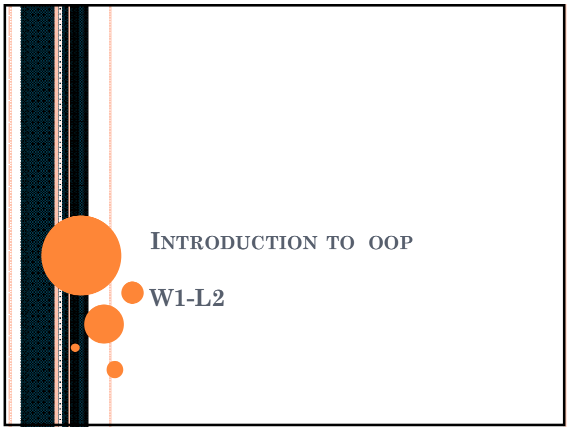
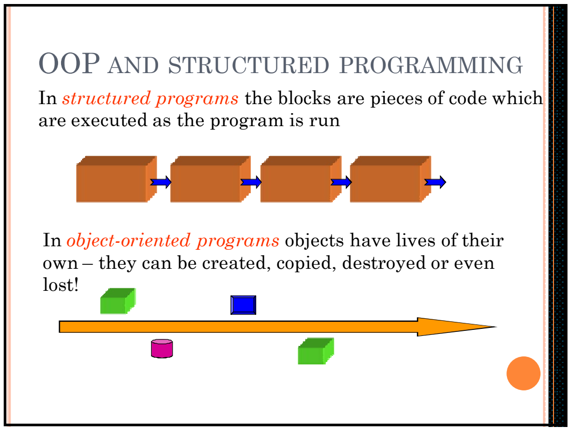


Introduction to OOP

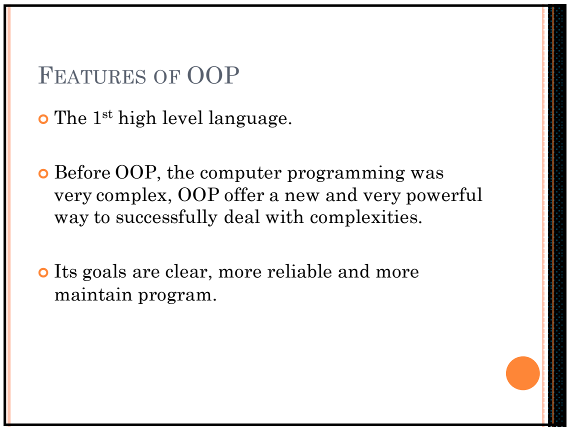
W1-L2



OOP and structured programming

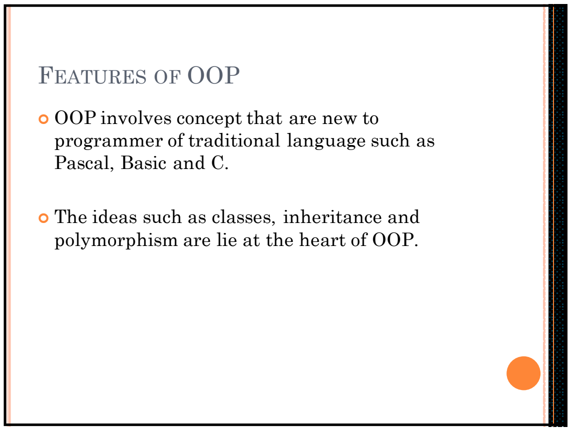
In *structured programs* the blocks are pieces of code which are executed as the program is run

In *object-oriented programs* objects have lives of their own – they can be created, copied, destroyed or even lost!



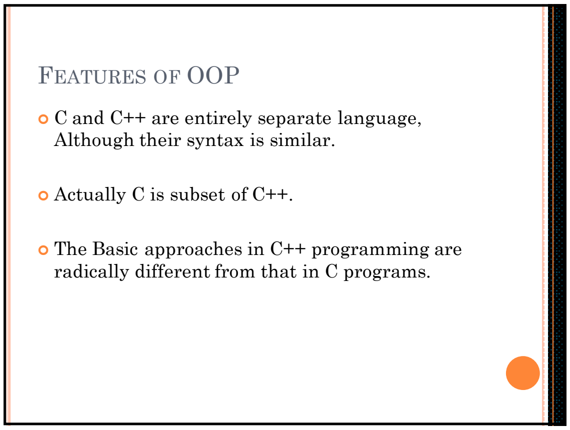
Features of OOP

- The 1st high level language.
- Before OOP, the computer programming was very complex, OOP offer a new and very powerful way to successfully deal with complexities.
- Its goals are clear, more reliable and more maintain program.



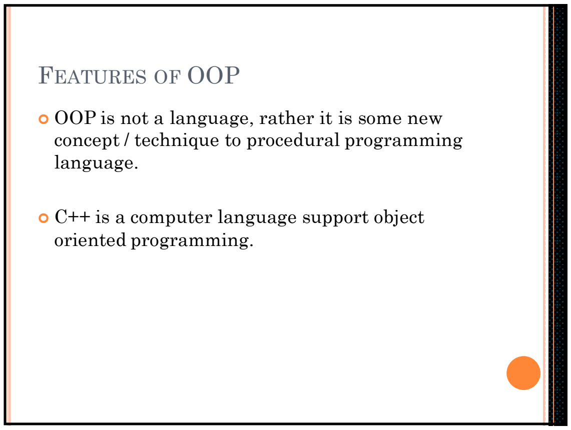
Features of OOP

- OOP involves concept that are new to programmer of traditional language such as Pascal, Basic and C.
- The ideas such as classes, inheritance and polymorphism are lie at the heart of OOP.



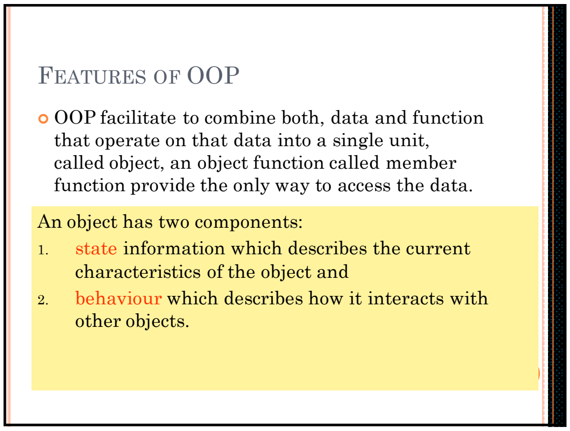
Features of OOP

- C and C++ are entirely separate language, Although their syntax is similar.
- Actually C is subset of C++.
- The Basic approaches in C++ programming are radically different from that in C programs.



Features of OOP

- OOP is not a language, rather it is some new concept / technique to procedural programming language.
- C++ is a computer language support object oriented programming.

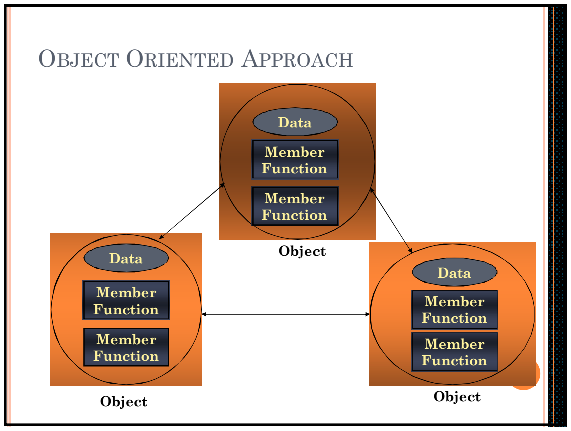


Features of OOP

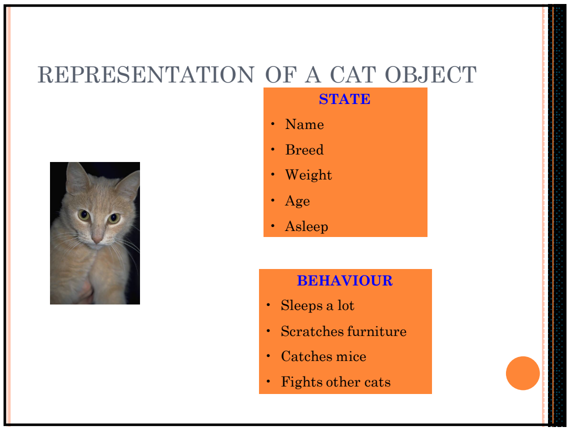
- OOP facilitate to combine both, data and function that operate on that data into a single unit, called object, an object function called member function provide the only way to access the data.

An object has two components:

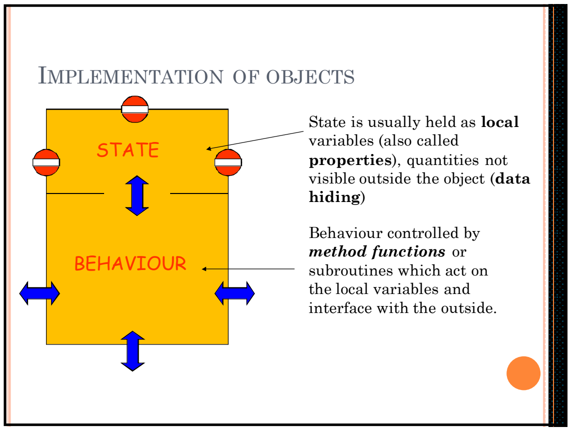
1. state information which describes the current characteristics of the object and
2. behaviour which describes how it interacts with other objects.



Object Oriented Approach



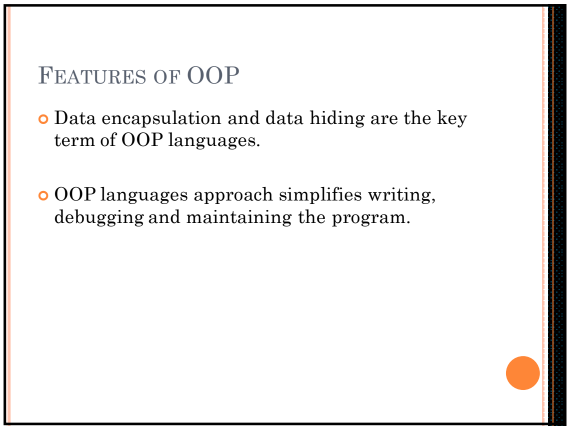
Representation of a cat object



Implementation of objects

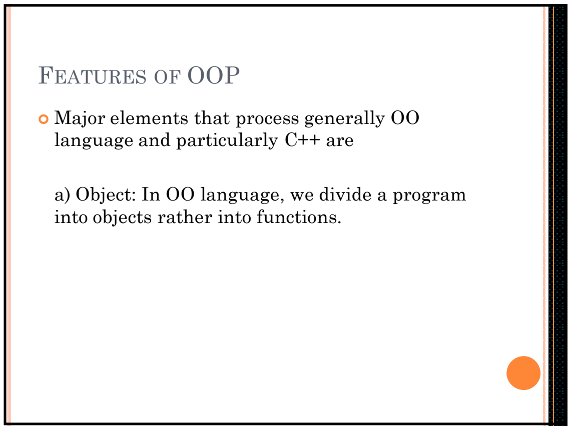
State is usually held as **local** variables (also called **properties**), quantities not visible outside the object (**data hiding**)

Behaviour controlled by ***method functions*** or subroutines which act on the local variables and interface with the outside.



Features of OOP

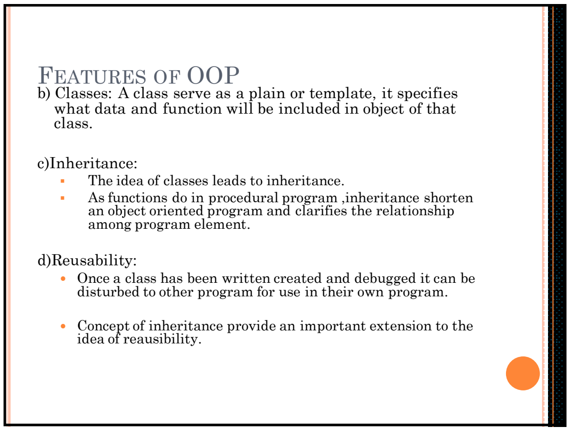
- Data encapsulation and data hiding are the key term of OOP languages.
- OOP languages approach simplifies writing, debugging and maintaining the program.



Features of OOP

- Major elements that process generally OO language and particularly C++ are

a) Object: In OO language, we divide a program into objects rather into functions.



Features of OOP

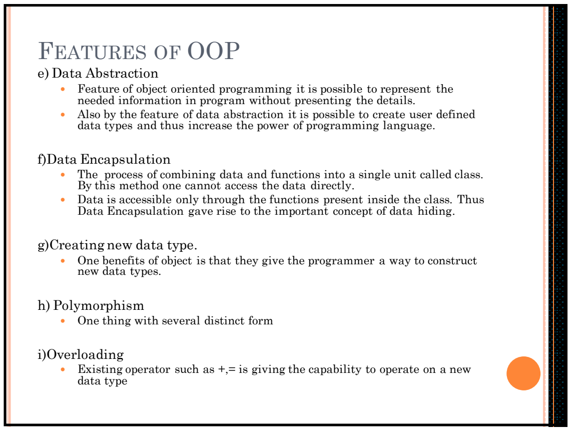
b) Classes: A class serve as a plain or template, it specifies what data and function will be included in object of that class.

c)Inheritance:

- The idea of classes leads to inheritance.
- As functions do in procedural program ,inheritance shorten an object oriented program and clarifies the relationship among program element.

d)Reusability:

- Once a class has been written created and debugged it can be disturbed to other program for use in their own program.
- Concept of inheritance provide an important extension to the idea of reausibility.



Features of OOP

e) Data Abstraction

- Feature of object oriented programming it is possible to represent the needed information in program without presenting the details.
- Also by the feature of data abstraction it is possible to create user defined data types and thus increase the power of programming language.

f)Data Encapsulation

- The process of combining data and functions into a single unit called class. By this method one cannot access the data directly.
- Data is accessible only through the functions present inside the class. Thus Data Encapsulation gave rise to the important concept of data hiding.

g)Creating new data type.

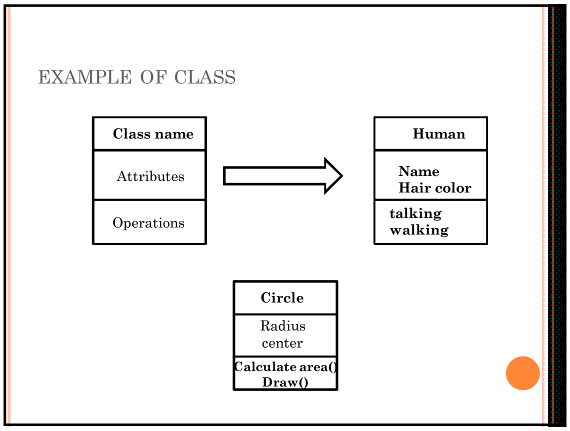
- One benefits of object is that they give the programmer a way to construct new data types.

h) Polymorphism

- One thing with several distinct form

i)Overloading

- Existing operator such as +,= is giving the capability to operate on a new data type



Example of class

Class name

Attributes

Operations

Human

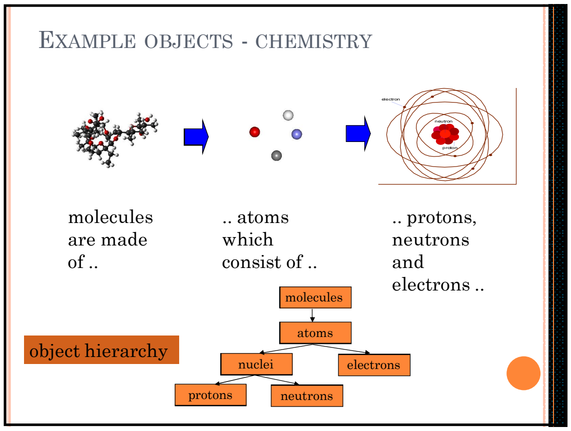
Name
Hair color

talking
walking

Circle

Radius
center

Calculate area()
Draw()



Example objects - chemistry

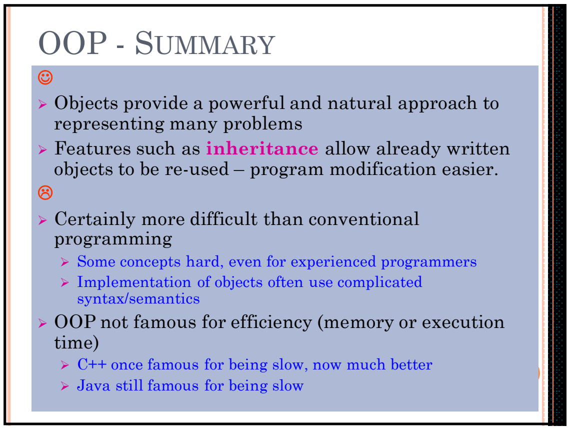
molecules are made of ..

.. atoms which consist of ..

.. protons, neutrons and electrons ..

object hierarchy

molecules
atoms
nuclei
electrons
protons
neutrons



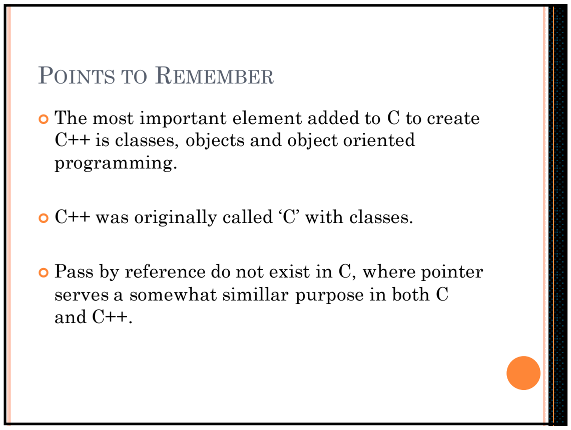
OOP - Summary

☺

- Objects provide a powerful and natural approach to representing many problems
- Features such as **inheritance** allow already written objects to be re-used – program modification easier.

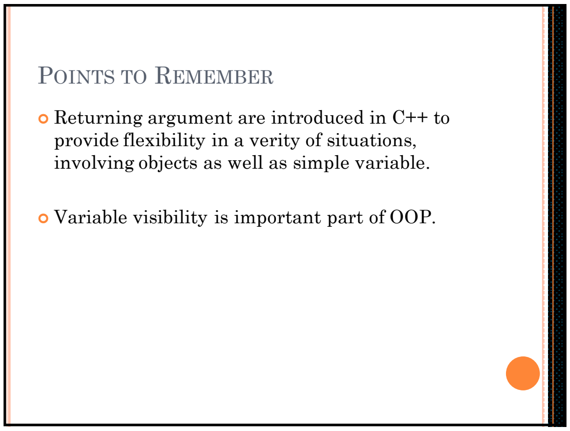
☹

- Certainly more difficult than conventional programming
  - Some concepts hard, even for experienced programmers
  - Implementation of objects often use complicated syntax/semantics
- OOP not famous for efficiency (memory or execution time)
  - C++ once famous for being slow, now much better
  - Java still famous for being slow



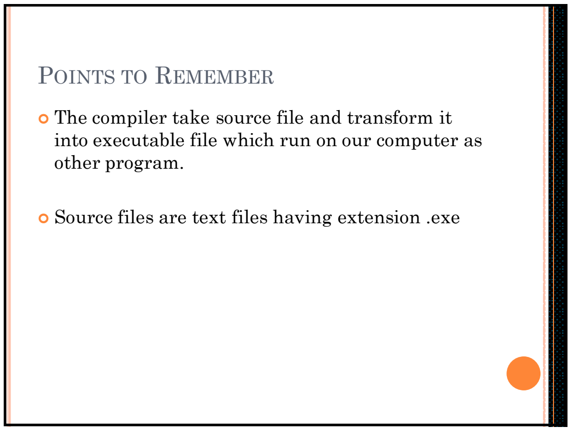
Points to Remember

- The most important element added to C to create C++ is classes, objects and object oriented programming.
- C++ was originally called 'C' with classes.
- Pass by reference do not exist in C, where pointer serves a somewhat simillar purpose in both C and C++.



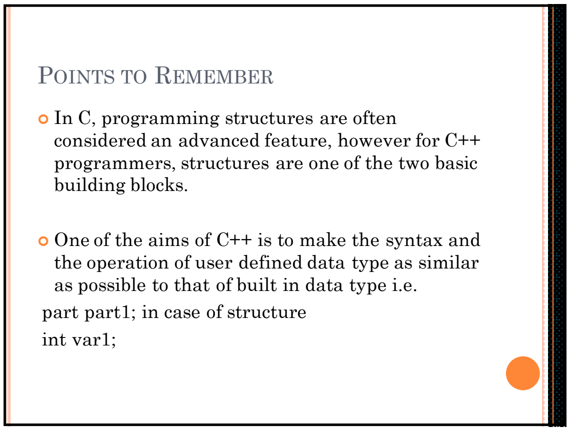
Points to Remember

- Returning argument are introduced in C++ to provide flexibility in a verity of situations, involving objects as well as simple variable.
- Variable visibility is important part of OOP.



Points to Remember

- The compiler take source file and transform it into executable file which run on our computer as other program.
- Source files are text files having extension .exe

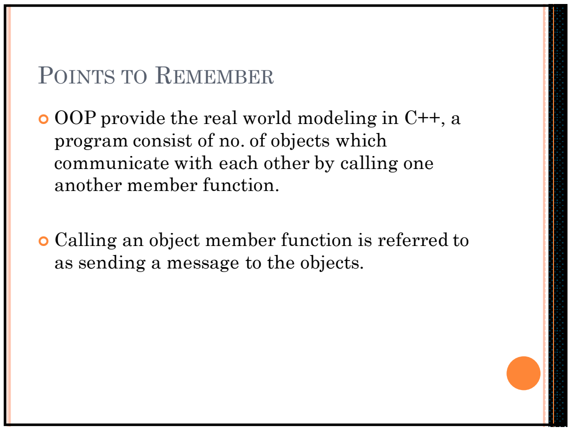


Points to Remember

- In C, programming structures are often considered an advanced feature, however for C++ programmers, structures are one of the two basic building blocks.
- One of the aims of C++ is to make the syntax and the operation of user defined data type as similar as possible to that of built in data type i.e.

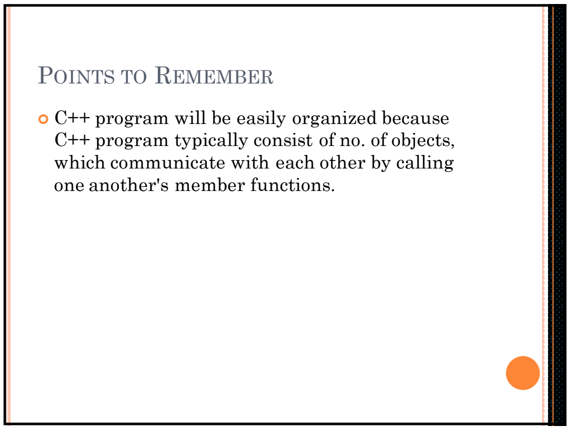
part part1; in case of structure

int var1;



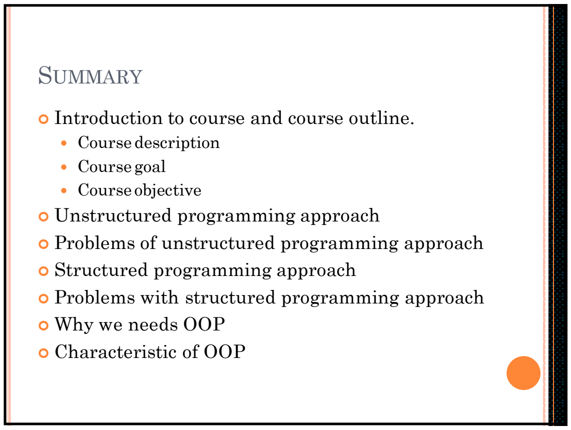
Points to Remember

- OOP provide the real world modeling in C++, a program consist of no. of objects which communicate with each other by calling one another member function.
- Calling an object member function is referred to as sending a message to the objects.



Points to Remember

- C++ program will be easily organized because C++ program typically consist of no. of objects, which communicate with each other by calling one another's member functions.



Summary

- Introduction to course and course outline.
  - Course description
  - Course goal
  - Course objective
- Unstructured programming approach
- Problems of unstructured programming approach
- Structured programming approach
- Problems with structured programming approach
- Why we needs OOP
- Characteristic of OOP