SNS COLLEGE OF TECHNOLOGY

Coimbatore – 641 029

An Autonomous Institution

DEPARTMENT OF CIVIL ENGINEERING

19CET303 – 3D PRINTING

III YEAR / V SEMESTER

UNIT 1 :**INTRODUCTION TO 3D PRINTING**

Topic 1 :**INTRODUCTION TO 3D PRINTING**

Syllabus

- Introduction To 3D Printing
- Design Sketching for 3D Printing
- Fusion 360
- 3D Scanning
- Applications Of 3D Printing

UNIT 1 :Introduction to 3D Printing

1. Introduction to 3D Printing
2. Advantages of 3D Printing and limitations of 3D Printing
3. Types of 3D Printing - Fused Deposition Modeling
4. Stereolithography
5. Selective laser sintering
6. Types of 3D Printers.

HISTORY OF 3D PRINTING

Developed in the 1980’s by a Japanese engineer and researcher named Hideo Kodama

Later in 1984, Chuck Hull of “3D Systems Corporation” developed ‘Stereo lithography’ in which layers are added by curing photopolymers with UV light lasers to make 3D objects.

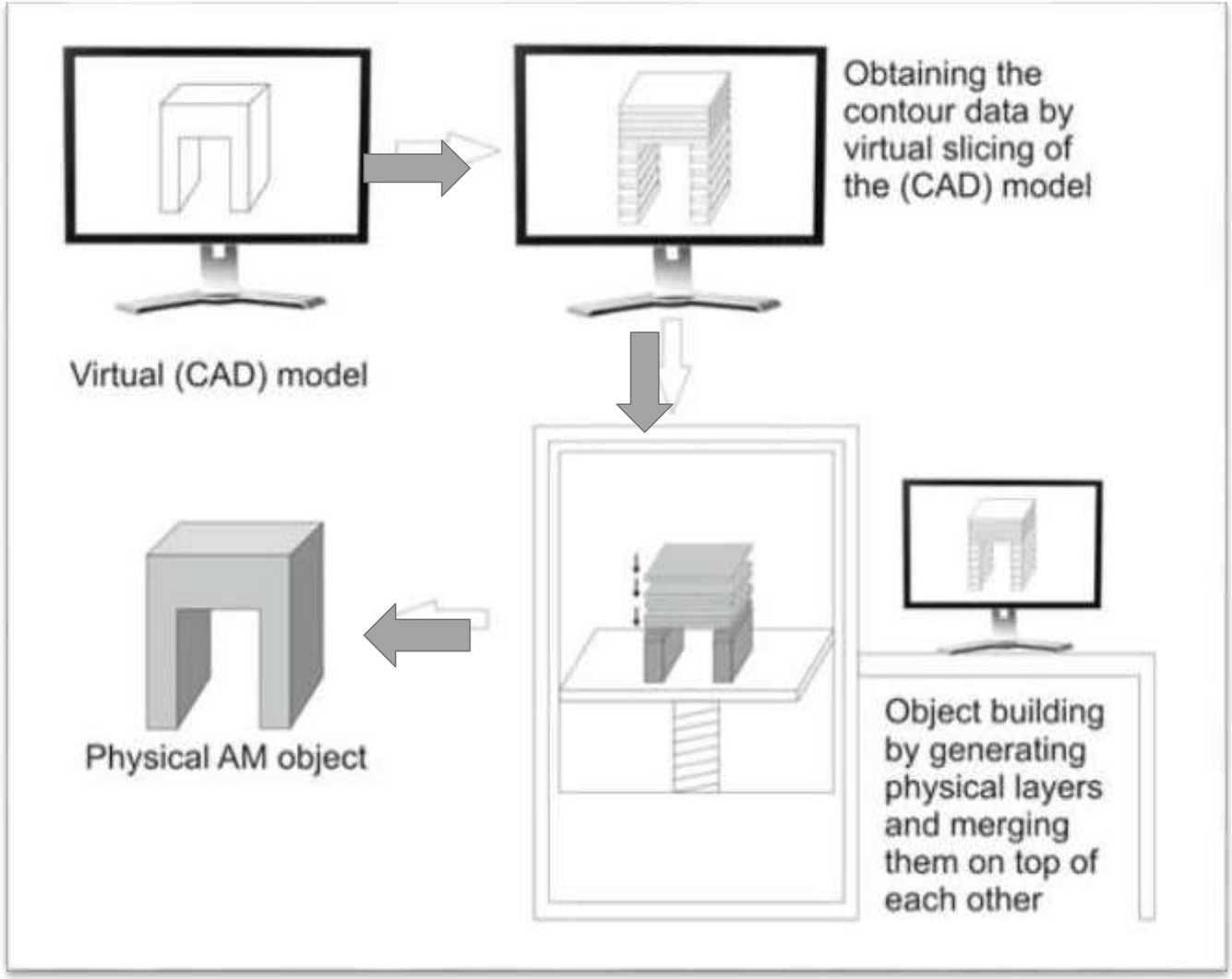
HISTORY

- Since then, almost all the industries were developing and using 3D printing technologies simultaneously researching on it .
- These technologies had opened the gateway to a new realm of scientific venture were conventional fabrication process could be replaced with much more efficient, reliable and economically favorable way of manufacturing
- Stereo Lithography(STL) is a file format on which 3D printers work.
- Within 1980s to 1990s, a lot a 3D printing machines came into existence with various configurations and methodologies.
- In the beginning of 2000, only polymers were used for 3D printing, which are plastics that could be molded into any shapes.
- By the early 2010, Printers were developed that could work on metals and other variety of materials which revolutionized 3D printing technology.

WHAT IS 3D PRINTING TECHNOLOGY?

- 3D printing (or additive manufacturing, AM) is any of various processes used to make a three dimensional object that comes under the method of Rapid Prototyping.
- In 3D printing technology, successive layers of material are laid down one after the other under computer control until the entire designed object is made from the raw material used.
- 3D design are created using CAD software's like CATIA, Pro e, Solid works etc.

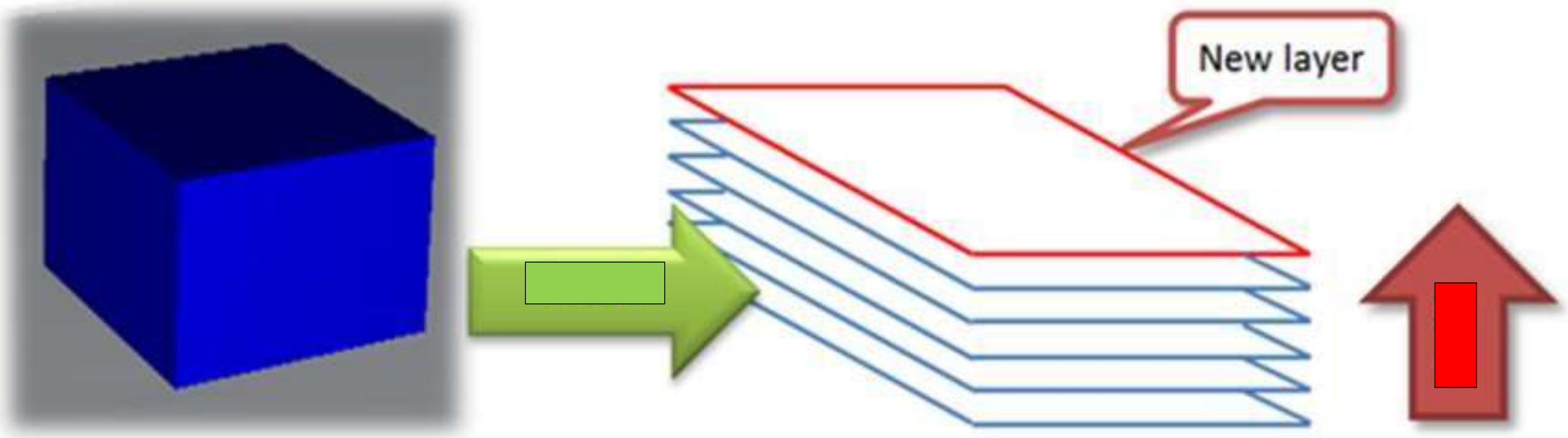
What is 3D Printing



3D Design → File Preparation → 3D Print

Let us know about how the software works

•It is a form of Additive Manufacturing Process of joining materials to make an object from 3D model Data; layer-by-layer process

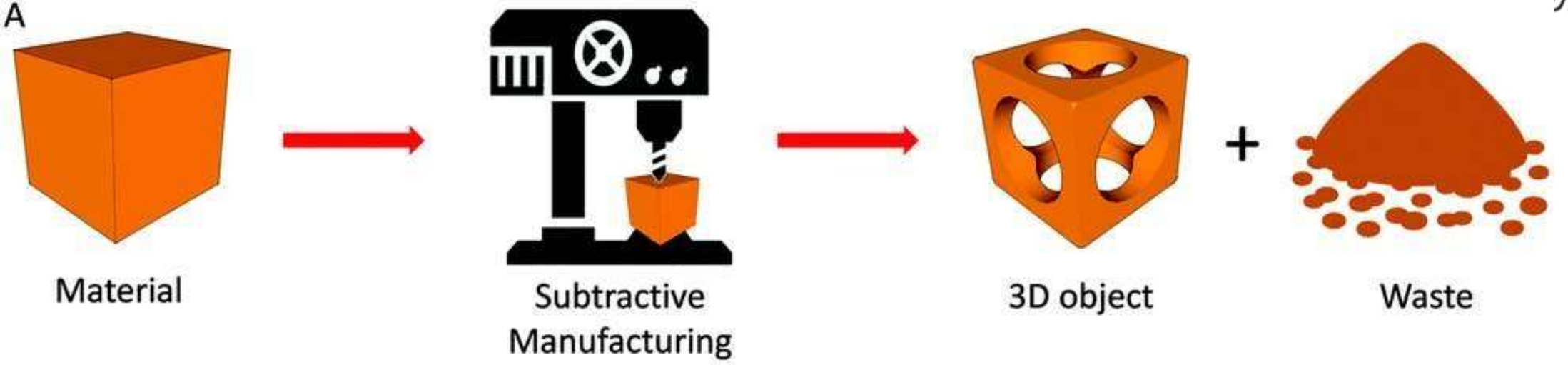


Scanning the human by using scanner

- The design should be then converted into an Stl file format ie; StereoLithography format, based on which the 3D printer(s) works.
- This format slices the designed object or part into spatial orientations like x,y,z-axis and each orientations confirms the machine on how to proceed with the process of manufacturing.
- 3D CAD designs can be of any complex dimensions and shapes and wholly could be produced in a 3D printer within less time compared to the conventional methods.
- Thermoplastics are the raw materials commonly used globally were PLA is the prime material used. Other materials like ABS (Acrylonitrile Butadiene Styrene), NYLON, PLA (**polylactic acid or polylactide)** etc.
- The advantage of using a 3D printer is that there will be no wastage of materials used, since its controlled via a computer.
- There is no requirement of any moulding or casting for the production of designed prototype which saves money and time!

Subtractive vs Additive manufacturing

A



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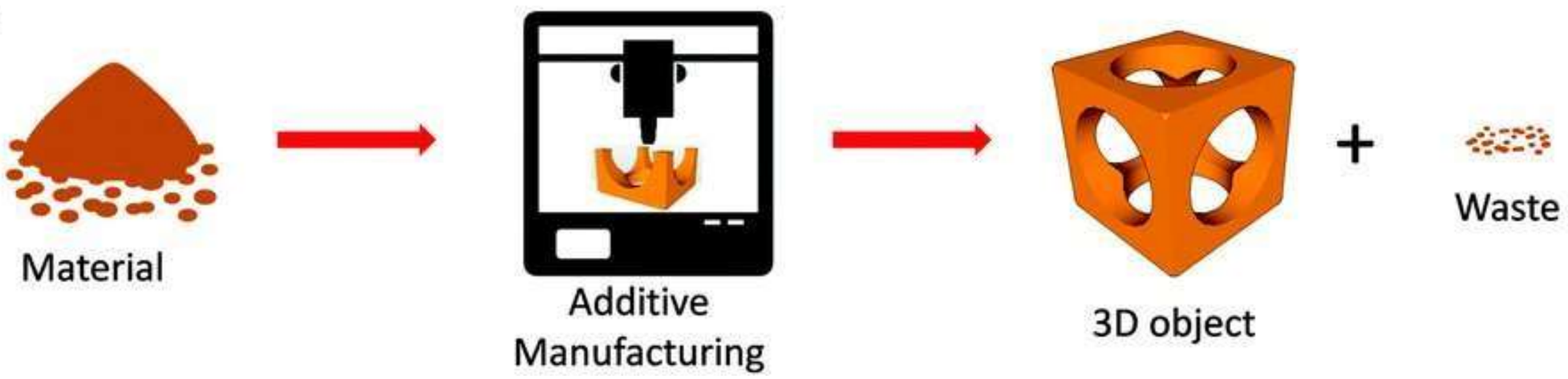


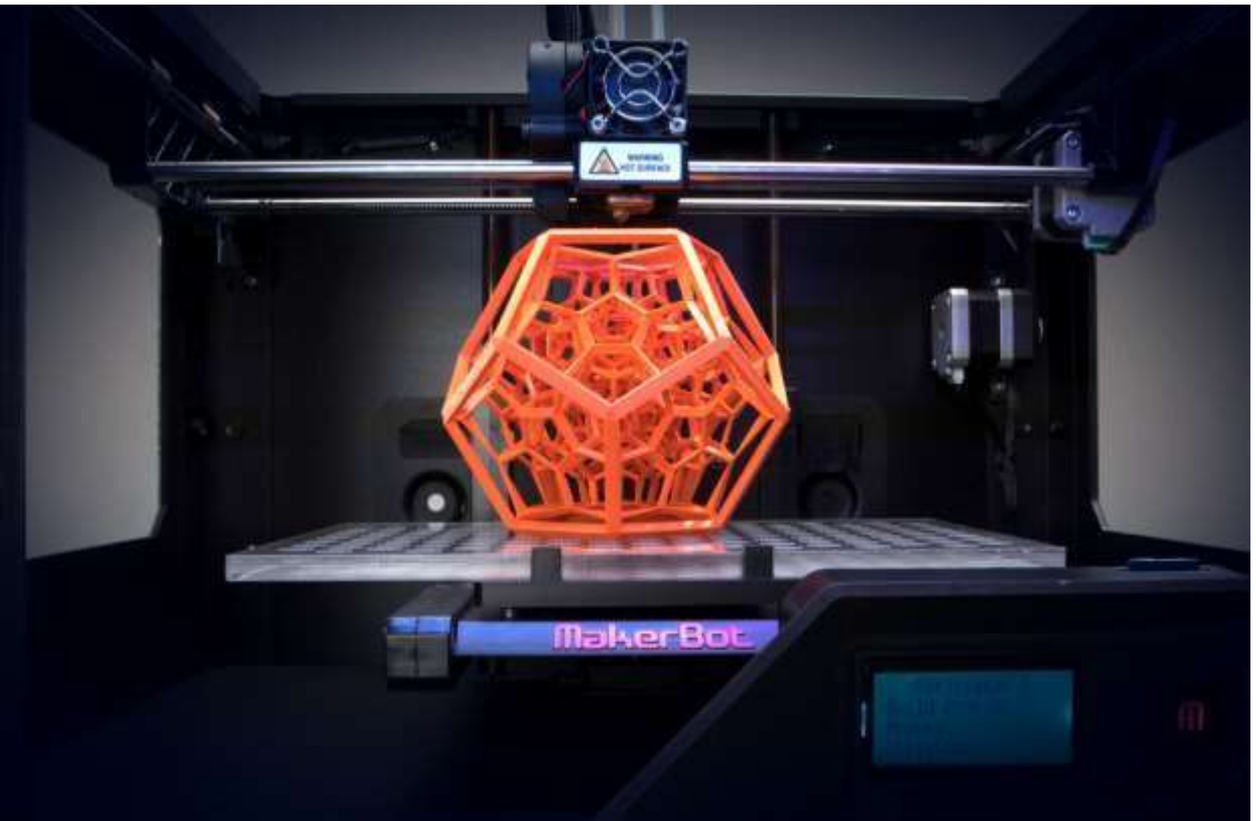
So why do we need 3D Printing Technology?

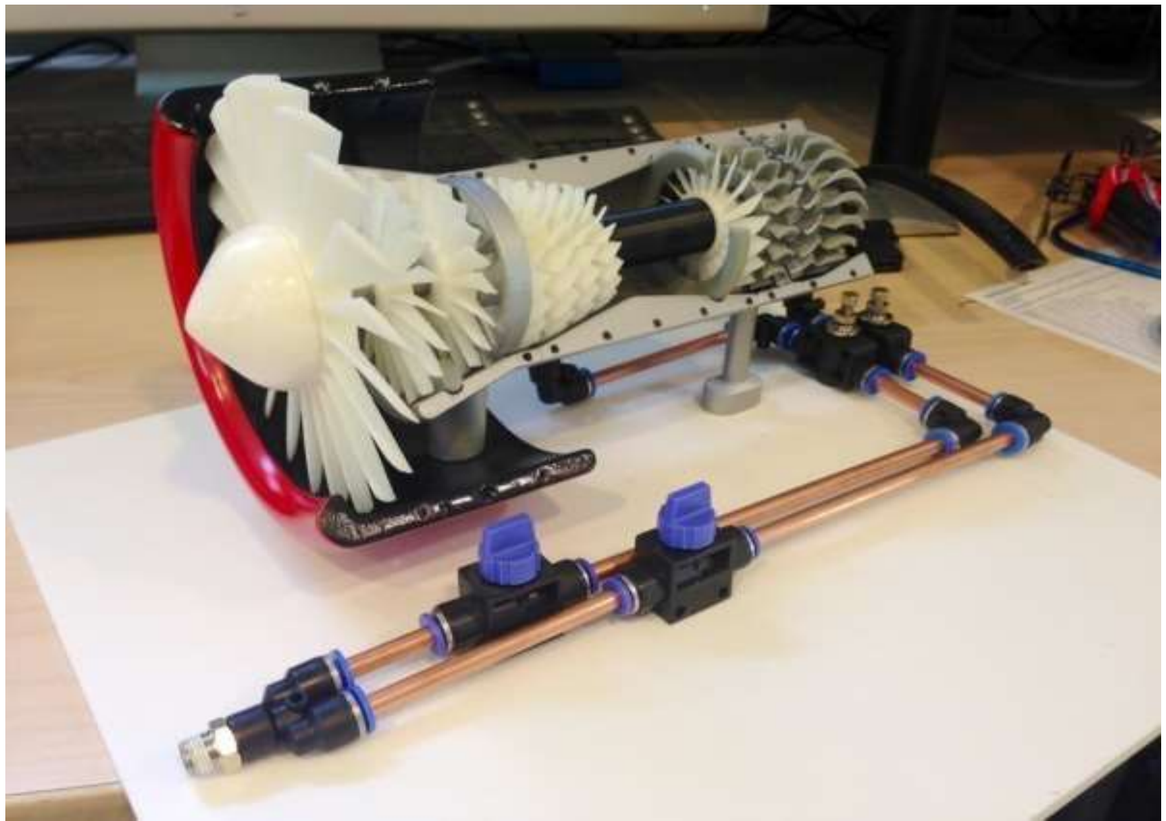
- Traditional method of teaching can be converted in practical oriented approach through 3D Printing Technology in the institution where pupils and scholars gets a better understanding of the basics and concepts of different subjects.

- It enhances hands-on learning and learning by doing. Using this prototyping technology, students will be able to produce realistic 3 dimensional mini-models (great for engineering, architecture, and multi-media arts students).

- Empowers the students to convert their designs into products: Text book oriented concepts could be utilized to create models in the class rooms.

BULDING PROTOTYPES, & ORNAMANTALS



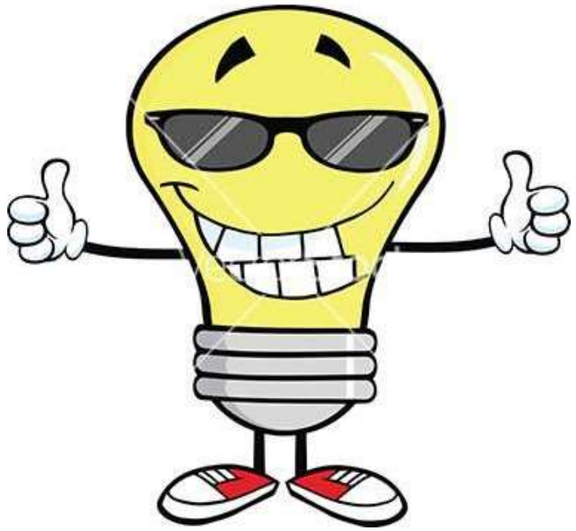


3D Printed unit of a Micro Air Vehicles (Quadrotor) by the Students of IIT Bombay

3D Printed bio model of pelvic girdle by a student of MSR Institute of Technology, Bangalore

- Opens up inspiring possibilities and opportunities: Its like the ability to produce a fully functional “machine” in one print that meets the requirements and constraints.

- 3D printers enables you to Hold, Evaluate, Test and use your own ideas!



- India is in her initial stages of prototyping using 3D printing technologies even though there are exploding experimentations and researches going on in this field.

- Many Indian companies are coming up with this 3D printing technologies to upgrade themselves in the market.

- Many educational institutions like IITs and NIT’S Institute of Technology have come up with a new level of implementing this technology in India.