

National Changhua University of Education



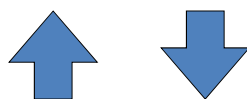
Creative Engineering Design 2011

Prepared by Kerwin Wang

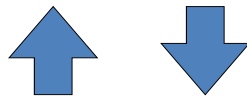
Department of Mechatronics Engineering



Creative Thinkers



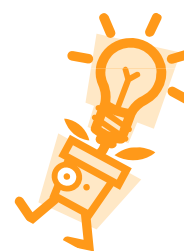
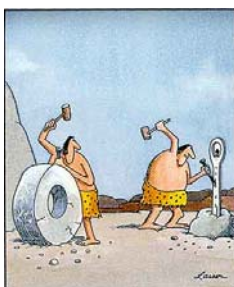
Design Philosophy

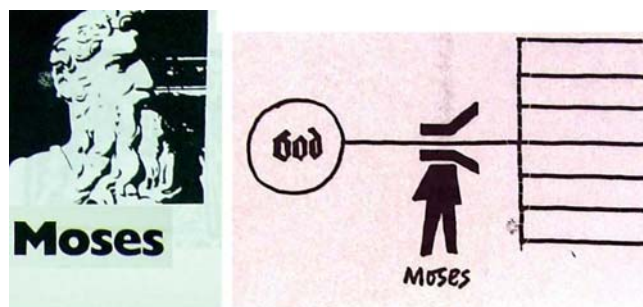


Funny Inventions



Useful Inventions





Moses acted as the loudspeaker who broadcast God's will as tight set of law that established a people and religion.



http://tw.wrs.yahoo.com/_ylt=A8tUxwnLV1dHYwYBAQlr1gt./SIG=12fbvjui/EXP=1196992843/**http%3A//tw.knowledge.yahoo.com/question/%3Fqid=1405123020680

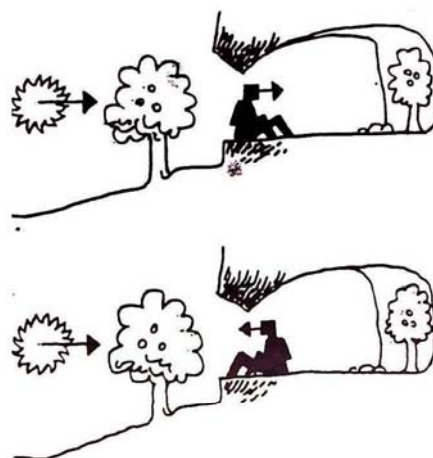


Confucius put all the emphasis on the relation itself.

(The Christian put more weight on encourage a man or woman to be right within himself/herself)



Plato

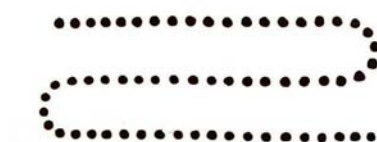


The ordinary man sits in his limited cave and sees only the shadow of reality. Plato insisted that the truth existed as true forms below the surface appearance of things. (Philosopher like to see the truth itself.)

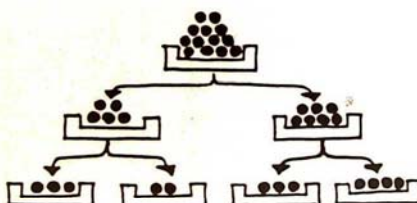


Aristotle

Aristotle classified and categorized concepts in order to extract their full meaning and form their relationship to each other.



before



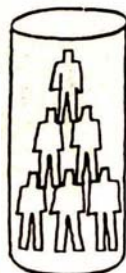
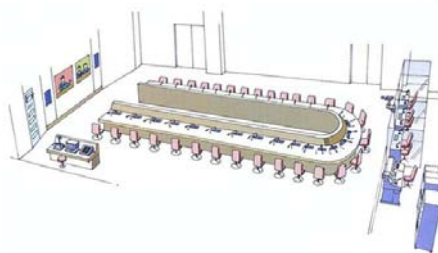
after



He offered the kingdom of God in which all men were equal.



Jesus



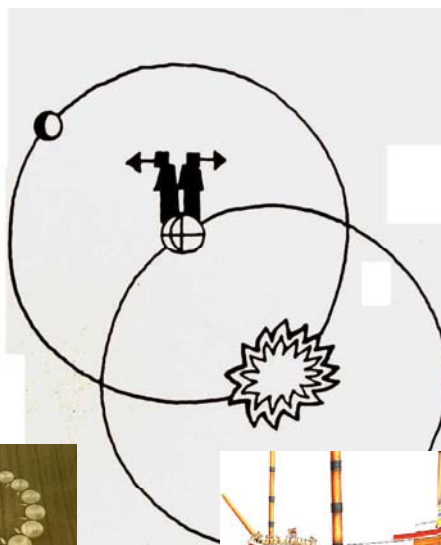
before

after



Copernicus

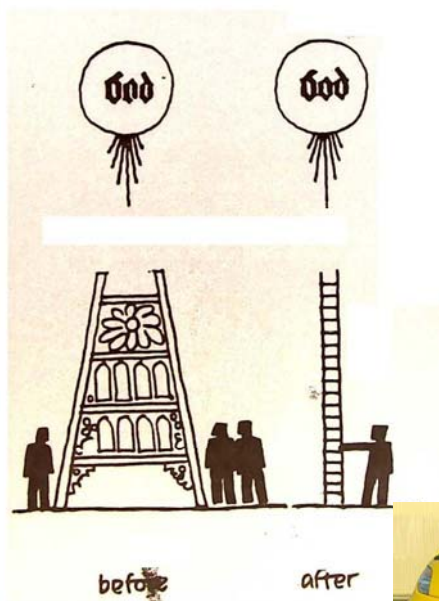
Copernicus set off the revolution in thinking that was to follow.





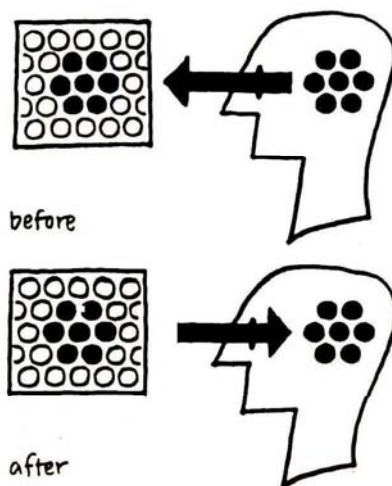
Luther

Man could communicate directly and on personal level with God without the intervention of Church.



Bacon

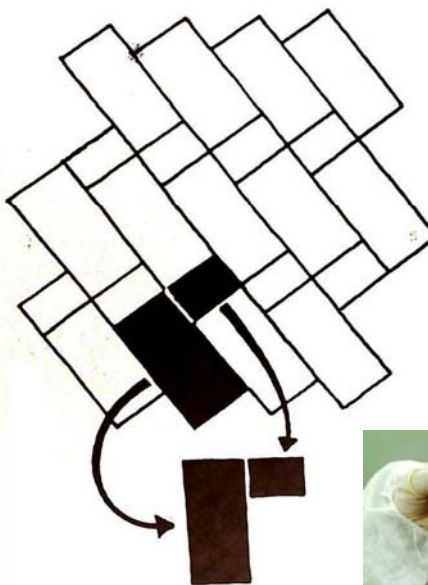
The truth only came from careful observation.





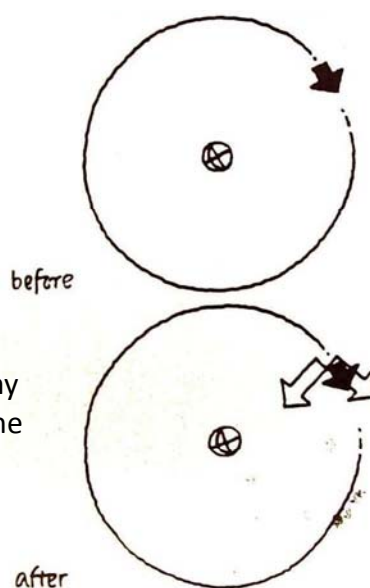
Descartes

Descartes' success in inventing analytical geometry convinced him that even the most complicated situation can be broken down into simple parts that are combined in a special way.



Newton

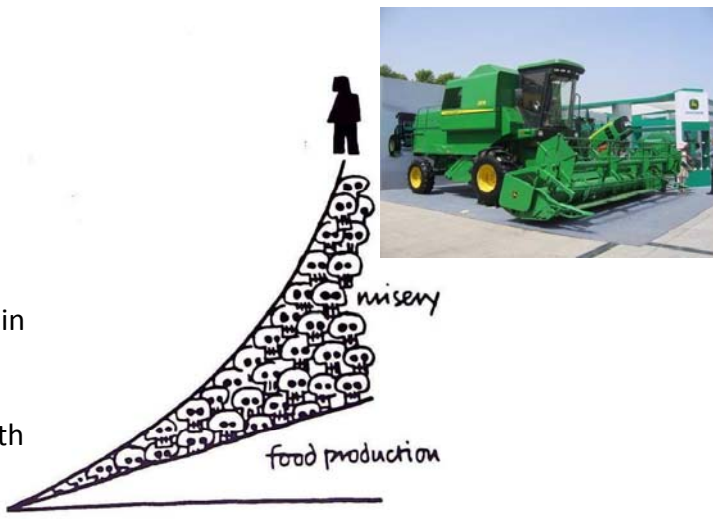
Newton explained many mysteries of the natural in a scientific way.





Malthus

He saw nothing in nature which would halt the geometric growth of population.



Clausewitz

The father of management science, he was interested in action not in essence.



before



after

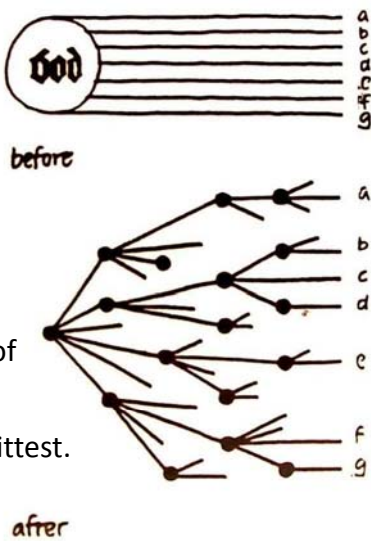




Darwin

Using Evolution to explain the

- 1. Differentiation of species.
- 2. Survival of the fittest.

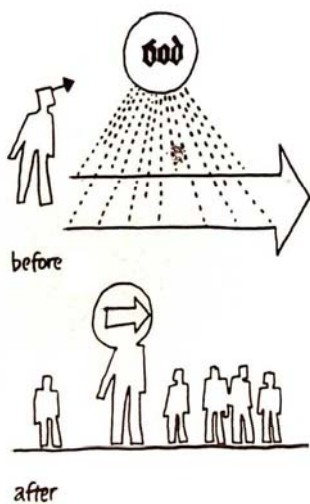


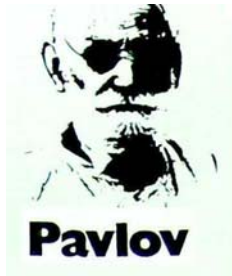
Nietzsche

Supermen theory

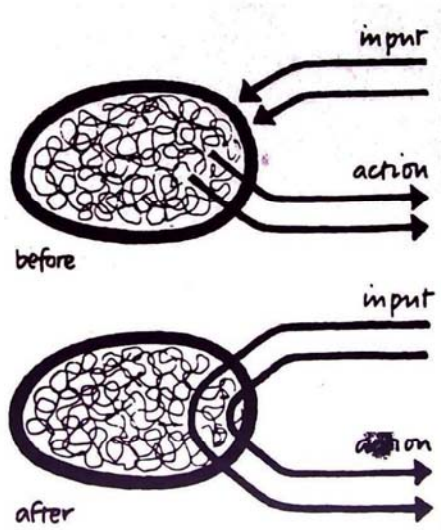
Nietzsche restore man's moral fibre.

God was dead.



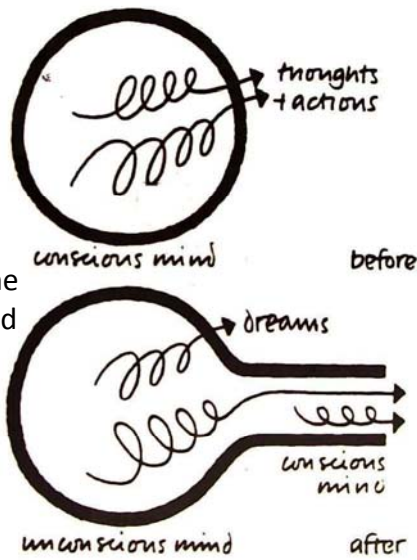


Human's behavior could be controlled and predicted.



Freud

The conflicts of the subconscious mind could be seen to explain much of human behavior.



Sleep Learning

自我暗示有著驚人的力量

睡眠週期九十分鐘

睡眠學習
睡前暗示

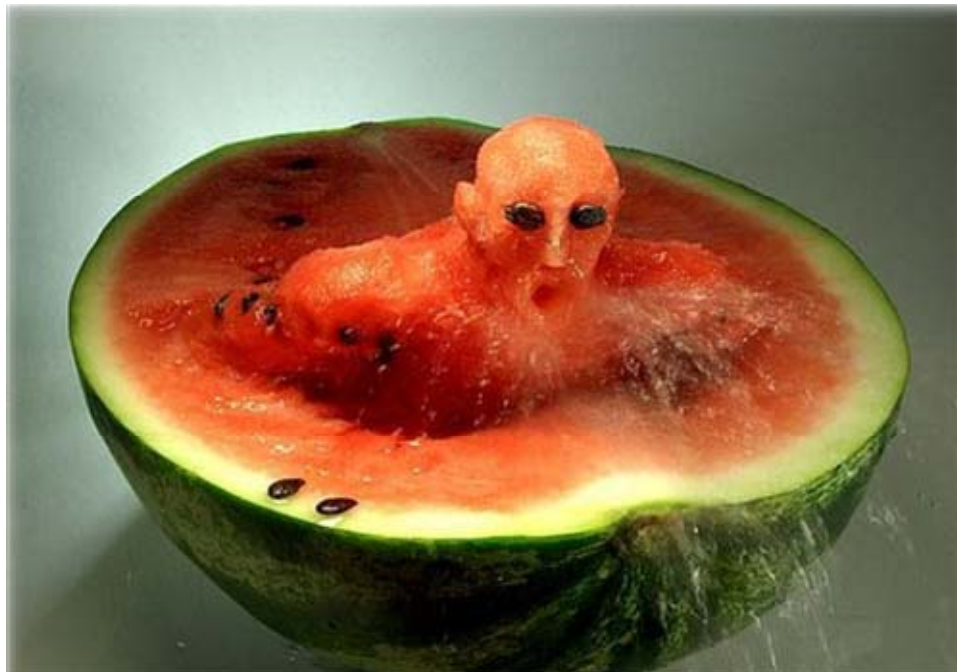
REFERENCES

1. Weidenfeld and Nicolson, "The Greatest thinkers"
2. Beitz W. and Pahl G., Engineering Design: A Systematic Approach, The Design Council London
3. <http://en.wikipedia.org/wiki/>

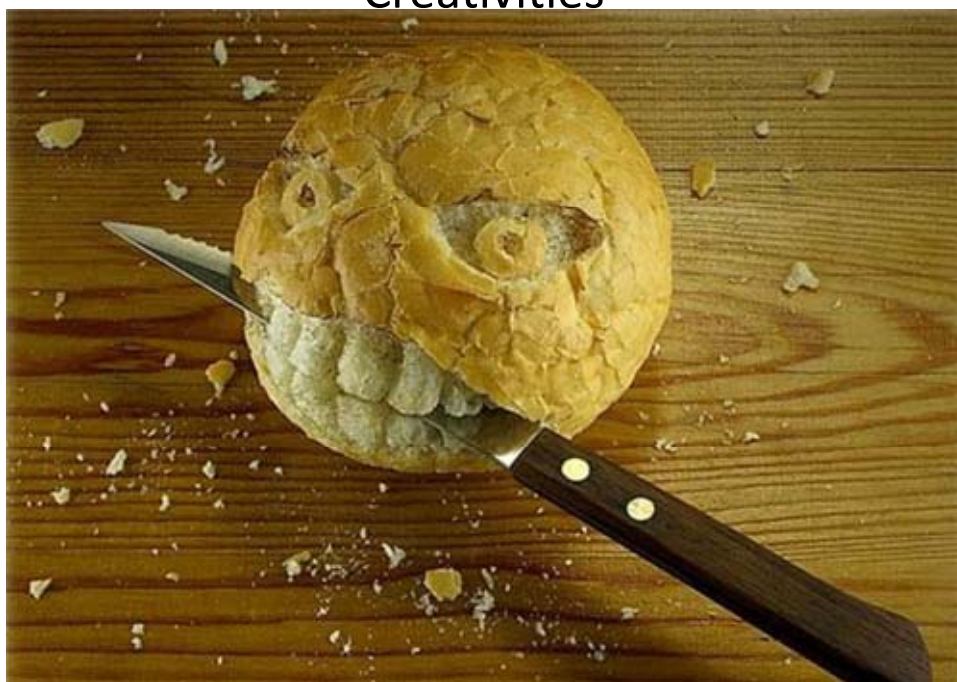
Creativities



Creativities



Creativities



Hi Kerwin,

I'd be honored if you would show my images to your students. My websites are:

<http://www.pbase.com/dsouzl>
<http://www.engagingimages.ca/welcome.html>

Thanks and all the best!

..Lew D'Souza..

On Fri, May 1, 2009 at 4:25 AM, Kerwin Wang <kerwin@cc.ncue.edu.tw> wrote:

Dear Dsouzl,

May I show your creative images to my students in the "Creative Engineering Design" Class?
I think these pictures will give them very good inspiration.

All the Best!

Kerwin Wang, Assistant Professor
Department of Mechatronics Engineering
National Changhua University of Education
1, Jin De Road,
Changhua 50007, Taiwan
TEL 886-4-723-2105-7818

Great Images



From http://www.pbase.com/dsouzl/fun_stuff

Great Images



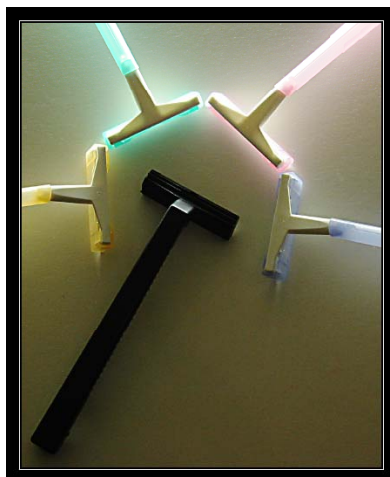
From http://www.pbase.com/dsouzl/fun_stuff

Great Images



From http://www.pbase.com/dsouzl/fun_stuff

Great Images



From http://www.pbase.com/dsouzl/fun_stuff

Great Images



From http://www.pbase.com/dsouzl/fun_stuff

OK!!!

Let's take a break

and then

move to the

DESIGN



What is Engineering Design?

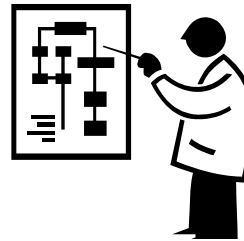
- Systematic thinking
- A process of converting information that characterizes the needs and requirements for a product into knowledge about a product.
- It is a data based decision making process.
- It is an Open System

Let's play an example!!

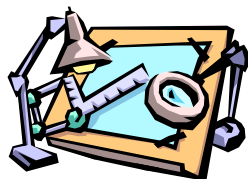


Engineering Design

- Problem Identification
- Creative Process (stress can enhance creative process)
- Limitations and Barriers to Creative Thought
- Tools Available to Designers



Problem Identification



- A Story
- Technical Brief
- Events
- Abstract
- Problem Statement
- Word Problem
- Work Schedule
- Mathematical Model
- Template
- Validation
- Synthesis

Creative Process

- IQ, Age, Education is not required to think creatively
- Brain Storming
- Combining old things is one way



Funny inventions



Funny inventions



Funny inventions



CARRYING four persons and a sewing machine, the world's weirdest bicycle recently had a tryout in Chicago, Ill. The two-wheeled vehicle, known as the "Dandybike," is the creation of Charles Steinlauf. It carries the whole Steinlauf family. The inventor rides at the top and guides the contraption

by means of a huge automobile steering wheel. Mrs. Steinlauf sits below, operating sewing machine, while her son pedals behind and her daughter rides on the handlebars in front. When the odd vehicle is at rest, its projecting legs of the sewing machine prevent the lanky cycle from tipping over.



Funny inventions



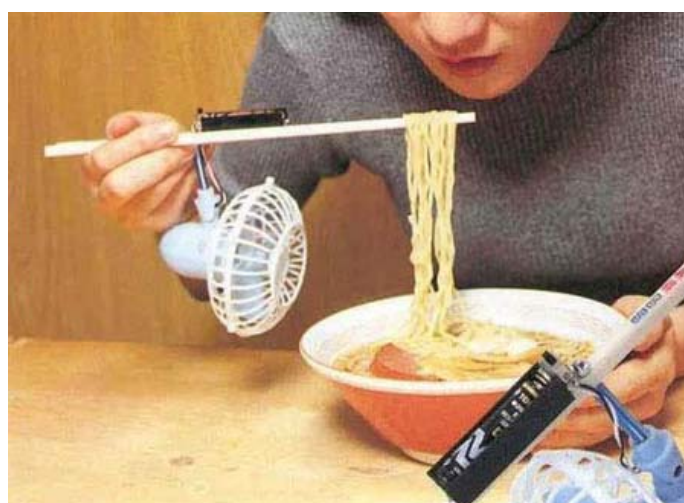
Funny inventions



Funny Design in Japan



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Funny Japanese inventions



Limitations and Barriers

- Intellectual Barriers
- Emotional Barriers
- Social and Cultural Barriers
- Material Properties
- Technology Barriers
- Dilemma



Money Traps



Tools Available to Designers

- Continuous quality improvement (cascading chart)
- Planning tool (QFD)
- Time management tools (active network, master schedule, Gantt (PEI) chart,...)
- Ideation tools (brainstorming, mind-mapping, visual thinking, combing ideas, morphological matrix)
- Evaluation and analysis tool (knowledge box, evaluation table, on-conscious competence, ramification learning plan, up-to-date knowledge)

Tools Available to Designers

SIX THINKING HATS

White => An objective look at data and information.

Red => Intuition

Black => Logical negative (judgment, caution)

Yellow => Logical positive (feasibility)

Green => New idea & creative thinking

Blue => Control of thinking process

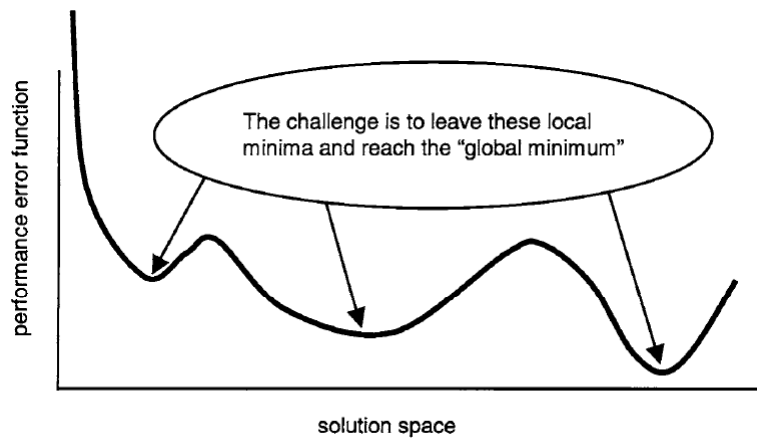
The way of thinking

- Lateral thinking
- Vertical thinking
- Critical thinking
- Objective oriented thinking

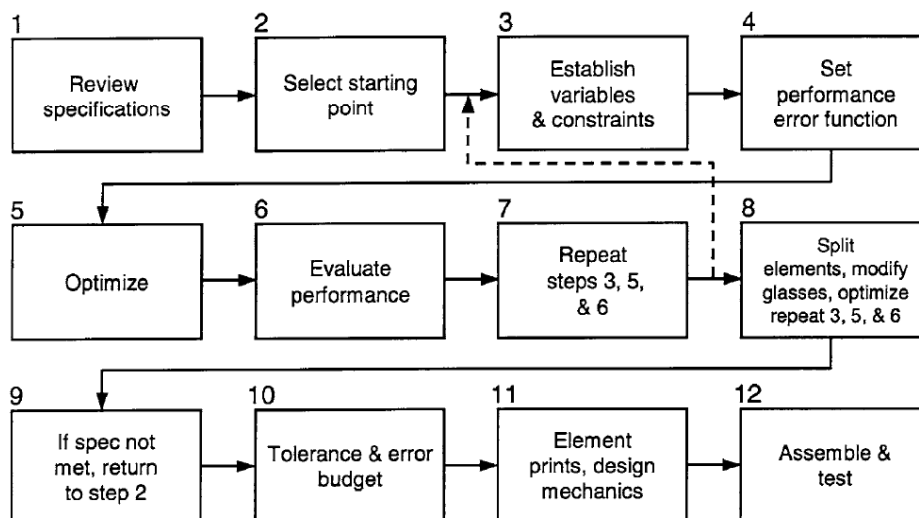
Be a Good System Designer

- A good system designer is like a conductor of an orchestra who get right materials and design parameters to play right function at the right place.

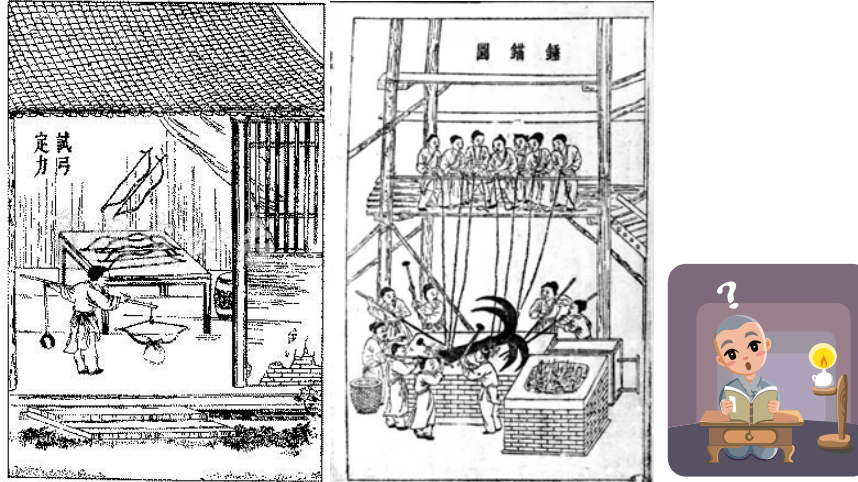
Design Space



Engineering Design Steps



Steps In Engineering Problem Solving



Chinese Technology in the Seventeenth Century: T'ien-kung K'ai-wu, Yingxing Song
天工開物, '宋應星' 1637

Steps in engineering problem solving

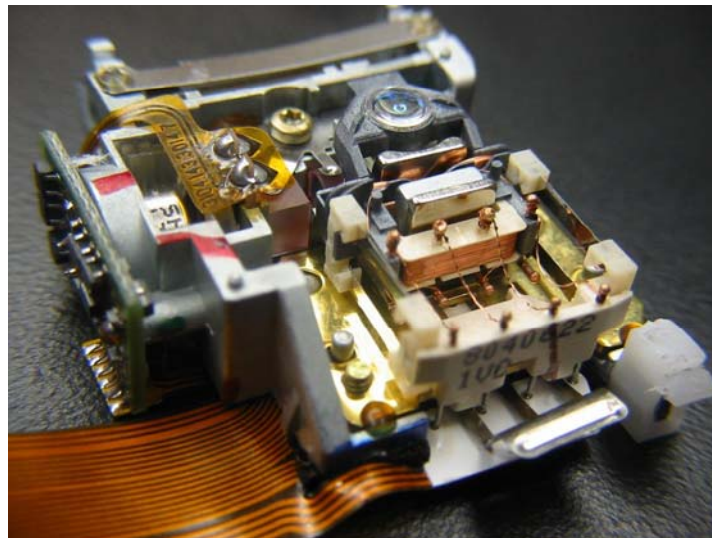
1. Understand the purpose of the problem.
2. Collect the known information.
3. Determine what information you must find.
4. Simplify the problem. State any assumptions you make.
5. Draw a sketch and label any necessary variables.
6. Determine which fundamental principles are applicable.
7. Think generally about your proposed solution approach and consider other approaches before proceeding with the details.
8. Label each step in the solution process. **Understand the purpose of the problem**
9. If you solve the problem with a program, hand check the results using a simple version of the problem.
10. Checking the dimensions and units and printing the results of intermediate steps. Estimate the range of the expected result and compare it with your answer.
11. Do not use the answer without considering what they mean. (Simulation always produce something .)

A Real Engineering Design Example

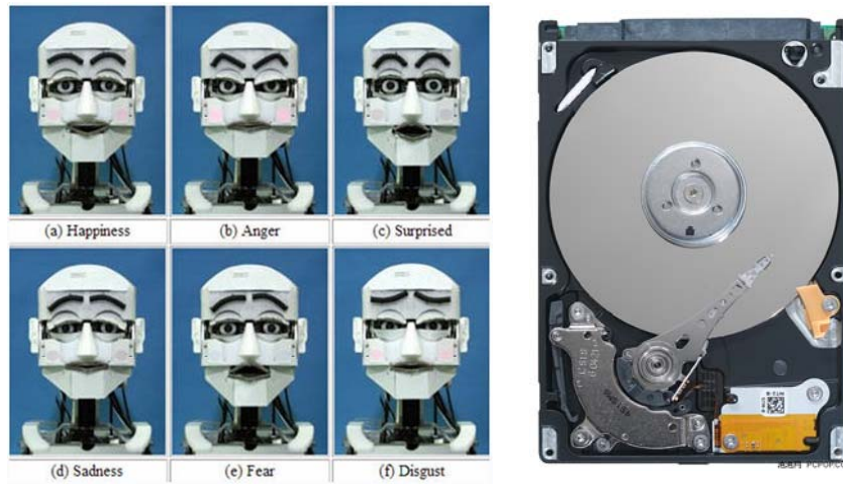


From :www.nissan.com

A Real Engineering Design Example



Real Engineering Design Examples



<http://consultaglobal.wordpress.com/2008/02/16/innovation-and-the-rationale-behind-emotional-design/>

Great Inventions





Green + Orange Technologies in the Future



Robot Philosophy

KEYWORD FOR SEARCH

- All is full of love
- Puppy Vs. Robot! Epic Battle For Territorial Domination!
- Eva the female robot
- Doll Face