



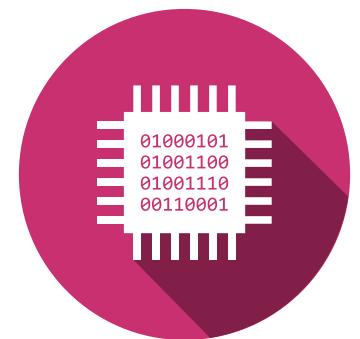
Digitales Design (DiD)

Einführung

IND

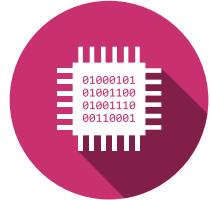
Studiengang Systemtechnik
Studiengang Energie und Umwelttechnik
Studiengang Informatik und Kommunikationssysteme

Silvan Zahno silvan.zahno@hevs.ch
Christophe Bianchi christophe.bianchi@hevs.ch
François Corthay francois.corthay@hevs.ch



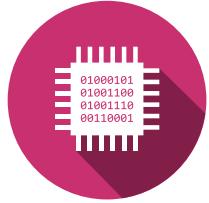
ISC Module 1. Jahr

<https://www.hevs.ch/media/document/20/plan-etude-isc-v1-02.pdf>



	<i>Vorlesungen</i>	<i>Stunden</i>	<i>Credits</i>
	Semester 1	32	28
	Lineare Algebra 1	4	4
	Analysis 1	6	5
	Kommunikation 1	2	2
	Ethik und Rechtespekte	2	2
	Sprachen 1	4	3
	Imperative Programmierung	8	7
	<i>Digitale Technik</i>	6	5
1. Jahr	Semester 2	36	32
	Lineare Algebra 1	4	4
	Analysis 2	6	5
	<i>Computerarchitektur</i>	4	3
	Kommunikation 2	2	2
	Sicherheitbewusstsein	4	3
	Sprachen 2	4	3
	Objektorientierte Programmierung	8	6
	Netzwerke	4	6
	Projekt 1		
			Summer school
ZaS	DiD IND		

Ziel des Kurses



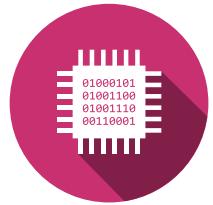
Das funktionale Pflichtenheft eines einfachen Systems interpretieren (C) und es digital darstellen können (A).

Die Grundprinzipien des digitalen Designs nach den vorgeschlagenen Methoden anwenden (A).

Die daraus abgeleitete logische Funktion realisieren (A)

Validieren des erstellten digitalen Designs anhand von Simulations- und Testmethoden (J)

Inhalt des Kurses



Pflichtenheft

Q_A	Q_B	Q_A^+	Q_B^+
0	0	1	0
0	1	0	0
1	0	1	1
1	1	0	1

Zustandstabellen

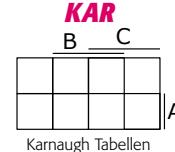
MSb **NUM** LSB
11110101
Binary digit IT

Wahrheitstabellen

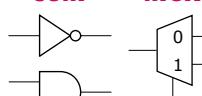
a	b	y
0	0	0
0	1	1
1	0	1
1	1	0

Wahrheitstabellen

KAR



COM **MUX**



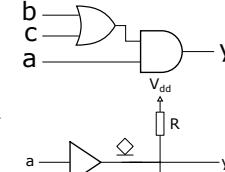
Kombinatorische Logik Elemente

Polynomiale Gleichungen

$$Q_0^+ = \overline{Q_0}$$

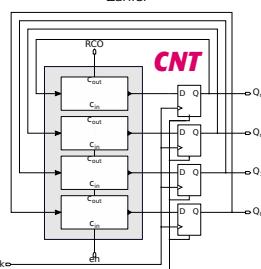
$$Q_1^+ = Q_0 \oplus Q_1$$

Kombinatorische Schaltkreise

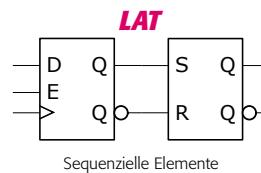
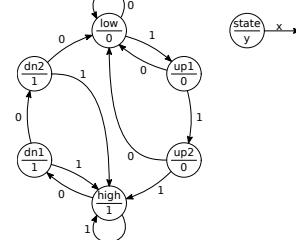
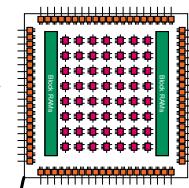


LST

Zähler



FPGA



Sequenzielle Elemente

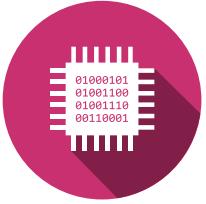
DiD IND



Zustandsmaschinen

MET

Witz



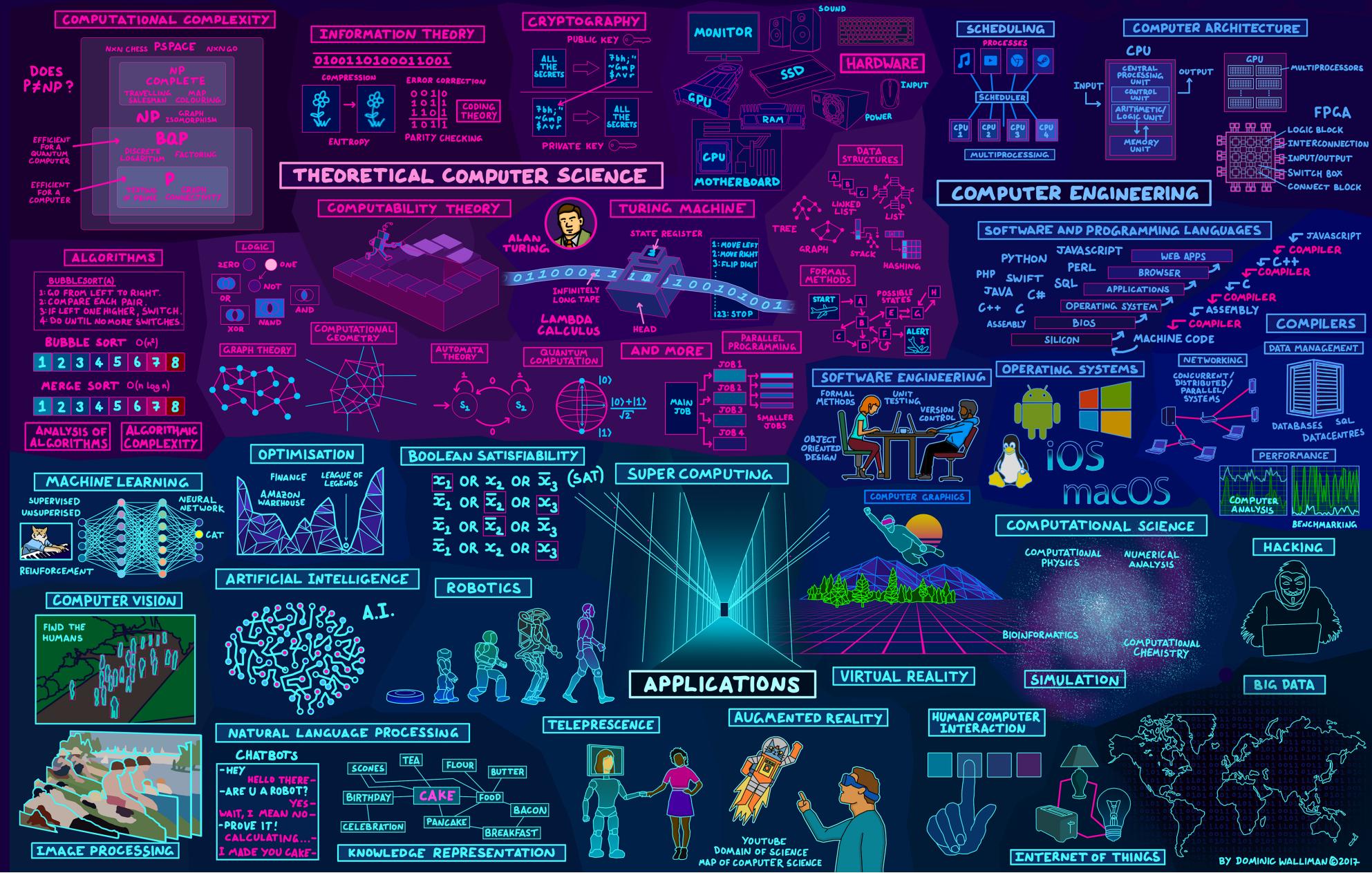
There are 10 types of people in this world. Those who understand binary and those who don't.

Es gibt 10 Arten von Menschen auf dieser Welt. Diejenigen, die das Binäre verstehen und diejenigen, die es nicht verstehen.

Map of Computer Science

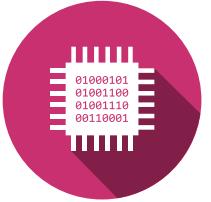


Computer Science



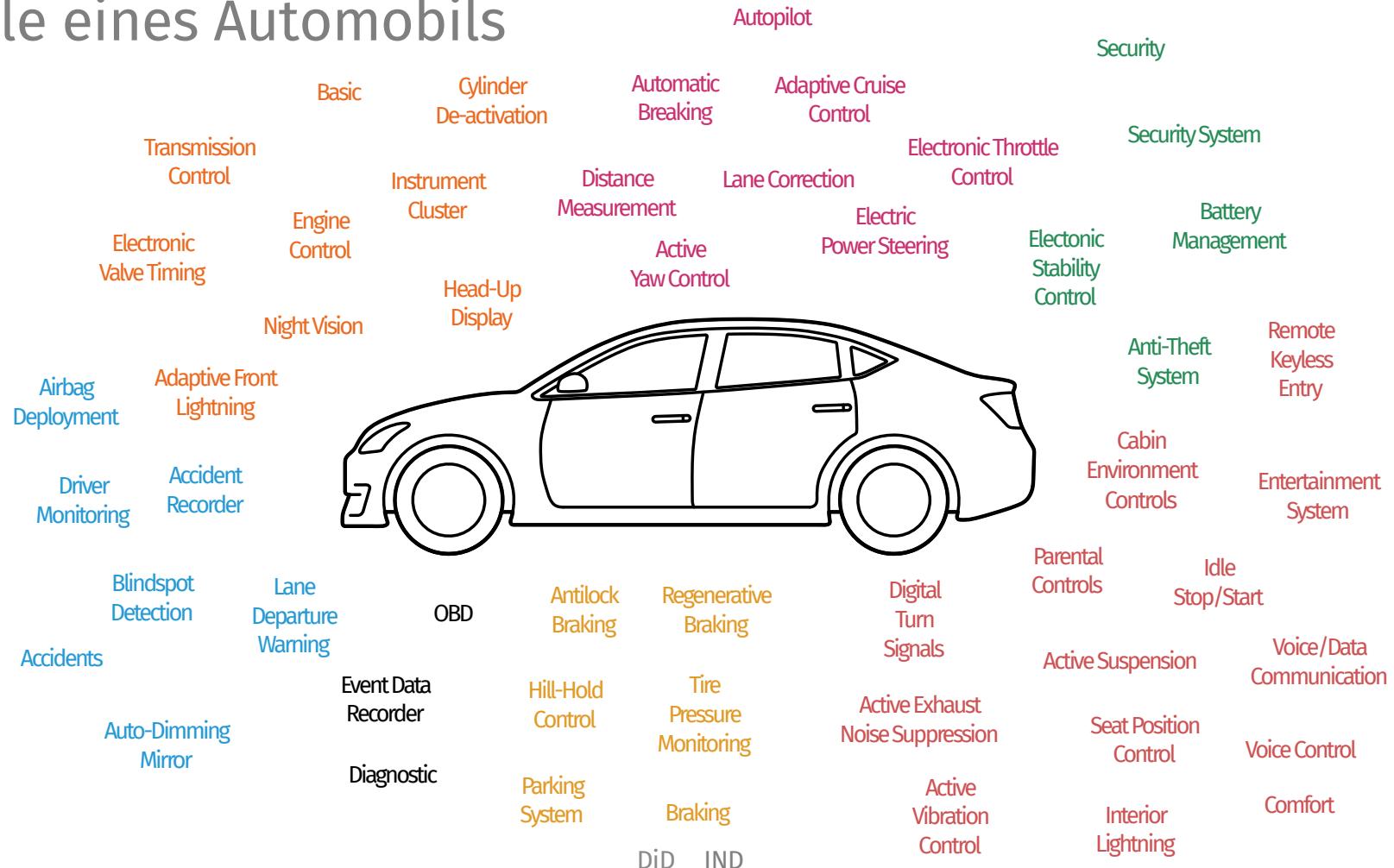
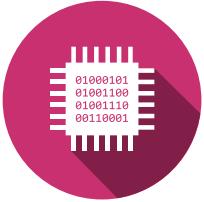
Numerische Elektrotechnik

Anwendungsbereiche



Numerische Elektrotechnik

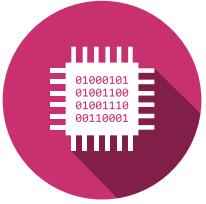
Beispiele eines Automobils



Numerische Elektrotechnik

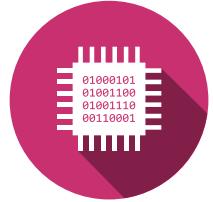
Ariane 5

https://youtu.be/PK_yguLapgA

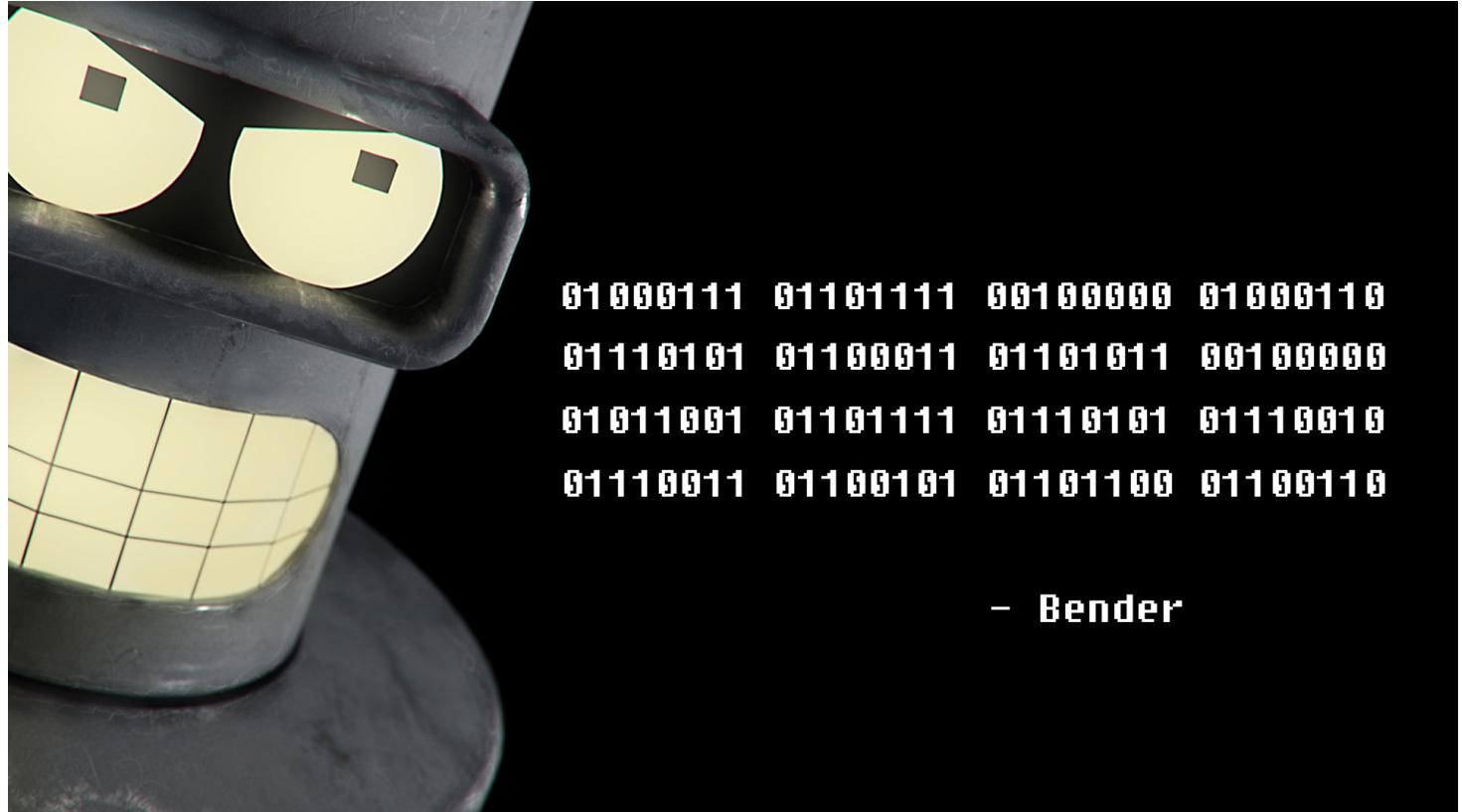
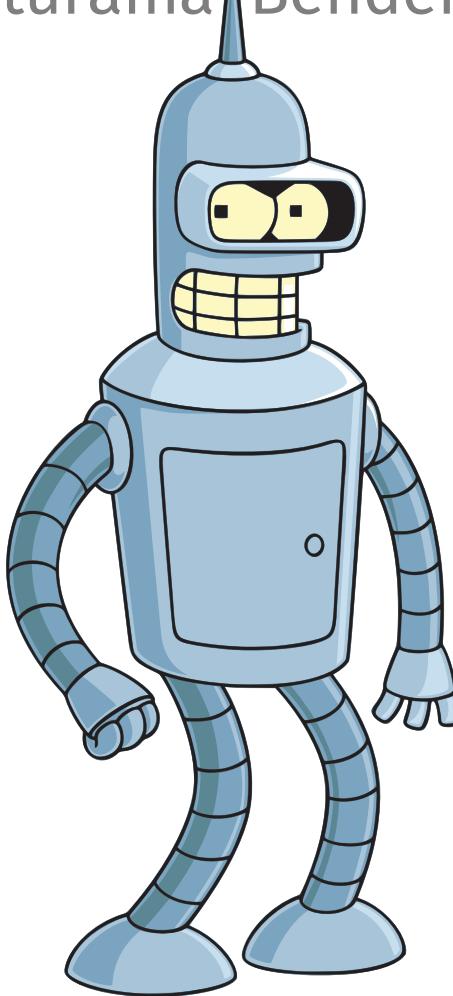


Numerische Elektrotechnik

Futurama Bender



https://youtu.be/_4TPlwwHM8Q

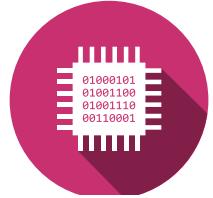


```
01000111 01101111 00100000 01000110  
01110101 01100011 01101011 00100000  
01011001 01101111 01110101 01110010  
01110011 01100101 01101100 01100110
```

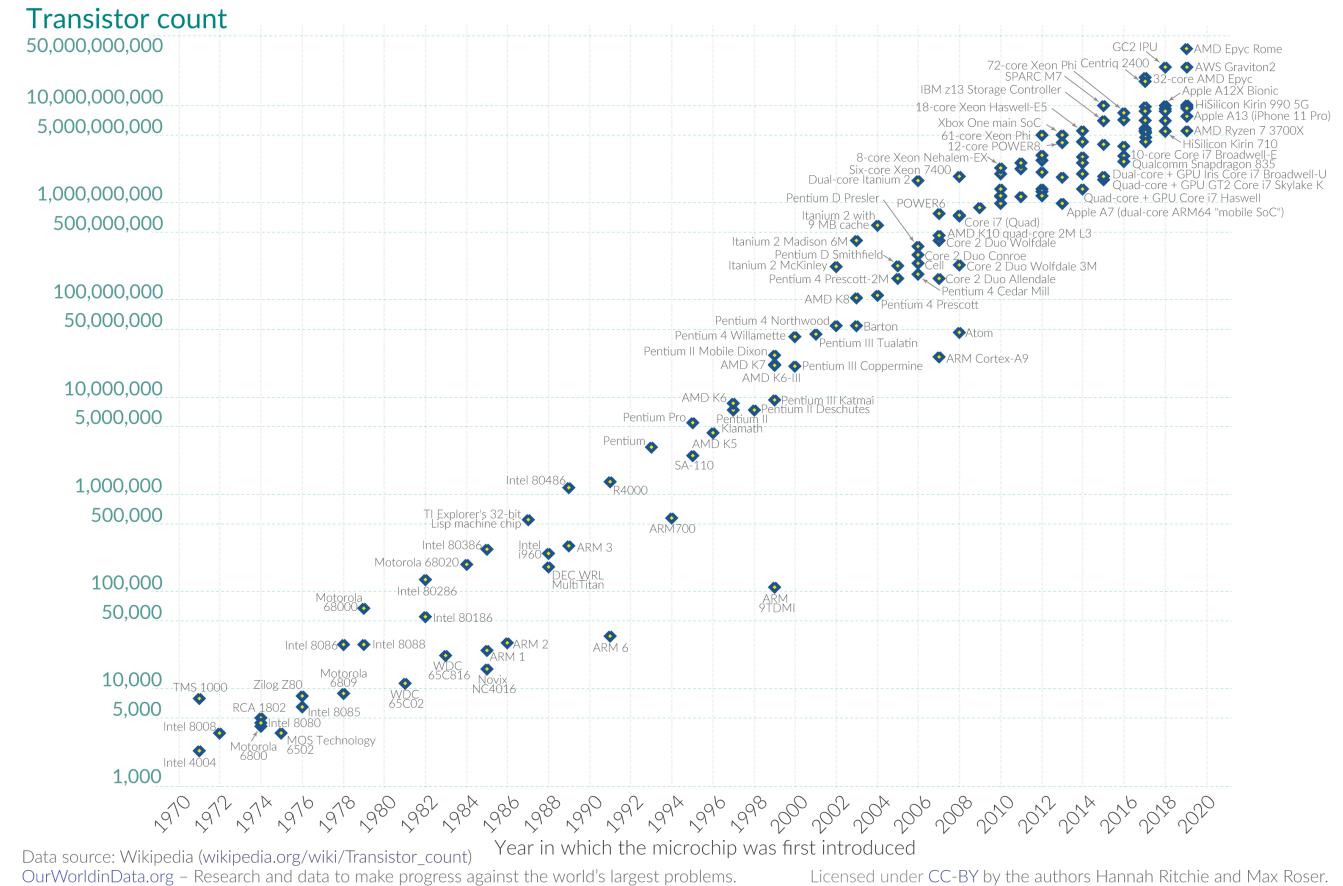
- Bender

Numerische Elektrotechnik

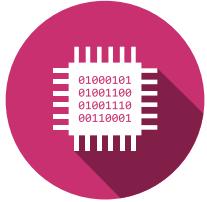
Moore's Law



*Number of transistors double
every two years
- Gordon Moore -*

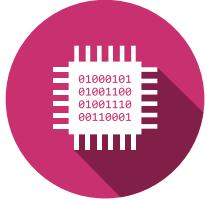


ISC Organisation



- Kurs ($2^{Stunden/Woche}$)
- Labore ($4^{Stunden/Woche}$)
- Projekt (Display $\approx 3 - 5$ Wochen)
- Prüfung
 - Woche 47 (17.11.25 – 21.11.25)

	Herbstsemester (DiD)			Frühlingssemester (CAr)		
Bewertung	Exa 1	Project	Exa Sem	Exa 1	Project	Exa Sem
Koeffizient	0.5	0.5	1	0.5	0.5	1
Semester	1		1	1		1
Module	5/9			4/9		

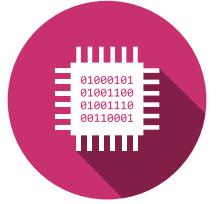


Um in diesem Kurs gut zu bestehen

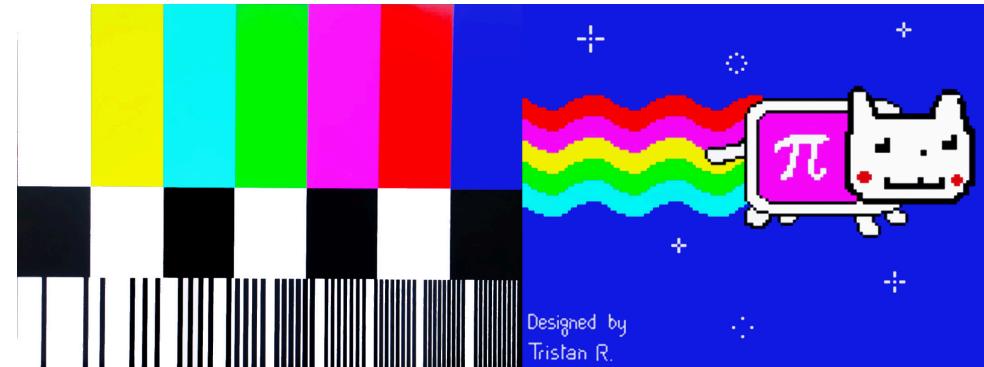
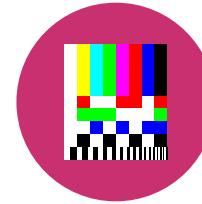
- **Anwesenheitspflicht**
 - Die Teilnahme an allen Kursen ist obligatorisch. Nur die Dozierenden können eine **Dispensation** gewähren.
- **Notizen**
 - Es ist **unerlässlich**, während des Unterrichts **Notizen zu machen**, insbesondere bei den gemeinsam gelösten **Beispielen und Übungen**.
 - Die im Unterricht **an der Wandtafel erarbeiteten Lösungen** dürfen abgeschrieben werden.
- **Selbstständige Arbeit**
 - **Zusätzliche Übungen** sind zu Hause zu bearbeiten.
 - **Regelmässiges, persönliches Arbeiten** ist unerlässlich, um den Stoff zu verinnerlichen.
- **Hilfe und Unterstützung**
 - Der **Stützkurs** sowie der **MS-Teams-Kanal** stehen zur Verfügung, um **Fragen zur Theorie** oder zu den **Übungen** zu stellen.
- **Korrektur von Übungen**
 - Die gelösten Aufgaben können **zur Korrektur** bei einem Dozenten **eingereicht werden**.

Semesterprojekt

Informatik und Kommunikationssysteme

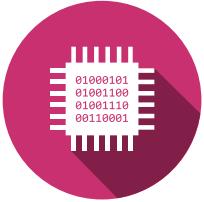


Display



DiD IND

Organisation Professoren



Bianchi Christophe (BiC)
Büro: ENP.23.N207
Email: christophe.bianchi@hevs.ch
Tel: +41 58 606 87 60

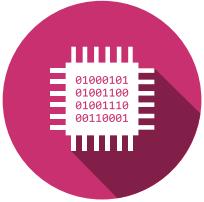


Andrea Guerrieri (GuA)
Büro: ENG.23.N312
Email:
andrea.guerrieri@hevs.ch
Tel: +41 58 606 93 55



Zahno Silvan (ZaS)
Büro: ENG.23.N312
Email: silvan.zahno@hevs.ch
Tel: +41 58 606 88 07

Organisation Mitarbeiter



Alban Theytaz (ThA)
Büro: ENG.23.N219
Email: alban.theytaz@hevs.ch
Tel: +41 58 606 85 85



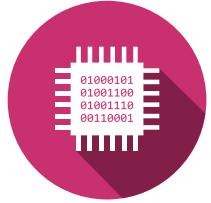
David Tagan (TaD)
Büro: ENG.23.N219
Email: david.tagan@hevs.ch
Tel: +41 58 606 92 96



Rémy Borgeat (BoR)
Büro: ENG.23.N313
Email: remy.borgeat@hevs.ch
Tel: +41 58 606 92 20

Server und Dateien

Informatik und Kommunikationssysteme

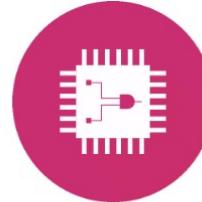


- **Moodle ISC Learn**

- 102.1 – Digital design
- Password: *welcome*

INFORMATIONS DU MODULE –
MODULINFORMATIONEN

MODULE DID – KURS DID



- **Microsoft Teams**

- 25_ISC_Car
- Access Code: **ia5sw6e**

Le module "102 Architecture materielle" est composé des deux cours suivants: 102.1 Systèmes numériques et 102.2 Architecture des ordinateurs.

Vous trouverez tous les documents de cours sur le repo Git.

Das Modul "102 Materielle Architektur" besteht aus den beiden folgenden Kursen:
102.1 Digitale Systeme und 102.2 Computerarchitektur

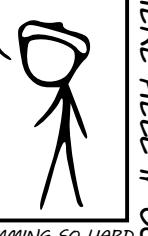
The screenshot shows the Microsoft Teams application interface. On the left, there's a sidebar with icons for Activity, Chat, Teams (selected), Assignments, and Apps. The main area displays a team named '20_ein_se1d' with sections for 'General' and 'Announcements'. To the right, there are two large buttons: 'Join or create a team' and 'Join a team with a code'. Below these buttons, there's a text input field labeled 'Enter code' with the number '2' next to it, and a 'Join team' button.

WHY ARE THERE MIRRORS ABOVE BEDS
WHY DO I SAY UH
WHY IS SEA SALT BETTER
WHY ARE THERE TREES IN THE MIDDLE OF FIELDS
WHY IS THERE NOT A POKEMON MMO
WHY IS THERE LAUGHING IN TV SHOWS
WHY ARE THERE DOORS ON THE FREEWAY
WHY ARE THERE SO MANY SVHOST-EXE RUNNING
WHY AREN'T ANY COUNTRIES IN ANTARCTICA
WHY ARE THERE SCARY SOUNDS IN MINECRAFT
WHY IS THERE KICKING IN MY STOMACH
WHY ARE THERE TWO SLASHES AFTER HTTP
WHY ARE THERE CELEBRITIES
WHY DO SNAKES EXIST
WHY DO OYSTERS HAVE PEARLS
WHY ARE DUCKS CALLED DUCKS
WHY DO THEY CALL IT THE CLAP
WHY ARE KYLE AND CARTMAN FRIENDS
WHY IS THERE AN ARROW ON AANG'S HEAD
WHY ARE TEXT MESSAGES BLUE
WHY ARE THERE MUSTACHES ON CLOTHES
WHY WUBA LUBBA DUB DUB MEANING
WHY IS THERE A WHALE AND A POT FALLING
WHY ARE THERE SO MANY BIRDS IN SWISS
WHY IS THERE SO LITTLE RAIN IN WALLIS
WHY IS WALLIS WEATHER FORECAST ALWAYS WRONG

WHY ARE THERE MALE AND FEMALE BIKES

WHY ARE THERE BRIDESMAIDS
WHY DO DYING PEOPLE REACH UP
HOW FAST IS LIGHTSPEED
WHY ARE OLD KLINGONS DIFFERENT

WHY ARE THERE SQUIRRELS



WHY IS THERE HELL IF GOD IS LOVE
WHY IS THERE NO GPS IN LAPTOPS
WHY DO KNEES CLICK
WHY AREN'T THERE E GRADES
WHY ARE PROGRAMMING SO HARD

QUESTIONS

CAN BE ASKED BY ANYONE ANYTIME

WHY AREN'T ECONOMISTS RICH
WHY DO AMERICANS CALL IT SOCCER
WHY ARE MY EARS RINGING
WHY IS 42 THE ANSWER TO EVERYTHING
WHY CAN'T NOBODY ELSE LIFT THORS HAMMER
WHY IS MARVIN ALWAYS SO SAD

WHY IS THERE A SWARM OF ANTS
WHY IS THERE PILGRIM
WHY ARE THERE SO MANY CROWS IN ROCHESTER
WHY IS TO BE OR NOT TO BE FUNNY
WHY DO CHILDREN GET CANCER
WHY IS POSEIDON ANGRY WITH ODYSSEUS
WHY IS THERE ICE IN SPACE

WHY ARE THERE ANTS IN MY LAPTOP

WHY IS EARTH TILTED
WHY IS SPACE BLACK
WHY IS OUTER SPACE SO COLD
WHY ARE THERE PYRAMIDS ON THE MOON
WHY IS NASA SHUTTING DOWN

WHY ARE THERE GHOSTS


WHY IS THERE AN OWL IN MY BACKYARD
WHY IS THERE AN OWL OUTSIDE MY WINDOW
WHY IS THERE AN OWL ON THE DOLLAR BILL

WHY DO OWLS ATTACK PEOPLE
WHY ARE FPGA's EVERYWHERE

WHY ARE THERE HELICOPTERS CIRCLING MY HOUSE
WHY ARE THERE GODS
WHY ARE THERE TWO SPOCKS

WHY ARE MY BOOBS ITCHY
WHY ARE CIGARETTES LEGAL
WHY ARE THERE DUCKS IN MY POOL
WHY IS JESUS WHITE
WHY IS THERE LIQUID IN MY EAR
WHY DO Q TIPS FEEL GOOD
WHY DO PEOPLE DIE

WHY IS LIFE SO SHORT
WHY ARE THERE OBELISKS
WHY ARE WRESTLERS ALWAYS WET
WHY ARE OCEANS BECOMMING MORE ACIDIC

WHAT IS <https://xkcd.com/1256/>

WHY DO THEY SAY T-MINUS

WHY ARE THERE FEMALE

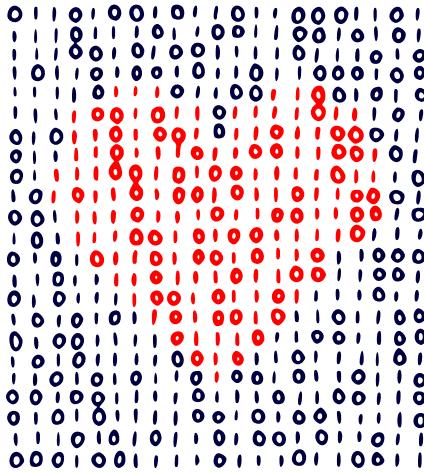
WHY ARE THERE OBELISKS

WHY ARE WRESTLERS ALWAYS WET

WHY ARE OCEANS BECOMMING MORE ACIDIC



WHY AREN'T THERE GUNS IN HARRY POTTER



Hes·so // VALAIS
WALLIS



Haute Ecole d'Ingénierie
Hochschule für Ingenieurwissenschaften

Silvan Zahno silvan.zahno@hevs.ch
Christophe Bianchi christophe.bianchi@hevs.ch
François Corthay francois.corthay@hevs.ch

