# Engineering Exploration

Semester I

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116U06L106

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SOMAIYA VIDYAVIHAR UNIVERSITY
K J Somaiya College of Engineering

Somaiya TRUST

# Engineering Exploration

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# Lecture 3

## Last Lecture

**Module 2** Engineering Design Process

- Graduate Attributes
- Domains of Projects
- Features of Engineering Project
- Engineering Design Process

# Engineering Design Process

- Fundamental elements of the design process
  - Identify the Problem
  - Research the Problem
  - Develop Possible Solutions
  - Choose Best Solution
  - Construct Prototype
  - Test and Evaluate Solution
  - Communicate and Document Solution
  - Redesign

# Engineering Design Process

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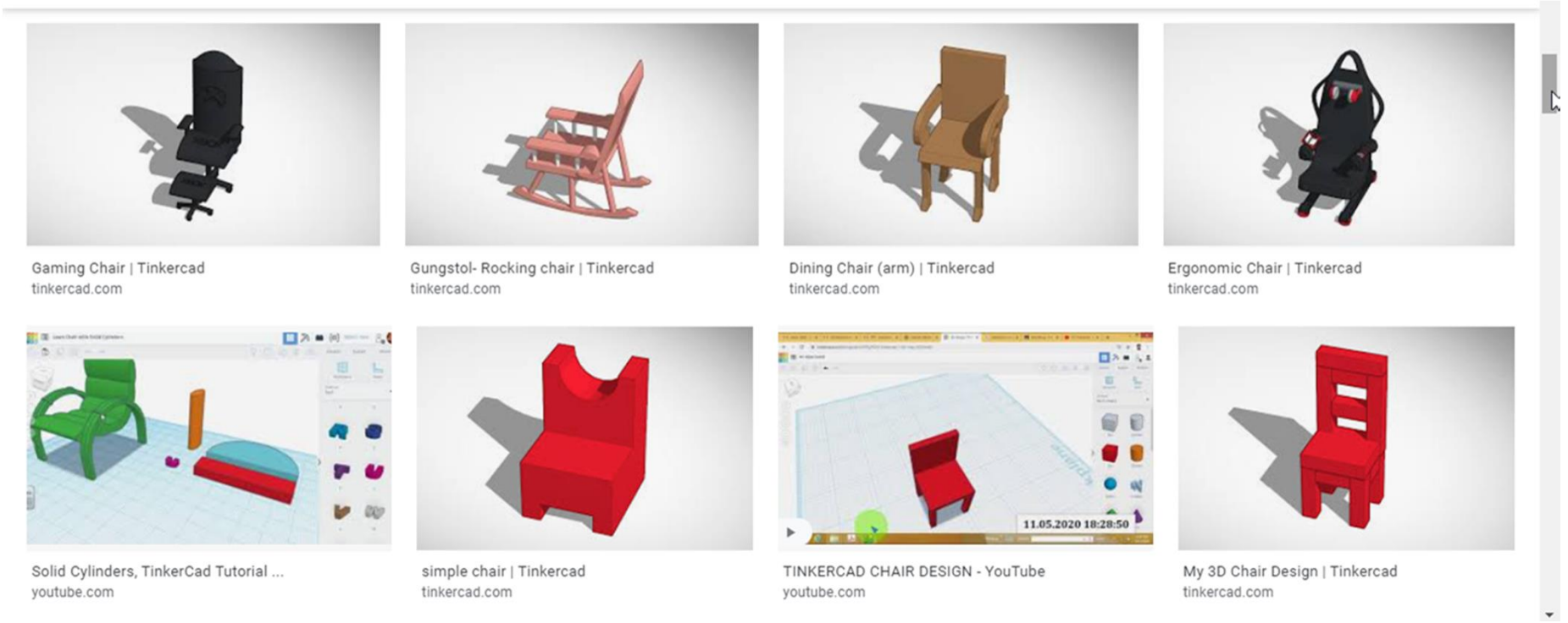
Let us design a CHAIR

# TV Remote Control and Mobile phone holder

VS.

# Engineering Design Process

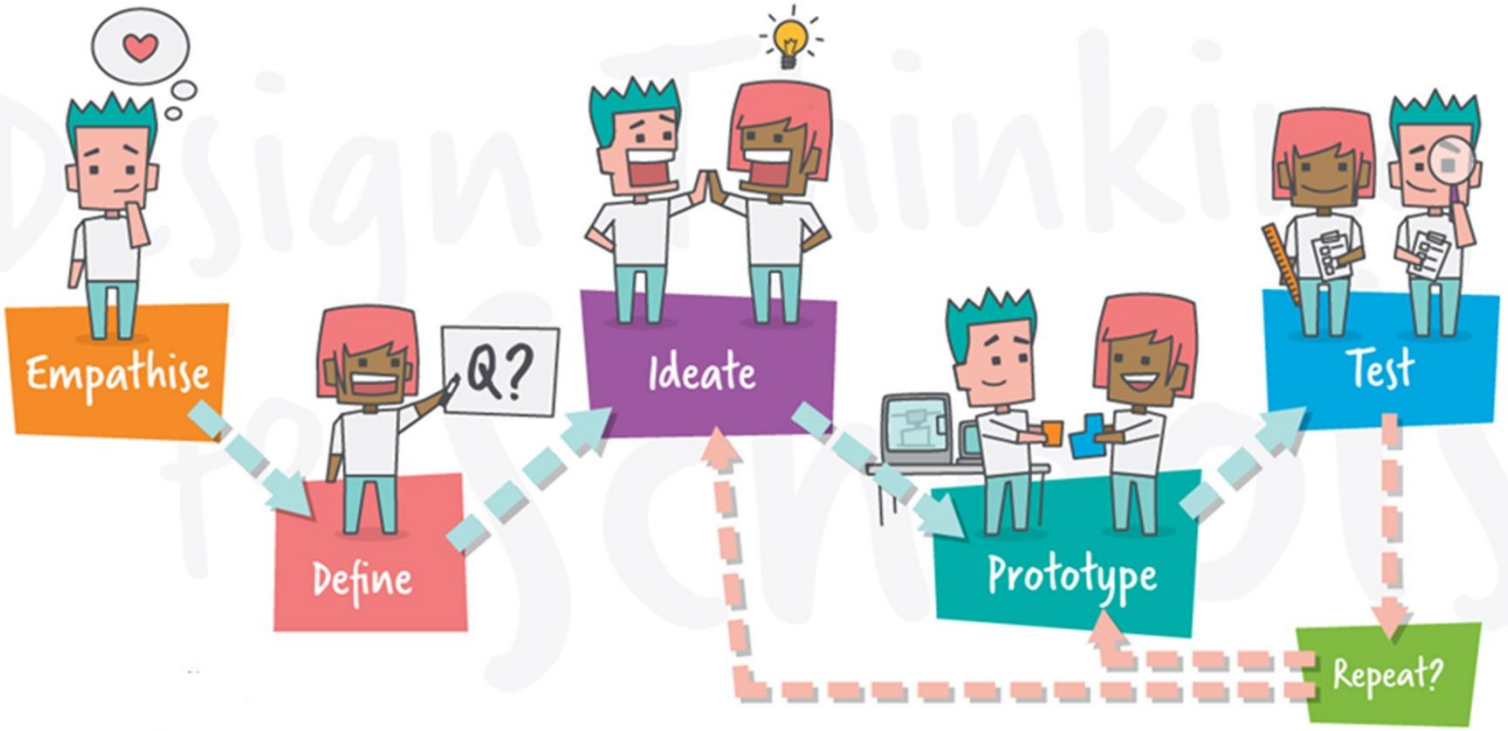


# Examples

List few examples (Product/services) where you have seen innovations in past few years?

List few examples (Product/services) which was failed in last few years?

# Engineering Design Process



# Engineering Design Process: Define 5 Ws

- Who is the client and target audience?
  (Size, nature, characteristics)
- What design solution is the client thinking for?
  (Product, service, web, video)
- When will the design be needed and for how long?
  (Project timescales)
- Where will be the design be used?
  (Media, location, country)
- Why does the client think a design solution is required?
- How will the solution be implemented
  (Budget, tools)

# Engineering Design Process

Example of Active Toy

1 Need Statement:**“Active Toy”**
2. Designers: **Group of the students**
3. Clients: **Toy Company**
4. Users: **Children**

In order to understand what client and user wants, designer needs to do the following

- Ask questions
- Brainstorming

Answers to those questions help the designer to establish **client’s objectives**, **identify constraints and establishing functions** in the initial phases of design

# Engineering Design Process

Example of Active Toy

1. How will the toy be used (Entertainment / Learning)?
2. How much can it cost?
3. What age group of children is a targeted user?
4. What does active mean?
5. What other features is expected?

Identify client's objective

# Engineering Design Process

## Identify Constraints

1. What's the maximum weight that a toy can be?
2. What shape and materials can the toy be made of?
3. What can be the size of the toy?

## Establish functions

1. How should the device interact with child?
2. What learning is expected for children?
3. What entertainment is expected for children?

# Engineering Design Process

Brainstorming and basic literature survey

| Observation and from Lit.Survey | Requirements |
|---|---|
| 1. Based on the weight of other toys and the weight that a child can easily carry | The toy's total weight should not exceed 400 gms |
| 2. A child starts identifying alphabets, numbers and colours beginning from 2 years | Toy most suitable for the age group of 2-4 years |
| 3. Based on the cost of competing products in the market | Cost of the toy should lie within the range of Rs 300 to Rs 700 |

# Engineering Design Process

Problem Statement

"Design a toy for 2 to 4 years children which is simple to operate safe and nontoxic. Cost of the toy should range between Rs.300/- to Rs 700/-. Shape of the toy should not have sharp edges and weight of the toy should not exceed 400 gms"

# Engineering Design Process

**Activity**

**Time given 10 min**

- Within your Team Assign roles as Customer and Designer (half students each)
- Let the Customer group specify what is their need ( some rational for making a product defining age group of customer )
- Designers should ask questions such that they will
  - Understand the desire
  - Identify functionality
  - Identify constraints