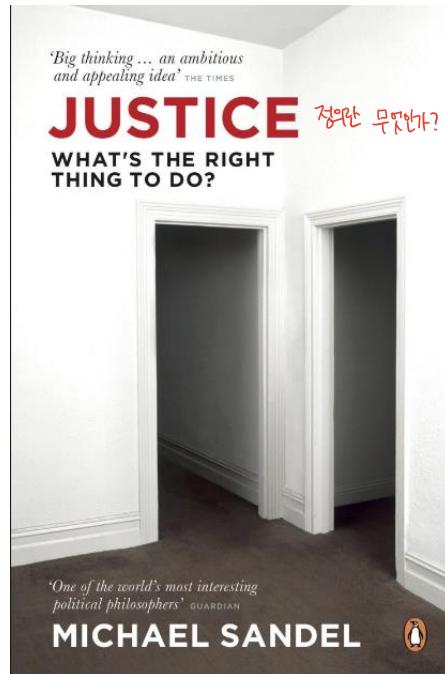


Concept of Engineering Economy



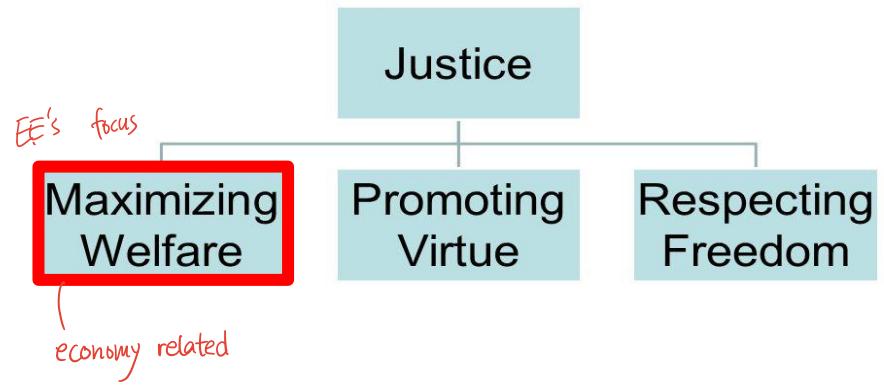
Engineering Economy

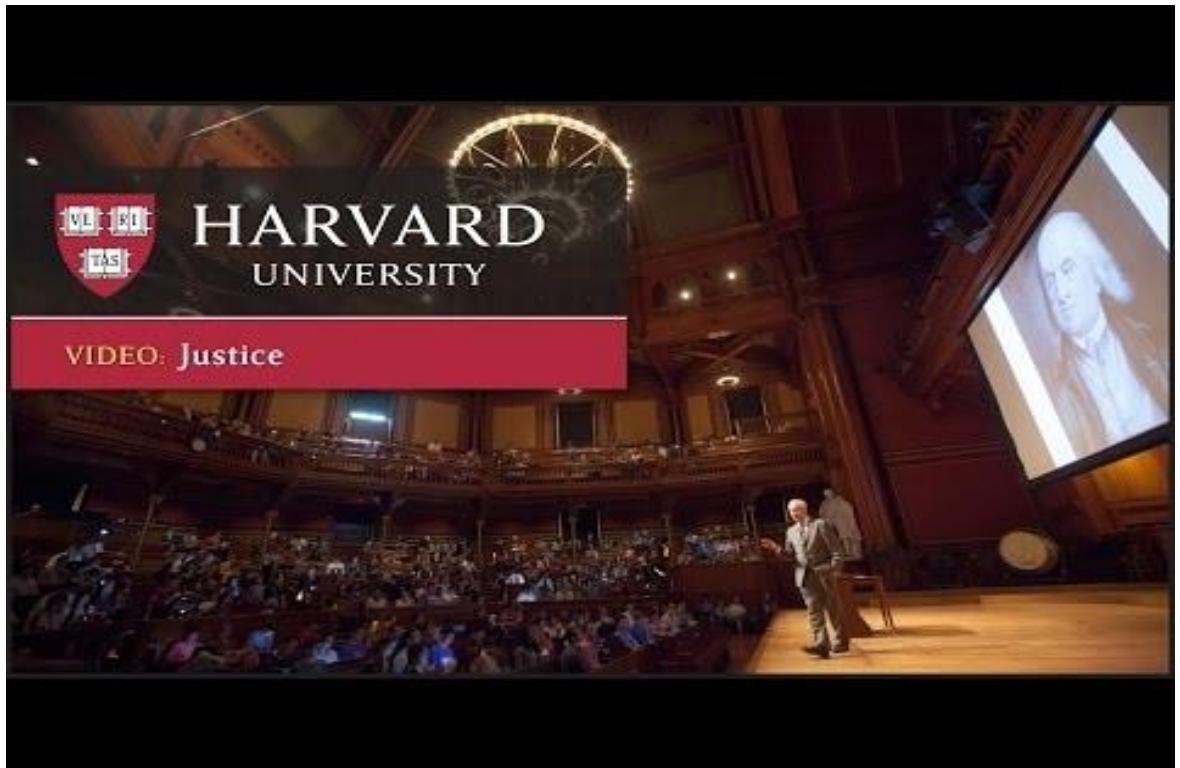
- Is about Money - economy
- Involves many choices among alternative designs, procedures, plans, and methods - engineering (e.g., build bridge)
- Asks the question "Will it pay?" - deserve to pay? 「자본화 가치가 있는가?」
trade off cost Benefit
- Judges whether any proposed course of action will prove to be economical as compared to others
for best / optimum choice
↳ considering economic aspect



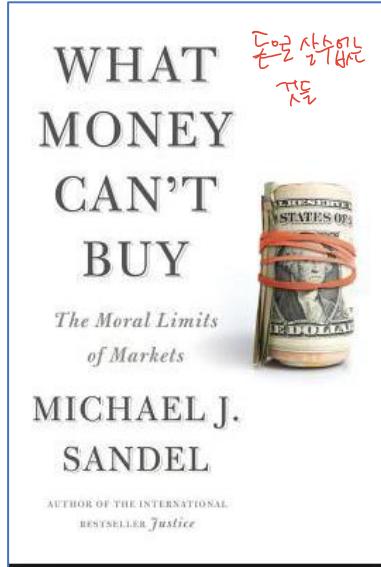
Sandel's Theories of Justice

Michael Sandel is a professor of history and philosophy at Harvard University. He is one of the most prominent thinkers and writers on the idea of justice today.

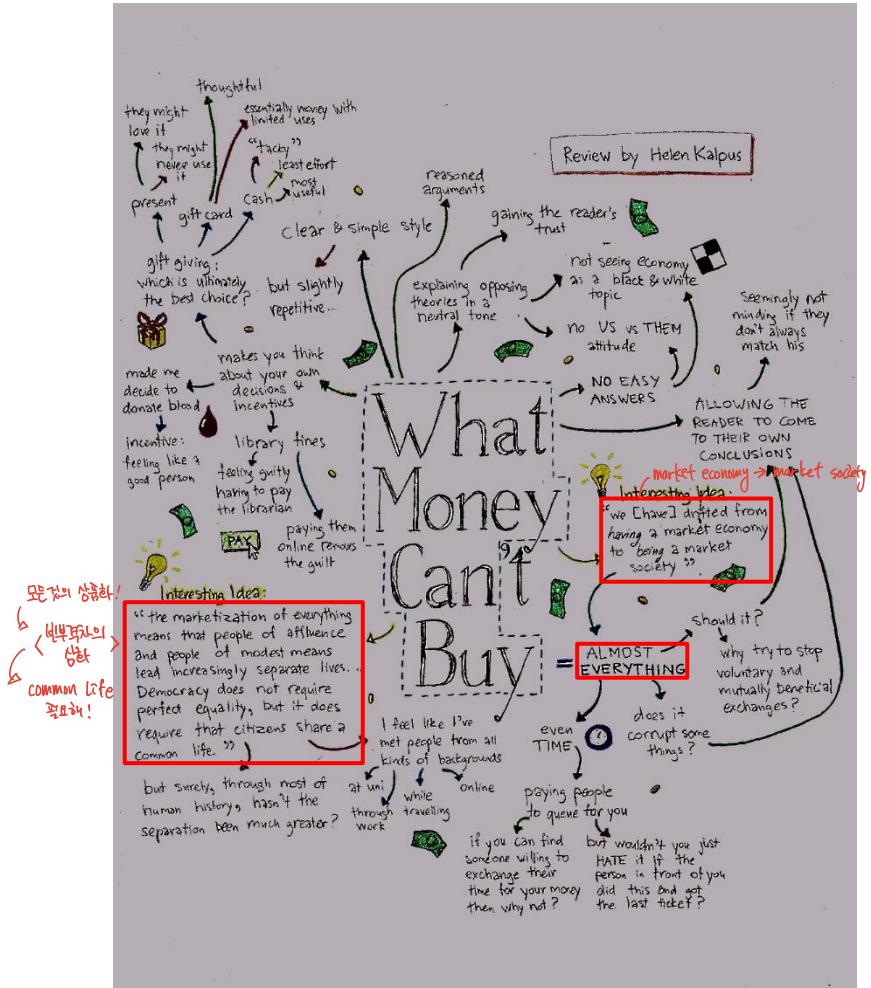




<https://www.youtube.com/watch?v=0O2Rq4HJBxw&list=PL30C13C91CFFFEA6>



Moral vs market





<https://www.youtube.com/watch?v=GvDpYHyBlgc>

Yuval Noah Harari
New York Times Bestselling
Author of *Sapiens*

Homo Deus

A Brief History
of Tomorrow

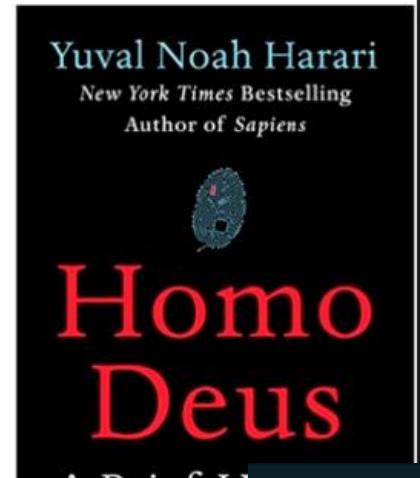
WHERE ARE HUMANS HEADED AS A SPECIES?

In the last century, mankind has conquered famine, plague and war. In a healthy, prosperous and harmonious world, where will humans channel our ambitions? By understanding our history, how we've evolved and where we are, we can see our possible futures, and make enlightened choices today to shape our collective outcomes—before it's too late.



READINGGRAPHICS
ACTIONABLE INSIGHTS IN ONE PAGE

Yuval Noah Harari
New York Times Bestselling
Author of *Sapiens*



Homo Deus

A Brief History
of Tomorrow

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HOMO SAPIENS => HOMO DEUS



Are we more enlightened beings
favoured by the Gods...

...Or are we simply animals
evolved with better algorithms?

And what'll happen when we develop
organisms with superior algorithms?

HOMO DEUS

Ri



<https://www.youtube.com/watch?v=4ChHc5jhZxs>



Amos Tversky



Daniel Kahneman

“Prospect Theory: An Analysis of Decisions Under Risk,”
Econometrica (1979) 47:263 – 291.

“The Framing of Decisions and the Psychology of Choice,”
Science (1981) 211:453 - 458.

“...the research that Tversky and I conducted was guided by the idea that intuitive judgments occupy a position ... between the automatic operations of perception and the deliberate operations of reasoning...we held *a two-system view, which distinguished intuition from reasoning.*” -- Kahneman’s Nobel Lecture

http://en.wikipedia.org/wiki/Behavioral_economics
http://nobelprize.org/nobel_prizes/economics/laureates/2002/kahnemann-lecture.pdf
<http://harvardmagazine.com/2006/03/the-marketplace-of-perce.html>

'A lifetime's worth of wisdom'
Steven D. Levitt, co-author of *Freakonomics*

The International Bestseller

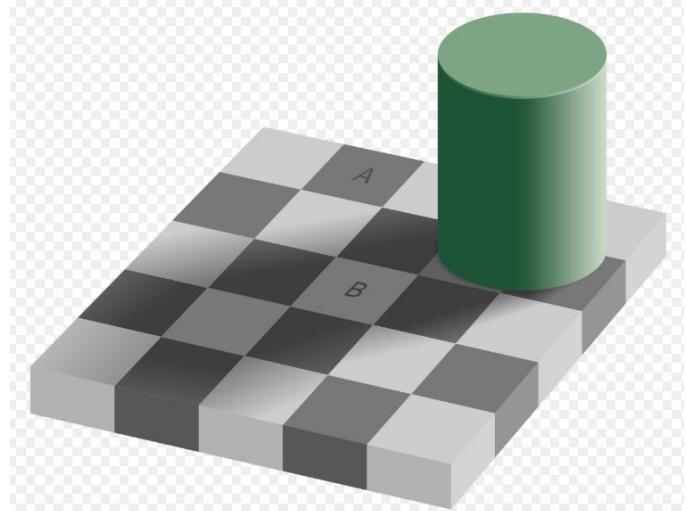
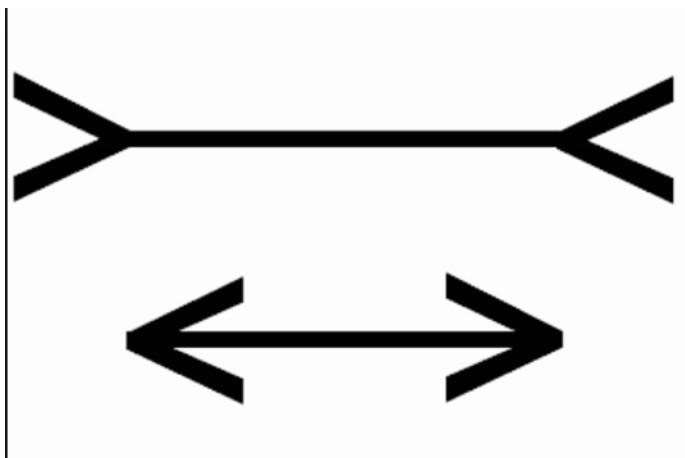
Thinking, Fast and Slow



Daniel Kahneman

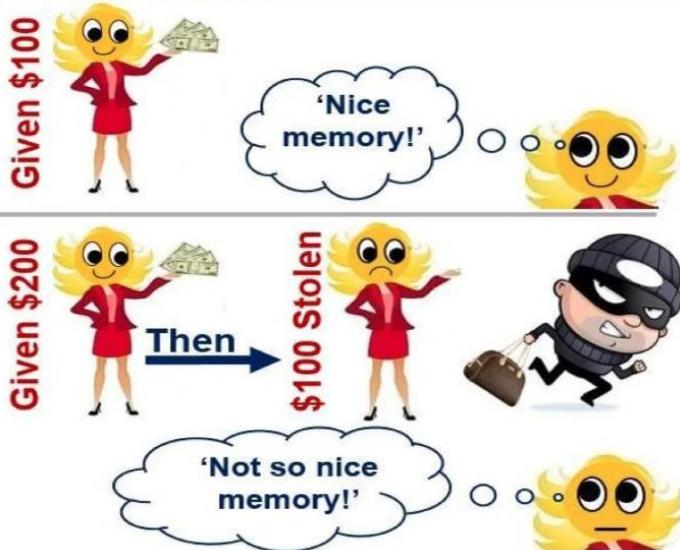
Winner of the Nobel Prize





기억이란

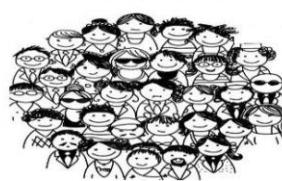
Prospect Theory



Why is second memory not so nice if in both cases she is \$100 better off?

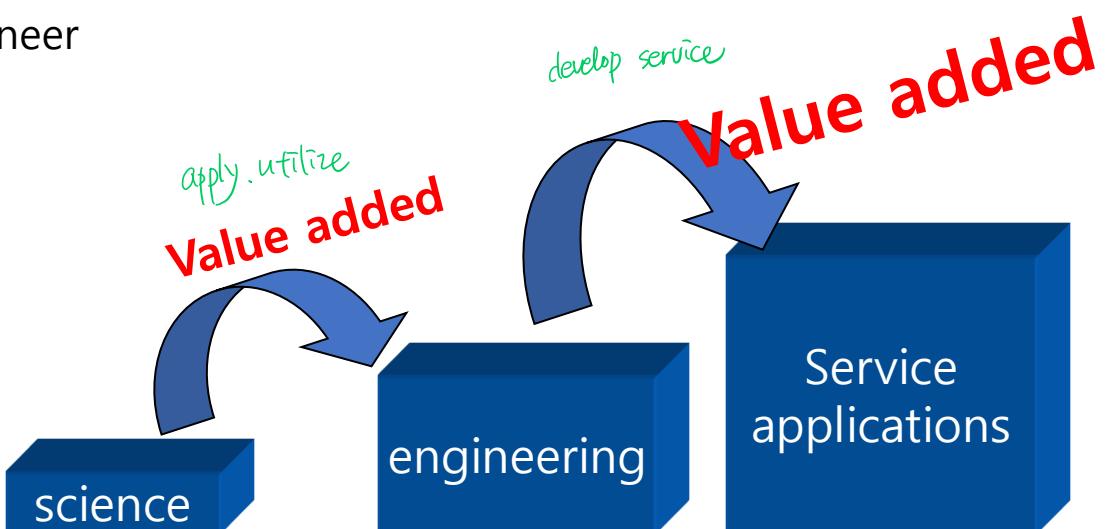
→ focusing on "LOST"

Prospect Theory



Engineering vs. Eng. Economy

- Engineer



- Engineering (ABET)

The Profession in which a knowledge of the mathematical and natural sciences gained by study, experience, and practice is applied with judgement to develop ways to utilize, economically, the materials and forces of nature for the benefit of mankind

Science

Compare
vs
input

Engineering vs. Eng. Economy

- Economic Efficiency
 - **System Worth / System Cost > 1** \Rightarrow Worth > Cost
 - ♣ cf. Physical Efficiency = output / input (< 1) → 예상 효율은 1을 넘지 못한다.

- Engineering Economy
 - A systematic evaluation of the economic merits (benefit-cost) of proposed solutions to engineering projects
 - Provides technical solutions with economic justification

1999~2006 National Finance Act
: More than ₩50B(Gross) or ₩30B
(Government Only)



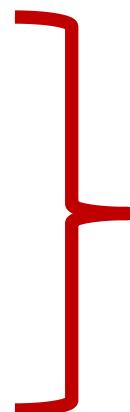
Eng. Economy Procedures

1. Define the problem(Engineer)

2. Find the solutions (Engineer)

★ 3. Decision Making (E. economist)

- Quantitative: B/C ratio, NPV,..
- Qualitative: AHP, Delphi,..
- Economic Evaluation



Preliminary
Feasibility
Analysis

★ 4. Presentation (E. economist)



Provide Rational Principles and
Systematic Analysis Methods

to solve problems in [3.1.1] presentation
Decision making

Engineering Economy

1. Objective – Evaluation

- ✓ How to compare the economic value of alternative design options?

2. Basis – Cash Flow Analysis

- ✓ Equivalence occurs when one is indifferent between two sets of cash flows

각 프로젝트마다 성과를 다르다.

각 현금흐름 fairly 비교유익한 방향을 찾는다.

3. Key Issues

- ✓ Time Value of Money 시간에 따라 돈의 가치 변화

- ✓ Cash flows occurring at different times ↳ 어떤가지 차이를 찾는가?

- ✓ Designs with different durations ↳ 어떤가지 차이를 찾는가?

Time Value of Money

- **Value of money changes over time!!!**

- Interest & Interest Rate

- Interest : Manifestation of TVM
(表現)
- Interest Rate = Interest / Principal
(比率)

Time Value of Money

- How to determine Interest Rate ?

- risk cost, opportunity cost, inflation, financing cost
-



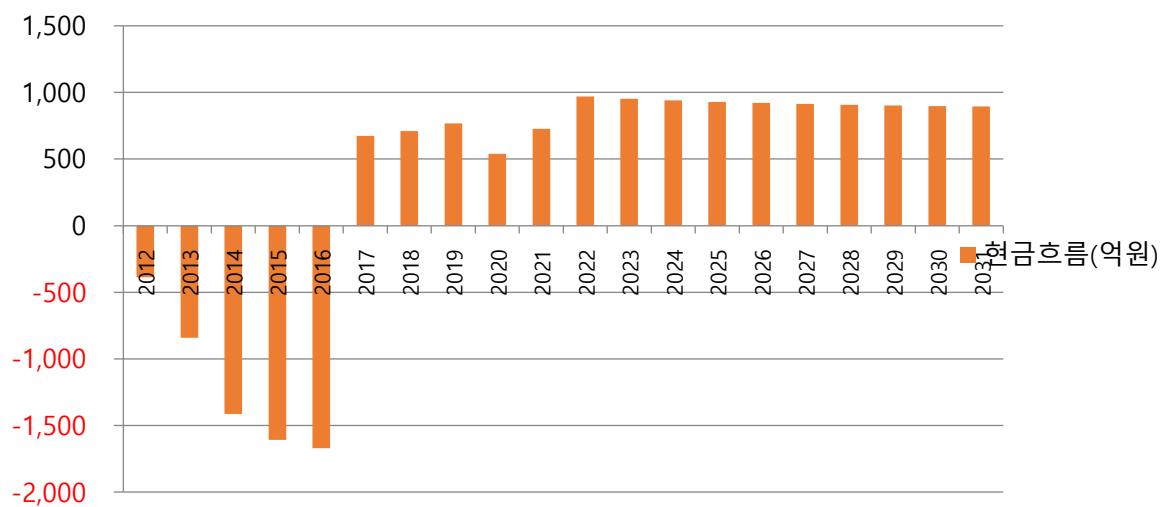
Examples



[통신위성 사용할 cost vs 통신위성으로 얻는 benefit]
compare \Rightarrow Merit 계산.

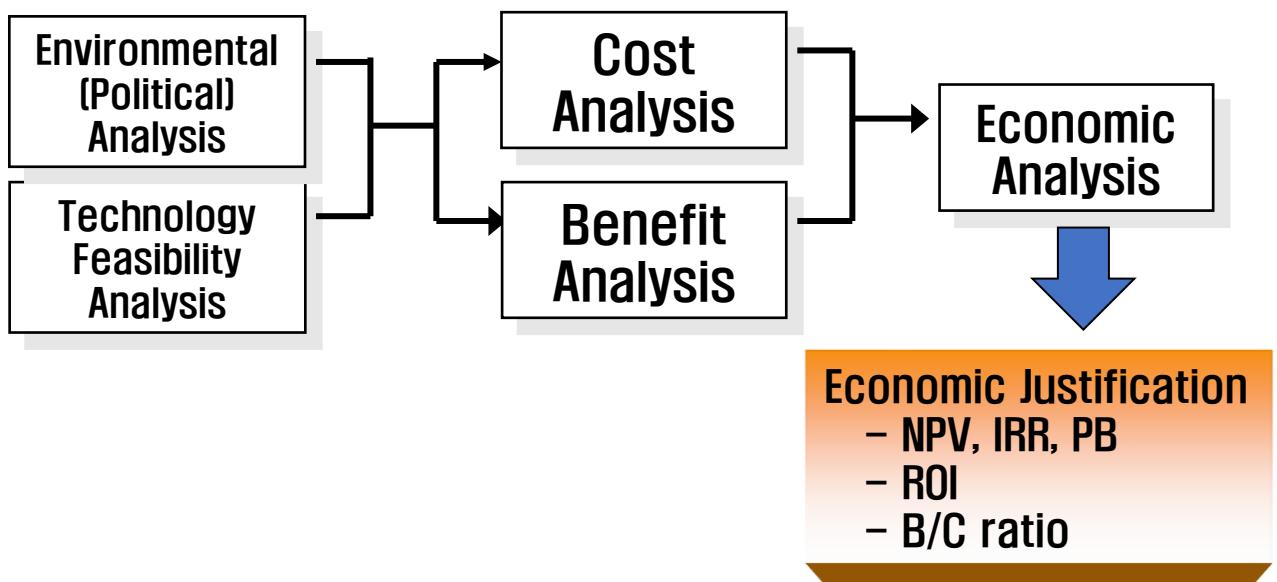
EE의
역할

An Example of Cash Flow



Procedures for Economic Analysis

L *이제까지의*



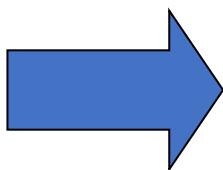
E.E., Accounting, Finance

- Accounting vs. E.E.

- Past Cashier Records vs. Future Investment Estimation
(会計) (投資)
- Ex-Post vs. Ex-Ante
(過去) (未来)
- Integrity vs. Accuracy
- Historian vs. Fortune teller

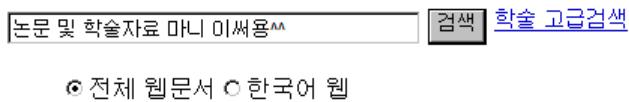
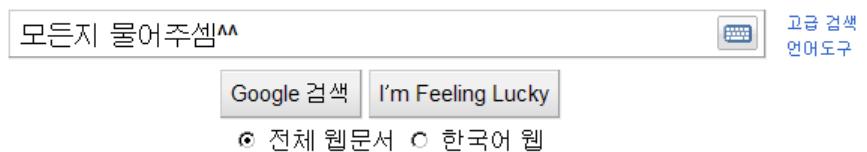
- Finance vs. E.E.

- Fund Mgmt & Financial Investment vs. Project Investment
- Financing, Stock& Bond Issue, M&A vs. New Technology & Business Investment
(資金調達)



Need All the Answers!

Basics of Economics



거인의 어깨에 올라서서 더 넓은 세상을 바라보라 - 아이작 뉴턴

Thank you !