

Teknologi

Introduktion
& Abstraction

Hvem er jeg

- ❖ Claus Bové (clbo@kea.dk)
- ❖ Cand.Musicae, Nordjysk Musikkonservatorie
- ❖ Cand.IT Business & IT, CBS/ITU
- ❖ Underviser i
 - ❖ Python på 4 semester
 - ❖ Teknik på 2. semester

Undervisning

- ❖ Hver onsdag fra 08:30 til 12:45
- ❖ Altid 1 times forberedelse
- ❖ Altid 4 timers undervisning
- ❖ Altid 1 times hjemmearbejde efter undervisningen

Formålet med faget

- ❖ Studieordningen: <https://katalog.kea.dk/course/3050241/2022-2023>
- ❖ Formål med faget er at give jer en forståelse for det fundament som jeres programmer afvikles på. Det kan være jeres **operativsystem**, en **webserver** eller en **database**.
- ❖ Ud over dette er teknologifaget også et “værktøjsfag” hvor vi kigger på en masse af de tools i gør brug af når i arbejder med softwareudvikling.

Obligatorisk opgave

- ❖ 1 obligatorisk opgave
- ❖ Miniprojekt (alle fag) i uge 15 & 16 (11. til 21 april)
 - ❖ I teknik skal i deploy jeres web app

Eksamensprojekt

- ❖ Alle fag i et eksamensprojekt (4 uger) og mundtlig eksamen herefter.
 - ❖ 33% programmering, 33% softwareudvikling, 17,5% Teknologi, 16,5% Virksomhed
- ❖ Krav til Teknik er at i skal deploye jeres web app ved brug af Git, en online database, en online web host.
- ❖ Krav til teknik er også at i skal kunne samarbejde vha. git og GitHub og dokumenterer jeres projekt i en readme fil.

Eksamensopgaver

- ❖ **Git og GitHub**
 - ❖ <https://github.com/techkea/todolist>
 - ❖ **Branches**
 - ❖ <https://github.com/techkea/todolist/network>
 - ❖ Valg af samarbejdesmetode
- ❖ **render.com**
 - ❖ <https://todo-spring-78fi.onrender.com/>
- ❖ **planetscale.com**
 - ❖ Database

Emner i Teknologitimerne

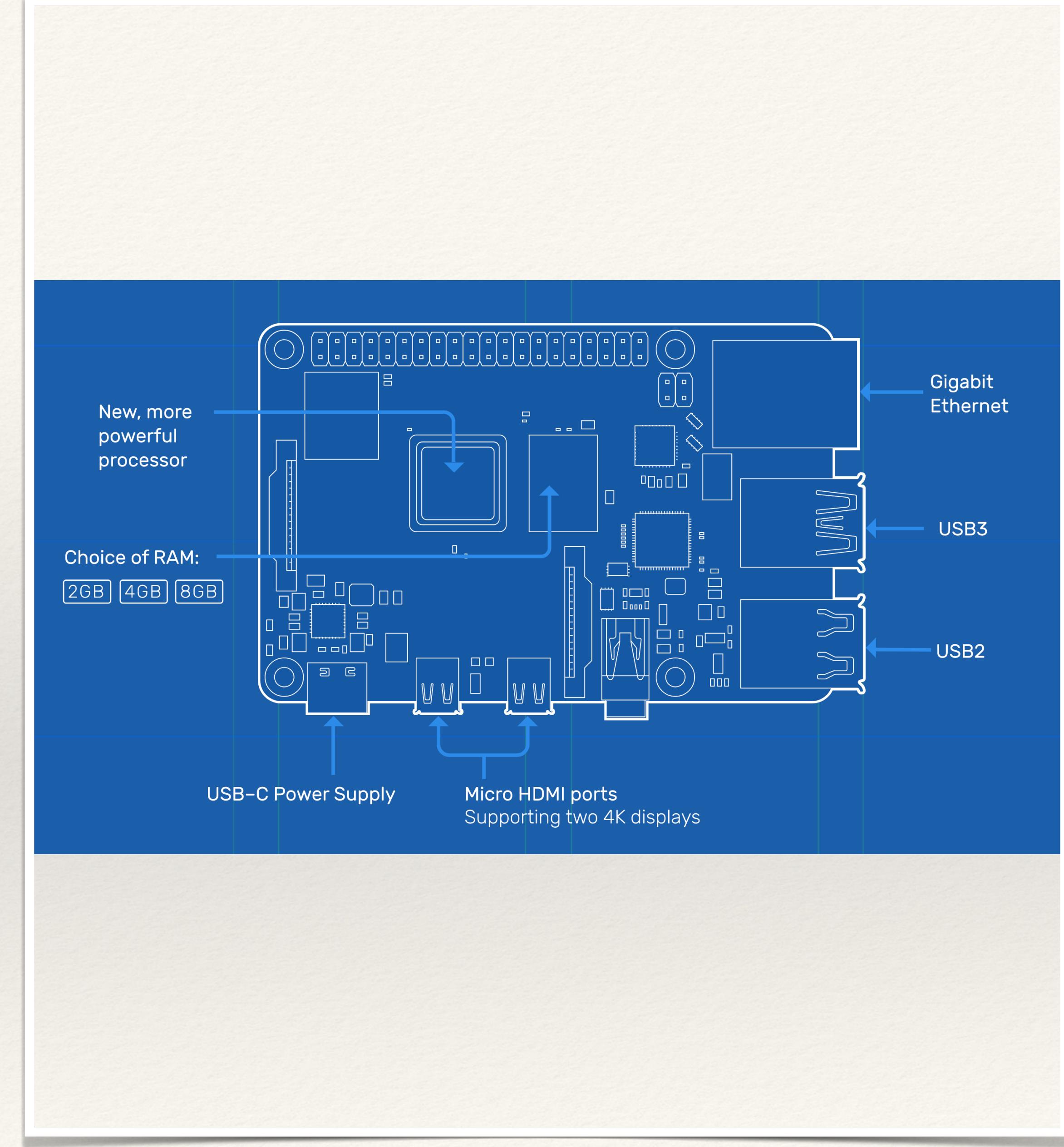
- ❖ I skal lære om Operativsystemer (Linux, Websvere, Windows eller Mac)
- ❖ Om en del værktøjer på disse platforme.
- ❖ Om deployment af et website (ligge det online)
 - ❖ Git & GitHub
 - ❖ Database online
 - ❖ Web app online

Emner i Teknologitimerne

- ❖ Computerens Hardware og emnet Abstraction
- ❖ Linux operativsystemet
- ❖ Windows og Mac
- ❖ Databaser
- ❖ Git (3 uger)
- ❖ Deployment (jeres web applikation online) (3 uger)

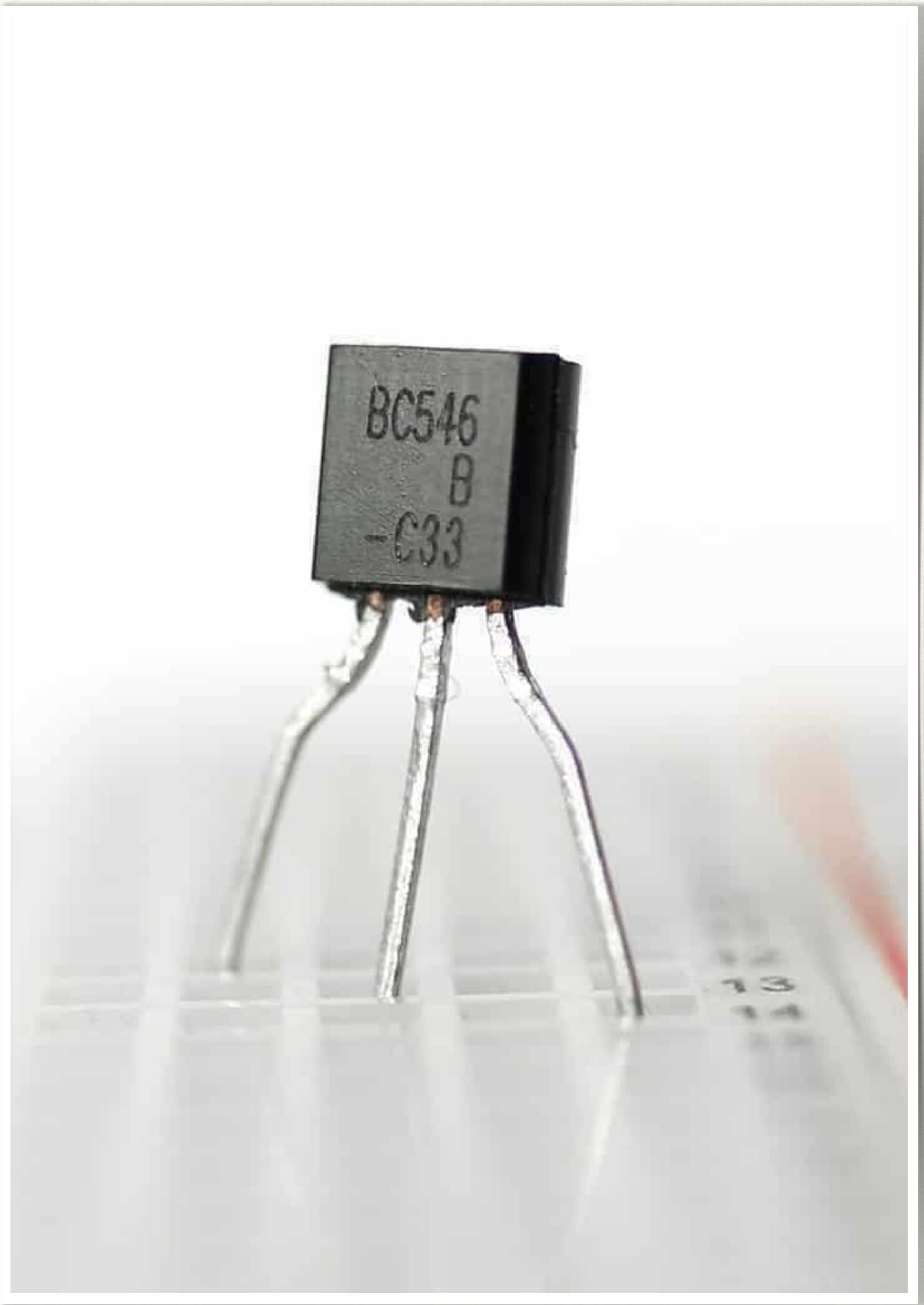
Emner i Dag

- ❖ Computer hardware
- ❖ Abstractions:
 - ❖ Binær kode
 - ❖ Java kode til binær kode



Computer Hardware

Transistorer





is silicon a stone or metal



Silicon is a chemical element with the symbol Si and atomic number 14. It is a metalloid, meaning it has properties of both metals and nonmetals. It is not a stone or a metal.

Like Dislike



could it be compared to sand?



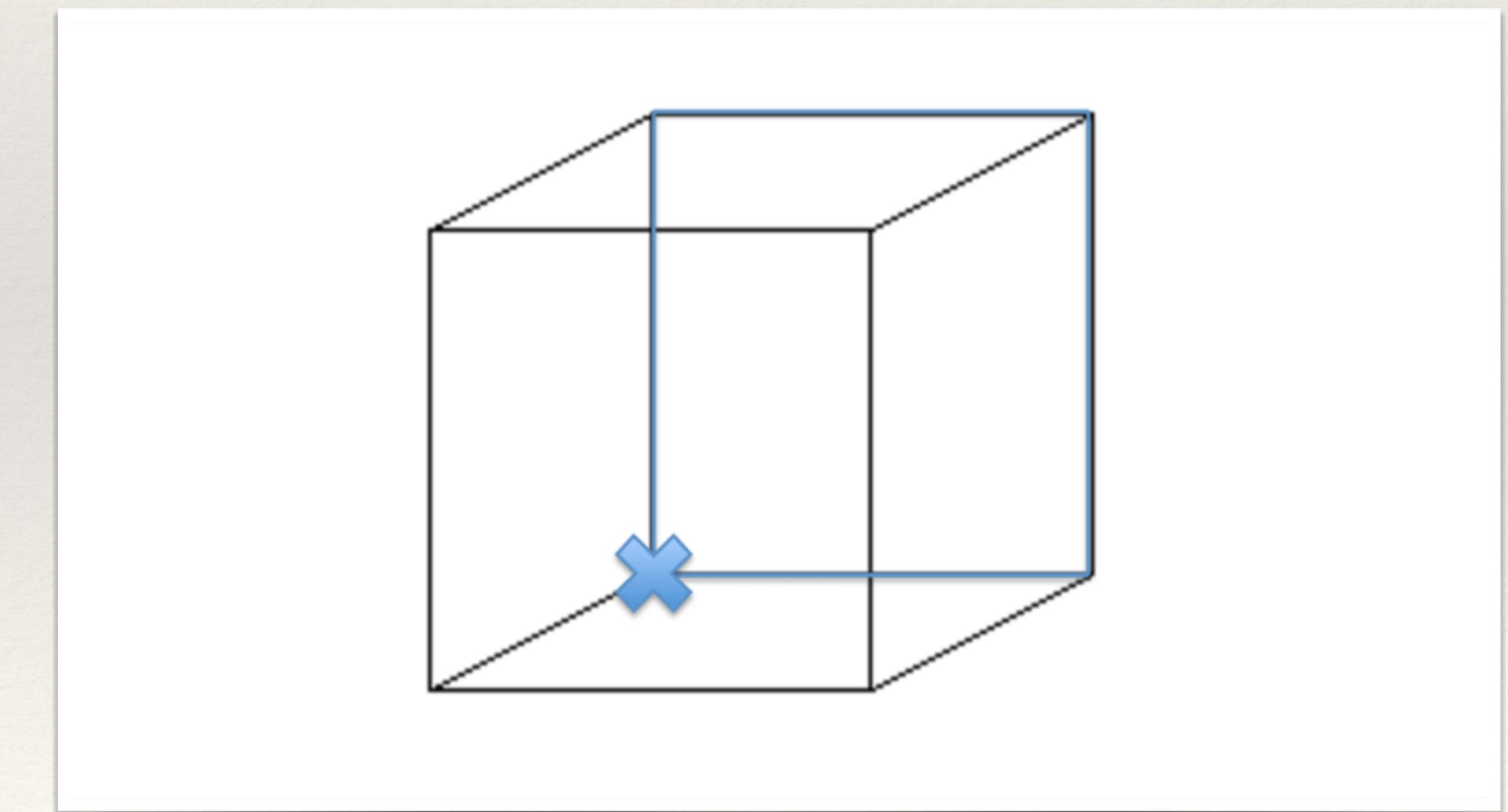
Silicon can be compared to sand in the sense that both silicon and sand are composed of silicon dioxide (SiO_2), which is the most common compound of silicon in the Earth's crust. Sand is made up of tiny grains of rock, and many types of rock, such as quartz, granite, and sandstone, are composed primarily of silicon dioxide. So yes, silicon can be compared to sand in that regard.

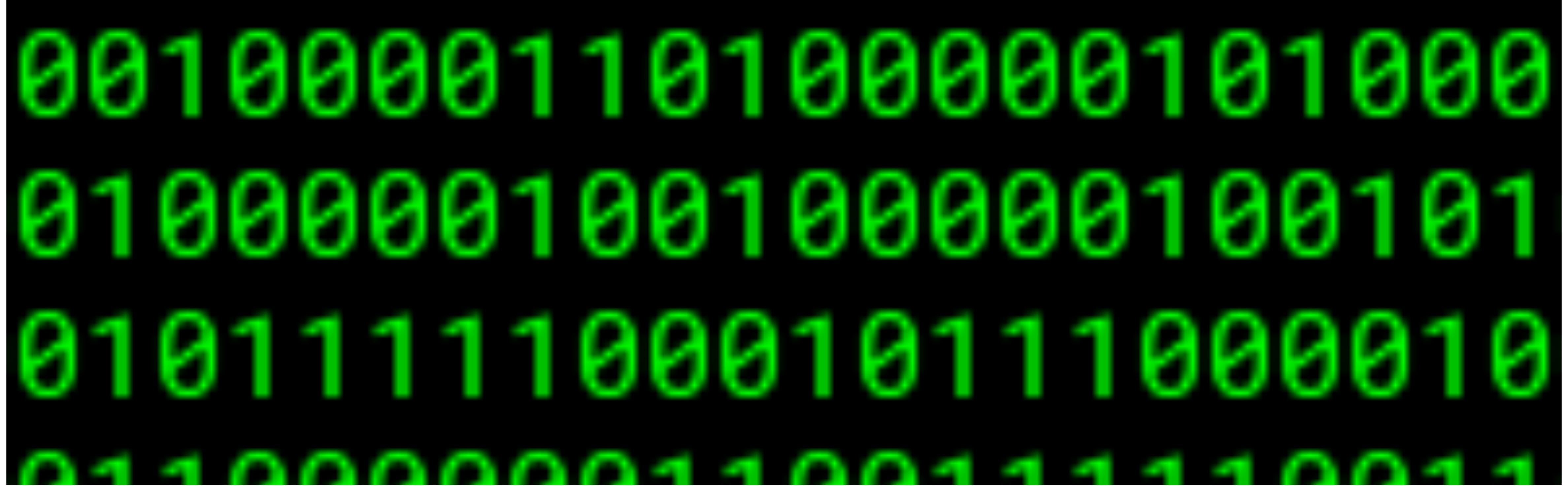
Like Dislike

67 milliarder transistorer i en i9



Abstraction





0010000110100000101000
0100000100100000100101
01011110001011000010
01100000110011110011

Binære tal

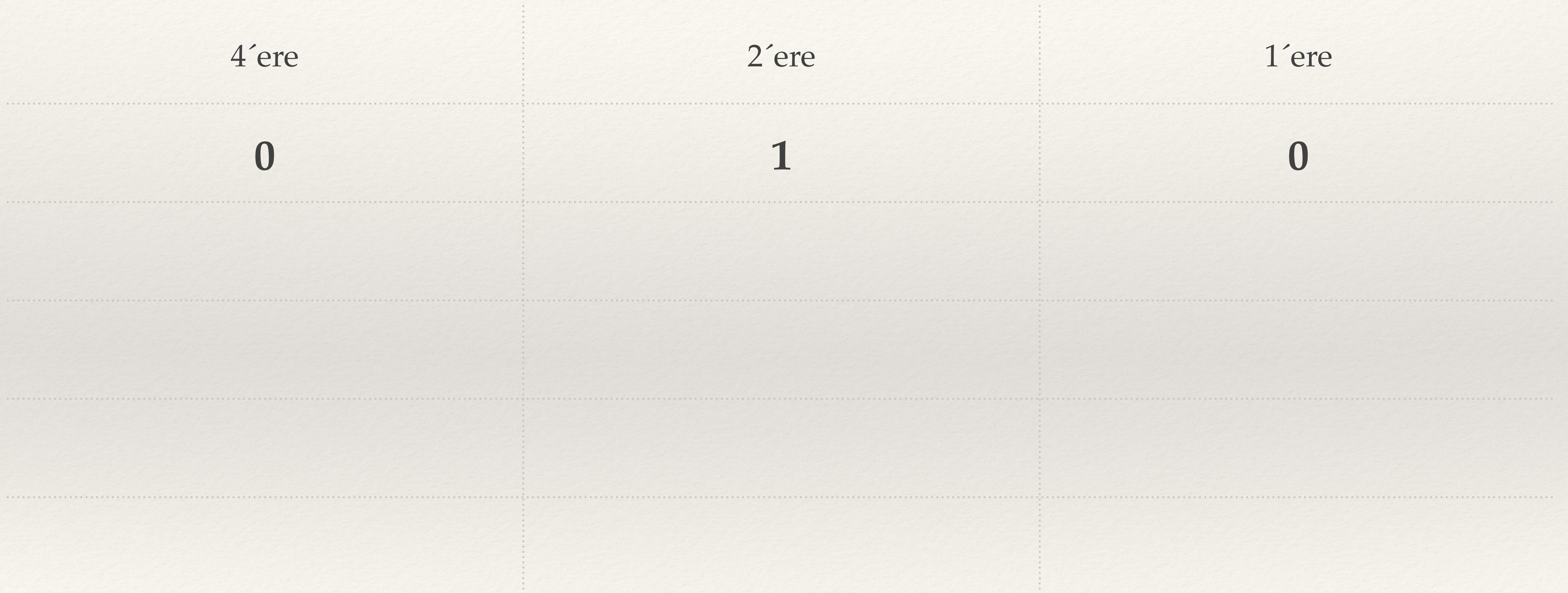
Binær kode

Det første abstraktionslag

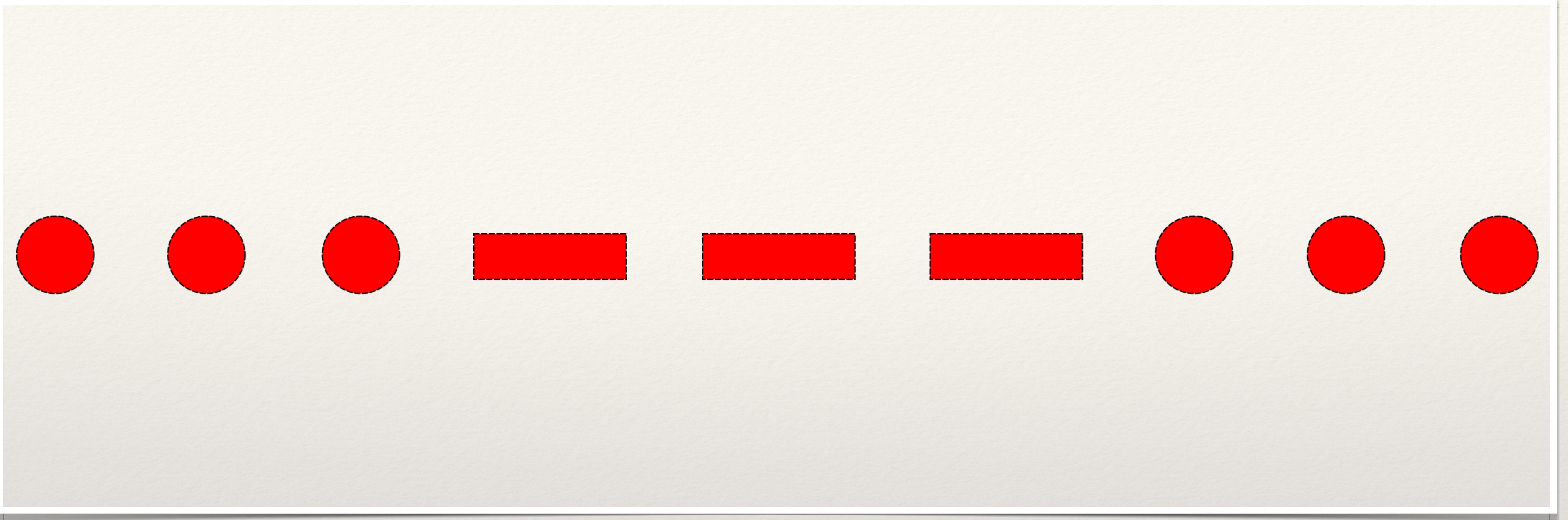
10 tals systemet

1	2	3	
100	10	1	
100×1	10×2	1×3	
100	20	3	=
+	+		123

2 tals systemet



Protokol



Protokol =
sæt af regler som 2 parter kan følge

Binær kode

Ascii table

01001000 01001001 0010001

HI!

ASCII - Binary Character Table

Letter	ASCII Code	Binary	Letter	ASCII Code	Binary
a	097	01100001	A	065	01000001
b	098	01100010	B	066	01000010
c	099	01100011	C	067	01000011
d	100	01100100	D	068	01000100
e	101	01100101	E	069	01000101
f	102	01100110	F	070	01000110
g	103	01100111	G	071	01000111
h	104	01101000	H	072	01001000
i	105	01101001	I	073	01001001
j	106	01101010	J	074	01001010
k	107	01101011	K	075	01001011
l	108	01101100	L	076	01001100
m	109	01101101	M	077	01001101
n	110	01101110	N	078	01001110
o	111	01101111	O	079	01001111
p	112	01110000	P	080	01010000
q	113	01110001	Q	081	01010001
r	114	01110010	R	082	01010010
s	115	01110011	S	083	01010011
t	116	01110100	T	084	01010100
u	117	01110101	U	085	01010101
v	118	01110110	V	086	01010110
w	119	01110111	W	087	01010111
x	120	01111000	X	088	01011000
y	121	01111001	Y	089	01011001
z	122	01111010	Z	090	01011010

RGB colors

01001000 01001001 0010001



White	(255,255,255)	#FFFFFF
Red	(255,0,0)	#FF0000
Lime	(0,255,0)	#00FF00
Blue	(0,0,255)	#0000FF
Yellow	(255,255,0)	#FFFF00
Cyan	(0,255,255)	#00FFFF
Magenta	(255,0,255)	#FF00FF
Silver	(192,192,192)	#C0C0C0
Gray	(128,128,128)	#808080
Maroon	(128,0,0)	#800000
Olive	(128,128,0)	#808000
Green	(0,128,0)	#008000

Java source code til binær kode

```

16     public static void main(String[] args){
15
14         int x, y, z;
13         x = 0;
12         y = 1;
11
10         for(int i = 0; i < 255; i++){
9             System.out.println(x);
8             z = x + y;
7             x = y;
6             y = z;

```

javac Calculator.java

```

Compiled from "Calculator.java"
class Calculator {
    Calculator();
    Code:
        0:  aload_0
        1:  invokespecial #1           // Method java/lang/Object."<init>":()V
        4:  return

    public static void main(java.lang.String[]);
    Code:
        0:  iconst_0
        1:  istore_1
        2:  iconst_1
        3:  istore_2
        4:  iconst_0
        5:  istore_4
        7:  iload_4
        9:  sipush   255
       12: if_icmpge 36
       15: getstatic #7           // Field java/lang/System.out:Ljava/io/PrintStream;
       18: iload_1
       19: invokevirtual #13        // Method java/io/PrintStream.println:(I)V
       22: iload_1
       23: iload_2
       24: iadd

```

java bytecode

Assembly code

Address	OpCode	OpName	OpDesc
0000000100000f49	movl	-0x8(%rbp), %esi	x → ESI
0000000100000f4e	addl	-0xc(%rbp), %esi	y → ESI
0000000100000f50	movl	%esi, -0x10(%rbp)	z = x
0000000100000f57	movl	-0xc(%rbp), %esi	
0000000100000f5a	movl	%esi, -0x8(%rbp)	
0000000100000f5d	movl	-0x10(%rbp), %esi	
0000000100000f60	movl	%esi, -0x4(%rbp)	
0000000100000f63	movl	%eax, -0x4(%rbp)	
0000000100000f66	cmpl	\$0xff, -0x8(%rbp)	
0000000100000f6d	jl	0x10f73	
0000000100000f73	jmp	0x10f73	

Binær kode

```

01000100 01000101 01010011 01010000 01001001 01000101 01010010 01010100 01000001 00100001 00100000 01001110
01001111 01010011 00100000 01000101 01010011 01010100 11000011 10000001 01001110 00100000 01001101 01000001
01001110 01001001 01010000 01010101 01001100 01000001 01001110
01010011 01010101 00100000 01000001 01001110 01010100 01001111
01001100 00100000 01001110 01010111 01001111 00100000 01001001
01000001 00100000 01001100 01000001 00100000 01010000 01000101
00100000 01000100 01000101 00100000 01010100 01001111 01000100
01000101 01010011 01000101 00100000 01010100 01000100 01010101
01001001 01001011 01010100 01000101 01001110 01000000 01010011
01000001 01001100 01000001 00100000 01010000 01000101 01000011
00100000 01001100 00100000 01000001 01010011 11000011 10001101 00100000 01001111 01001101 01001111
00100000 01010101 01001110 01000001 00100000 01010010 01000101 01000101 01000011 01001001
11000011 10010011 01001110 00100000 01000100 01010010 11000011 10000001 01010011 01010100 01001001 01000011
01000001 00100000 01000100 01000101 00100000 01001100 01000001 00100000 01010000 01001111 01000010 01001100
01000001 01000011 01001001 11000011 10010011 01001110 00100000 01001101 01010101 01001110 01000100
01000001 01001100 00100001 00100000 01010010 01000101 01001011 01001001 01010011 01001001 01000101
01000001 01001001 01000001 00100000 01001000 01100101 01110000 01100101 01110000 01100100 01100001
01100100 00100001 01100100 01100101 01110011 01110000 01100101 01110000 01100100 01100001 01100100
01100100 01110000 01100101 01110010 01110100 01100001 01100100 00100001 01100100 01100101 01110001
01100101 01110010 01100100 01100001 01100100 00100001 01100101 01110011 01110000 01100101 01110001
01110100 01100001 01100100 01100101 01110011 01110000 01100101 01110000 01100100 01100001 01100100
01100100 00100001 01100100 01100101 01110011 01110000 01100101 01110000 01100100 01100001 01100100

```