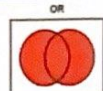


Logical addition
(disjunction)

A	B	F = A ∨ B
0	0	0
0	1	1
1	0	1
1	1	1

A	B	A ∨ B
True	True	True
True	False	True
False	True	True
False	False	False

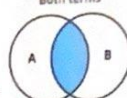
Logical disjunction



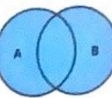
Definition:
Truth table
Logic gate

BOOLEAN LOGIC

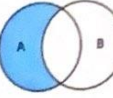
AND
Both terms



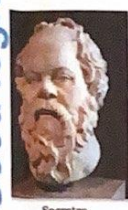
OR
Either term



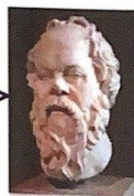
NOT
Only one term



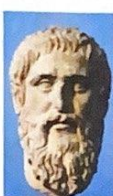
Good logic



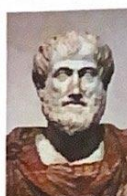
Socrates was
a philosopher



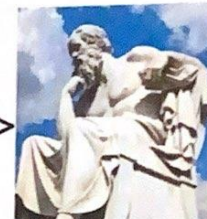
philosophers are men



Plato



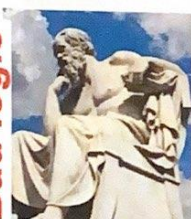
Aristotle



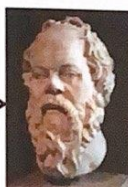
Socrates was
a man



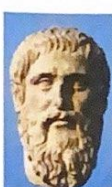
Bad logic



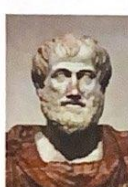
Socrates was
a man



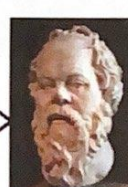
Socrates



Plato



Aristotle



Socrates

philosophers are men



Socrates was
a philosopher



Resume of Lecture by Pr. Bob Gallagher from MIT

Massachusetts Institute of Technology (MIT)

George Boole (1815-1864) developed Boolean logic

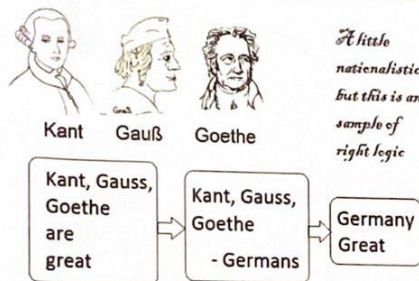
The principles of logical thinking have been understood (and occasionally used) since the Hellenic era.

Boole's contribution was to show how to systemize these principles and express them in equations (called Boolean logic or Boolean algebra).

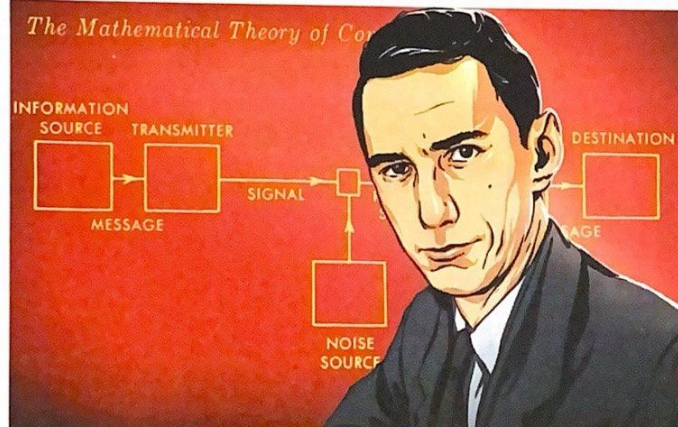
Claude Shannon (1916-2001) showed how to use Boolean algebra as the basis for switching technology. This contribution systemized logical thinking for computer and communication systems, both for the design and programming of the systems and their applications.

Logic continues to be abused in politics, religion, and most non-scientific areas.

Logic continues to be abused in politics, religion and most non-scientific areas

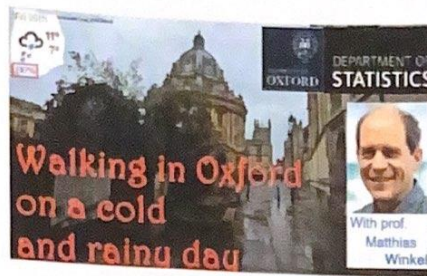


Bad logic (abuse of logic)



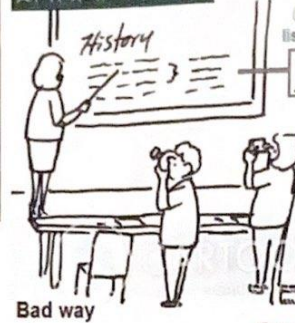
Creating a reliable connection over an unreliable (noisy) channel that's what IT is about

and that's what Shannon did



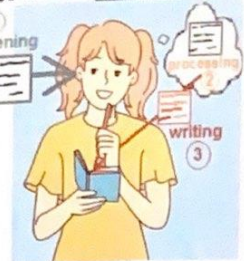
80% chance of rain
says the Met Office in its weather forecast for Oxford.

CHALK+TALK

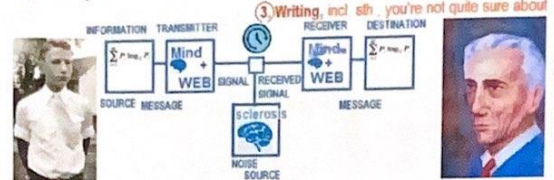


Bad way

ink + think

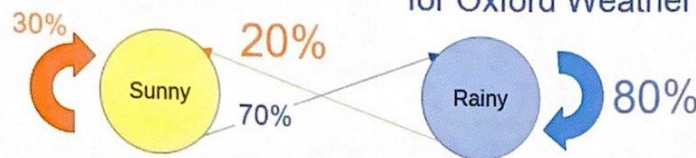


Good way ① listening
② first way of processing
③ Writing, incl. sth. you're not quite sure about

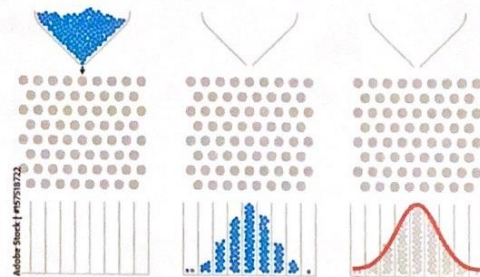
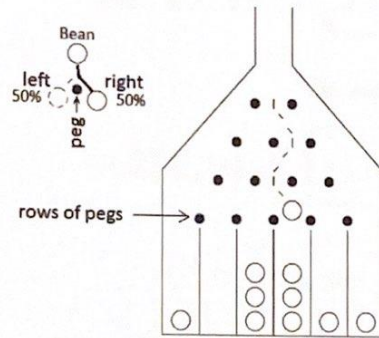


Markoff Chain Probability Model

for Oxford Weather



If it is Rainy today => there is an 80% chance that it will be rainy tomorrow.



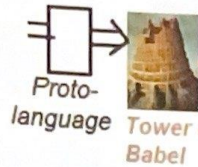
School \downarrow gravity \downarrow \uparrow MOTION == formalism ==> University $E=mc^2$ $\Phi_{\text{vac}} = W = 2\pi f \hbar \omega$

Motivation: 80% chance of rain
Let A_j be the event of rain at Jam on day j of this term, $1 \leq j \leq n$
Suppose the events A_i each have probability p , independently

Oxford			
Tue 13th	Wed 14th	Thu 15th	Fri 16th
10° 9° 70%	13° 10° 70%	13° 8° 70%	11° 7° 80%



then take notes on the lecture yourself

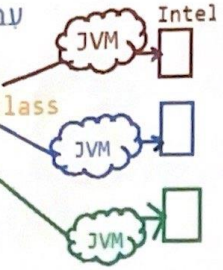
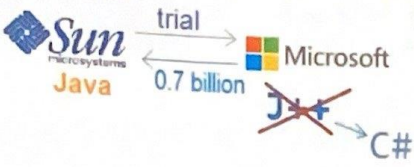


Old Slavic
Ancient Greek?
Ancient Hebrew



Cross-platform Java

Hello.java => javac.exe = Hello.class



CLR JIT-compiler

Hello.cs => csc.exe = Hello.class

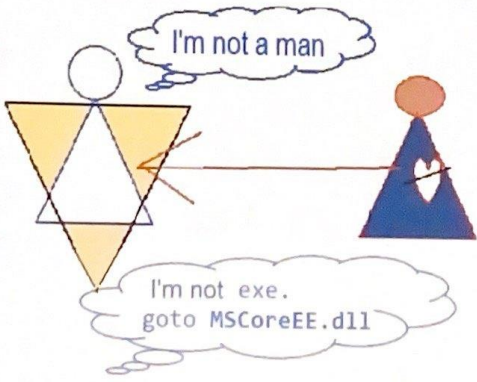
C# компилятор

IL
intermedia
language

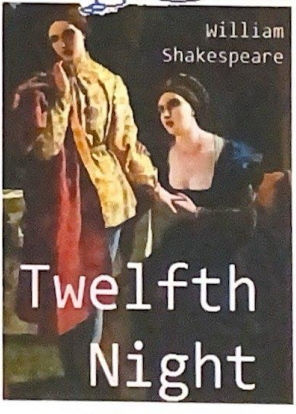
Hello.vb => vbc.exe = Hello.class

VB компилятор

Hello.pl => plc.exe = Hello.class



Hello.exe - which is not exe
MSCoreEE.dll JIT-compiler



What should you do at home:
Register free hosting on **freeasphosting.net**
At home because many hosting services do not register from one IP address.

ASP.NET Hosting .NET 7

FREE ASP.NET Hosting
FREE Domain Hosting
FREE MS SQL Database
INCLUDES .NET Core
Full Trust Permissions

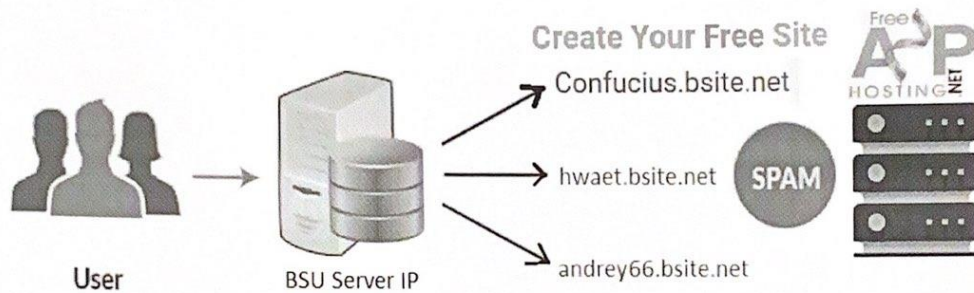
SIGN UP FOR FREE

Create Your Free Site

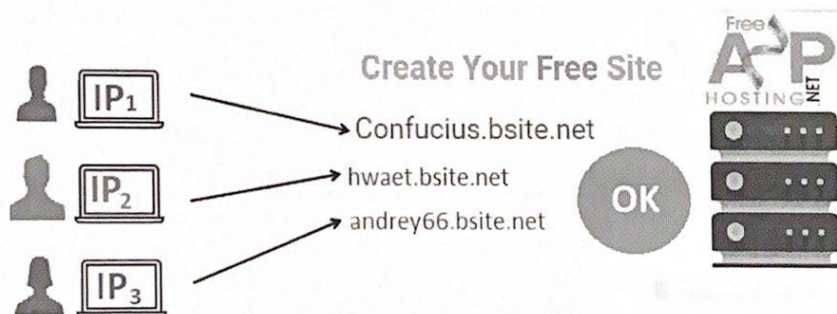
By signing up with our service you agree to our [Terms & Conditions](#)

Create Site

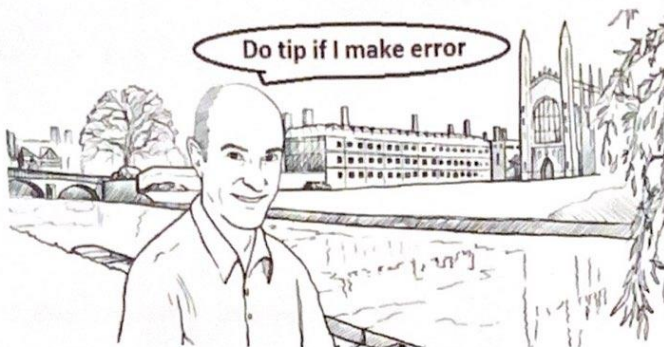
If several dozen hosting attempts to register from one IP address, the **freeasphosting.net** server may decide that this is a SPAMer and block it.



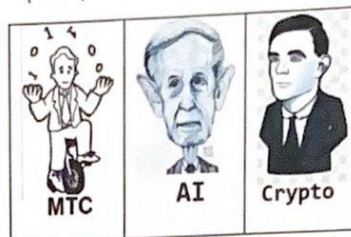
And if registration is carried out from different computers (with different IP addresses), then the freeasphosting.net server does not raise any suspicions.



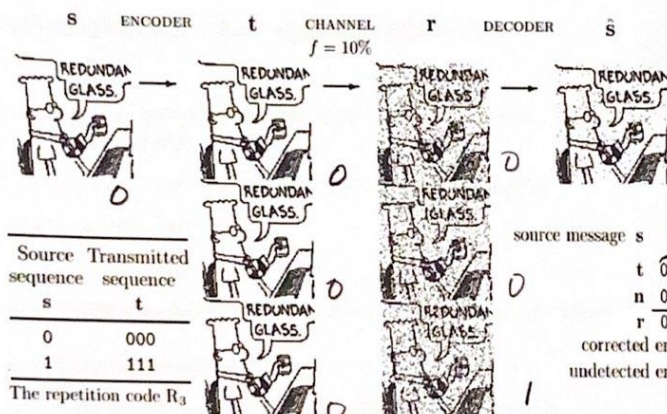
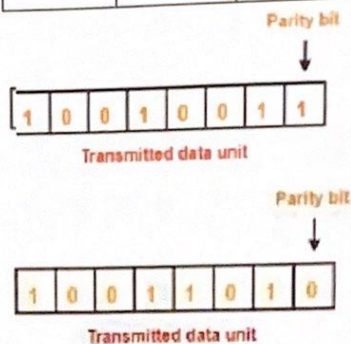
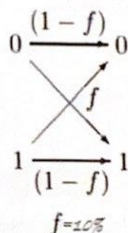
After you have registered on the server, send me your address (which you received during registration) by email.



Sir Dr. D. MacKay,
University of Cambridge
(22 April 1967 – 14 April 2016)



"I believe in clean energy,
but I also believe in mathematics"



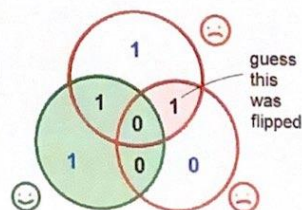
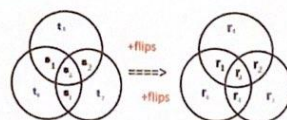
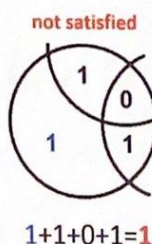
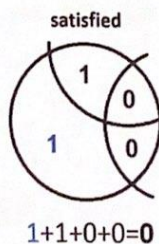
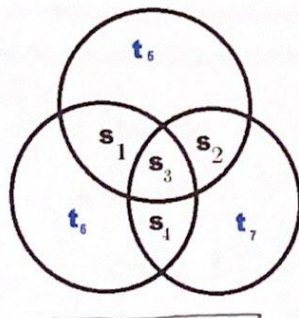
source message s

0	0	1	0	1	1	0
t	000	000	111	000	111	000
n	000	001	000	000	101	000
r	000	001	111	000	010	111

corrected errors *
undetected errors * $\leftarrow 2$ errors

7.4. Hamming code.

$$\frac{4}{\Sigma} \rightarrow \frac{7}{t}$$



width="150"

What should you do in class: 課堂上你該做什麼:

0. Come up with a good name for your site. 為您的網站取一個好名字。

I came up with a name for my site - 我為我的網站想出了一個名字 -
Confucius (in my opinion, this is a good name) Confucius - www.confucius.bsite.net
(在我看來, 這是一個很好的網域)

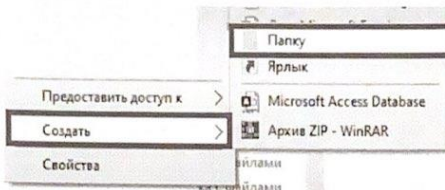
Добавлено примечание ([П1]):

Добавлено примечание ([П2R1]):

Добавлено примечание ([П3R1]):

1. On a HDD-disk or on a flash drive, make a folder that matches the name of the site

www.confucius.bsite.net
Новый том (D:) >
www.confucius.bsite.net



在 HDD 磁碟或快閃磁碟機上, 建立一個與網站名稱相符的資料夾

2. In a folder D:\www.confucius.bsite.net\ create a folder for Projects
D:\www.confucius.bsite.net\Projects

在資料夾 D:\www.confucius.bsite.net\ 中為 Projects 建立一個資料夾
D:\www.confucius.bsite.net\Projects

3. In a folder D:\www.confucius.bsite.net\Projects create a folder for Projects Number 0
D:\www.confucius.bsite.net\Projects\0\

在資料夾 D:\www.confucius.bsite.net\Projects 中為 Projects Number 0 建立一個資料夾

4. In a folder D:\www.confucius.bsite.net\Projects\0\ create file index.htm
在資料夾 D:\www.confucius.bsite.net\Projects\0\ 中建立檔案

index.htm

<html>

<body>

<h1> IT </h1>

<h3> by Maria ... </h3>

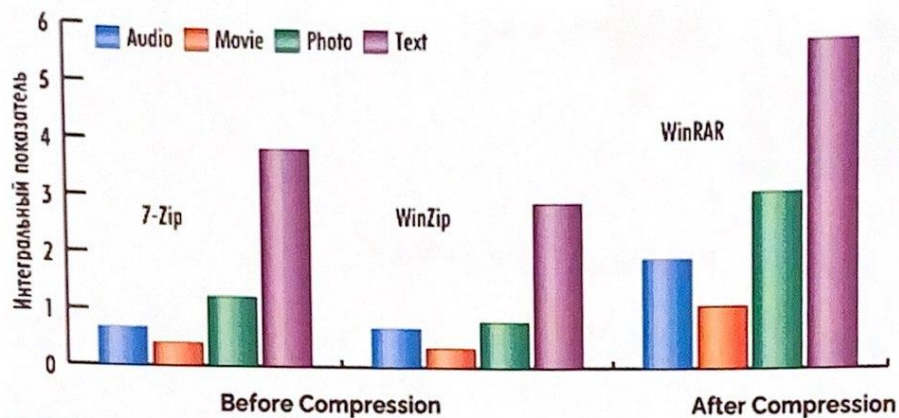
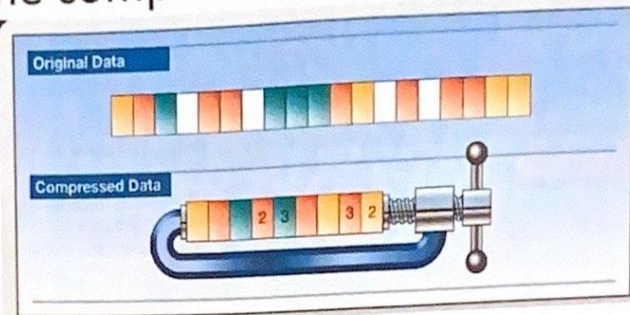
</body>

</html>

Save As

index.htm

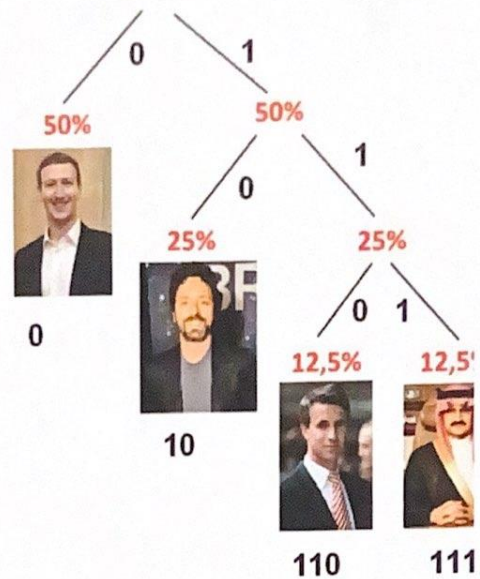
Comparison of the compression ratio of popular archivers



Data	Symbol	Frequency	Symbol	Bit Code
<div style="text-align: center;"> ↓ AAAAAAABCCCCCDEEEEE </div>	A	7	A	00
	B	1	B	111
	C	6	C	01
	D	2	D	110
	E	5	E	10

Entropy
compression ratio

Before Compression - $21 \times 8 \text{ bits} = 198 \text{ bits}$
 After Compression - $7 \times 2 \text{ bits} + 1 \times 3 \text{ bits} + 6 \times 2 \text{ bits} + 2 \times 3 \text{ bits} + 5 \times 2 \text{ bits} = 45 \text{ bits}$



First-order approximation
(symbols independent but with
frequencies of Belarusian txt).

Мама мыла ра
М - 3 — 30% 1-3 М
а - 4 — 40% 4-7 а
ы - 1 — 10% 8 -ы
л - 1 — 10% 9 -л
р - 1 — 10% 10 -р
10
лла мамма р



Мама мыла ра

Ма - 2 22% 1-2 ма
ам - 2 22% 3-4 ам
мы - 1 11% 5 мы
ыл - 1 11% 6 ыл
ла - 1 11% 7 ла
а р - 1 11% 8 ар
ра - 1 11% 9 ра
9

0. 4 6 7 3 1 9 1 6 7 3 5
ам ыл ла ам ма ра ма ыл ла ам мы
мылла рама



Second-order approximation (digram (2-symbols) structure as in Belarusian)



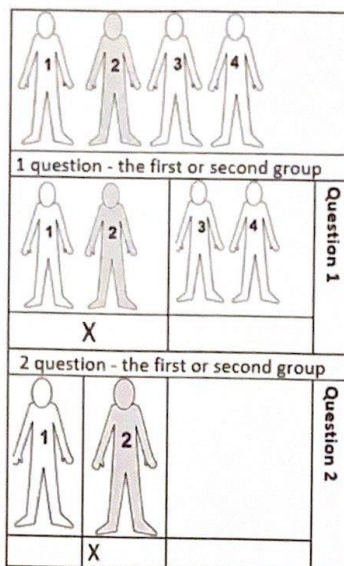
Say **NO** to the first



Say **YES** to the second if it is better than the first



Say **NO** to the third only if it is worse than all the others



Average number of questions =
 $2 \cdot 0.25 + 2 \cdot 0.25 + 2 \cdot 0.25 + 2 \cdot 0.25 = 2$

Average number of questions =

$1 \cdot 0.5 +$	$2 \cdot 0.25 +$	$3 \cdot 0.125 +$	$3 \cdot 0.125$

Question 1. Is this Zuckerberg?	50%	$1 \cdot 0.5$
Question 2. Is this Sergey Brin?	25%	$2 \cdot 0.25$
Question 3. Is this Stefan from BMW?	12.5%	$3 \cdot 0.125$
So Prince Saud	12.5%	$3 \cdot 0.125$
Average number of questions = 1.75		

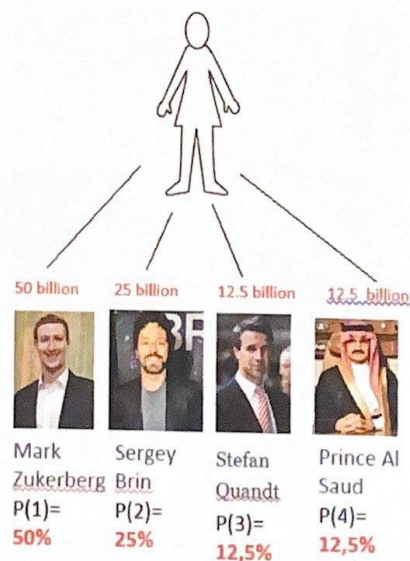
Quantifying information

$$S(x) = \sum_{i=1}^n p(i) \log_2 \frac{1}{p(i)}$$

Quantifying information

$$I(x_i) = \log_2 \left(\frac{1}{p_i} \right)$$

number of bits required to encode choice



$$32 \rightarrow f(x) \rightarrow 5$$

$$64 \rightarrow f(x) \rightarrow 6$$

$$\log_b(n) = x \Leftrightarrow b^x = n$$

base argument base exponent argument

ce