

object oriented programming language

there are four object oriented paradigms that we can implement in any object oriented programming languages like c++, java.

class

it is design template.

object

object is defined as an instance of the class.

OR

object is something which has state, behaviour, identity, responsibility.

* state

state is defined as a value assigned to the characteristics / attributes.

* Behaviour

Behaviour is defined as response given to the real world.

* Identity

unique characteristics from which we can uniquely identify the object.

* Responsibility

if we achieve the behaviour properly then only we achieve the responsibility.

① ATM Machine

* Identity

ATM machine at SBI Branch, machine No. 2045

* State

- cash inside
- screen message
- card reader status

* Behaviour

- shows options
- accepts pin
- gives machine

* Responsibility

allow user to withdraw, check balance, transfer money.

② Mobile Phone

* Identity

TMEI number

* State

- battery
- camera
- storage

* Behaviours

- call
- app run
- message

* Responsibility

- enable communication



③ Refrigerator

* Identity - serial No. LG-REF-88221

- * state
- * inside temperature
- * food items stored

- * Behaviours
- cool Food
- freeze items
- adjust temperature

* Responsibility

- keep Food Fresh

④ Water Bottle

* Identity

- product code - MILTON-WB-1001

* state

- water level

- temperature

- cap

- colour

* Behaviour

- store water

- pour water

* Responsibility

- hydrate users

⑤ SCHOOL BUSES

* Identity

Vehicle number - MH 12 AB 2244

* State

- seats
- wheels
- doors
- engine

* Behaviours

- move forward/backward
- pick up/drop student

* Responsibility

- safe student transportation

⑥ TRAFFIC SIGNAL

* Identity

Signal unit II-TS PUNE-320

* State

- light
- timer

* Behaviour

- change light
- control vehicle flow

* Responsibility

manage traffic safety



* Book

* Identity

BOOK ID - RR - HP - 1192

* State

pages

cover

author

* behaviour

- can be issued
- can be returned

* Responsibility

- provide knowledge to users

* Laptop

* Identity

serial no - DELL LAP - 5521

* State

- battery

- storage

* Applications

* Behaviours

- Boot

- shutdown

- software run

* Responsibility

- perform computing work

⑨ washing machine

* Identity

model No. WM-7711

* State

- timer

motor

fan

* Behaviour

- wash clothes

- spin dry

* Responsibility

- clean clothes effectively.

⑩ BANK Account

* Identity

Account Number - 45290012025

* state

- balance

- account type

- status

* Behaviours

- deposit

- withdraw

- transfer

* Responsibility

hold and manage customer money securely.

Abstraction

Abstraction is defined as a selective ignorance the things which are necessary we will consider only those things and we will ignore other things intensionally.

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① car steering wheel

- you only need to know : turn left/right
- you do not need to know
 - how steering mechanism connect to wheels
 - how hydraulic works inside

② selective ignorance

you ignore internal engineering.

③ ATM machine

- you need to know
 - insert card
 - enter pin
 - receive p/money

you do not need to know

- how machine reads magnetic strips
- how cash cassette works
- how encrypted communication happens

selective ignorance

ignore how machine interact with bank servers

④ mobile phone

- click photo
- You don't care how sensor capture light internally.

⑤ TV remote

- You just enter pin and amount

- you ignore

- You press volume up / down

- You don't worry about IR signal encoding.

⑥ Google maps

- you only see routes
- you don't see algorithm like dijkstra running behind it.

⑦ online shopping

- you choose on product and pay.
- you don't care about backend server, API, db op.

⑧ Email sending

- type, click and send
- you ignore protocols and mails server handling

⑨ Restaurant menu

- you select dish.
- you don't how how dish is cooked.

⑩ Elevator lift

- you press Floor No.
- you ignore motor control & counter weight mechanism.

⑪ music player app

- you tap 'play'.
- you not care about audio encoding, buffering, signal processing

④ Encapsulation

- it is defined as binding and hiding characteristics and behaviours together.
it gets achieve by the class.

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- Encapsulation means binding and hiding characteristics and behaviours together.
it get achieve by the class.

① capsule
- powder (data) is hidden inside.
- shell (class) bind and protect it.

② car
- characteristics - speed, fuel level
- behaviour - accelerator, brake

③ student
- characteristics - name, roll no
- behaviours - study, attend class

④ bank accountant
- characteristics - account no, balance
- behaviours - deposite, withdraw

⑤ mobile phone
- characteristics - battery, sensors, camera
- behaviours - call, message, photo

⑥ tv remote
- characteristics - channel no, volume up, button
- behaviours - channel change, volume increase

⑦ employee
- characteristics - empid, salary
- behaviours - work, apply leave

⑧ library book
- characteristics - title, author
- behaviours - issue, return book.

Q11:

characteristics - 15.6" screen, 8GB RAM

Behaviours - Charge 95%, Start/Stop

Q12:

Laptop characteristics - RAM, processor, camera

behaviours - Boot, shut down, open camera

Inheritance

Inheritance is defined a reusability using is-a relation.

① dog (child), Animal (Base class)

Animal
characteristics - legs, color

Behaviours - eat(), breathe()

Dog characteristics - Breed

Dog Behaviours - Barks()

② car (Derived), vehicle (Base)

Vehicle

Characteristics - speed, capacity

Behaviours - move(), stop()

Car

Characteristics - model, fuel type

Behaviours - playmusic()

③ Rose (Derived), Flower (Base)

Flower

Characteristics - petals, fragrance

Behaviours - bloom()

Rose

Characteristics - color shade

Behaviours - decorative uses()

④ Teacher (Derived), Person (Parent)

Person

Characteristics - name, age

Behaviours - walk(), talk()

Teacher

characteristics - subject, experience

Behaviours - Teacher, evaluate()

(5) saving account (derived), Account (base)

Account

characteristics - Account no, Balance

Behaviours - withdraw(), deposit()

saving account

characteristics - interest rate

Behaviours - addinterest()

(6) Laptop (derived), Computer (parent)

Computer

characteristics - processor, RAM

Behaviours - process(), storedata()

Laptop

characteristics - Battery

Behaviour - portablemodel()

derived

(7) Bus (child) - Transport vehicle (base class)

Transport vehicle

characteristics - Fuel tank, seats

Behaviours - start(), stop()

Bus

characteristics - Route no.

Behaviours - passenger pick().



④ Lion (derived), wild animal (base)

wild Animal

characteristics - habitat, age

wild animal behaviour - hunt(), sleep()

Lion

characteristics - mane size

behaviours - roar()

⑤ cat (derived), mammal (parent)

mammal

characteristics - warm blooded, hair

behaviour - Feed young one(), Breath air()

cat

characteristics - eye colour

behaviour - meow(), climb()

⑥ smart phones (derived), phone (base)

phone

characteristics - number, ringtone

behaviour - call(), message()

Smartphone

characteristics - OS

behaviour - click photo(), browse internet()

① shape (Base)

circle, rectangle (derived)

common:: draw()

circle - draw() - drawing shape

rectangle - draw() - drawing 4 sided shape

② Animal (Base)

cat, dog (derived)

common method - sound()

dog : sound() → bark

cat : sound() → meow

③ Employee (Base)

full time, part time (Derived)

common method - calculate salary()

full time : monthly salary

part time : hourly salary

④ Vehicle (Base)

car, bike (derived)

common method - start()

car - start() → key start

bike - start() → kick / self start

⑤ Bank Account (Base)

common method - withdraw()

saving account, current account (derived)

saving - withdraw() - with limit

current - withdraw() - without limit

Printer (Base)

laser printer, inkjet printer - (derived)

common method - print()

laser printer print() - print page with laser

inkjet printer print() - print using ink drop.

Bird (Base)

eagle, sparrow (derived)

common method - fly()

eagle - fly() → fly high

sparrow - fly() → fly low

payment (Base)

credit card, UPI (derived)

common method - pay()

credit card - pay using card.

UPI - pay using mobile ap

student (Base)

PG student, UG student (derived)

common method - study

UG student - basic study

PG student - Research based Study.

message (Base)

whatsapp msg, email msg (derived)

common method - send

whatsapp msg - send using mobile

email message - send using server SMTP.