SILVER OAK COLLEGE OF ENGINEERING & TECHNOLOGY

TECOs SOCET

Reflection of SOCET....

5th Issue

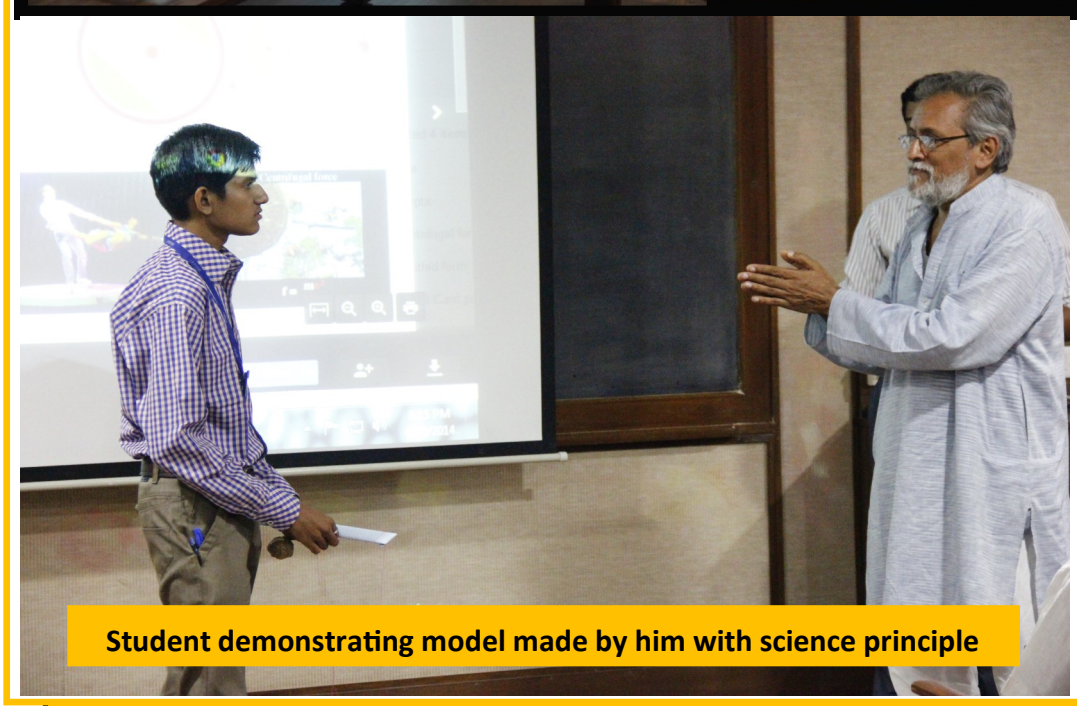
Sept

2014

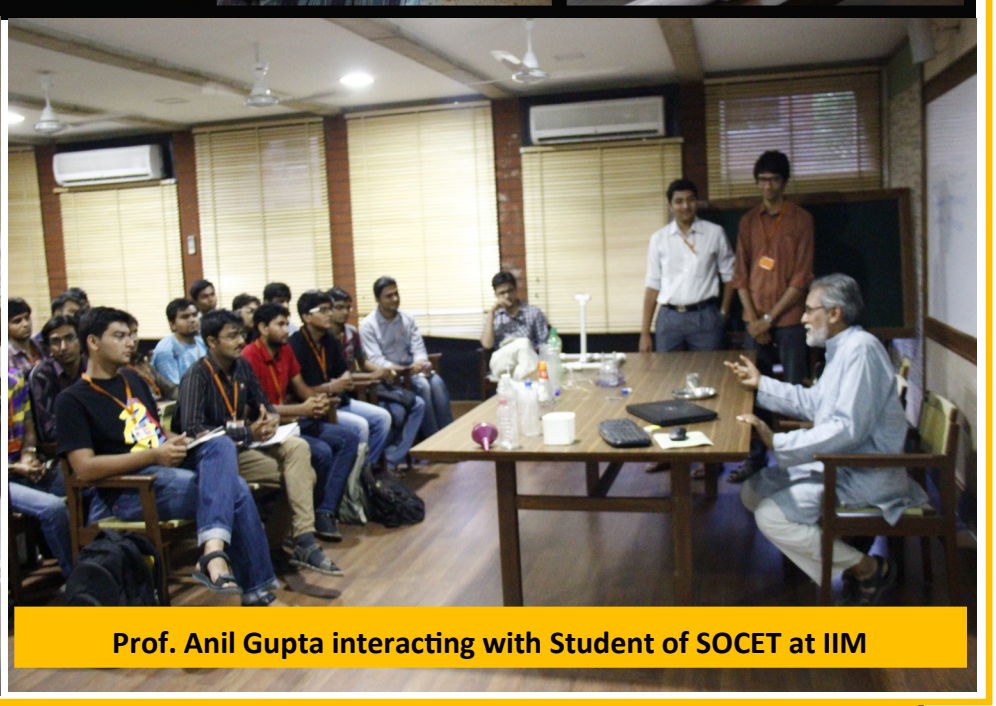
Make India is a student volunteering movement. It is a movement to redefine Indian education system. We want to make education fun. We want making and designing for each and every principle that our students study. We want our students to understand the basic concepts of maths and science by making the toy models related to it. We believe in learning by making. We want to empower the roots of students knowledge by giving them backbone of practical knowledge. so We want students to identify their core competency.

We youth endeavour the future of India. We youth are backbone of INDIA. If we want to develop India, we need to develop our youth. We want to use potential of our youth in developing our country. We have 150 volunteers from various areas; we will be reaching more and public schools in their vicinity.

We personally thinks that Education is the path in which student can make its own credential. Nowadays students might learn the theory from their books but they don't know where practically it is needed. They don't know where that theory is applied. Students are lacking in innovation. Our initiative stands to bring the culture of STEM education (Science Technology Engineering and Mathematics), science from environment curriculum. We emphasis on students skill of STEM education that should increase conceptual skill of them enormously.



Student demonstrating model made by him with science principle

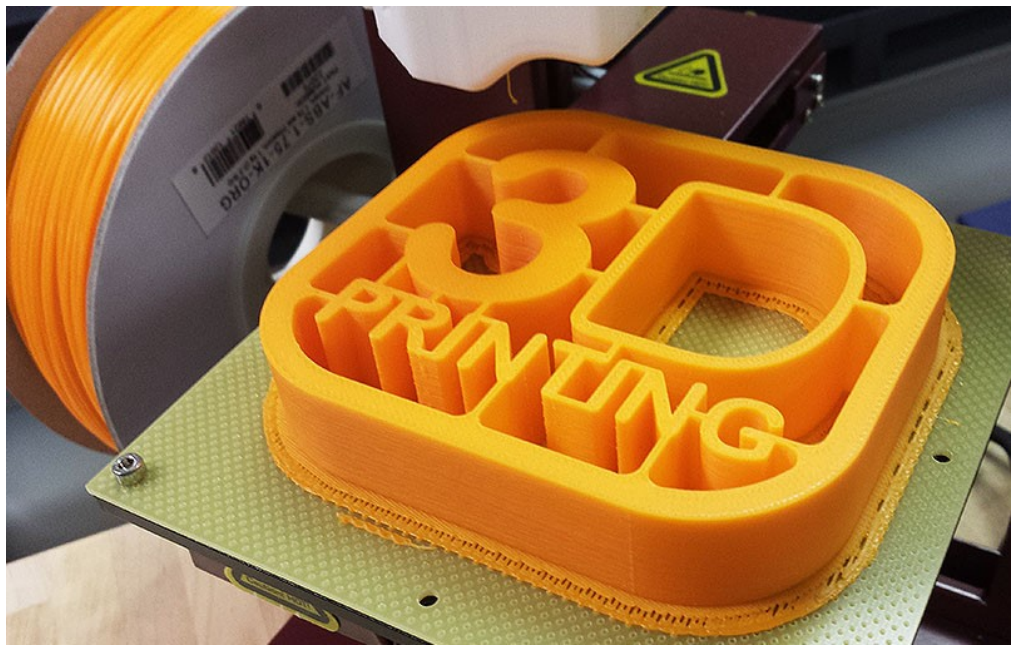


Prof. Anil Gupta interacting with Student of SOCET at IIM

“Don’t find fault, find a remedy.”- Henry Ford

What the heck is that?

3D printing is a process of making three *dimensional solid objects from a digital model. The creation of a 3D printed object* is achieved using additive processes (This refers to a process by which digital 3D design data is used to build up a component in layers by depositing material).



Printing the object

There are two ways to make a 3D object. Firstly, the virtual design is made firstly on certain CAD (Computer Aided Design) software OR secondly, by using 3D scanner to scan an existing object & make certain changes in its design & re-build it for further use. The software "slices" the desired object into several hundred or several thousand horizontal layers. The printer reads the design from 3D printable file (STL file) and lays down successive layers of liquid, powder, paper or sheet material to build the 3D object from a series of layers. Typical layer thickness is around 100 micrometer (µm) or 250 Dots per Inch (DPI).

Several methods are used in 3D printing to produce 3D objects of which are

- Selective Laser Sintering (SLS)
- Stereolithography (SLA)
- Fused deposition modeling (FDM)
- Syringe Extrusion
- PolyJet photopolymer

Stereolithography is the most common technology for 3D printing. This technology is used for producing models, prototypes, patterns, and production parts up one layer at a time by curing a photo-reactive resin with a UV laser or another similar power source.

Application

The application of 3D printing includes design visualization, prototyping/CAD, metal casting, architecture, education, geospatial, health care, entertainment & retail.

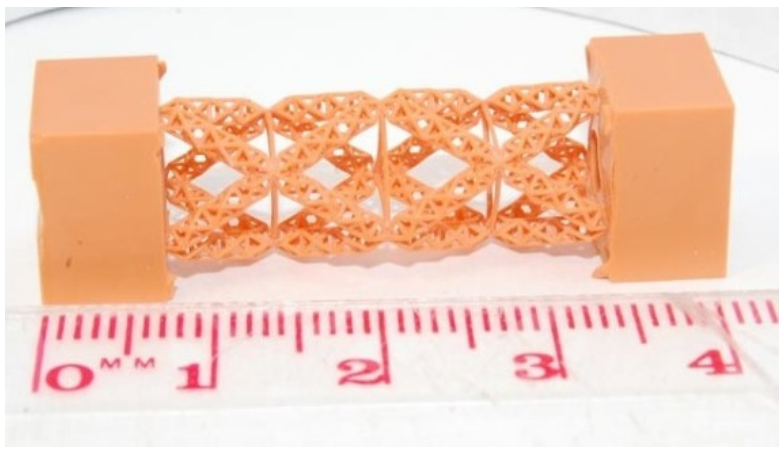
Interesting Facts

Recently, these are some of the interesting data from the world of 3D printing.

- Students of Massachusetts Institute of Technology (MIT) has developed a 3D-printer that can produce ice creams in any shape in just 15 minutes.
- IBM 3D Prints World's Smallest Magazine Cover.
- A UK research group has unveiled several aircraft concepts projected for 2040 which include self-healing and transforming air vehicles with the use of 3D printing.
- University of Arizona students created and successfully launched a rocket made up with several 3D printed parts.
- Philips announced a collection of new products, from a new app-controlled light bulb and kinetic-powered light switch to a 3D-printed lamp line.
- Scientists 3D Print a 'Tumor' of Cancer Cells.
- Doctors at a United Kingdom hospital have broken surgical boundaries by reconstructing the face of a motorcycle-crash survivor using 3D-printing technology.

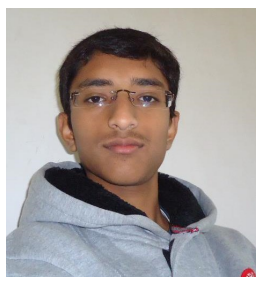
The FUTURE is now here !

Instantly printing parts and entire products, anywhere in the world, is a game changer. But it doesn't stop there. 3D printing will affect almost every aspect of industry and our personal lives.

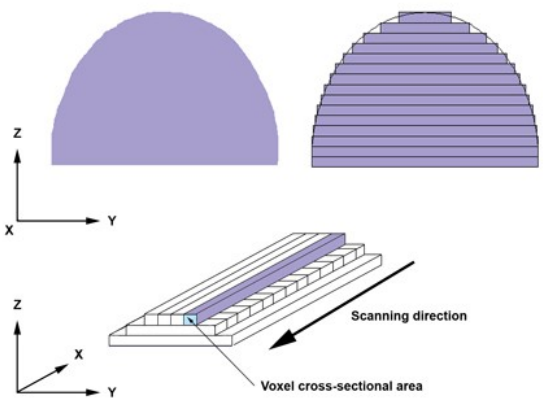


Now, 3D-printed models of complex architectural drawings are created quickly and inexpensively, rather than the expensive and time-consuming process of handcrafting models out of cardboard.

This is a disruptive technology of gigantic proportions, with effects on energy use, waste, customization, product availability, art, medicine, construction, the sciences, and of course manufacturing. It will change the world as we know it. Before you know it !



Agney Patel
Computer Engineering



Application

Additive manufacturing's earliest applications have been on the toolroom end of the manufacturing spectrum. For example, rapid prototyping was one of the earliest additive variants, and its mission was to reduce the lead time and cost of developing prototypes of new parts and devices, which was earlier only done with subtractive tool room methods (typically slowly and expensively). With technological advances in additive manufacturing, however, and the dissemination of those advances into the business world, additive methods are moving ever further into the production end of manufacturing in creative and sometimes unexpected ways. Parts that were formerly the sole province of subtractive methods can now in some cases be made more profitably via additive ones.

Standard applications include design visualisation, prototyping/CAD, metal casting, architecture, education, geospatial, healthcare, and entertainment/retail.

“To lead people, walk behind them.” – Lao Tzu

Transcranial Magnetic Stimulation

EEG is used to measure brain activity but we can't stimulate it. TMS can be used to stimulate brain activity. It can be used for diagnostics, study of brain functioning, Therapeutic use and many more. This technology is recently developed so there is lots of research still pending.

What is TMS?

Transcranial Magnetic Stimulation (TMS) is recently developed technology which is used to stimulate brain activity. As magnetic field is used in this technology there are no harmful effects to user after operation as it is a non-invasive technique. We know that our brain utilize electrical pulses to transmit signals which travel through neural cells. As these signals are electric it can be interfered by all phenomenon of electricity. TMS uses low frequency magnetic field to induce small current in brain as shown in figure.

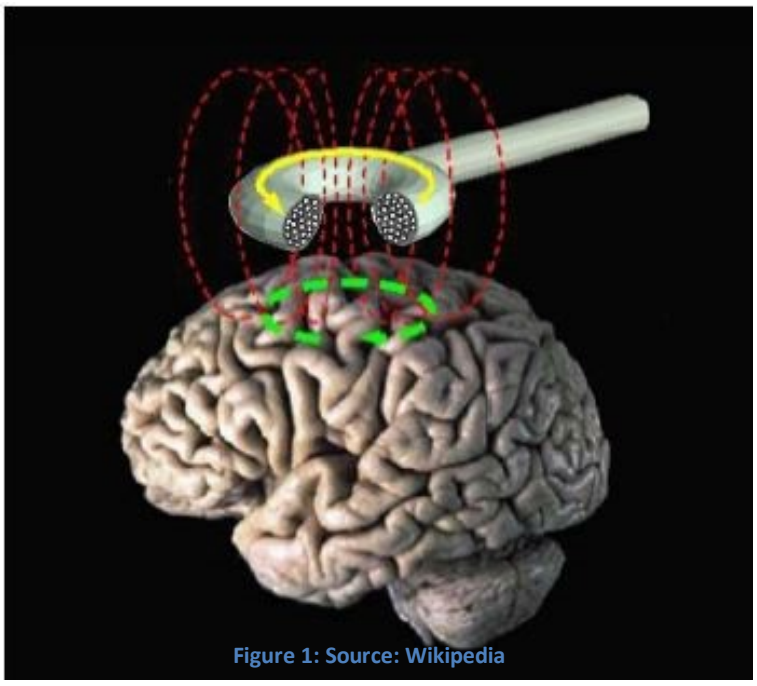
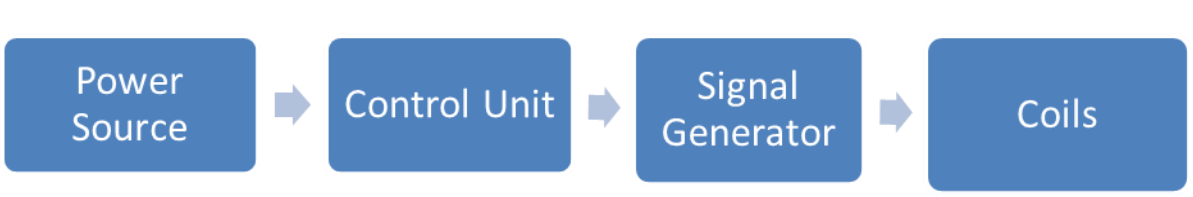


Figure 1: Source: Wikipedia

First attempt to stimulate brain was successive made by Anthony Barker and his colleagues at the Royal Hallamshire Hospital in Sheffield, England in 1985. The idea was simple; Anthony Barker was just wanted to produce eddy current in brain. TMS device uses a magnetic coil of diameter normally 50-150 mm and maximum magnetic strength of 1-2.5 T for 50-200 microseconds.

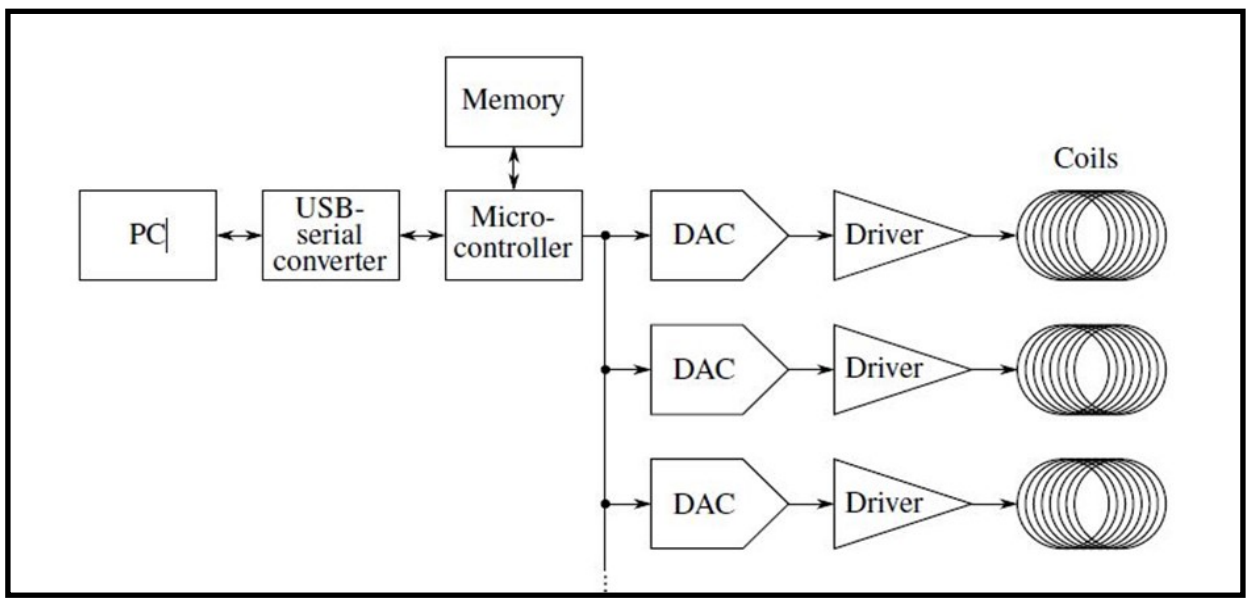
Construction of TMS:

A TMS Device's coil is placed above the head over a region of interest, for example, above the visual cortex. When a changing electric current flows through the coil, an electromagnetic field is created. According to Faraday's law, this induces an electric field in the brain that can stimulate neurons as an illusion of firing of neurons.



As per the waveforms used there are following types of TMS: 1) Single Pulse TMS 2) Repetitive TMS(rTMS)

Block Diagram of TMS working

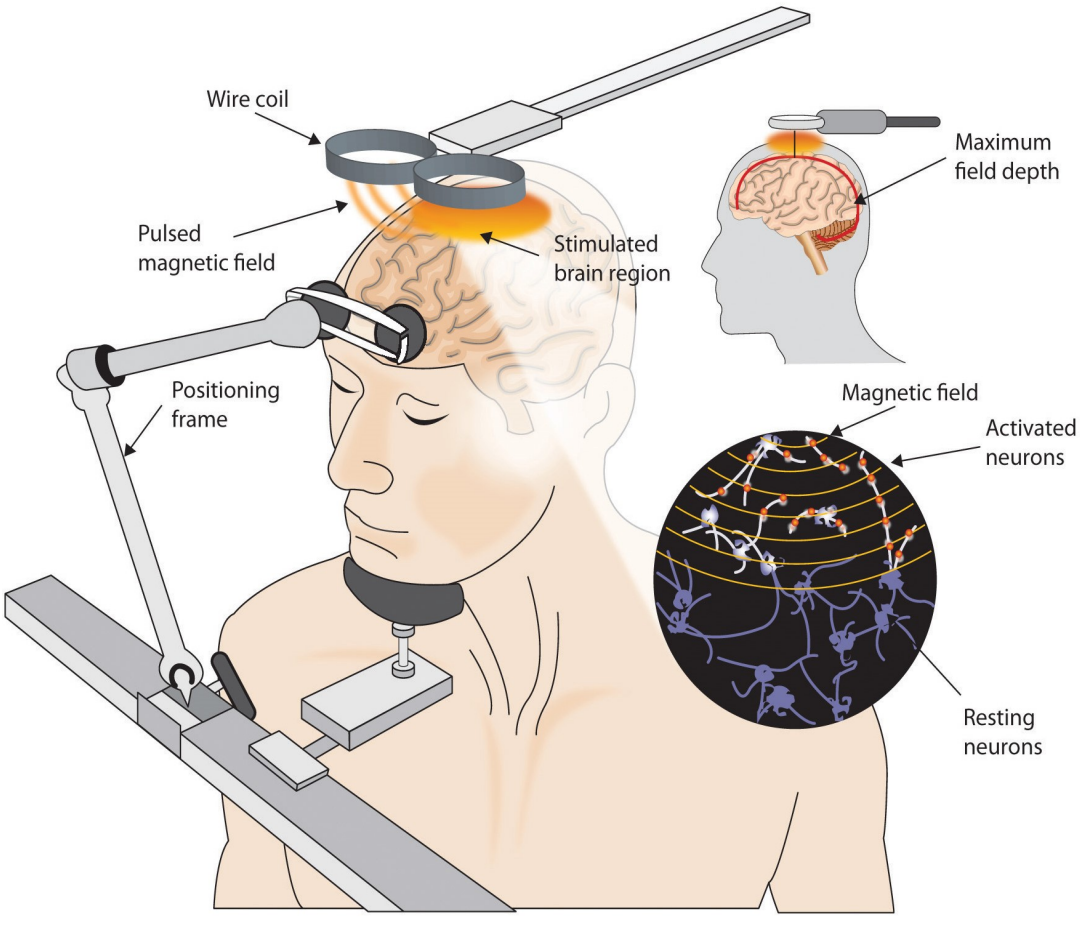


In single pulse TMS there is only one pulse in magnetic field. While if magnetic pulses are in a continuous series then it is called Repetitive TMS system.

In above device control instructions are given to device by a computer through serial or USB communication. Microcontroller generates PWM signal from instructions which is fed in to Digital-to-Analog converter producing analog signal. This analog signal is fed in to driver circuits which increase voltage and current level necessary to produce required strength of magnetic field. In TMS systems magnetic field has strength almost equal to field used in MRI machine.

"The results of the follow-up study further support TMS as a viable treatment option for patients with major depression who have not responded to conventional antidepressant medications," said Janicak. "After acute response to TMS, a standardized regimen of antidepressant medication maintained the acute benefit in the majority of patients over a six-month period."

TMS received clearance from the U.S. Food and Drug Administration (FDA) in October 2008. This novel treatment option is a safe and effective, acute antidepressant therapy, but there is limited information on its long-term benefits.

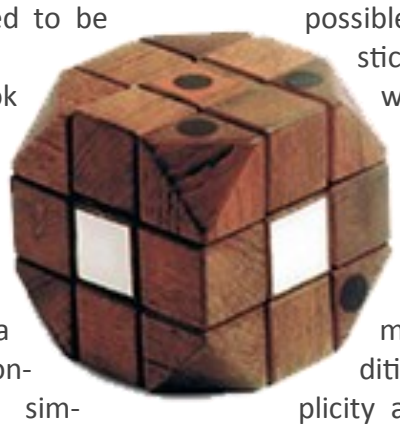


Markand Pathak
Mechanical Engineering

"A teacher affects eternity; he can never tell where his influence stops." – Henry Adams

RUBIK'S CUBE

In 1974, a young Professor of architecture in Budapest (Hungary) named Erno Rubik created an object that was not supposed to be possible. His solid cube twisted and turned - and still it did not break or fall apart. With colourful stickers on its sides, the Cube got scrambled and thus emerged the first “Rubik’s Cube”. It took well over a month for Erno to work out the solution to his puzzle. Little did he expect that Rubik’s Cube would become the world’s best-selling toy ever. As a teacher, Erno was always looking for new, more exciting ways to present information, so he used the Cube’s first model to help explain to his students about spatial relationships. Erno has always thought of the Cube primarily as an object of art, a mobile sculpture symbolizing stark contrasts of the human condition: bewildering problems and triumphant intelligence; simplicity and complexity; stability and dynamism; order and chaos. For this magic object to become the most popular toy in history a few chance meetings had to take place.



As with many of the world’s greatest inventions it did not have an easy birth. After presenting his prototype to his students and friends Erno began to realise the potential of his cube. The next step was to get it manufactured. The first cubes were made and distributed in Hungary by Politechnika. These early Cubes, marketed as “Magic Cubes” (or “Buvos Kocka”), were twice the weight of the ones available later. In the 70’s Hungary was part of the Communist regime behind the Iron Curtain, and any imports or exports where tightly controlled. How was Erno’s invention, that had become a major success in Hungary, going to make it into the hands of every child of the 80’s?

The first step in the Rubik’s Cube’s battle to worldwide recognition was to get out of Hungary. This was accomplished partly by the enchanted mathematicians who took the Cubes to international conferences and partly by an expat Hungarian entrepreneur who took the cube to the Nuremberg Toy Fair in 1979. It was at there that Tom Kremer, a toy specialist, agreed to sell it to the rest of the world. Tom’s unrelenting belief in the Cube finally resulted in the Ideal Toy Company taking on distribution of the “Magic Cube”. Ideal Toy’s executives thought that the name had overtones of witchcraft and after going through several possibilities the name: “Rubik’s Cube” was decided on, and the icon was born.

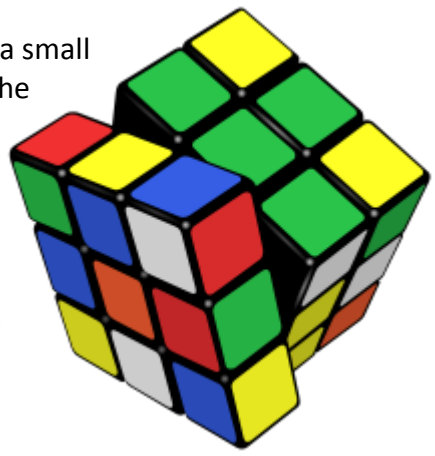
In the time since its international launch in 1980 an estimated 350 million Rubik’s Cubes have been sold. Approximately one in seven people alive have played with a Rubik’s Cube. This little six color cube has gone on to represent a decade. It has started art movements (Rubik Cubism); pop videos, Hollywood movies and even had its own TV show; it has come to represent both genius and confusion; it has birthed a sport (Speedcubing); and it has even been into space.

The beauty of the Rubik’s Cube is that when you look at a scrambled one, you know exactly what you need to do without instruction. Yet without instruction it is almost impossible to solve, making it one of the most infuriating and engaging inventions ever conceived.

“IF YOU ARE CURIOUS, YOU’LL FIND THE PUZZLES AROUND YOU. IF YOU ARE DETERMINED, YOU WILL SOLVE THEM. ” - ERNO RUBIK

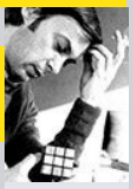
First Patent

Rubik applied for his Hungarian patent in January 1975 and left his invention with a small toy making cooperative in Budapest. The patent approval finally came in early 1977 and the first Cubes appeared at the end of 1977. By this time, Erno Rubik was married.



Two other people applied for similar patents at about the same time as Rubik. Terutoshi Ishige applied a year after Rubik, for a Japanese patent on a very similar cube. An American, Larry Nichols, patented a cube before Rubik, held together with magnets. Nichols' toy was rejected by all toy companies, including the Ideal Toy Corporation, which later bought the rights to Rubik's Cube.

THE CUBE STORY



1944 ERNŐ RUBIK IS BORN IN BUDAPEST, HUNGARY.

1974 RUBIK CREATES THE FIRST WORKING PROTOTYPE OF THE CUBE.

1975 RUBIK PATENTS THE 'MAGIC CUBE'

1977 THE FIRST 'MAGIC CUBE' IS SOLD IN A BUDAPEST TOYSHOP.

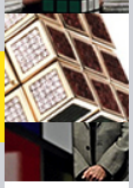
1979 TOM KREMER NEGOTIATES AND SIGNS THE DISTRIBUTION LICENSE.

1980 THE 'MAGIC CUBE' IS RENAMED THE 'RUBIK'S CUBE'.

1981 'YOU CAN DO THE CUBE' BY PATRICK BOSSERT, SELLS 1.5M COPIES.

1982 THE FIRST ANNUAL INTERNATIONAL RUBIK'S CHAMPIONSHIPS ARE HELD

1990 ERNŐ RUBIK BECOMES PRESIDENT OF THE HUNGARIAN ENGINEERING ACADEMY



1995 DIAMOND CUTTERS INT. CREATES THE 'MASTERPIECE CUBE' BUDAPEST.

2013 A NEW CUBE IS BORN! ALL NEW FASTER ACTION MECHANISM AND DURABLE TOUGH TILES.

Facts about Rubik’s Cube

- The Rubik’s Cube was invented in 1974 by Erno Rubik; he wanted a working model to help explain three-dimensional geometry. It took him one month before he was able to solve the Cube for himself.
- Over 350 million Rubik’s Cubes have been sold worldwide – making it the bestselling toy of all time.
- Every legal permutation of the Rubik’s Cube can be solved in 20 moves or fewer.
- Single time: The current world record for single time on a 3×3×3 Rubik's Cube was set by Mats Valk of the Netherlands in March 2013 with a time of 5.55 seconds at the Zonhoven Open in Belgium
- One-handed solving: A time of 9.03 seconds was made by Feliks Zemdegs at the Lifestyle Seasons Summer 2014. Antoine Cantin, from Clarence-Rockland, ON averaged 12.56 seconds over five cubes at the Toronto Open Spring 2014
- Fewest moves solving: Tomoaki Okayama of Japan holds the record of 20 moves set at the 2012 Czech Open
- Non-human solving: The fastest non-human time for a physical 3×3×3 Rubik's Cube is 3.25 seconds, set by CubeStormer III, a robot built using Lego Mindstorms and a Samsung Galaxy S4. This beats the prior 5.27 seconds, set by CubeStormer II, a robot built using Lego Mindstorms and a Samsung Galaxy S2.This broke the previous record of 10.69 seconds, achieved by final year computing students at Swinburne University of Technology in Melbourne, Australia in 2011.

Rounak Jansari
Civil Engineering

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“Leadership is the capacity to translate vision into reality.” – Warren Bennis