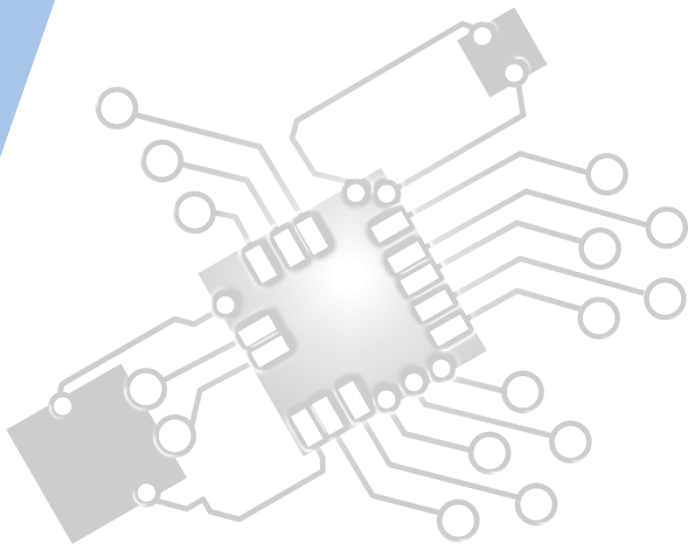
System Design basics

IB Computer Science



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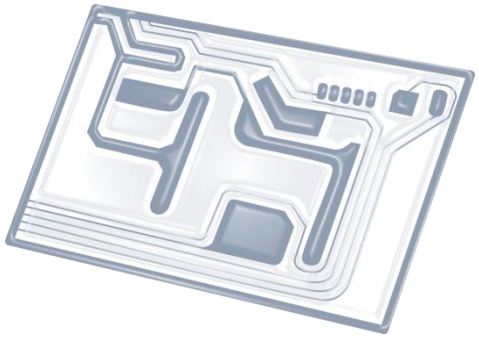
HL Topics 1-7, D1-4



1: System design

2: Computer Organisation

3: Networks

4: Computational thinking

5: Abstract data structures

6: Resource management

7: Control

D: OOP

HL & SL 1.2 Overview

Components of a computer system

1.2.1 Define the terms: hardware, software, peripheral, network, human resources

1.2.2 Describe the roles that a computer can take in a networked world

1.2.3 Discuss the social and ethical issues associated with a networked world

System design and analysis

1.2.4 Identify the relevant stakeholders when planning a new system

1.2.5 Describe methods of obtaining requirements from stakeholders

1.2.6 Describe appropriate techniques for gathering the information needed to arrive at a workable solution

1.2.7 Construct suitable representations to illustrate system requirements

1.2.8 Describe the purpose of prototypes to demonstrate the proposed system to the client

1.2.9 Discuss the importance of iteration during the design process

1.2.10 Explain the possible consequences of failing to involve the end-user in the design process

1.2.11 Discuss the social and ethical issues associated with the introduction of new IT systems

Human interaction with the system

1.2.12 Define the term usability

1.2.13 Identify a range of usability problems with commonly used digital devices

1.2.14 Identify methods that can be used to improve the accessibility of systems

1.2.15 Identify a range of usability problems that can occur in a system

1.2.16 Discuss the moral, ethical, social, economic and environmental implications of the interaction between humans and machines

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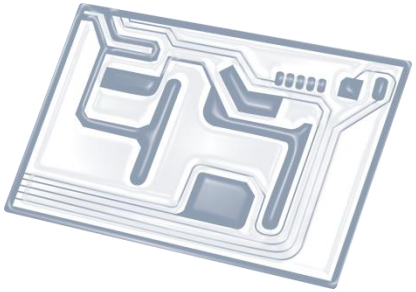
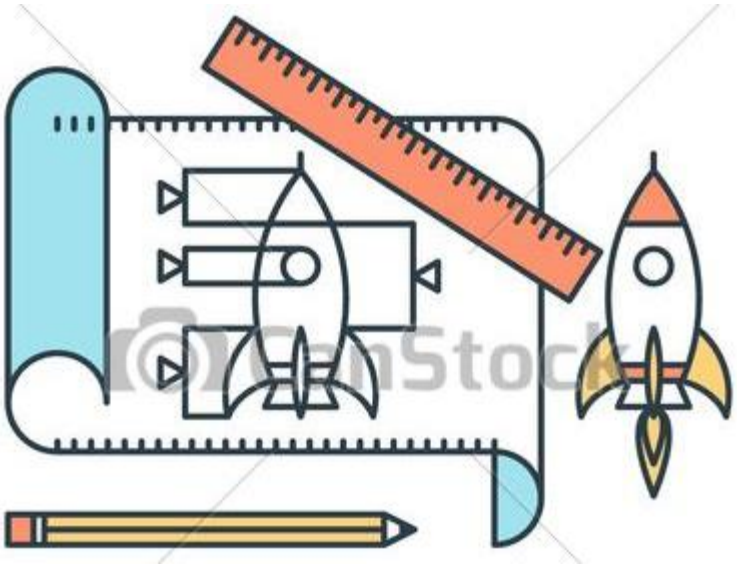


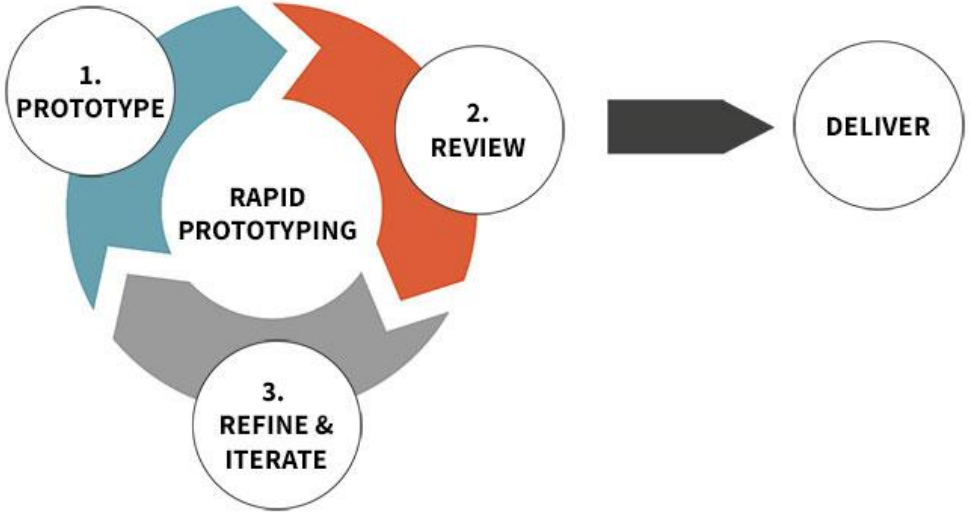
Topic 1.2.8

Describe the **purpose** of **prototypes** to demonstrate the proposed system to the **client**

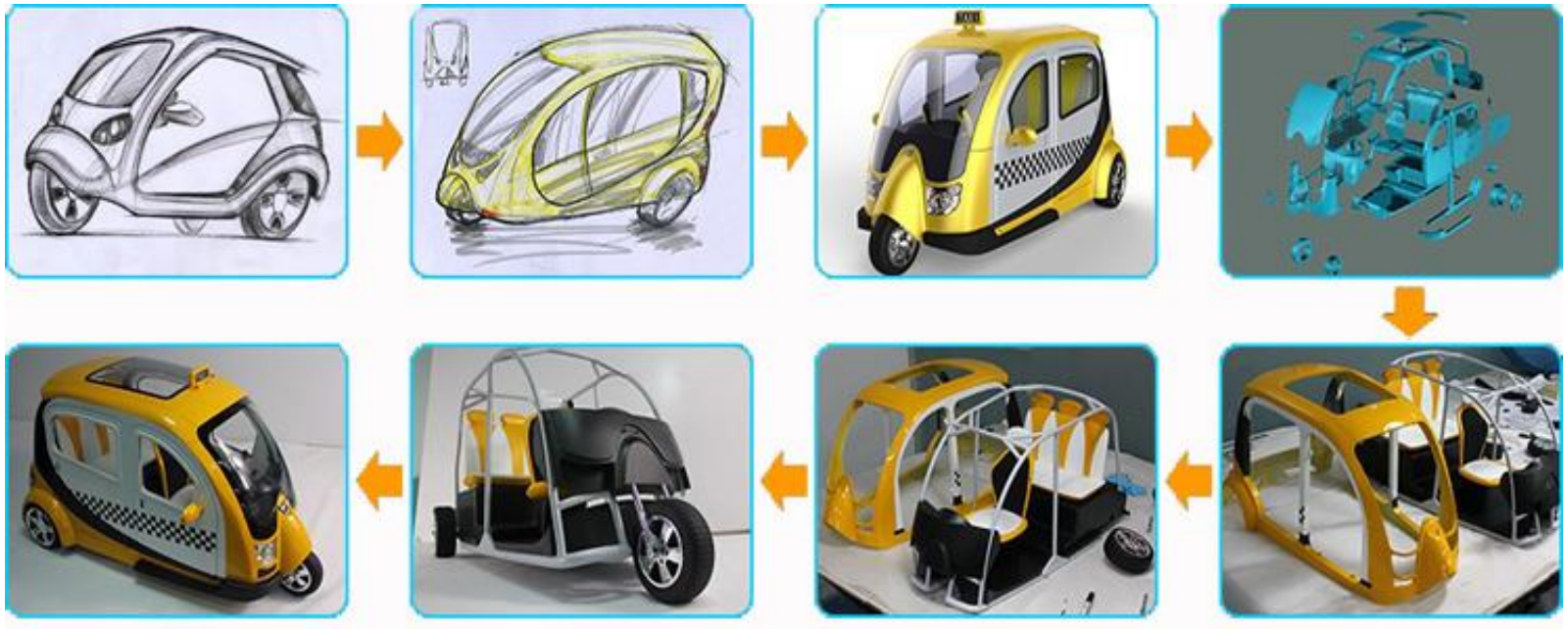


Prototypes

- Prototypes are **abstract representations** of the system, often focusing on only one or two key aspects of the system.
- They are important in **testing** as each component of the system can be tested before implementing, and to illustrate the working of the future system to the client.

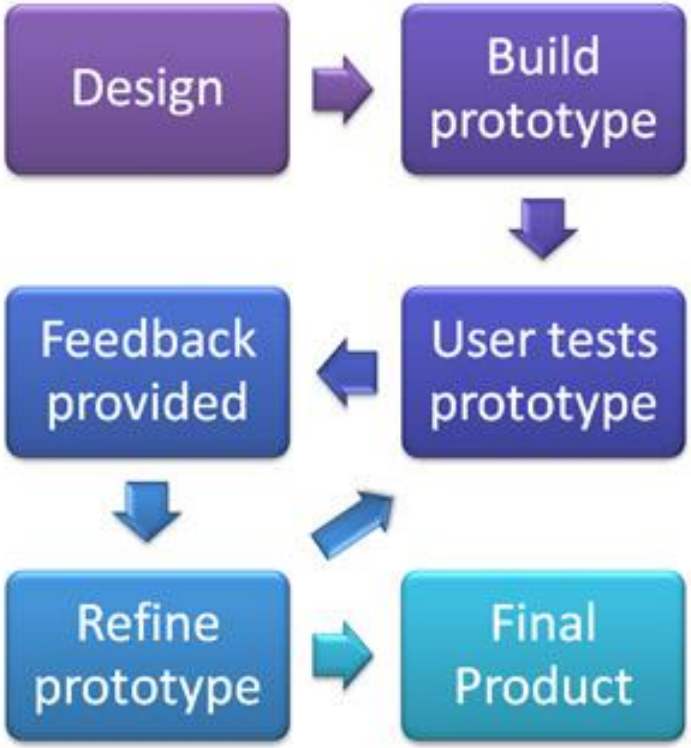


Prototype example



Purposes of a prototype

- **Fail early and inexpensively** – by building a prototype, you can quickly weed out the approaches that don't work to focus on the ones that do.
- **Gather more accurate requirements** – interviews and focus groups can fall short because many people find it difficult to conceptualize a product before they see it. By developing a working prototype, you can demonstrate the functionality to help solidify requirements for the final design.
- **Technically understand the problem** – by developing a functional prototype, you are forced to address both the foreseen and the unforeseen technical challenges of a device's design.
- Other purposes include…
  - Resolve conflicts
  - Rally financial support
  - File patents more



Stages in developing a prototype