

General Notes

Monday, 29 September 2025 10:18

- Vicin Unacadin!
- Project Proposal not GDD
- General research not Game research
- Present in two weeks - Present 4, focus 1
↳ Present after detailed research
- Lots of prototypes - even if paper prototype
- week 11 Present prototype @ gallery
wk 12 hand in all research / proposal
- be aware sunk cost fallacy
- keep track of ideas incl. the ones that are blind
- look at keynote
- no calm tuesday / friday

Action Plan

Monday, 29 September 2025

16:04

T

— 13:30 sort out linked in

— Pick research topics

↳ lens design ↳ Automation

↳ Gothic Architecture ↳ Clock making - horology

— Start research

— Relate to EMO 2025

— Look into high speed hydraulic - is it servo or valve?

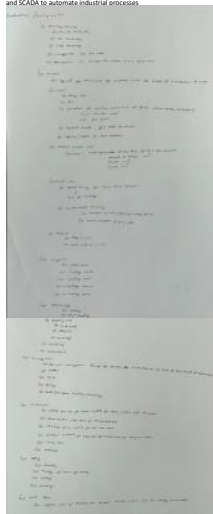
Wordpress planning

Tuesday, 30 September 2025 10:45

~ Sites . Wk - Series . Com

- Timeline / Gantt chart for contents page
- weekly recycling Bin for unused stuff
- Link Git (Gibson . cc . uk)

Text to reference:
Industrial Automation from Scratch: a hands-on guide for using sensors, actuators, PLCs, HMIs, and SCADA to automate industrial processes



On Lathe:

- The Lathe
- The lathe is a machine tool that rotates a workpiece about its own axis while a cutting tool removes material from the workpiece to produce a desired shape.

The Lathe

The lathe is an ancient tool. The earliest evidence of a lathe dates back to 4th century BC Egypt and is a depiction in the tomb of Ptolemy. There is also evidence for a turned artifact of a Mycenaean Greek site, dating back as far as the 13th or 14th century BC [1].

Clear evidence of turned artifacts have been found from the 6th century BC: fragments of a wooden bowl in an Etruscan tomb in Northern Italy as well as two flat wooden dishes with decorative turned rims from modern Turkey [2].

The modern metal lathe
1700's



Vauclain 1751

Arguably the first metal work used, offers an order of magnitude more precision over a wood lathe

Steam



Standardised SCADA

In the early 1900's lathes like this were common and are recognisable as they show a lot of elements with modern machine tools

- a revolution of it

This machine predates the widespread availability of electric motors and is in geared drive by a line shaft which is itself driven by steam



ew cutting

\$ a m



1940's Mower & Co. lathe



1960's Dean Smith & Grace Type 17T

The next major evolution was machining with its own note



1970's

Colchester 2000

- The university has a number of these
e.g. EPML, ELS, Physics

Production machining

The capstan

- the capstan or turret lathe has been around since the 1840's and allows for a series of identical parts to be produced quickly



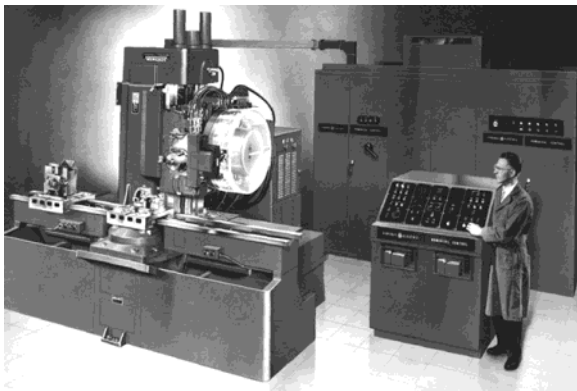
Ward 2C Capstan
lathe

The birth of automation

the first truly automatic centres were driven by cam



en rol



Punch tape
used to program
machines



Cassette tape
drive for storing
and reading
programs
≈ 1980

1950's and 60's
NC C &

CNC

in the 70's we start to see computer control



→ first computerized
control

floppy disk

1981 Mazatrol T-1

-S

—

L

Prevalence



~ 1980



1981 Mazak T1

floppy disk

So you have a machine, now

Auto loader?

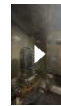
Bar loaders - automatically feeds bar into

What if my part is too big?

Robotic loader - Arm style $\Rightarrow$



- Dual pallet $\Rightarrow$



[Machining 451 Twin Pallet Horizontal Machining Center - Machine Blog](#)

- Pallet Pool $\Rightarrow$



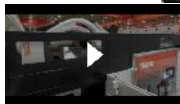
[Machining 451 Plus 300-PC11 Horizontal Machining Center with 11 Pallet Pool](#)

- Tomb st - les $\Rightarrow$

<https://www.machining.com/2016/04/04/04/04/>



- Gantry loading $\Rightarrow$



[INTEGRAL 1000 ST with Gantry Loader - IMTS 2014](#)

CNC designed for production

Sliding head

- mass production
- high aspect ratio
- complex
- small

Prevalence

What?

recovery

[Visit CMC Mail](#)



~ small

multi spindle

[INDEX CNC Multi-spindle machine M540 - Produktion mit 8 Spindeln](#)



— massive
cycle time reduction

— sliding head parts - complex

rotary dresser



— even more stations

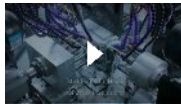
— very large volume production

— extremely fast

Custom tooling

~ multi spindle
heads

[Automation Multi Spindle Drill Head, Fixed heads, Adjustable heads - PURMO](#)



— precise job
much quicker

Gothic Architecture

02 October 2025 10:52

Text to reference:
Architectural Notes on German Churches : With Remarks on the Origin of Gothic Architecture
A Glossary of Terms Used in Grecian, Roman, Italian, and Gothic Architecture

Gothic architecture, architectural style in Europe that lasted from the mid-12th century to the 16th century

particularly masonry building characterized by cavernous spaces with walls broken up by overlaid tracery

tracery, in architecture, bars, or ribs, used decoratively in windows or other openings; the term also applies to similar forms used in relief as wall decoration

Characteristics:

- ↳ Rib vaults $\Rightarrow$ vaulted ceiling that reaches a point
- ↳ Fan vault $\Rightarrow$ ribs that fan out from the support along
creating a complex repeating web pattern
- ↳ Flying buttresses $\Rightarrow$ a buttress that serves as a support instead of being a solid vertical wall/column
- ↳ Pointed arch $\Rightarrow$ arches with a pointed top rather than a rounded arch segment

Where:

- ↳ Early years dominated by France
- ↳ Britain, Germany and Spain produced variations
- ↳ Italy preferred stone with brick and marble

When:

mid 12th century to the 16th century

High Gothic years $\Rightarrow$ c. 1250-1300

Application:

Typically cathedrals, churches, abbeys, castles, palaces and universities

also some government, town halls and private dwellings



- Used as a symbol of power and permanence
- Created ideal of perfection for worship
- Seen following transition with the characteristic elements allow us to trace, identify and name complex buildings

THE ancient churches of Europe offer to us two styles of architecture, between which, when we consider them in their complete development, the difference is very strongly marked.

During the first thousand years of the Christian period, religious edifices were built in the form of these two styles. Its characters are a more or less close imitation of the features of Roman architecture. The arches are round; are supported on pillars retaining traces of the classical proportions; the pilasters, cornices and entablatures, have a correspondence and similarity with those of classical architecture; there is a prevalence of rectangular faces and square-edged projections; the openings in walls are small, and subordinate to the surfaces in which they occur; the members of the architecture are massive and heavy; very limited in kind and repetition; the enrichments being introduced rather by sculpturing surfaces, than by multiplying and extending the component parts. There is in this style a predominance of horizontal lines, or at least no predominance and prolongation of vertical ones

The second style of which we have spoken, made its appearance in the early centuries of the second thousand years of the Christian world. It is characterized by the pointed arch; by pillars which are extended so as to lose all trace of classical proportions; by shafts which are placed side by side, often with different thicknesses, and are variously clustered and combined. Its mouldings, cornices and capitals, have no longer the classical shapes and members; square edges, rectangular surfaces, pilasters, and entablatures disappear; the elements of building become slender, detached, repeated and multiplied; they assume forms implying flexure and ramification. The openings become the principal part of the wall, and the other portions are subordinate to these. The universal tendency is to the predominance and prolongation of vertical lines; for instance, in the interior, by continuing the shafts in the arch-mouldings; on the exterior, by employing buttresses of strong projection, which shoot upwards through the line of parapet, and terminate in pinnacles.

Whewell, W. (2013) 'OF THE CAUSES OF POINTED ARCHITECTURE', in Architectural Notes on German Churches: With Remarks on the Origin of Gothic Architecture. Cambridge: Cambridge University Press (Cambridge Library Collection - Art and Architecture), pp. 1-33.

Key distinction between Roman architecture and Gothic, switch from dominance of

Horizontal lines to vertical.

Good examples:

- Cologne cathedral
- Gloucester cathedral
- Westminster Abbey - Chapel of Henry VII

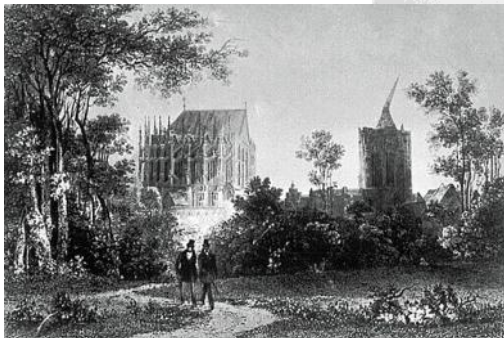
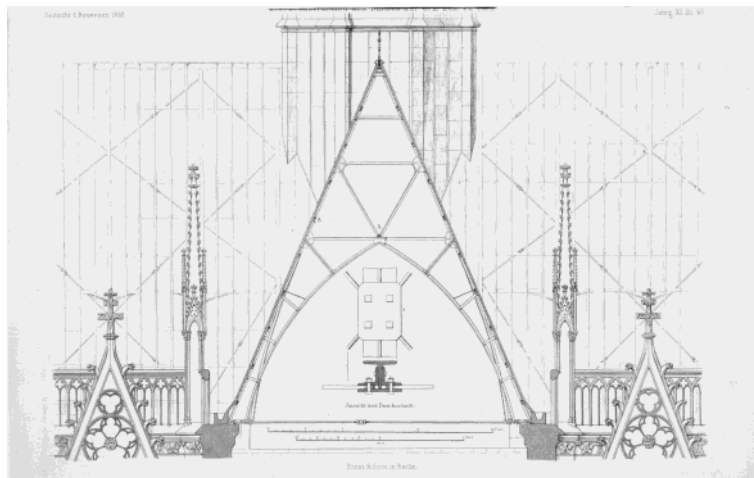
Cologne:

- Started construction 1248

Work on the Cathedral continued in the decades thereafter, although there were repeated interruptions due to war and financial difficulties. Construction of the choir was completed in the 14th century, and the foundation for the south tower was laid in 1360. In 1448/49 the two bells Pretiosa and Speciosa were cast, which are still part of the Cathedral's set of bells. In the later 15th century, construction work continued on the transept, the side aisles and the north tower.

In the 16th century, however, work on the cathedral was interrupted due to the Reformation and the Thirty Years' War and was not resumed until the 19th century, when Prussia annexed the Rhineland and the city of Cologne became part of the Prussian state. The break in construction lasted more than 300 years.

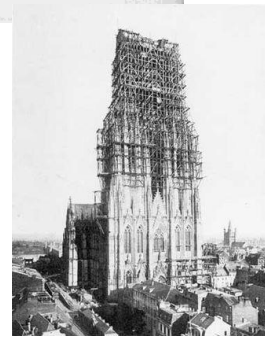
Work on Cologne Cathedral was finally finished in 1880. At that time, the Cathedral had a height of 157 metres, making it the tallest building in the world — after a total of 632 years of construction. And except for a few centimetres, the two towers are even the same height.



- 1820



- 1855



- 1880



- 1900

The eastern arm was completed under the direction of Master Gerhard, was consecrated in 1322 and sealed off by a temporary wall so it could be used as the work continued. Eighty-four misericords in the choir date from this building phase. [citation needed] This work ceased in 1473, leaving the south tower complete to the belfry level and crowned with a huge crane that remained in place as a landmark of the Cologne skyline for 400 years. [32] [page needed] Some work proceeded intermittently on the structure of the nave between the west front and the eastern arm, but during the 16th century this also stopped

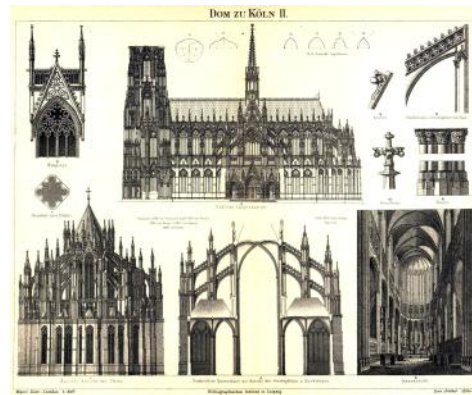
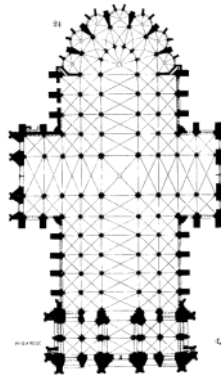
The cathedral works (Dombauhütte) has already tested numerous means of preserving the stones. A convincing method has not yet been found. [70] In addition, the iron anchors and dowels that hold the many parts of the architectural decoration are also beginning to rust. They are threatening to crack the stones and need to be replaced with steel parts. "It is therefore foreseeable that no one alive today will ever see the cathedral without scaffolding." [71]

[72] Arnold Wolff: Der Dom zu Köln. bearbeitet und ergänzt von Barbara Schock-Werner. Köln 2015, p. 10.

Architecture

ground plan design of Cologne Cathedral was based closely on that of Amiens Cathedral, as is the style and the width to height proportion of the central nave - shape of a Latin Cross

It has two aisles on either side, which help support one of the very highest Gothic vaults in the world, being nearly as tall as that of the Beauvais Cathedral, much of which was never built or had collapsed



Bells

- 11 Bells — 8 in South tower
- 3 in central tower

2 of the bells are from the 14th century

— *Prætoriana* 10,500 kg cast 1448

— *Speciosa* 5,600 kg cast 1449

Still in use today after over 570 years



By © Raimond Spekking / CC BY-SA 4.0 (via Wikimedia Commons), CC BY-SA 4.0,

Laser scanned data files of Cologne Cathedral from projects by Heriot-Watt University and partners are not publicly available as raw data but are documented in research papers,

— Photos by me:



Text to reference:
A general history of horology

history

Sundials and shadow clocks $\Rightarrow$ obelisks

Lunar cycles

water and sand clocks

Mechanical era -

mechanical clocks

pendulum clocks

modern clocks

quartz clocks



Atomic clocks

— note both are resonance based

From mechanical clocks on ward
keeping track of time consists of producing or

Keeping track of the consists of producing or
Finding a repeating motion and counting its repetitions

— storing — transporting

— making information from one place to another

chronologically

Ancient and early methods

Cave paintings and hieroglyphics: Prehistoric methods used for recording and storytelling.

Tally sticks: Notched sticks of bone or wood were used for numerical record-keeping, dating back to ancient times.

Quipu: An ancient Inca system of knotted strings used for record-keeping.

Cuneiform: An early writing system on clay tablets used by the Sumerians for record-keeping.

w righting

runners
long distance runners

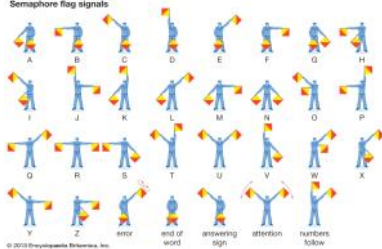
riders — horse back

pigeons

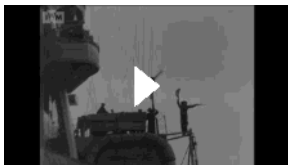
<https://en.wikipedia.org/wiki/Pheidippides>

Pheidippides was a 5th-century-BC Athenian running courier who was the central figure in the story that inspired the marathon race.

Semaphore flag signals



Flags, St. and Semaphore



Mid 1800's flag semaphore
And Morse code

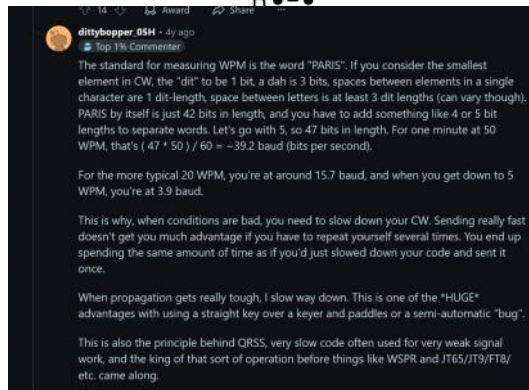
Flag semaphore is slower but offers quicker two way communication

Morse code quicker and works over greater distance

A	—	J	— — —	S	• • •
B	• • • •	K	— • —	T	—
C	— • —	L	• • • •	U	— • —
D	• • •	M	— —	V	• • • •
E	•	N	— • —	W	— • —
F	• • • —	O	— — —	X	• • • —
G	— • —	P	— • —	Y	— • —
H	• • • •	Q	— • —	Z	• • — •
I	• •	R	— • —		

Signalling lamp

Or telegram...



Telegraphy, ability to send messages over wire using code, shortly after this the telephone was invented, gap of around 35 years.

1858, first undersea transatlantic cable, awfully slow, took over a minute to send a single character

Significant improvements made for subsequent cables deployed between 1865 and 66 with the phrase

"Two weeks to two minutes" coined to emphasize the great improvement over ship-borne dispatches

From https://en.wikipedia.org/wiki/Transatlantic_telegraph_cable#First_contact

1870s, [duplex and quadruplex](#) transmission and receiving systems were set up that could relay multiple messages over the cable

From https://en.wikipedia.org/wiki/Transatlantic_telegraph_cable#First_contact

Very clever

— split signals into discrete voltages

+ 3 - 2, + 1 11

describes voltages

± 3 and ± 1 V

Band rate

↓

describes how many signals are sent per second

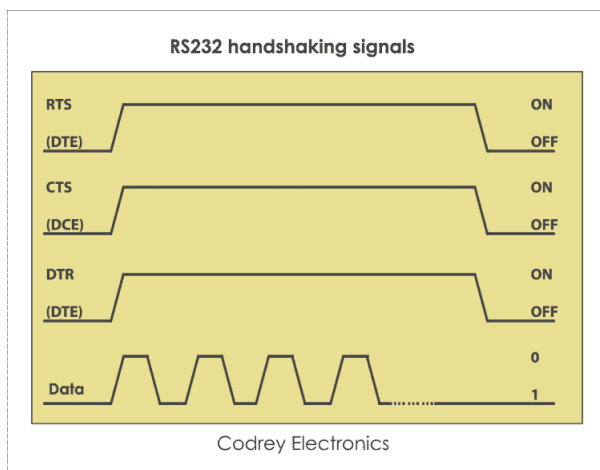
so 20 wpm $\Rightarrow$ 15.7 Bd

↓

62.8 Bd

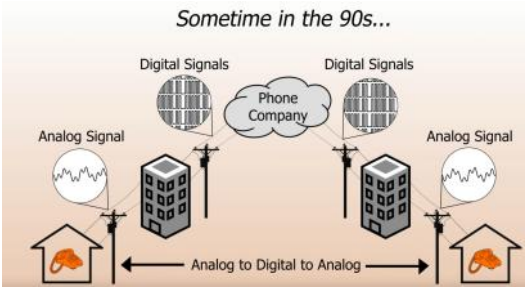
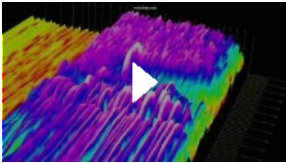
1960 $\Rightarrow$ RS 232

slowest Band rate 110 bps



Establish connection speed, ready to send and ready to receive.

[Dial Up Modem Handshake Sound - Spectrogram](#)



Dual-tone multi-frequency (DTMF) signaling is a [telecommunication signaling](#) system using the voice-frequency band over telephone lines between [telephone](#) equipment and other communications devices and [switching centers](#)

From <https://en.wikipedia.org/wiki/DTMF_signaling>



Back to rs232	Max speeds	115,200
		From < https://www.google.com/search?q=rs232%20max%20baud >

The issue? That's over a max of around 8.5ft 115k

Dial up internet max speed 56kbs

1990's

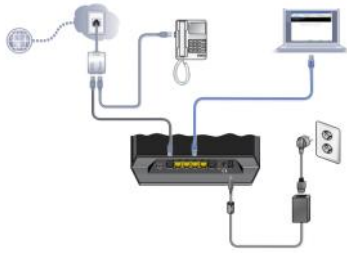
Asymmetric digital subscriber line (ADSL)

From <<https://en.wikipedia.org/wiki/ADSL>>

ADSL works by using spectrum above the band used by voice [telephone calls](#).

From <<https://en.wikipedia.org/wiki/ADSL>>





Adsl max speeds of 24Mbps i.e. over 400 times faster than dial up

To be phased out in 2027

A digression into isp's and moaning:

Fibre to cabinet sucks, also blew up a my father's computer and slow



Efficiently connecting devices

Company with office



48 1gb ethernet 4 fsp+ 10G



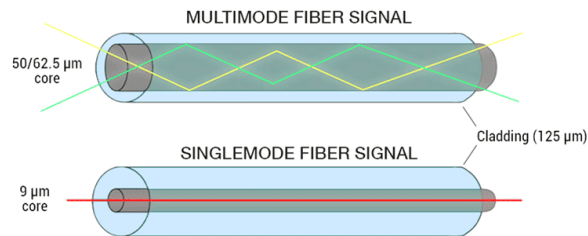
- 48 x 10G/25G SFP28 ports
- 6 x 40G/100G QSFP28 ports

From <<https://www.netxl.com/network-switches/ubiquiti-ecs-aggregation/>>

Hook up to server/internet

How does fibre work

Transceivers



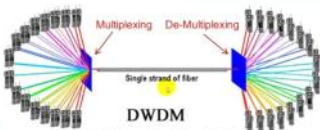
What is WDM?

Refraction through a prism



White light

WDM = Wavelength Division Multiplexing



Multiplexing De-Multiplexing

Single strand of fiber

DWDM

40 virtual high-speed channels per physical fiber
Expanding capacity of an OC-48 ring from 2.5 to 100 Gbps

WDM is used on fiber optics to increase the capacity of a single fiber



Fiber Optics For Sale Co.
CORPORATE OFFICES: (800) 555-5555

Week 1 Page 25

second using commercially available optical fibre.

From <<https://www.aston.ac.uk/latest-news/aston-university-researchers-break-world-record-again-data-transmission-speed>>

Speed isn't everything.

latency

What happens when light is too slow

Light in a fibre optic is around $2 \times 10^8 \text{ ms}^{-1}$

Due to the refractive index of glass being around 1.5

Hollow core fibre, because 186,000 miles per second is just too slow

Smol module

Thursday, 2 October 2025 13:30

(Professional contexts)

Winchester Cr. Games

Due 8th December

Write blog about the talks

- write up on the day
 - John Ukie (TIGA also exists)
 - into Games - lots of info
 - Reflect on talks and draw relevance to my own work
 - Jennie Blackwell - Portage Game Dev
 - Oliver Grogan
 - Ben Grove - Game designer + careers advice
 - Rhys Slepard - EPIC - writing tools for full guys
 - Jade Carter - Horizon zero down legs
 - Clément Glénard - Sr. game designer
 - Megan/Sofia - US 2
 - ↳ Accessibility in games
-
- entry level skills hub

- Sort LinkedIn

- Example portfolio sites

- Also reposted 2/10/25

- Business cards

- CV

- Covering Letters - tied to specific application

- Portfolio

hover.com domain buying

Card hop - digital business card

Portfolio

- easy contact details

- Clear and easy to navigate

- Quality over Quantity

- 3-5 projects

- embedded where possible