Proto-language

Tower of Babel

Old Slavic
ⰔⰎⰀⰂⰤⰐⰩ

Ancient Greek
Ελληνικά ?

Ancient Hebrew
עברית

RU
EN — learn
FR
DE

Esperanto
International
auxiliary language

Mia nomo estas Andy.
Du plus du estas kvar

Cross-platform Java

bytecode

JVM — Intel CPU

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

JVM — AMD CPU

Sun microsystems
Java

trial
0.7 billion

Microsoft

J++ → C#

JVM — Apple CPU

bytecode
```
Method Add()
  0 aload_0
  1 invokespecial
                #1
   <Method
java.lang.Object()>
  4 return
```

JIT-compiler — JVM — Intel CPU

Hello.cs => [csc.exe] = Hello.class — JVM — AMD CPU

IL
Intermediate Language

JVM — Apple CPU

C# компилятор

Hello.vb => [**vbc.exe**] = Hello.class   .exe

VB компилятор

CIL - Common
Intermediate Language
```
void .ctor() {
  .maxstack  1
  IL_0000:  ldarg.0
  IL_0001:  call instance
void
   System.Object::.ctor()
  IL_0006:  ret
} // end of
     method Add::.ctor
```

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

I'm not a man

I am a woman

I'm not exe.
goto MSCoreEE.dll

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

william shakespeare

Twelfth Night

|													
						1							← 1
					1		1						← 2
				1		2		1					← 4
			1		3		3		1				← 8
		1		4		6		4		1			← 16
	1		5		10		10		5		1		← 32
1		6		15		20		15		6		1	← 64
1	7	21	35	35	21	7	1						←

$1+3 \; ; \; 3+3 \; ; \; 3+1$ ←

$1+4 \; ; \; 4+6 \; ; \; 6+4,1$

?

Shannon Hartley Theorem

This is a measure of the *capacity* on a channel; it is impossible to transmit information at a faster rate without error.

$$C = B \log_2(1 + S/N)$$

- C = capacity (in bit/s)
- B = bandwidth of channel
- S = signal power (in W)
- N = noise power (in W)

It is more usual to use SNR (in dB) instead of power ratio (as with terrestrial and commercial communications system S/N >> 1, then rewriting in terms of log10.

$$C = B \frac{\log_{10}(S/N)}{\log_{10} 2} = B \frac{10\log_{10}(S/N)}{10.\log_{10} 2} = B \frac{SNR}{3.01}$$

I step.

II steps

III steps

1   2   1

1   3   3   1
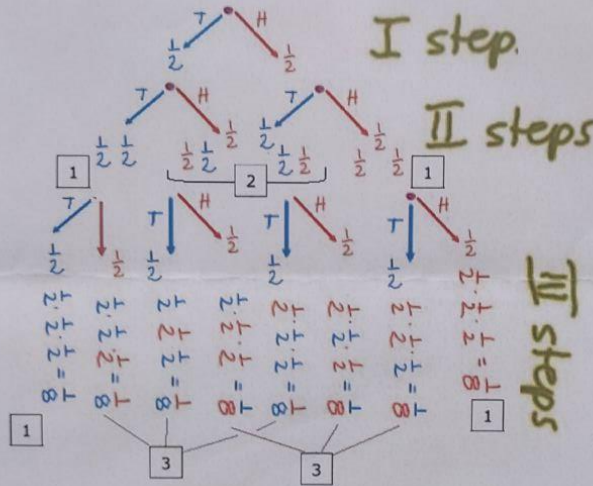
$(a+b)^0 = \quad 1$

$(a+b)^1 = \quad a+b$

$(a+b)^2 = \quad a^2 + 2ab + b^2$

$(a+b)^3 = \quad a^3 + 3a^2b + 3ab^2 + b^3$

$(a+b)^4 = \quad a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$

$(a+b)^5 = a^5 + 5a^4b + 10a^3b^2 + 10a^2b^3 + 5ab^4 + b^5$

$(a+b)^6 = a^6 + 6a^5b + 15a^4b^2 + 20a^3b^3 + 15a^2b^6$

$(1+x)^3 = 1 + 3x + 3x^2 + x^3$

$(1+x)^6 = 1 + x + 15x^2 + 20x^3 + 15x^4 + 6x^5 + x$

$= 1 + 5x + 10x^2 + 10x^3 + 5x^4 + x^5$

Proto-language

Tower of Babel
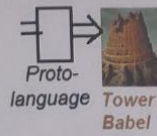
Old Slavic

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

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Sun microsystems
Java

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J++ → C#

CLR JIT-compiler

JVM → Intel

exe
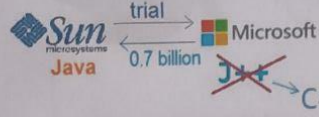
Hello.cs => [csc.exe] = Hello.class — JVM →

C# компилятор

IL
intermedia language

JVM →

.exe

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

VB компилятор
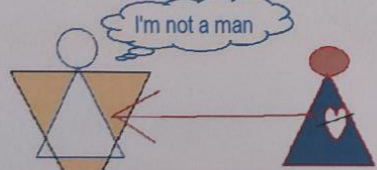
.exe

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

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

William Shakespeare

Twelfth Night
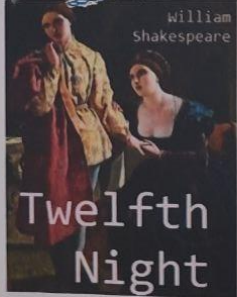
Main function Method
Main ()

Example

There are $6!$ ways to order the letters of GALOIS

If randomly reorder the letters what is probability that the Vowels (A, O, I) are all before consonants (G, L, S)?

$[GLS] = 3!$

$[AOI] = 3!$

Total $= 3! \cdot 3! = 36$

$\dfrac{36}{720} = \dfrac{1}{20} = 0,05$

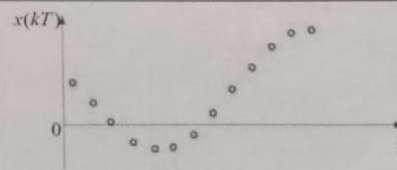# Fourier transform

time

frequency
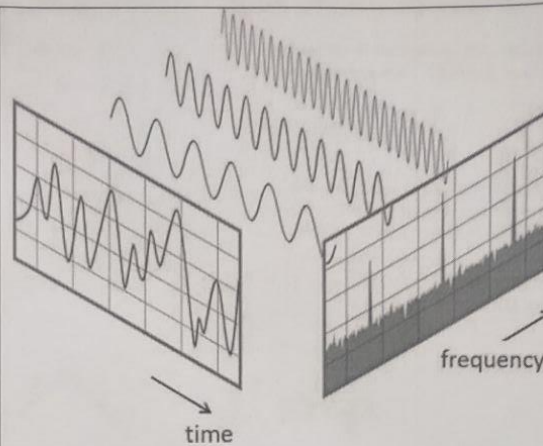
Sampling. Kotelnikov-Nyquist Theorem

$x(t)$
(kT)

0

T

Nyquist intervals

kT

t
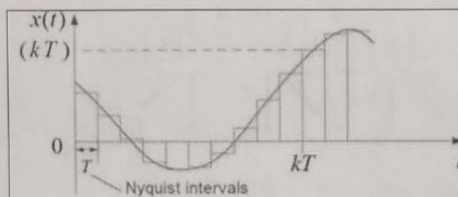
Time intervals T, through which readings s (kT) are taken, are called Nyquist intervals.

Sine with period T **Sampling at T/2**

Sample here

Sample Here

Sample Here

Text

$x(kT)$

0

t

frequency Sample

100Hz

100 Hz   200 Hz

$x(kT)$ discrete-time signals

0

t
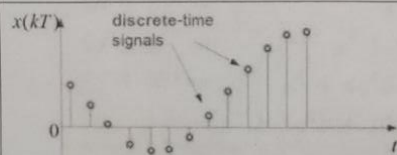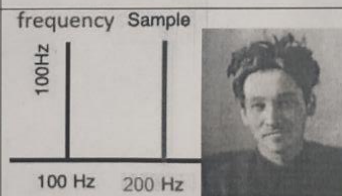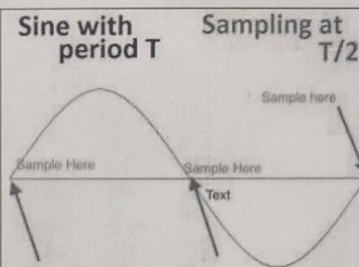
$$F_{sample} >= 2 * F_{max}$$
$$(T_{sample} <= T_{min}/2)$$
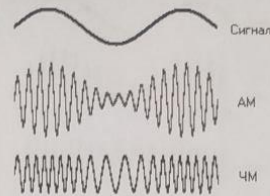
Reginald A. Fessenden

(October 6, 1866 – July 22, 1932)

first transmission of speech by radio (1900), and the first two-way radiotelegraphic communication across the Atlantic Ocean (1906)

Сигнал
АМ
ЧМ

"No organization engaged in any specific field of work, ever invents any important development in that field, or adopts any important development in that field, until forced to do so by outside competition." Oxford University Press. The Quarterly Journal of Economics , Feb., 1926, p. 262.

Battle of Britain
(3 month 3 weeks)
10.07-31.10.1940

MILES

115 M

80 м.

Receiving Antennas

Transmitting antennas

Radar played a major role in the Battle of England

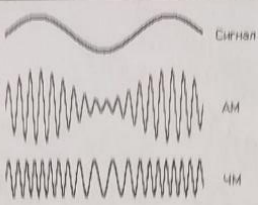**H. Nyquist**

$$W = K \log m$$

Where W is the speed of transmission of intelligence,
m is the number of current values,
and, K is a constant.

$$H = n \log s$$
$$= \log s^n.$$
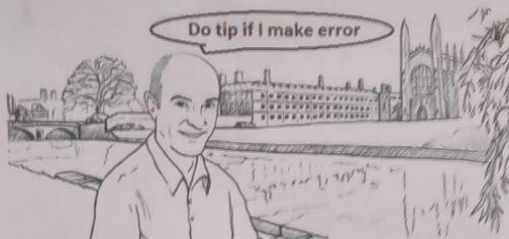
Information of continuos signals

		Reginald A. Fessenden
	Сигнал AM ЧМ	(October 6, 1866 – July 22, 1932) first transmission of speech by radio (1900), and the first two-way radiotelegraphic communication across the Atlantic Ocean (1906)

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MILES 0 10 20 30 40 50 60 70 80

115 м

80 м.

Receiving Antennas

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Do tip if I make error

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

MTC   AI   Crypto

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

I don't believe in mathematics

REDUNDANT GLASS.

$$0 \xrightarrow{(1-f)} 0$$
$$1 \xrightarrow{(1-f)} 1$$
$$f$$
$$f = 20\%$$

REDUNDANT GLASS.

Parity bit
| 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
Transmitted data unit

Parity bit
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 |
Transmitted data unit

| s | ENCODER | t | CHANNEL $f = 10\%$ | r | DECODER | $\hat{s}$ |

REDUNDANT GLASS.
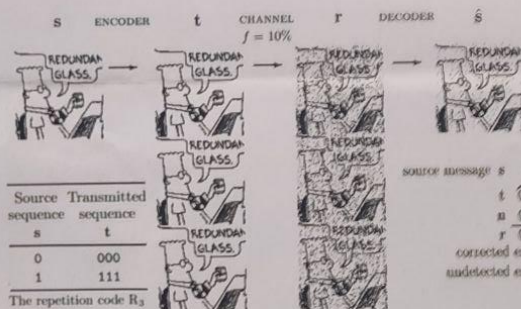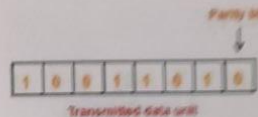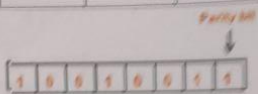
source message s	0	0	1	0	1	1	0
t	000	000	111	000	111	111	000
n	000	001	000	000	101	000	000
r	000	001	111	000	010	111	000
corrected errors							
undetected errors							

Source sequence s	Transmitted sequence t
0	000
1	111

The repetition code R_3

7.4. Hamming code.

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

satisfied

not satisfied

1+1+0+0=0

1+1+0+1=1

guess this was flipped