

Concepts of OOP

Weightage: 8%

- Introduction to OOP
- Procedural Vs. Object Oriented Programming
- Principles of OOP
- Benefits and applications of OOP

Introduction to OOP

- *OOP* is a design philosophy. It stands for Object Oriented Programming.
- C++ was founded in (1983)



Bjarne Stroustrup

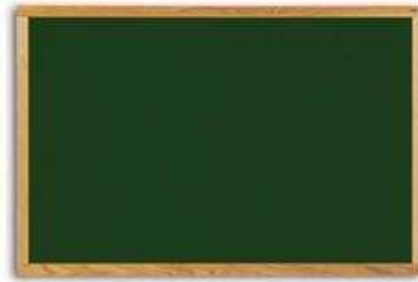
Introduction to OOP

- **Object-Oriented Programming** (*OOP*) uses a different set of programming languages than old procedural programming languages like (*C*, *Pascal*, etc.).
- Everything in *OOP* is grouped as self sustainable "*objects*".

What is Object?



Pen



Board



Laptop



Bench



Student



Projector

Physical objects...

What is Object?



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SEARCH RESULT:

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Exam Seat No: EB14875 Declared On: 19 Jun 2015
Exam: RE SEM 8 - Regular (MAY 2015)
Branch: CIVIL ENGINEERING

SUBJECT CODE	SUBJECT NAME	GRADE	INT. GRADE	ABSENT	BACKLOG
180601	Design Of Hydraulic Structures	BC	N	N	N - N - N - N
180602	Dock Harbour & Airport Engineering	BB	N	N	N - N - N - N
180603	Professional Practice & Valuation	BB	N	N	N - N - N - N
180604	Structural Design-II	BC	N	N	N - N - N - N
180605	Project -II	AA	N	N	N - N - N - N
180607	Repairs & Rehabilitation Of Structures	BB	N	N	N - N - N - N

Current Sem. Backlog: 0 Total Backlog: 0 GPE: 8.30 CPE: 7.58 CGPA: 7.98

Backlog: Sem-1: 0 | Sem-2: 0 | Sem-3: 0 | Sem-4: 0 | Sem-5: 0 | Sem-6: 0 | Sem-7: 0 | Sem-8: 0

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Congratulations! You have passed the exam.

Result



Account



Bank Account

Logical objects...

Attributes and operations



Attributes:

Name
Age
Weight

Operations:

Eat
Sleep
Walk



Attributes:

Company
Model
Weight

Operations:

Drive
Stop
FillFuel



Attributes:

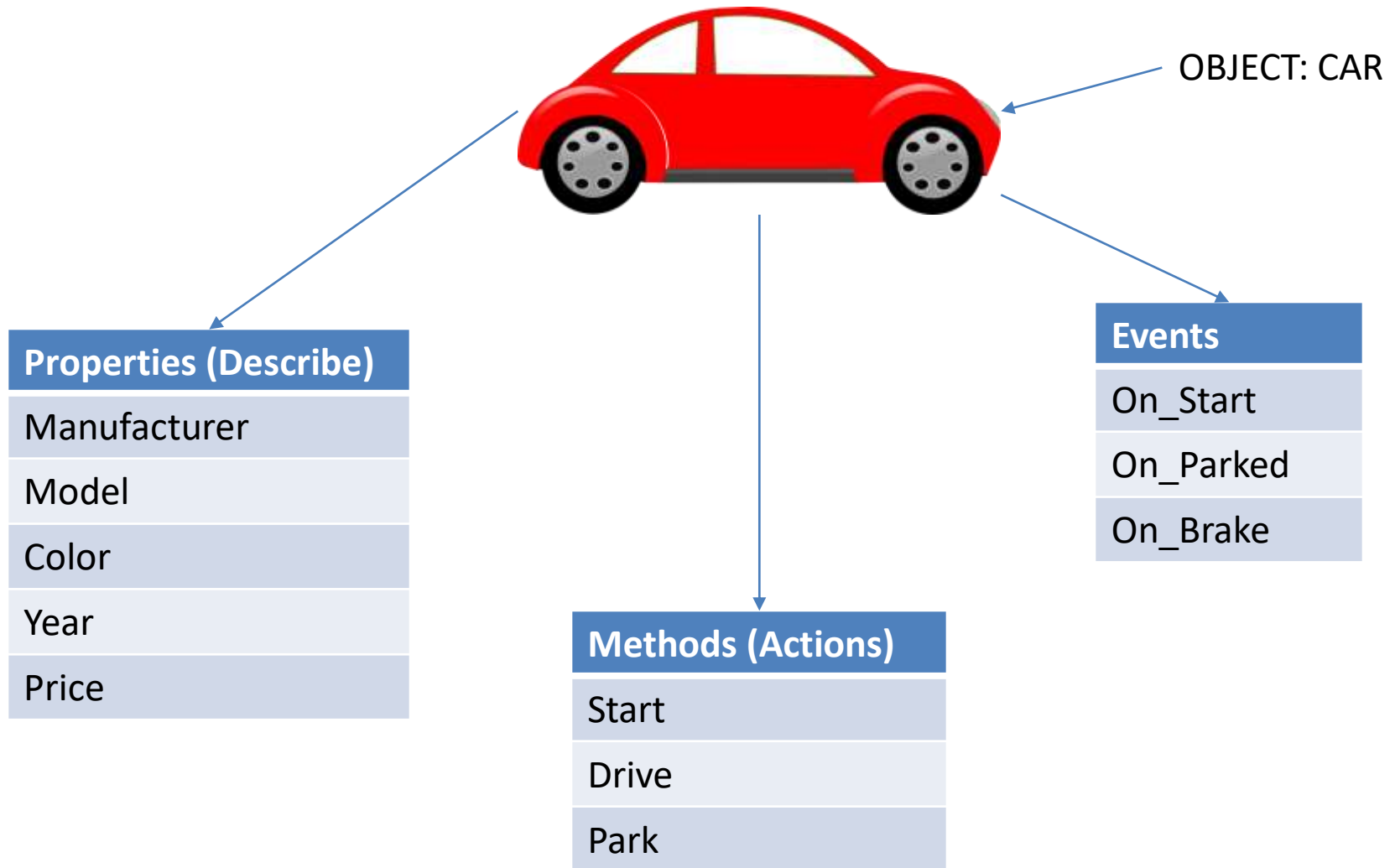
AccountNo
HolderName
Balance

Operations:

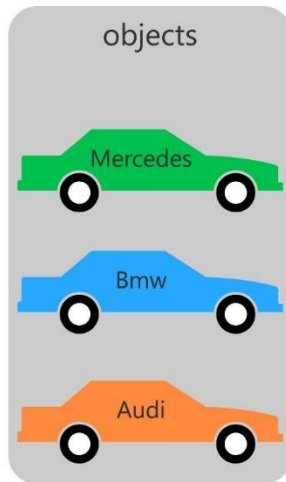
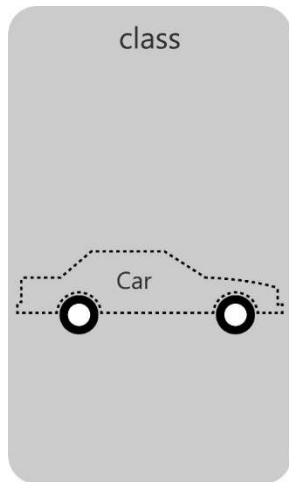
Deposit
Withdraw
Transfer

Write down 5 objects with its attributes and operations

What is Object ?



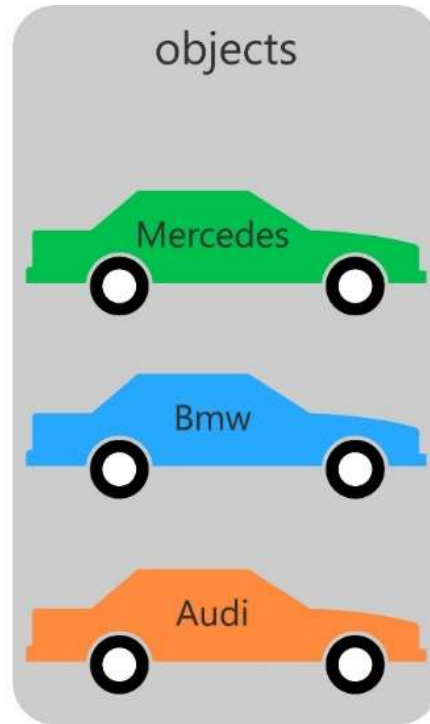
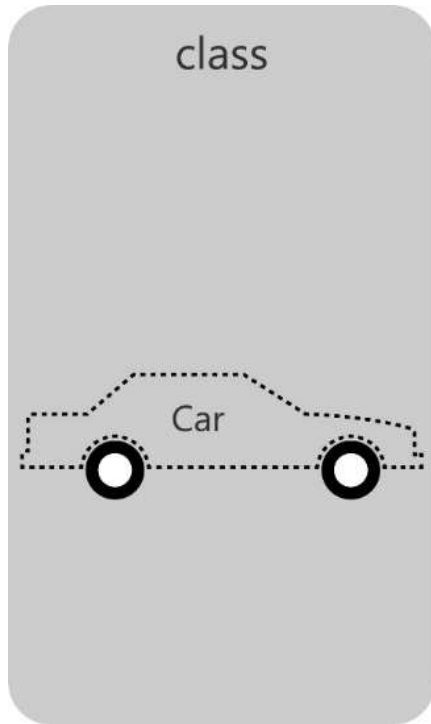
Classes...



Tutorial4us.com

Class: Blueprint (template) for object.
Object: Instance of class.

Class



Class Name

Car

Attributes

manufacturer
color
odometerReading
...

Methods

drive
rePaint
fillWithGas
...

Applications of OOP

- Real Time Systems Design
- Simulation and Modeling System
- Object Oriented Database
- Client-Server System
- Neural Networking and Parallel Programming
- Decision Support and Office Automation Systems
- CIM/CAD/CAM Systems
- AI and Expert Systems

Procedural Vs. Object Oriented Programming

POP	OOP
Emphasis is on doing things not on data, means it is function driven	Emphasis is on data rather than procedure, means object driven
Main focus is on the function and procedures that operate on data	Main focus is on the data that is being operated
Top Down approach in program design	Bottom Up approach in program design
Large programs are divided into smaller programs known as functions	Large programs are divided into classes and objects
Most of the functions share global data	Data is tied together with function in the data structure

Procedural Vs. Object Oriented Programming

POP	OOP
Data moves openly in the system from one function to another function	Data is hidden and cannot be accessed by external functions
Adding of data and function is difficult	Adding of data and function is easy
We cannot declare namespace directly	We can use name space directly, Ex: using namespace std;
Concepts like inheritance, polymorphism, data encapsulation, abstraction, access specifiers are not available.	Concepts like inheritance, polymorphism, data encapsulation, abstraction, access specifiers are available and can be used easily
Examples: C, Fortran, Pascal, etc...	Examples: C++, Java, C#, etc...

Principles of OOP (A.E.I.P)

- There are mainly four OOP Principles

Abstraction

Encapsulation

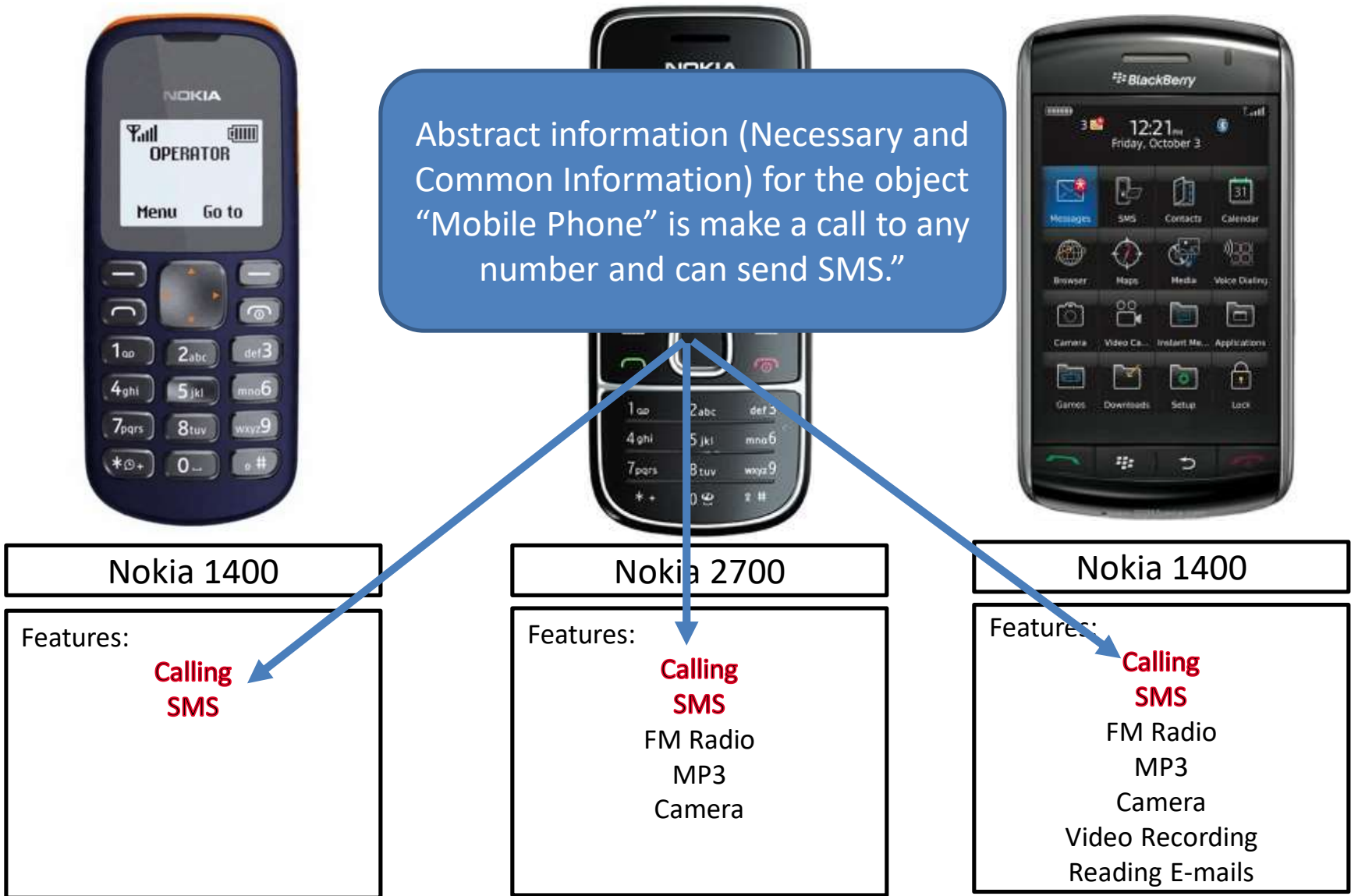
Inheritance

Polymorphism

Abstraction

- **Abstraction** refers to the act of representing essential features without including the background details or explanations.
- **Abstraction** provides you a generalized view of your classes or object by providing relevant information.
- **Abstraction** is the process of hiding the working style of an object, and showing the information of an object in understandable manner.

Abstraction Example



Abstraction Example

- Example:
If somebody in your collage tell you to fill application form, you will fill your details like **name, address, data of birth, which semester, percentage you have got** etc.
- If some doctor gives you an application to fill the details, you will fill the details like **name, address, date of birth, blood group, height and weight**.
- See in the above example what is the common thing?
Age, name, address so you can create the class which consist of common thing that is called abstract class.
That class is not complete and it can inherit by other class.

Encapsulation

- The wrapping up of data and functions into a single unit is known as **encapsulation**
- The insulation of the data from direct access by the program is called **data hiding** or **information hiding**.
- It is the process of enclosing one or more details from outside world through access right.

Encapsulation



- **Encapsulation** is the process of combining data and functions into a single unit called class. In Encapsulation, the data is not accessed directly; it is accessed through the functions present inside the class.
- Users are unaware about working of circuitry and hardware devices.

- **Abstraction** is a process where you show only “relevant” data and “hide” unnecessary details of an object from the user.
- Consider your mobile phone, you just need to know what buttons are to be pressed to send a message or make a call, What happens when you press a button, how your messages are sent, how your calls are connected is all abstracted away from the user.

Abstraction Vs Encapsulation

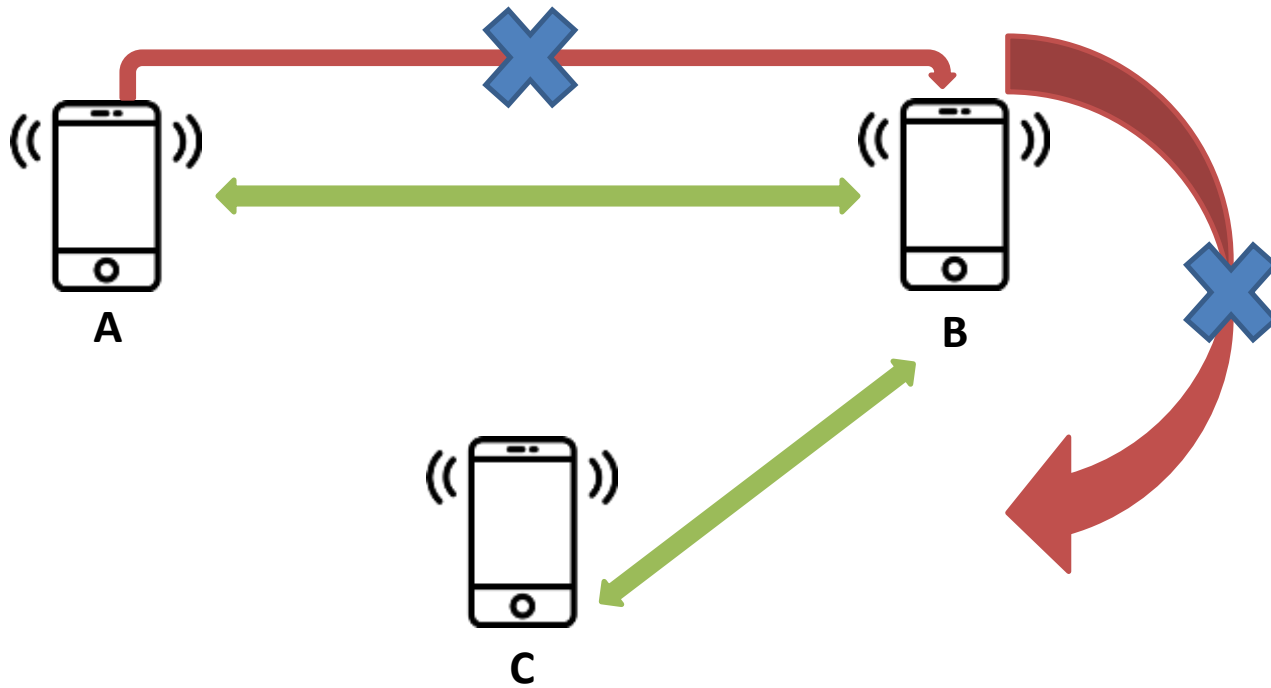
- Abstraction says what details to be made visible & Encapsulation provides the level of access right to that visible details.

Example:

- When we switch on the Bluetooth I am able to connect another mobile but not able to access the other mobile features like dialling a number, accessing inbox etc. This is because, Bluetooth feature is given some level of **abstraction**.

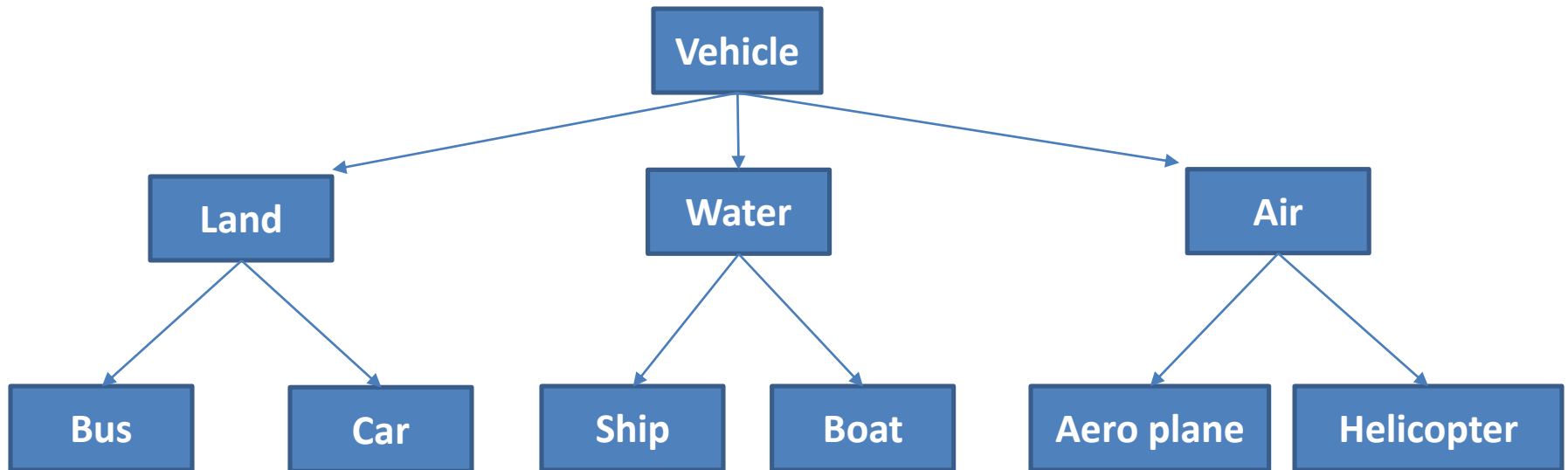
Abstraction Vs Encapsulation

- When mobile A is connected with mobile B via Bluetooth whereas mobile B is already connected to mobile C then A is not allowed to connect C via B. This is because of accessibility restriction.



Inheritance

- **Inheritance** is the process by which objects of one class acquire the properties of objects of another class.



- Here Vehicle class can have properties like Chassis no. , Engine, Colour etc.
- All these properties inherited by sub classes of vehicle class.

Polymorphism

- **Polymorphism** means ability to take more than one form.
- For example the operation **addition**.
- For two numbers the operation will generate a **sum**.
- If the operands are strings, then the operation would produce a third string by **concatenation**.

Thank You