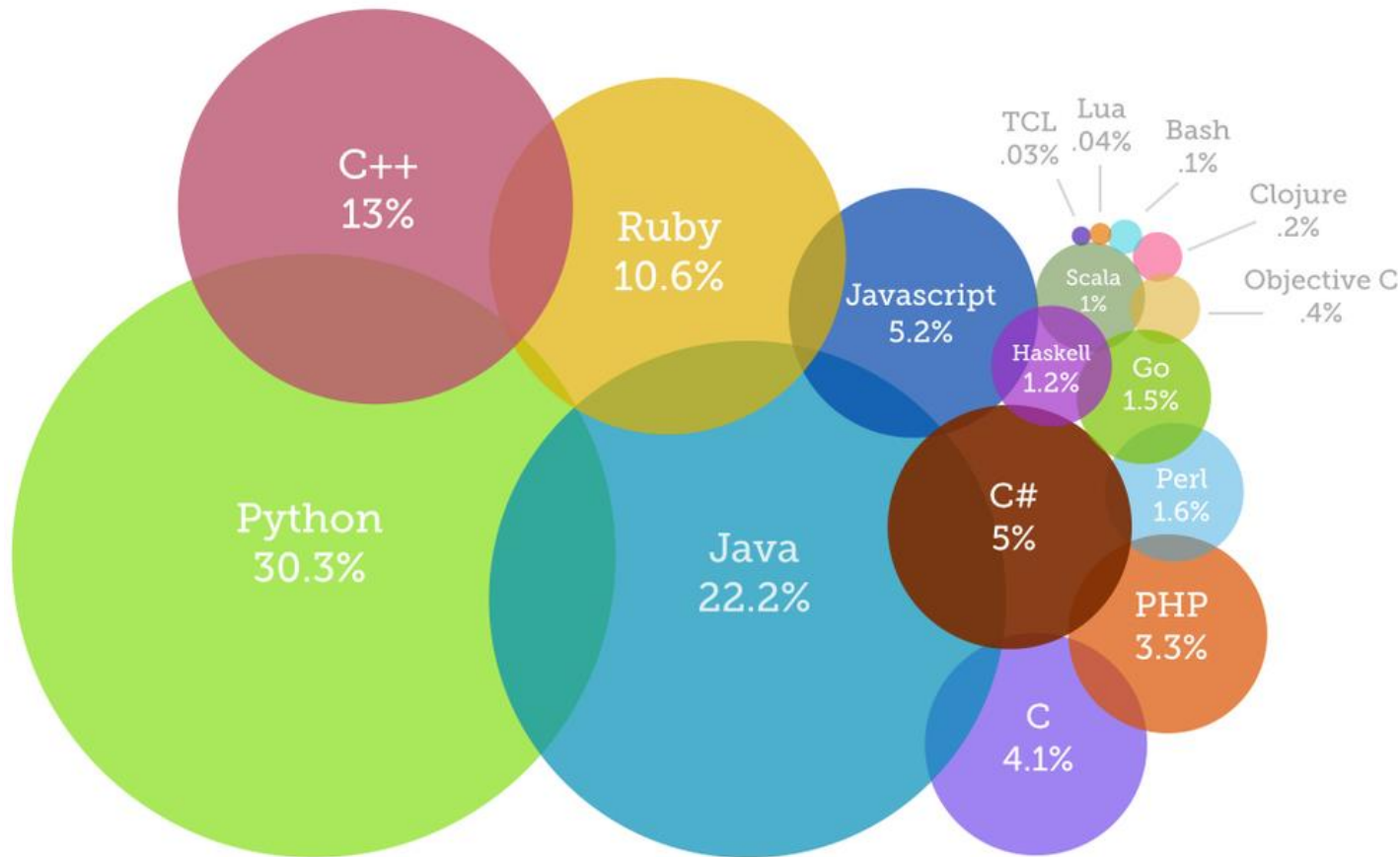


- How to Choose a Programming Language?!



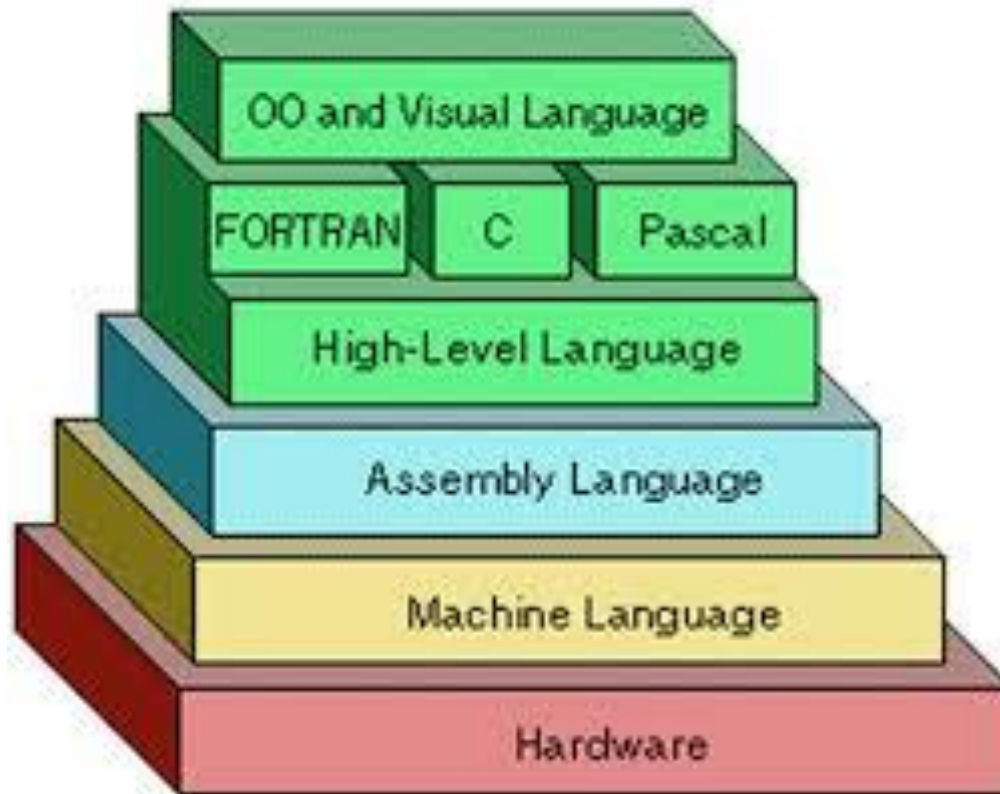


- Most Popular Programming Languages of 2014



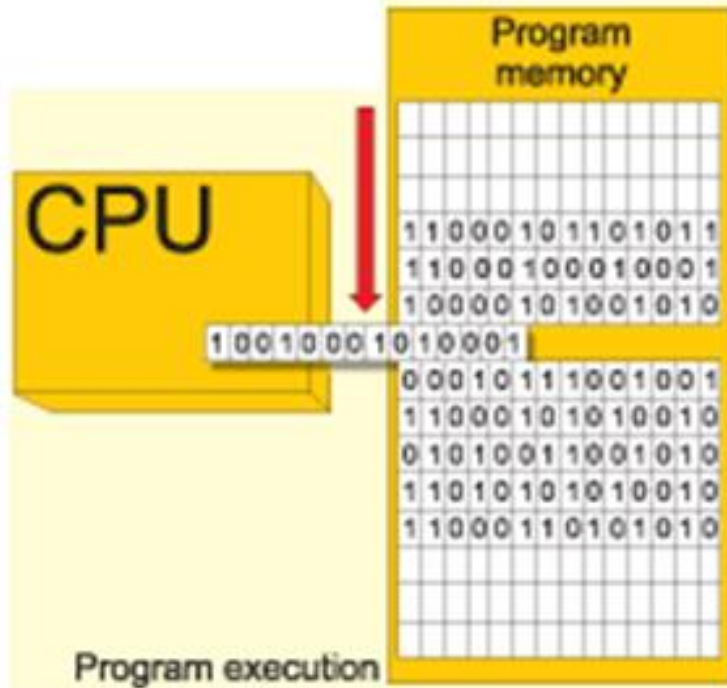
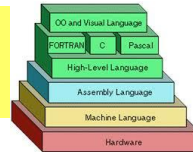


- Programming Language Classification





Machine Language



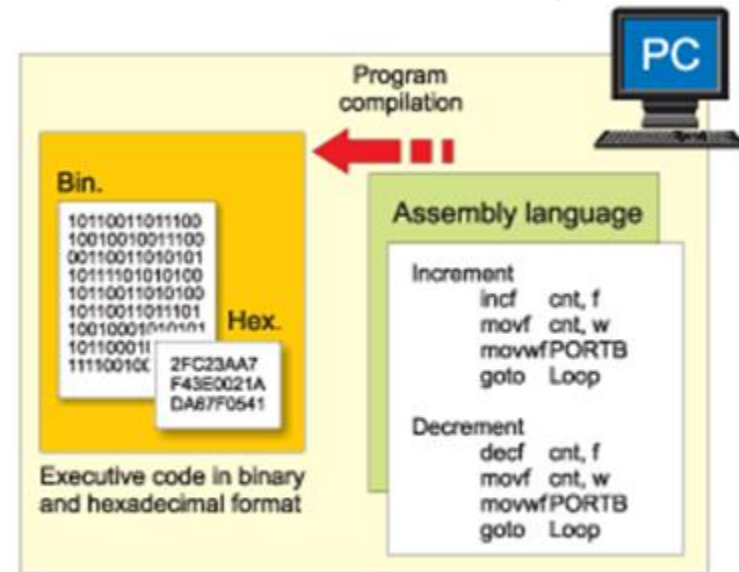
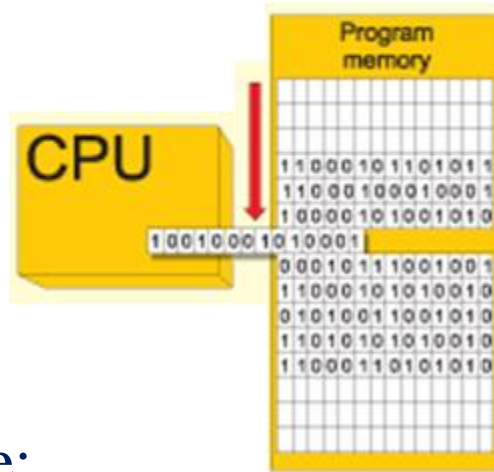
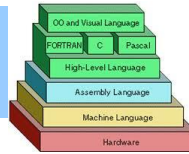
Code Example:

```
89 F8 A9 01 00 00 00 75 06 6B C0
03 FF C0 C3 C1 E0 02 83 E8 03 C3
```

Object Oriented Programming



Assembler Language



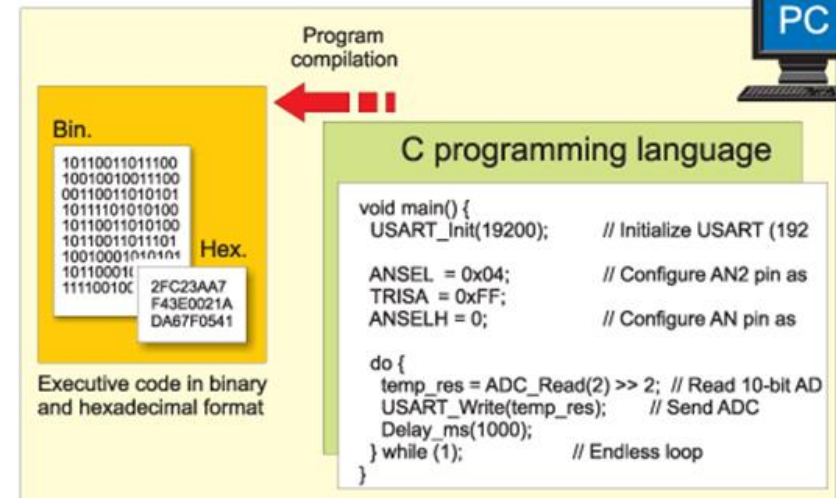
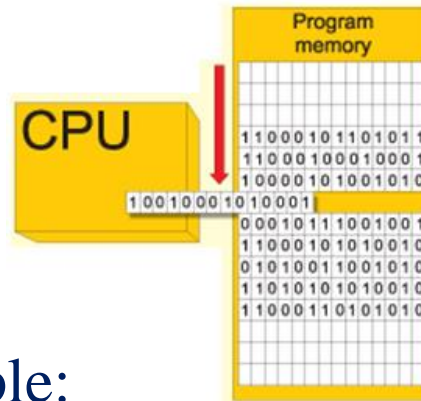
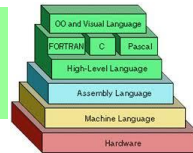
Code Example:

```
ORG 0H           ;start (origin) at location 0
MOV R5, #25H     ;load 25H into R5
MOV R7, #34H     ;load 37H into R7
MOV A, #0        ;load 0 into A
ADD A, R5        ;add contents of R5 to A, now A=A+R5
ADD A, R7        ;add contents of R7 to A, now A=A+R7
ADD A, #12H      ;add to A the value 12H, now A=A+12H
HERE: SJMP HERE  ;stay in this loop
END              ;end of the asm source file
```

Object Oriented Programming



■ C++ Language

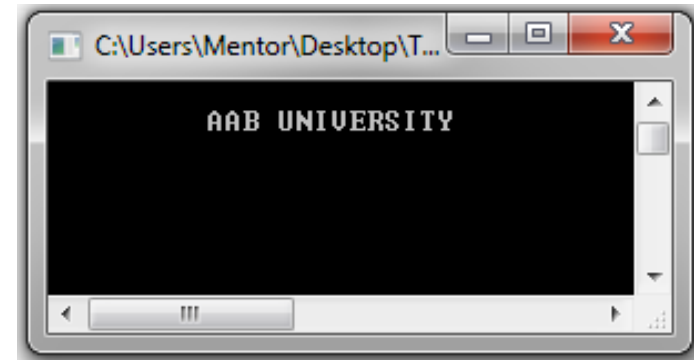


• Code Example:

```
# include <iostream>
using namespace std;

int main()
{
    cout<<endl;
    cout<<"\t AAB UNIVERSITY";

    cin.get();
    return 0;
}
```





- Programming Paradigms!
 - **Paradigms** *emerge as the result of social processes in which people develop ideas and create principles and practices that embody those ideas*
 - **Programming paradigms** *are the result of people's ideas about how programs should be constructed*
 1. Structural (Procedural) Programming
 2. Object-Oriented Programming



Difference between STRUCTURED & OOPs



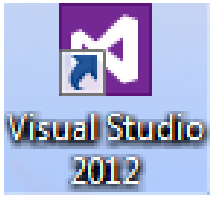
STRUCTURED PROGRAMMING	OBJECT-ORIENTED PROGRAMMING
Top-down approach is followed.	Bottom-Up approach is followed.
Program is divided into a number of sub-modules or functions or procedures.	Program is organized by having a number of classes and objects.
Function call is used.	Message passing is used.
Software reuse is not possible.	Helps in software reuse.
No encapsulation. Data and functions are separate.	Data and functionalities are put together in a single entity.



- Object Oriented Programming is a programming methodology characterized by the following concepts:
 1. Data Abstraction
 2. Encapsulation
 3. Information hiding
 4. Polymorphism
 5. Inheritance



- C++ Program Structure:



Source File (.cpp)

Directives

main program (or function)



- Questions?!

