Unit-4 Modular design

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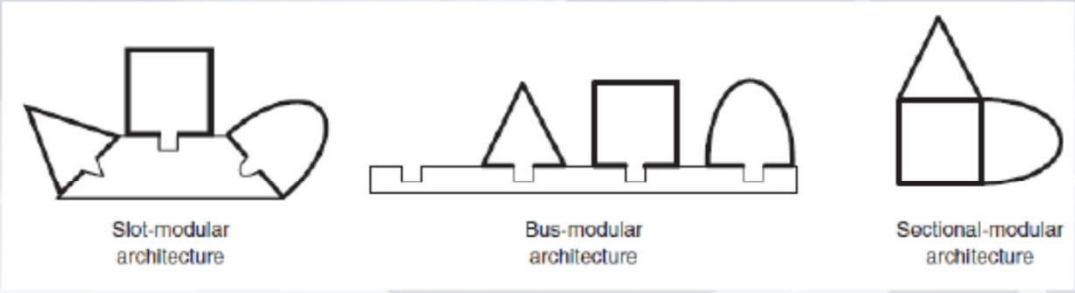
MODULAR DESIGNS

Modules are physical building blocks of a product.

- Each module is made up of a collection of components that carry out functions.
- The architecture of the product is given by the relationships among the components in the product and the functions the product performs.
- There are two entirely opposite styles of product architecture : *modular & integral*
- Products are usually a mixture of standard modules and customized components.
- Helps in customization of a product.

TYPES OF MODULAR DESIGNS



Slot Modular :

Each of the interfaces between modules is of a different type from the others.

Bus Modular:

The modules can be assembled along a common interface, or bus. Therefore, interchange of modules can be done readily.

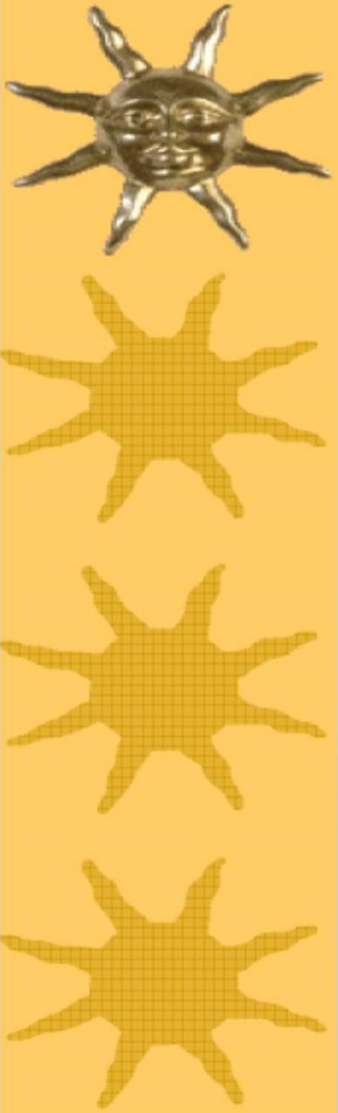
Sectional Modular:

All interfaces are of the common type, but there is no single element to which the other chunks attach.

Introduction to Modular Design - https://youtu.be/20JP8w6_nVA

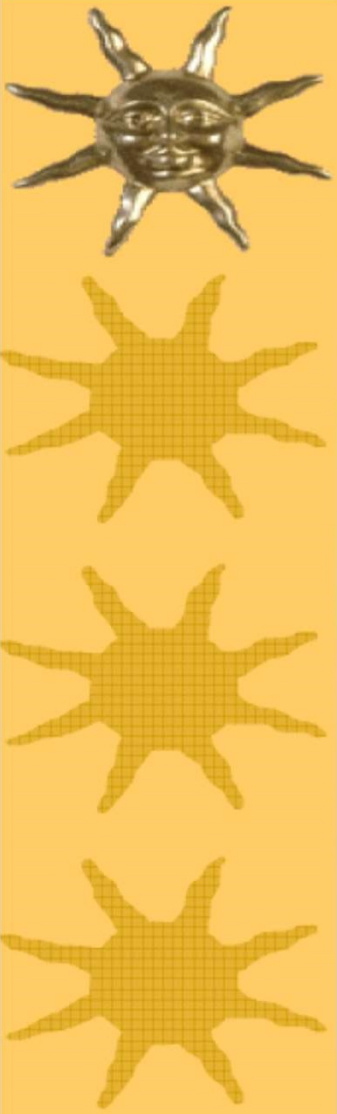
DESIGN OPTIMIZATION

- Optimization should have only a single objective to be dealt with.
- Multi objective optimization approaches are basically trying to cover more than one important factors.
- These could be quality, cost, time, weight etc.
- Analytical tools are used for such optimization.



Goal of Optimization

Find values of the variables that minimize or maximize the objective function while satisfying the constraints.



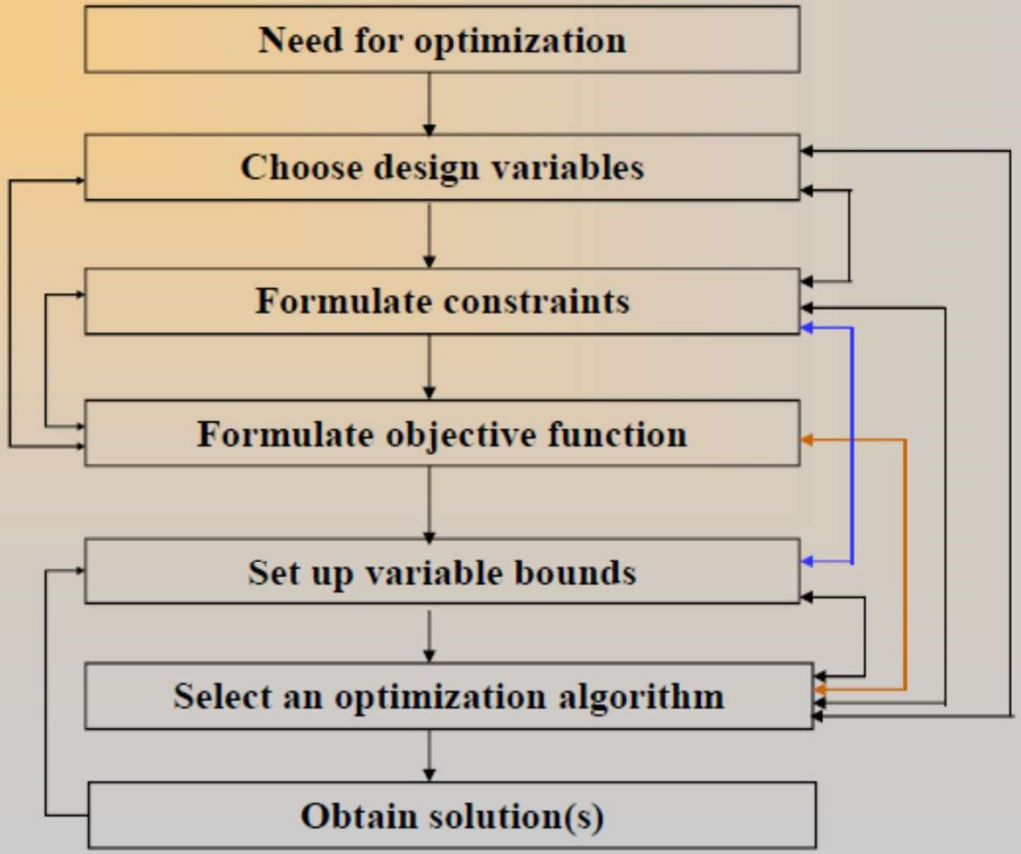
Component of Optimization Problem

- Objective Function: **An *objective function* which we want to *minimize* or *maximize*.**
- For example, in a manufacturing process, we might want to *maximize the profit* or *minimize the cost*.
- In fitting experimental data to a user-defined model, we might *minimize the total deviation* of observed data from predictions based on the model.
- In designing an inductor, we might want to *maximize the Quality Factor* and *minimize the area*.

Component of Optimization Problem

- Design Variables: **A set of *unknowns* or *variables* which affect the value of the objective function.**
- In the manufacturing problem, the variables might include the *amounts of different resources used* or the *time spent on each activity.*
- In fitting-the-data problem, the unknowns are the *parameters* that define the model.
- In the inductor design problem, the variables used define the *layout geometry* of the panel.

Flowchart of Optimal Design Procedure



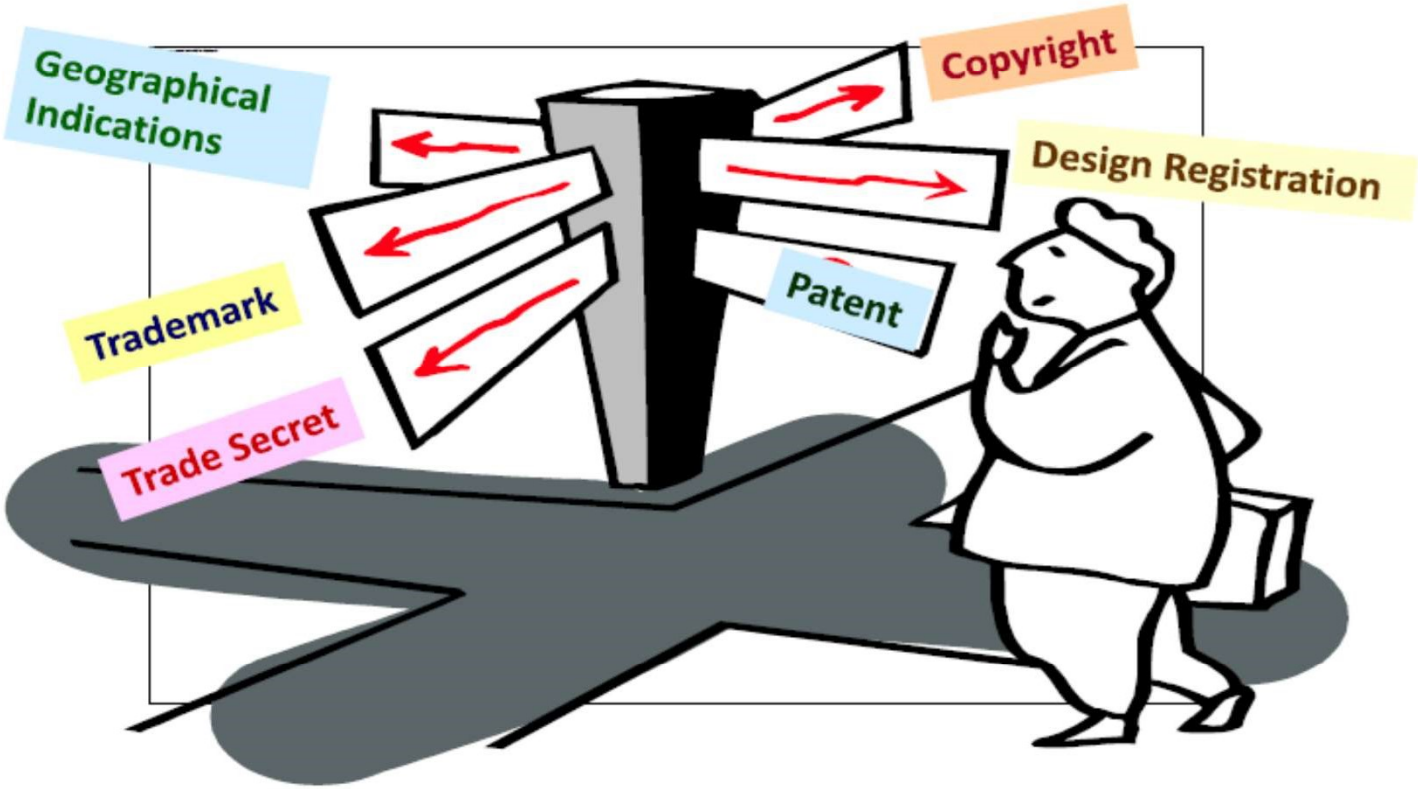
Intellectual Property rights (IPR)

Intellectual property (IP) is a term referring to creations of the intellect for which a monopoly is assigned to designated owners by law.

Intellectual Property Rights (IPR) gives them this protection, as well as helping them exploit and control their IP.

"The exclusive right granted by State, to prevent others from using, manufacturing, distributing - inventions, processes, applications, new and original designs, trademarks, new plant varieties, data bases and artistic and literary works". Such a person is known as 'rights owner' or 'rights holder'

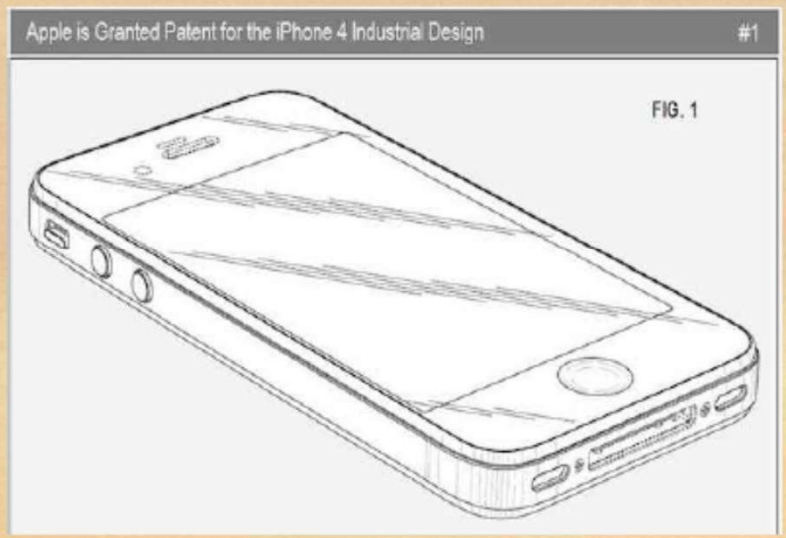
Common types of IPR

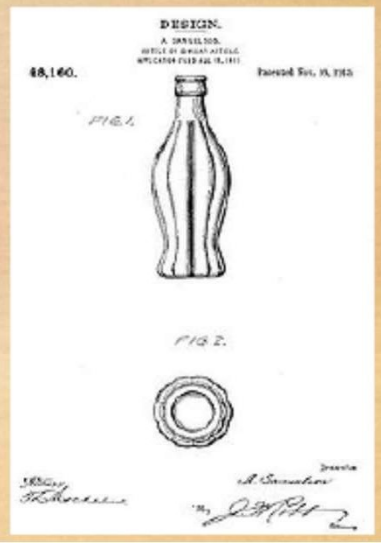


Industrial Design

Industrial Designs: Design deals with features, shapes, patterns, etc., applied to an article by an industrial process, manual or mechanical.

Eg., chair is a utility item. However, chair itself does not qualify for IPR, but its special carvings, embossing etc., is done which increases the value of chair though it's utility remains same, it becomes eligible for IPR under Designs Act. Designs can be registered based on its originality, henceforth they can use ® or registered, with registration number.





Patents

Patents: Is a monopoly right granted to a person, who invented a new product or process of making an article, for **20years** under the **Indian Patens Act, 1970**, and can be renewed after expiration of period.

The inventor has to file for patent first, and then make his/ her invention to public. A patent has to be applied in each country by the inventor, to claim his rights in that country

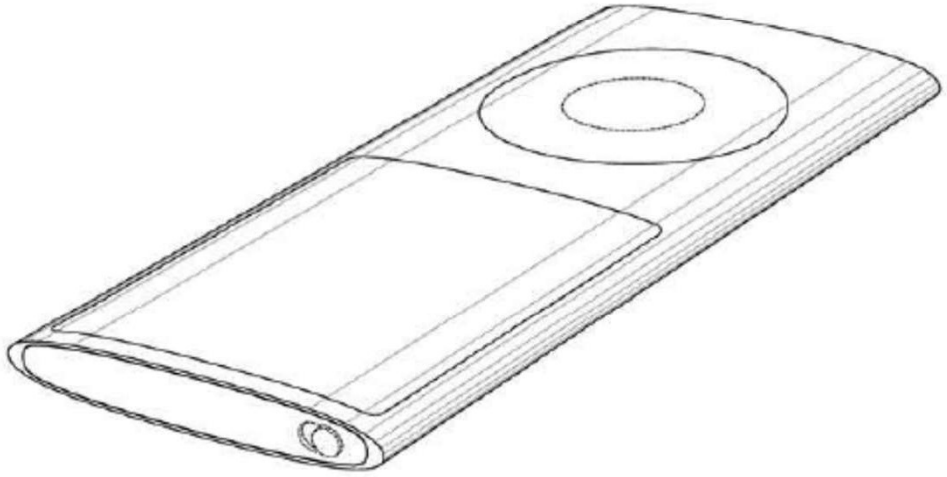


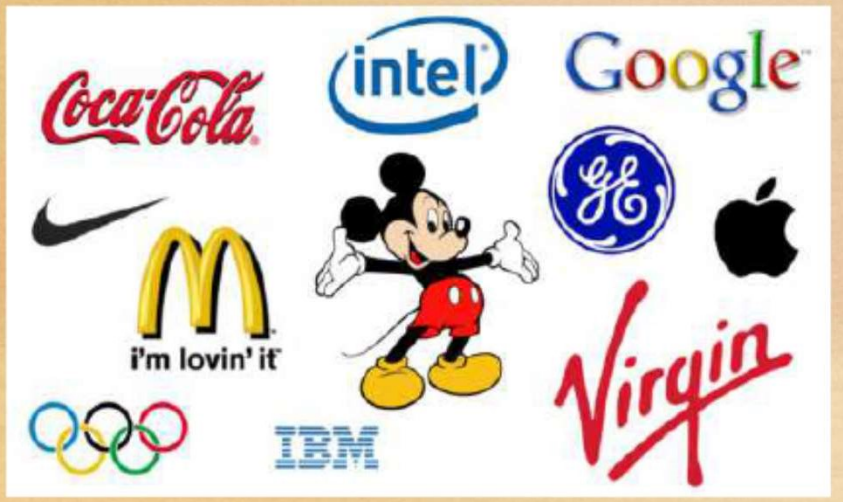
Fig 3. Apple's U.S. Patent No. 635,123 ("the '123 patent"), also entitled "Electronic Device," shows how the exterior appearance of a familiar device can be reengineered to provide a new "look." The design patent provides exclusive rights to the new appearance.

Design Patent Figure	Accused Product	Infringement?
		No. *Richardson v. Stanley Works, Inc.*, 597 F.3d 1288 (Fed. Cir. 2010).

Trademarks

Trademarks: Trademark can be a word, name, brand, symbol, label etc., used by a company to create a unique identity for their product. Trademark can be registered, and then use ™ ®.

The registration validity is for 7 years and renewable after expiry. In India, it is governed by the **Trade and Merchandise Marks Act, 1958**, which came into force on 25th Nov., 1959.



Trade Marks

Name

Logotype

Symbol

Slogan

Shape

Color

Trade Secrets

A trade secret is a formula, practice, process, design, instrument, pattern, commercial method, or compilation of information which is not generally known or reasonably ascertainable by others, and by which a business can obtain an economic advantage over competitors or customers.

- a formula for a sports drink
- survey methods used by professional pollsters
- recipes
- a new invention for which a patent application has not yet been filed
- marketing strategies
- manufacturing techniques
- computer algorithms

Microsoft

Copyrights 

Copyright is a legal right created by the law of a country that grants the creator of an original work exclusive rights for its use and distribution.

It prevents the appropriation of the fruits of man's work, labour or skill by another person.

- Types of work that can be Copyrighted:
  - Architecture
  - Art
  - Audiovisual works
  - Choreography
  - Drama
  - Graphics
  - Literature
  - Motion pictures
  - Music
  - Pantomimes
  - Pictures
  - Sculptures
  - Sound recordings
  - Other intellectual works
    - As described in Title 17 of U.S. Code

Geographical Indication

This is an indication, that originates from a definite geographical area, which is used to identify natural or manufactured product. In order to function as a GI, a sign must identify a product as originating in a given place.

Types of IPRs

Intellectual Property

- Industrial Property
  - Industrial Designs
  - Patents
  - Trademarks / Service marks
  - Trade Secrets
  - Geographical Indications
  - Layout Designs of Semi Conductor ICs
  - Plant varieties & Farmer's rights
- Copyrights and related rights