LOVELY PROFESSIONAL UNIVERSITY

CSE233 Object Oriented Programing

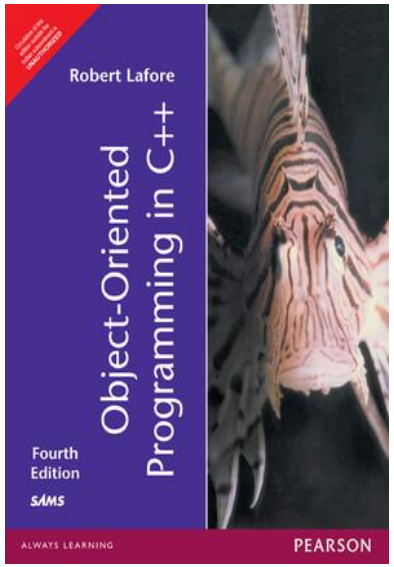
Lecture #0

Let's explore and move to "Better C"

Course details

- LTP – 004

- **Text Book**
  - OBJECT ORIENTED PROGRAMMING IN C++
    by Robert Lafore, PEARSON



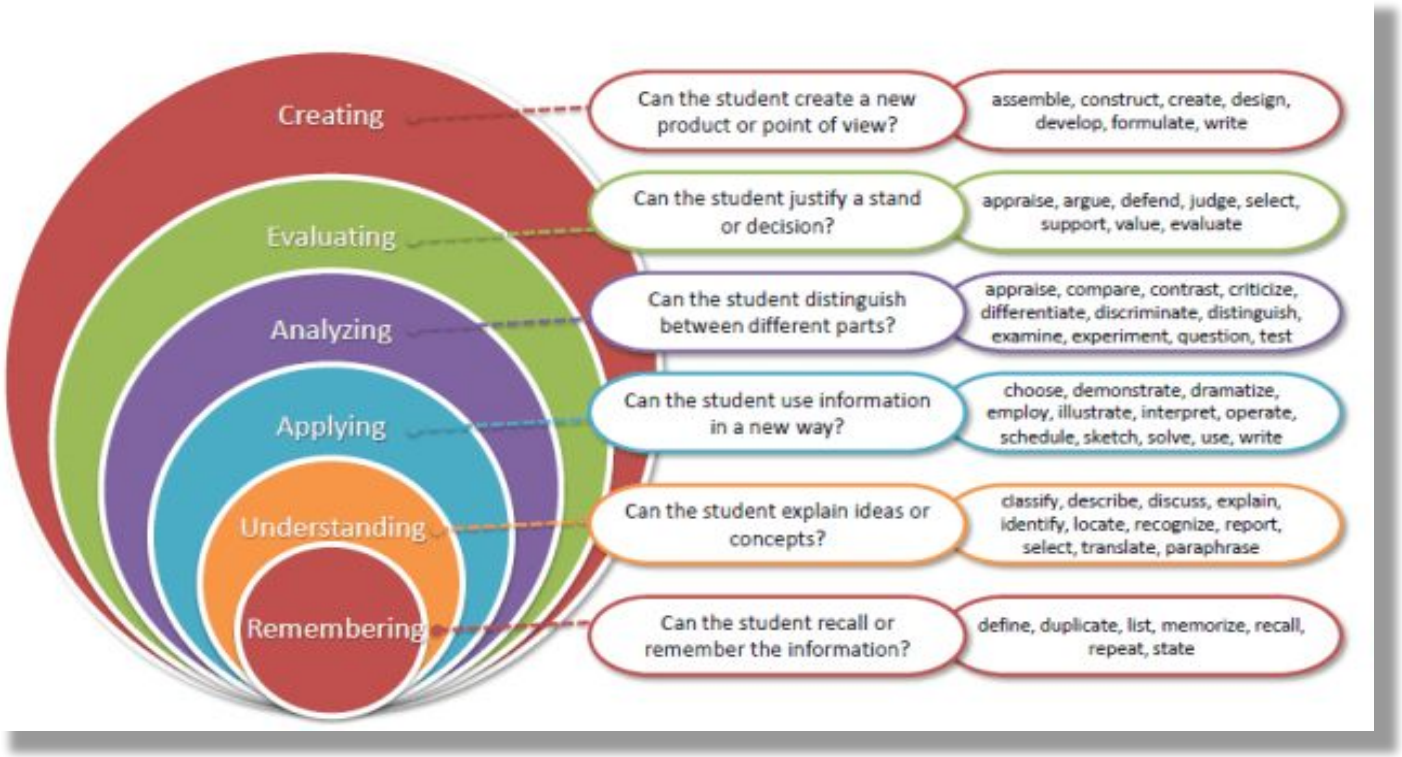
Vision and Mission of University

- **Vision:** To be a premier academic institution, recognized internationally for its contribution to industry and society through excellence in teaching, learning, research, internationalization, entrepreneurship and leadership.
- **Mission:**
- To transform education through academic rigour, practical orientation and outcome based teaching.
- To develop and implement a relationship of cooperation between industry and academia.
- To undertake impactful research addressing local, national and global challenges.
- To prepare graduates to be lifelong learners with strong analytical and leadership skills.
- To develop global professionals and entrepreneurs with innovative spirit, tolerance and desire to make a difference to the society.

Vision and Mission of SEEE

- **Vision:** To become one of the leading Schools globally in Electronics and Electrical Engineering recognized for its academics and innovations by nurturing professionals, researchers and entrepreneurs for sustainable growth of industry and society.
- **Mission:**
- To provide a learning-based environment on technical concepts applied to real-life situations with measurable outcomes.
- To establish connections with the industry for curriculum design, and creating internship cum career opportunities.
- To address societal issues related to regional, national and global challenges through meaningful research.
- To inspire graduates for pursuing lifelong learning in professional careers.
- To develop leadership potential in ethically competent entrepreneurs.

Revised Bloom's Taxonomy



Course Outcomes

Through this course students should be able to:

CO1: identify basic programming constructs and use the newly acquired skills to solve extensive programming problems

CO2 :: discuss the mechanism of code reusability by creating own libraries of functions

CO3 :: validate the logic building and code formulation by designing code capable of passing various test cases

CO4 :: interpret the principles of the object-oriented model and apply it in the implementation in C ++ language

CO5 :: develop accurate, reliable and efficient software applications

CO6 :: apply the knowledge acquired to develop software applications

Program Outcomes

PO1

Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2

Problem analysis::Identify, formulate, research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3

Design/development of solutions::Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4

Conduct investigations of complex problems::Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Program Outcomes

PO5

Modern tool usage::Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6

The engineer and society::Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7

Environment and sustainability::Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8

Ethics::Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9

Individual and team work::Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

Program Outcomes

PO10

Communication::Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11

Project management and finance::Demonstrate knowledge and understanding of the engineering, management principles and apply the same to one's own work, as a member or a leader in a team, manage projects efficiently in respective disciplines and multidisciplinary environments after consideration of economic and financial factors.

PO12

Life-long learning::Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PO13

Competitive Skills::Ability to compete in national and international technical events and building the competitive spirit alongwith having a good digital footprint.

Mapped Cohorts

SOFTWARE ENGINEER/SOFTWARE DEVELOPMENT-(Product Based and Service Based) The business environment relies heavily on software for many functions - from automated traffic control systems to complex manufacturing processes. Software Engineers are pivotal in the development of software that provides real solutions.

C++ provides skills to develop software applications.So this programming language is highly demanded by IT companies.

CSE233 IS A STAR COURSE

- This course provides a pathway for the students to gain insights about the technical skills in the field of programming
- This course helps the students to apply their technical skills to become software developers.
- Students could be able to streamline their career in programming and become industry-ready.
- C++ is basic requirement for most of the companies for placement drives.

Execution strategy for star courses

- Github repository creation
- Screening of job requirements and profiles
- Interaction with recently placed senior students
- Profile creation on online platforms

INNOVATIVE PEDAGOGY

- Placement drives level coding tasks
- Hackerrank based problem solving
- Live demonstration using compliers
- Pair Programming
- Case studies implementation
- Code Review
- Analysis of existing object oriented projects

Course Assessment Model

Marks break up(Weightage)

•Attendance	05
•CA	30
•MTE	20
•ETE	45
Total	**100**

Complete evaluation criteria for the course

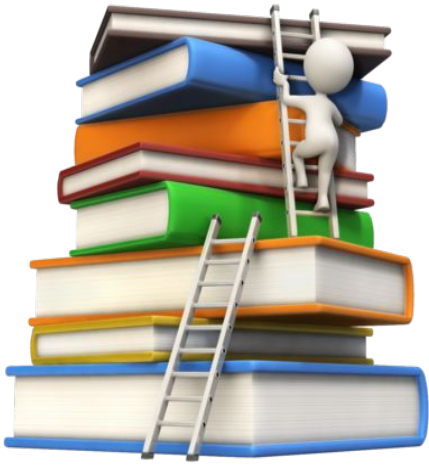
CA1: 30 marks- Test

CA2: 30 marks- Test

CA3: 30 marks- Code based Test

Online Resourcses

- MIT OpenCourseware
- Stanford online
- Udemy
- Coursera
- The homepage of Bjarne Stroustrup, the inventor of C++: http://www.research.att.com/~bs
- A C++ online tutorial: http://www.cplusplus.com/doc/tutorial/
- The C++ FAQ: http://www.parashift.com/c++-faq-lite
- learncpp.com



and many, many more!

The course contents

- **Unit I:** Concepts and Basics of C++ Programming, Functions and Input/output Streams.

- **Unit II:** Pointers, Reference Variables, Arrays and String Concepts

- **Unit III:** Constructor, destructor and File Handling

- **Unit IV:** Operator Overloading and Type Conversion, Inheritance and Aggregation.

- **Unit V** : Dynamic Memory Management, Polymorphism

- **Unit VI:** Exception Handling, Templates and Standard Template Library (STL)

The hitch…

The BURNING questions in mind…

- **Oh no… Why another Programming Language ?**
- **What would we do with it, we already know C?**
- **Will it really help improve my programming skills?**

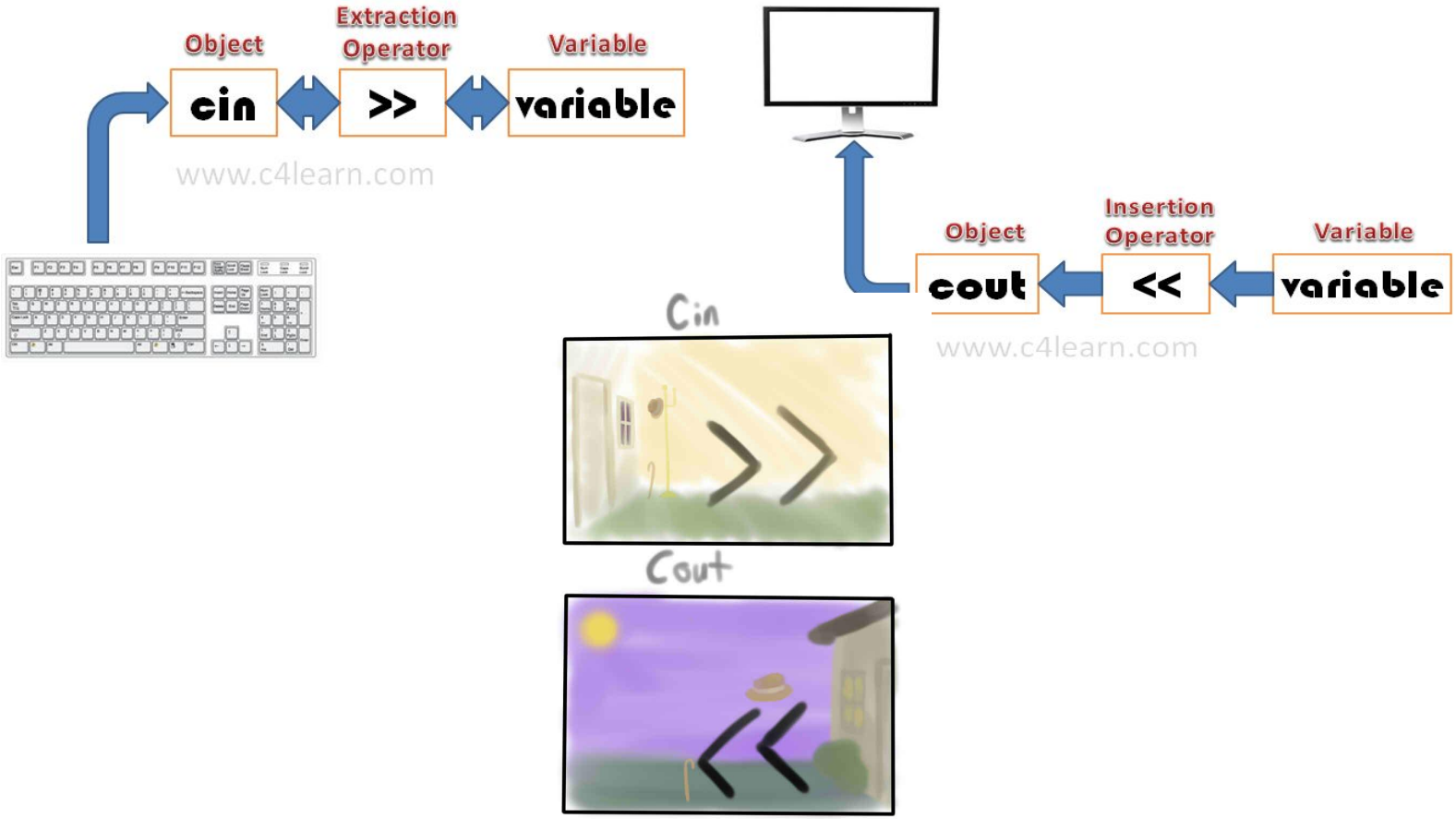
A Better C

C++

- Improves on many of C's features
- Has object-oriented capabilities
  - Increases software quality and reusability
- Developed by Bjarne Stroustrup at Bell Labs
  - Called "C with classes“ an enhanced version of C
- Superset of C
  - Can use a C++ compiler to compile C programs
  - Gradually evolve the C programs to C++

Towards better programming….

Unit 1: Concepts and Basics of Programming



Bring in through cin and Take out through cout

Object ,Object and Object

A student, a professor

A desk, a chair, a classroom, a building

A university, a city, a country

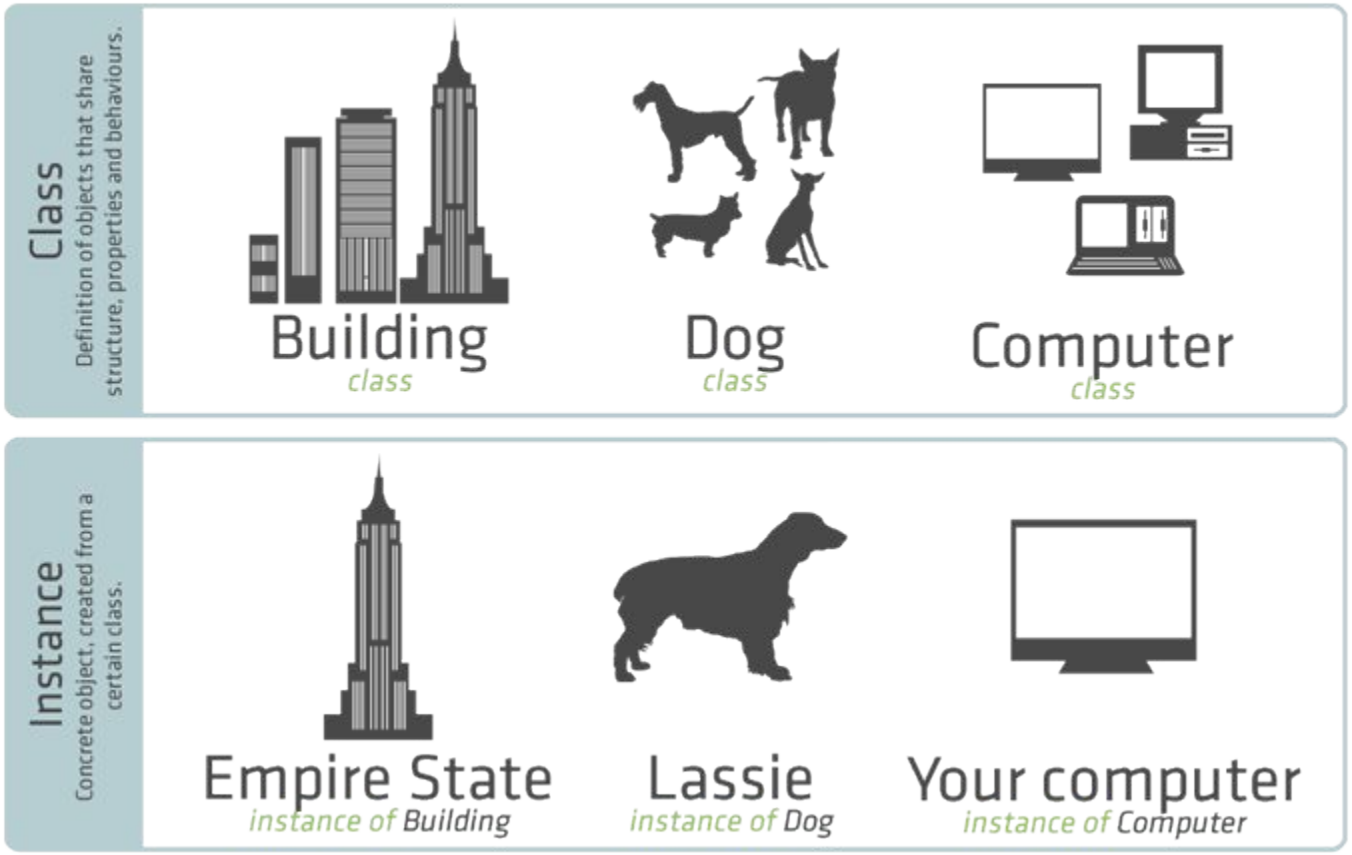
A subjects such as Physics, Math, History, …

Daily Analysis

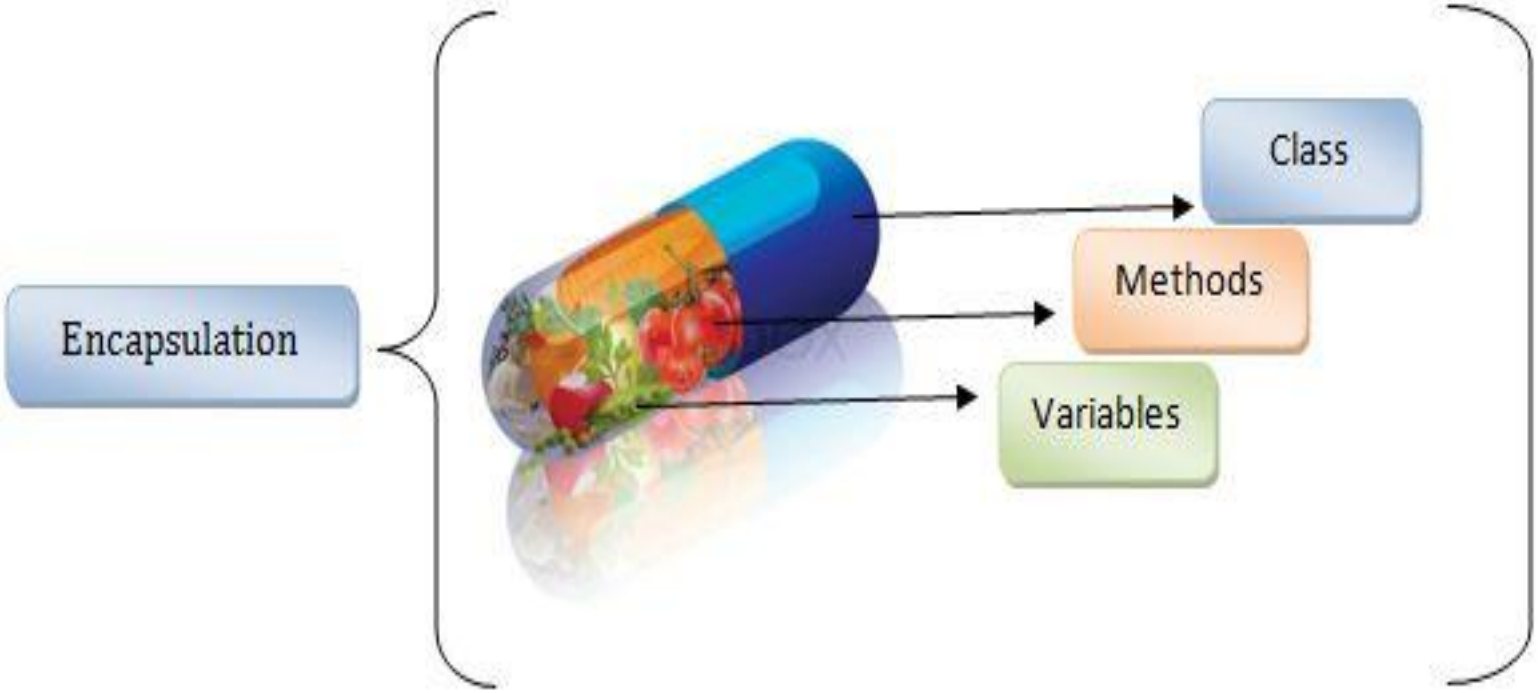
Look around you and identify some objects

Everything is an OBJECT

CLASSES v/s OBJECTS



Encapsulation



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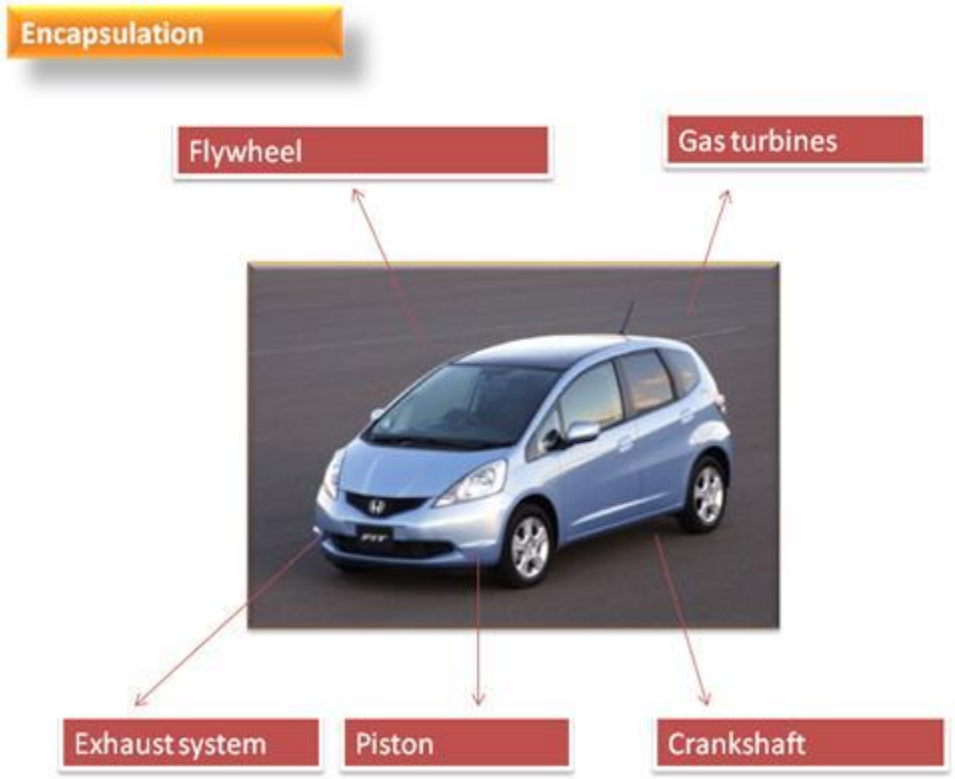
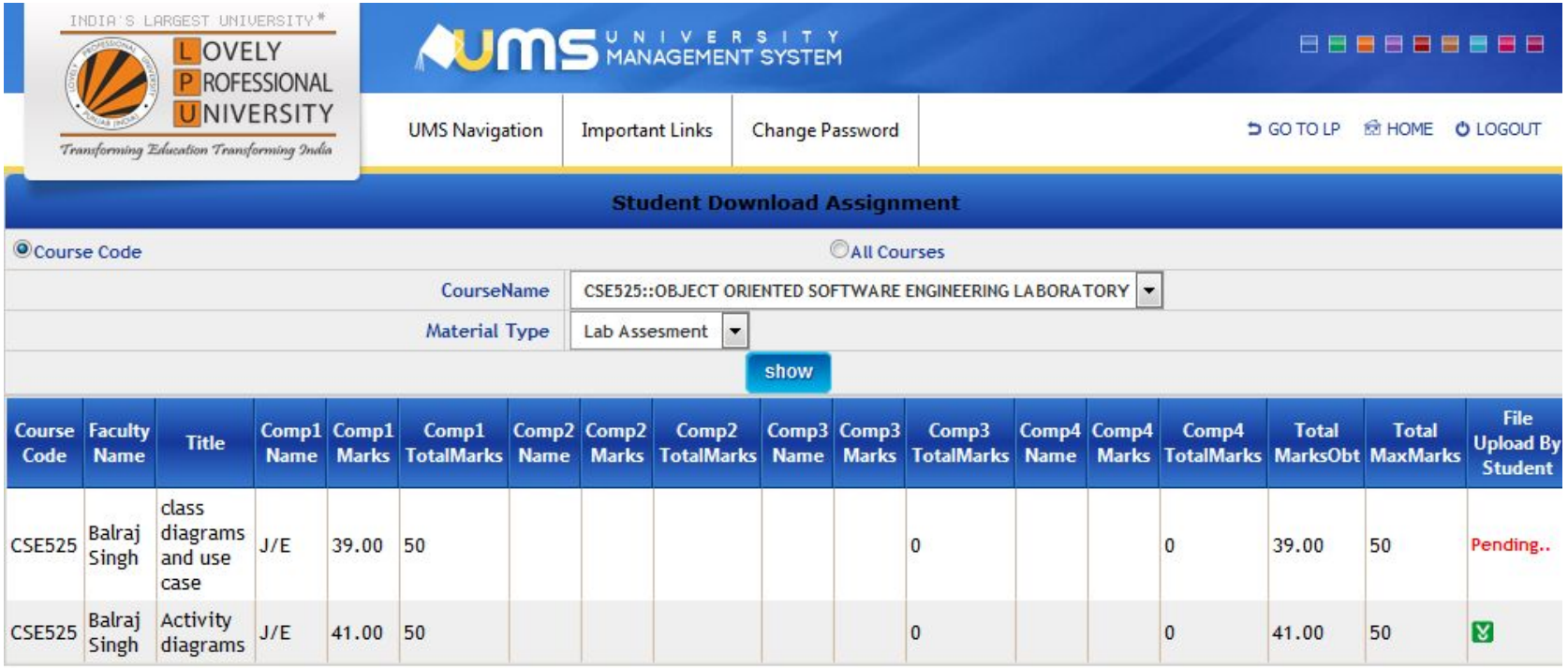


DATA ABSTRACTION

An abstraction includes the essential details relative to the perspective of the viewer

Hiding data



Course Code	Faculty Name	Title	Comp1 Name	Comp1 Marks	Comp1 TotalMarks	Comp2 Name	Comp2 Marks	Comp2 TotalMarks	Comp3 Name	Comp3 Marks	Comp3 TotalMarks	Comp4 Name	Comp4 Marks	Comp4 TotalMarks	Total MarksObt	Total MaxMarks	File Upload By Student
CSE525	Balraj Singh	class diagrams and use case	J/E	39.00	50						0			0	39.00	50	Pending..
CSE525	Balraj Singh	Activity diagrams	J/E	41.00	50						0			0	41.00	50	

Update Marks

Hiding Details

For the mathematical equation, shown in the figure assume that complex functions are required - >But I the end we obtain result for it

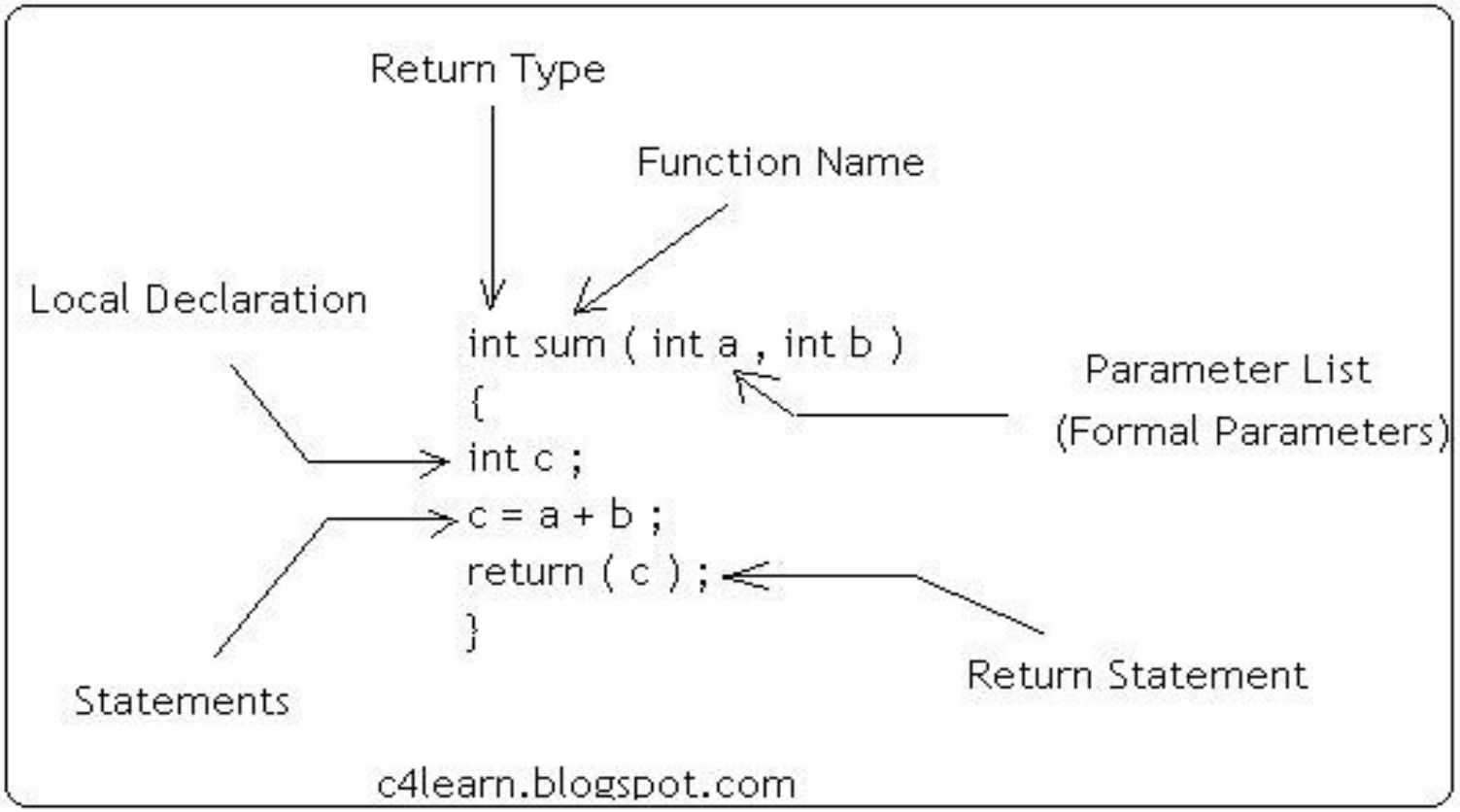
Calculator shows the result of equation but hides the implementation (calculating the result) involved.

The calculator shown in the figure has to be powered by a battery source. How the battery module works for the calculator is not necessary to know for the user who uses the calculator.

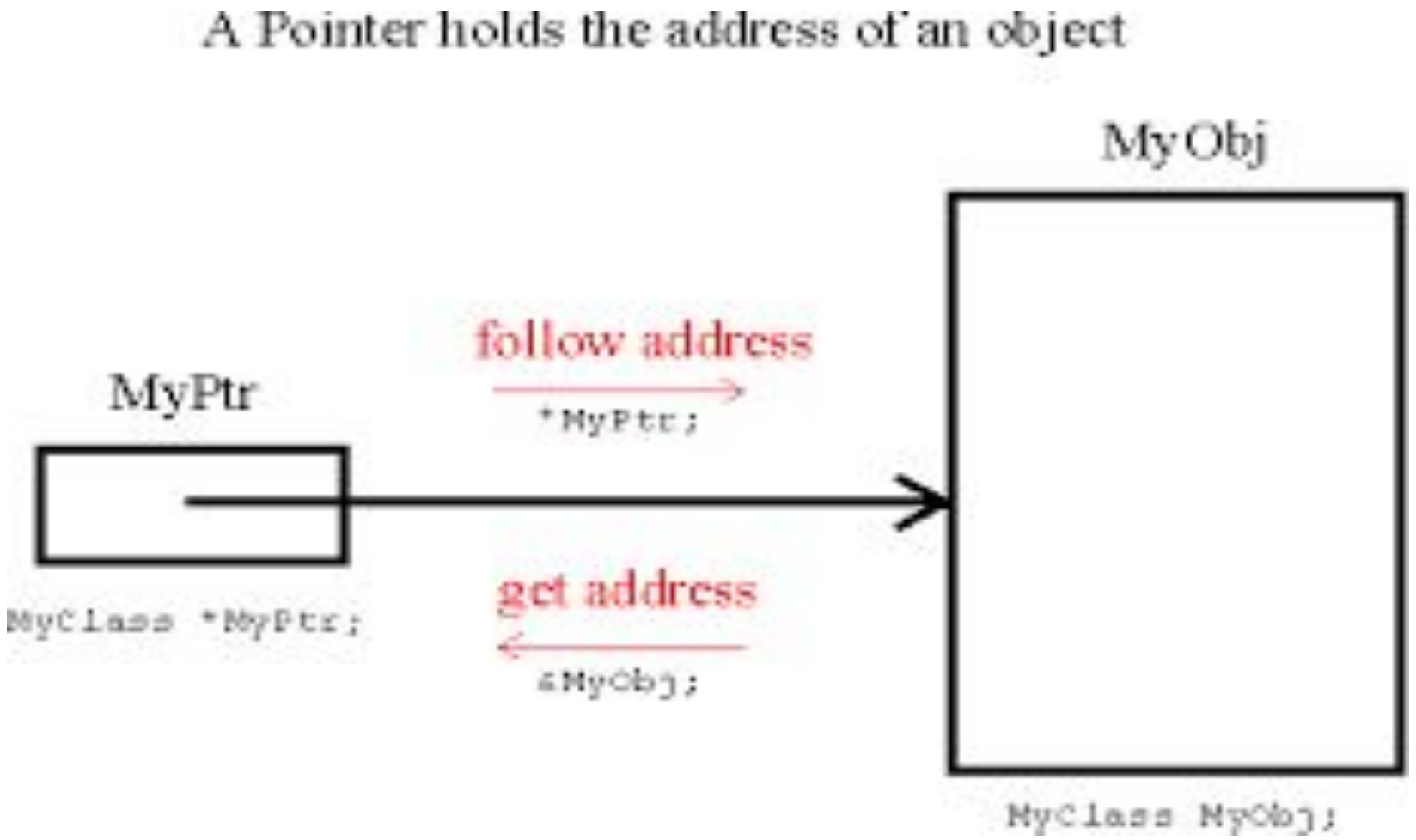
Using Battery module along with other modules we use calculator

Message Passing

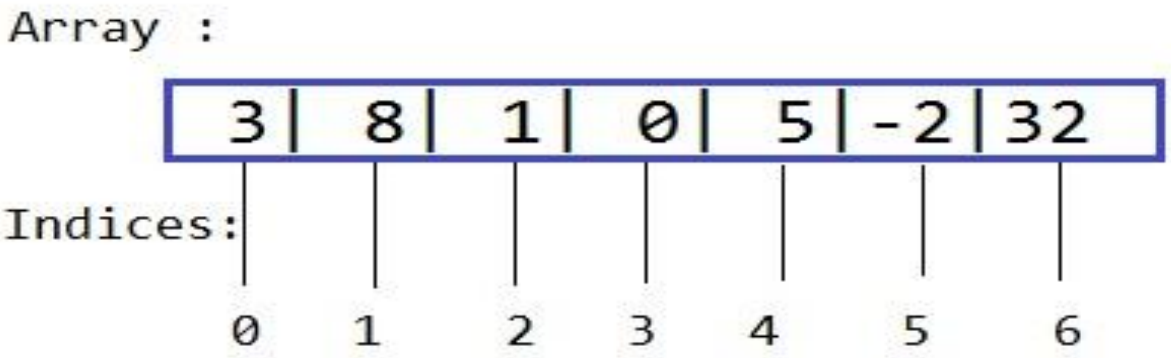
Unit I (Continued): Function



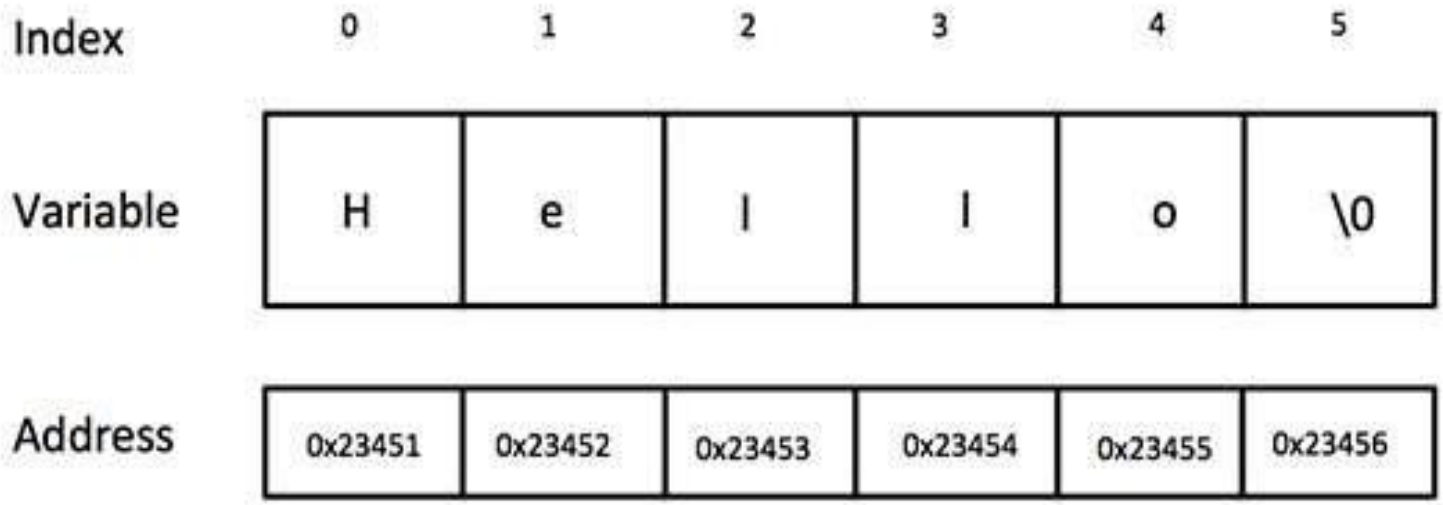
Unit II: Pointers, Arrays and String Concepts



Array



String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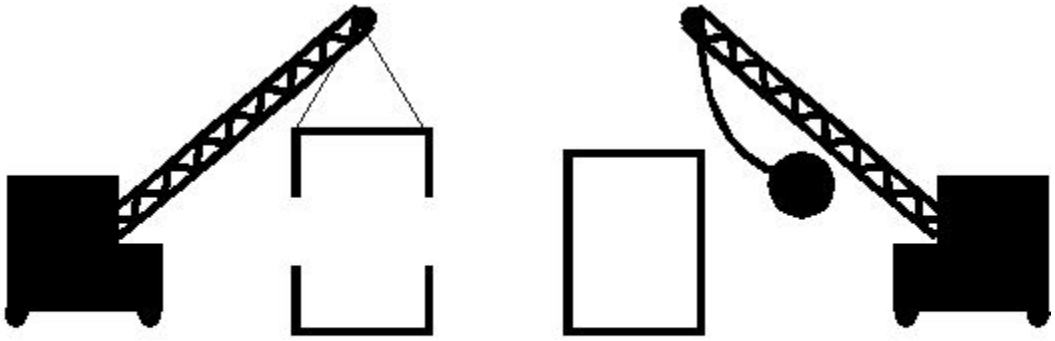
Unit III. Constructors, Destructors and File Handling



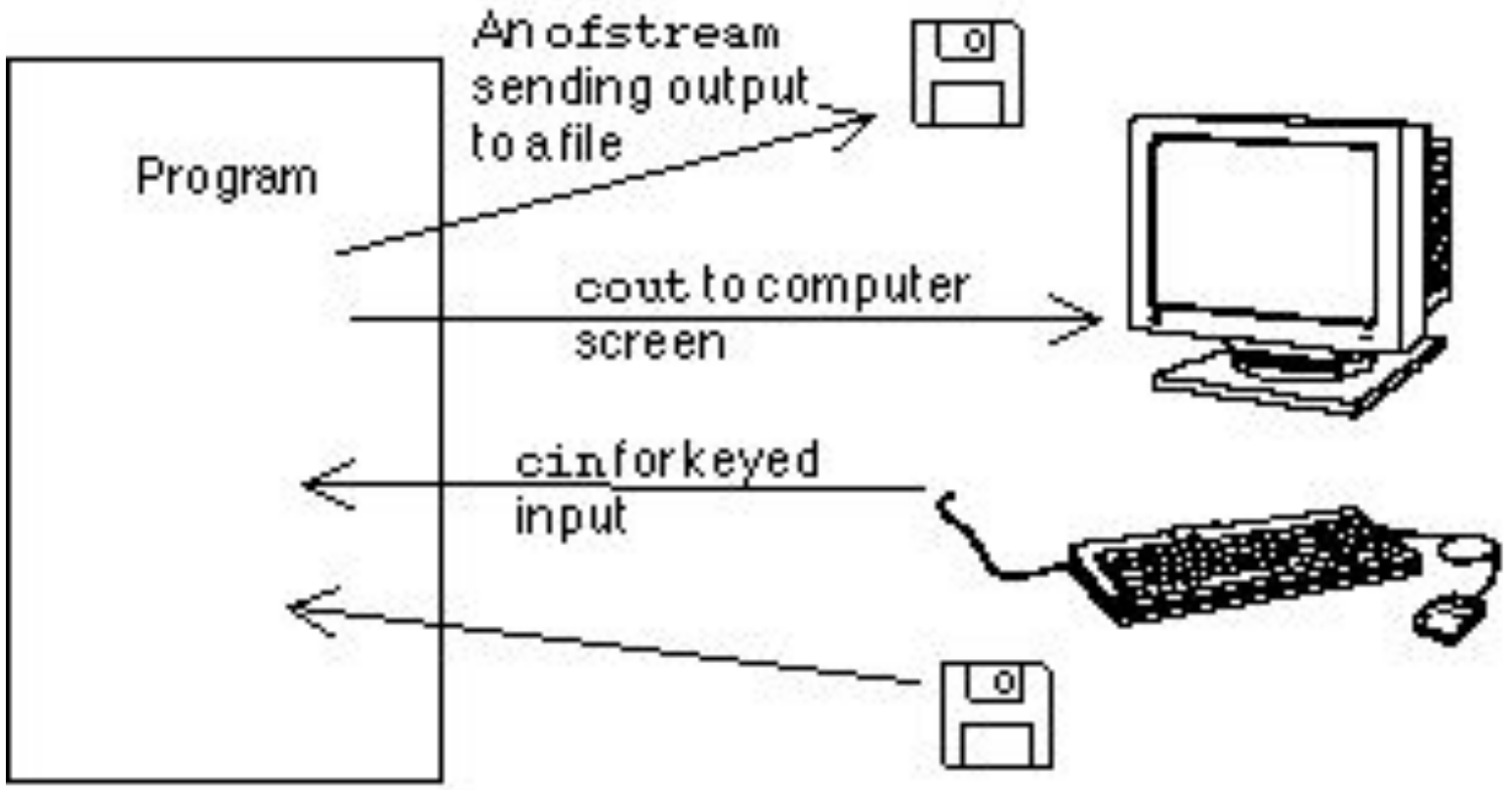
Constructor

```
MyClass *MyObjPtr = new MyClass();
```

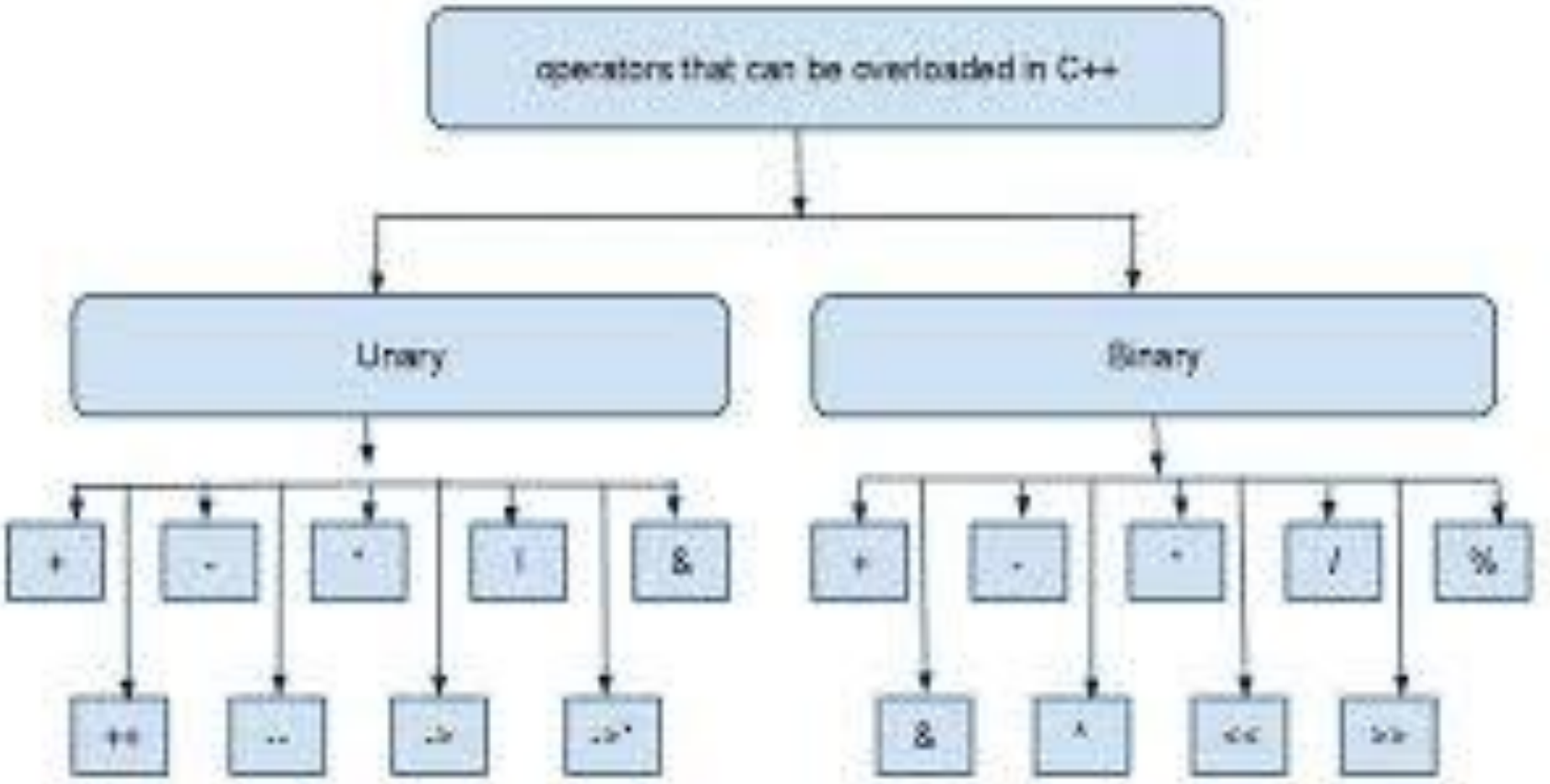
Destructor

```
delete MyObjPtr;
```

File Handling in C++



Unit IV. Operator Overloading and Type Conversion, Inheritance and Aggregation

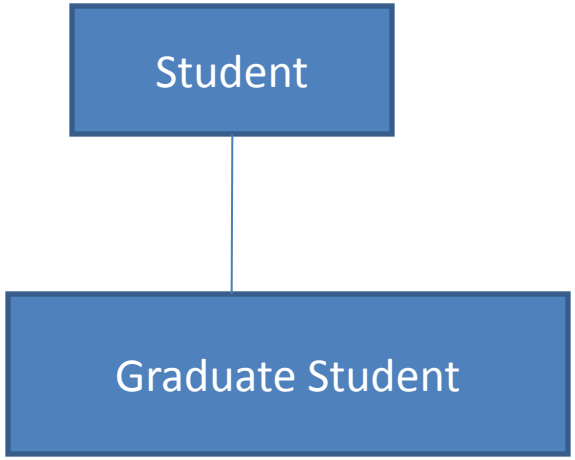


Traits Passed Through Inheritance

But Mummy, where did my blue eyes come from?

Student and Graduate Student

So what does this mean?



The Student Inherited and built upon the learning from past

Reuse, Reduce & Reliable !!!

Existing Features

Existing Features + Additional Features

Unit V: Dynamic Memory Management and Polymorphism

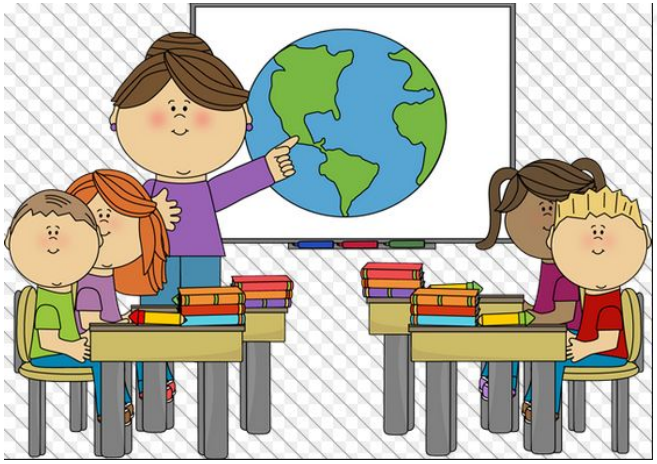
- C++ uses new and delete operator for dynamic memory management.

Polymorphism

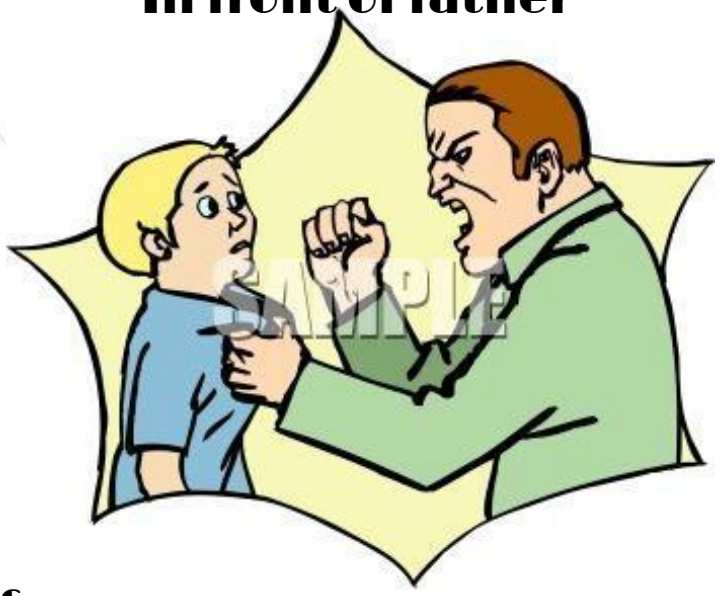
Expression of a student

In CCD

In class

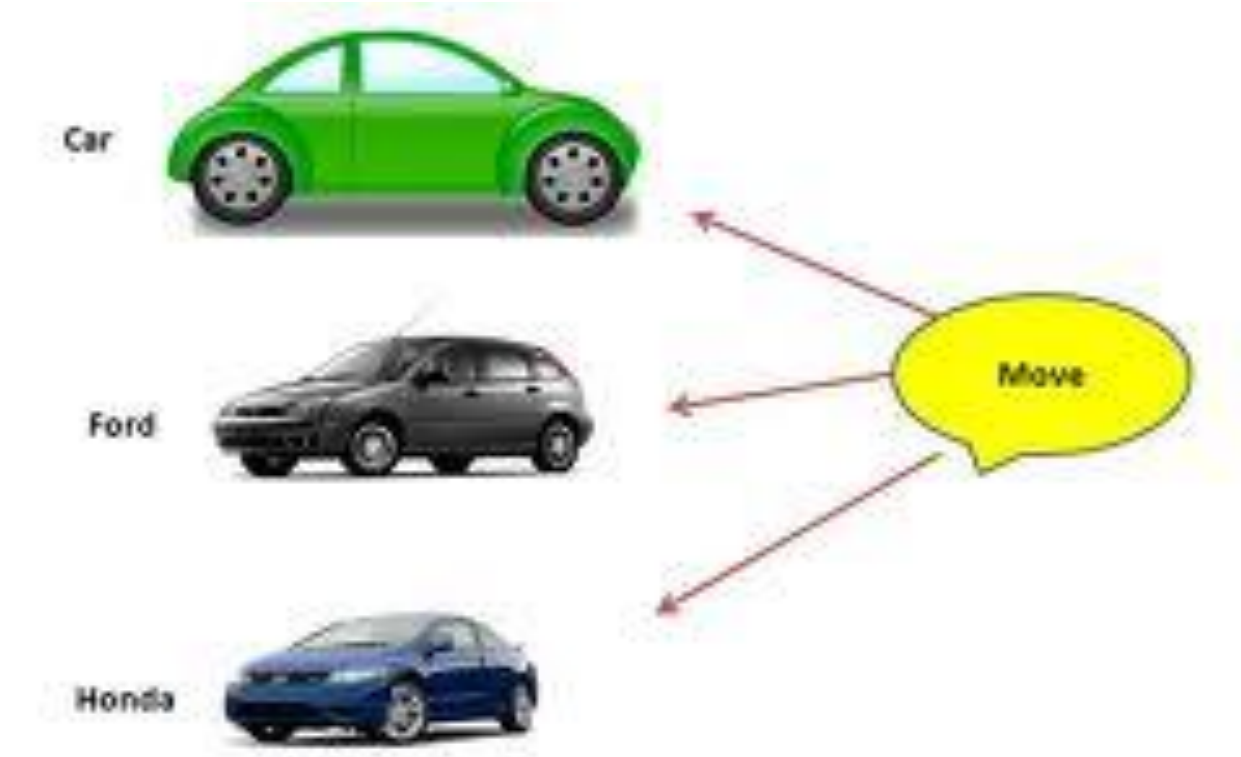


In front of father



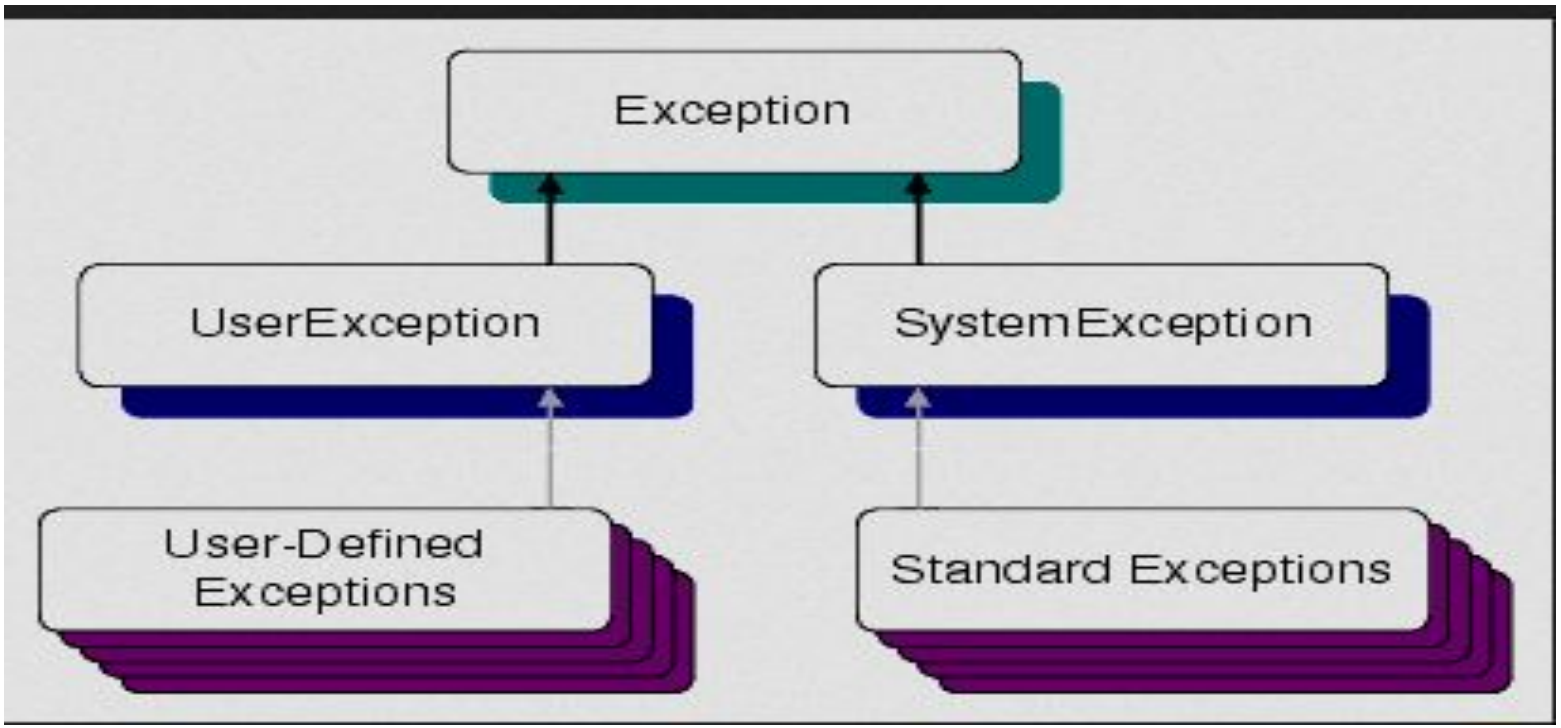
One thing and many forms

Example of Polymorphism

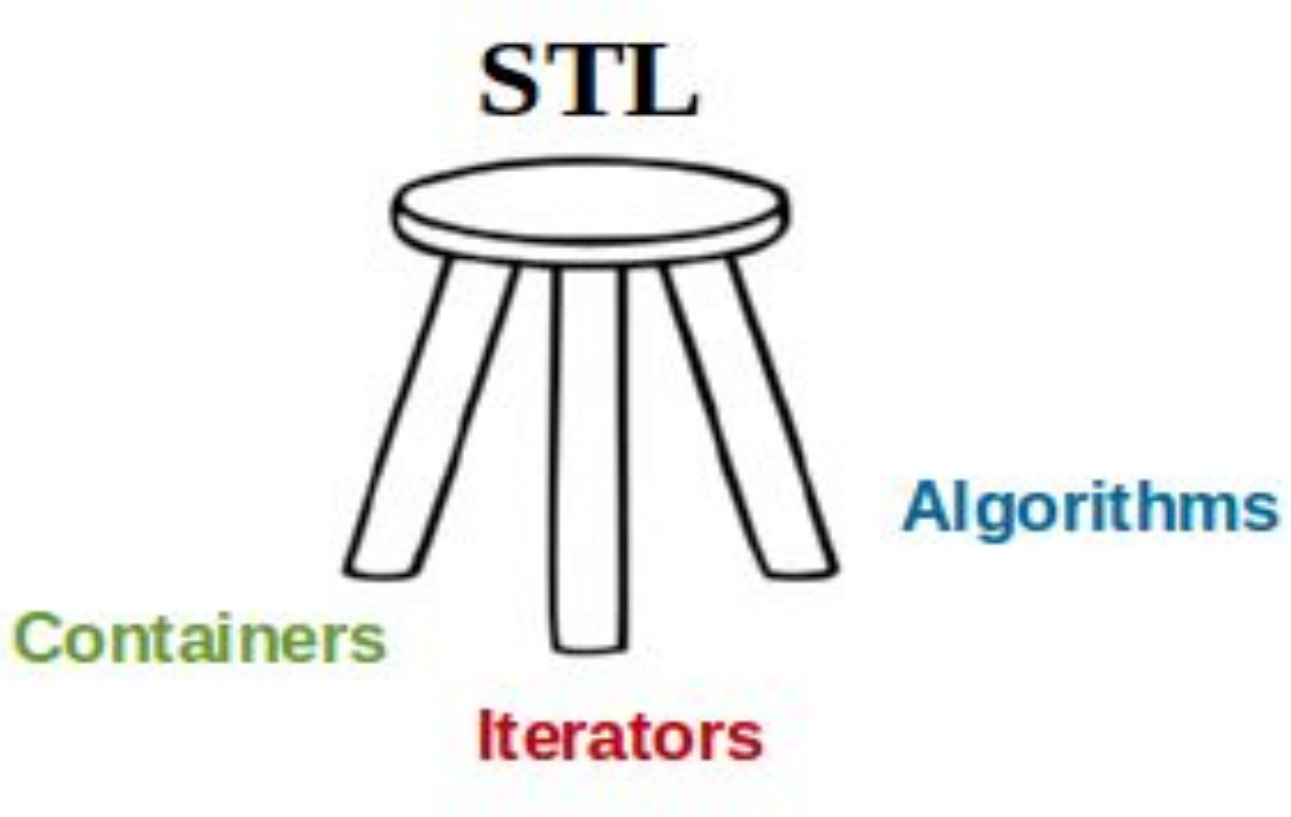


- Car uses normal engine to move
- Ford uses V engine to move
- Honda uses i-vtec technology to move

Unit VI: Exception Handling, Templates and Standard Template Library (STL)



Standard Template Library



As an electronics and communication engineering student, why should I learn programming ?

- Electronics and communication deals broadly with the following fields:
  1. Analog Electronics
  2. Digital Electronics
  3. Communication
  4. Digital signal processing
  5. Miscellaneous(Control system etc.)

- Apart from the first heading(Analog electronics) where programming is limited to spice tools and scripting for automation, all the other fields involve extensive programming.
- Programming provides the means to implement the ideas for practical applications. i.e. : The digital circuits are implemented using *verilog*, whereas the signal processing algorithms are implemented on various platforms according to the application

- Communication encompasses everything from antenna design to data communication. Except for the antenna and RF filters, every system is programmed chiefly by the electronics engineers.
- Embedded systems are in use across all the application areas of electronics, the programming of which is a valuable skill for all electronics engineers.

Any Question?

Next Class: Concepts and Basics of C++ programming