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3D-modelling

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THINK FUTURE.

3D-modelling – what, where, how?

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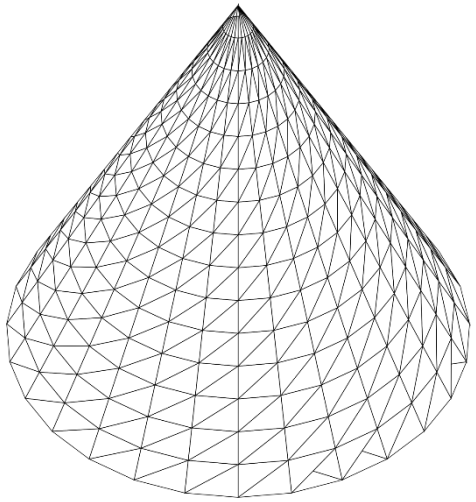
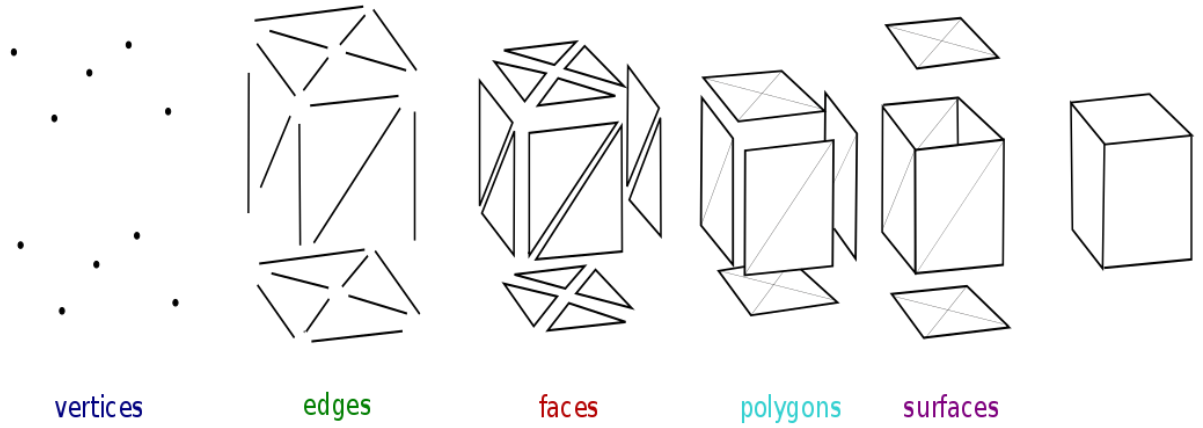
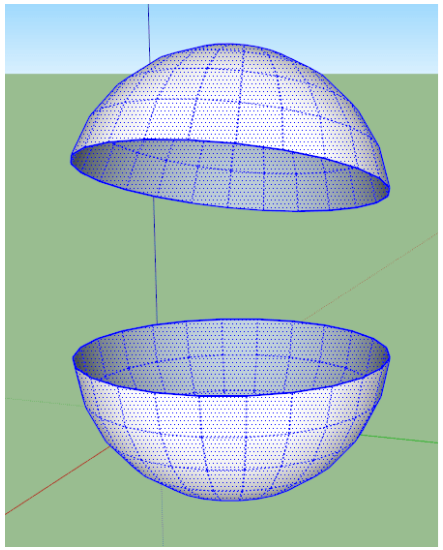
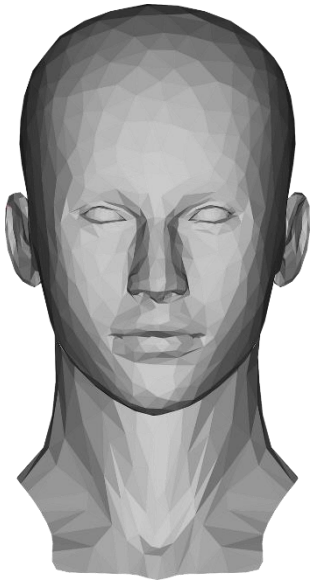
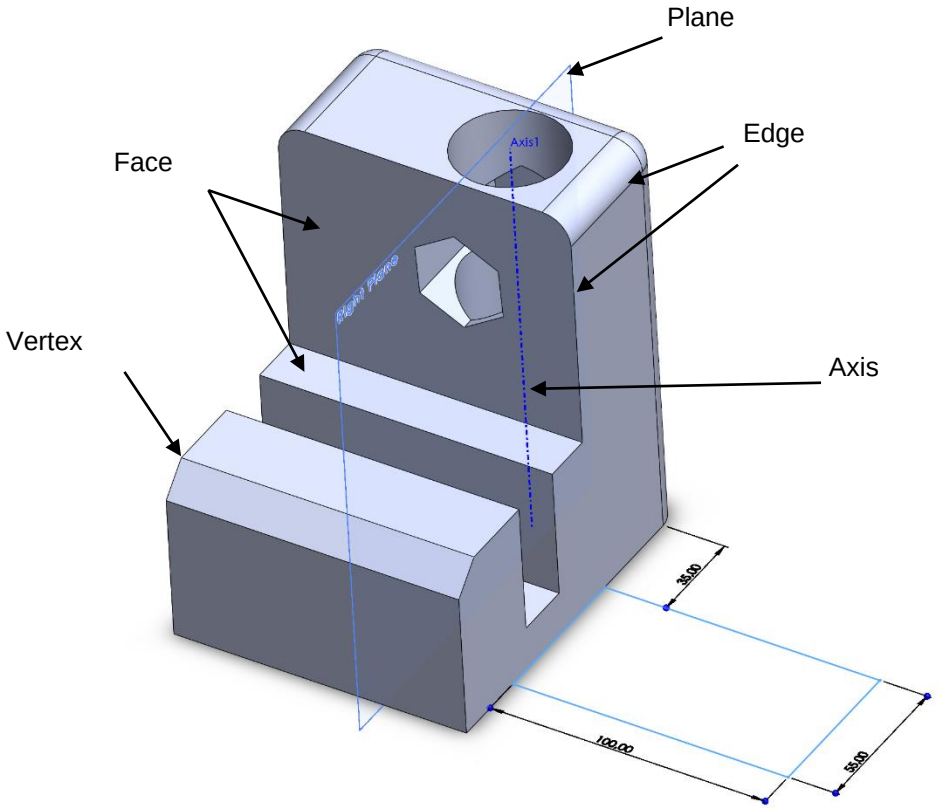
3D-modelling
WHAT?

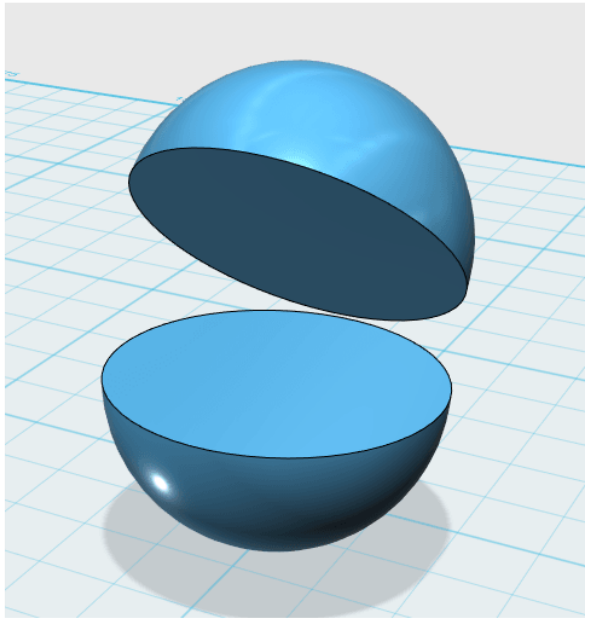












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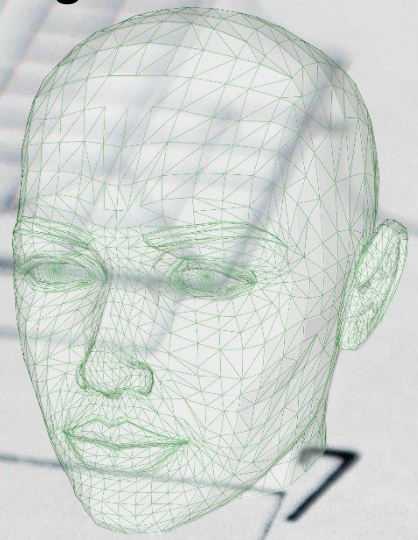
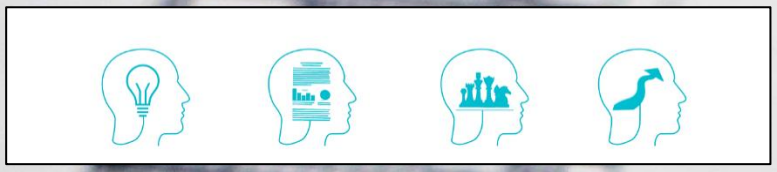
3D-modelling
WHERE?





Product design

Games

Construction

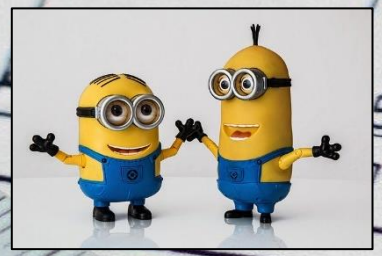
Simulations

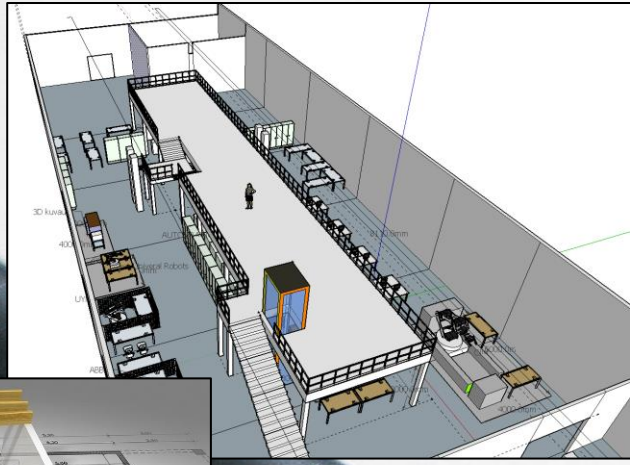
VR

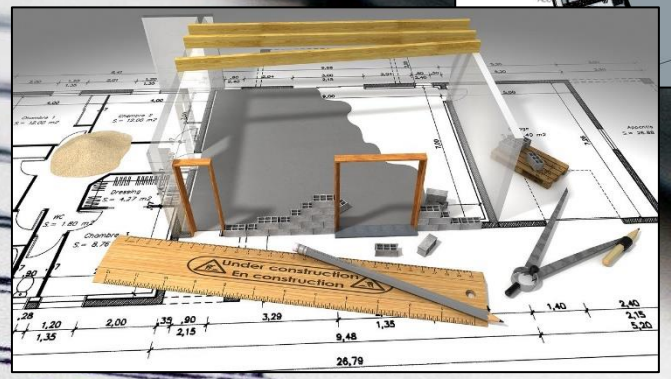
3D-printing

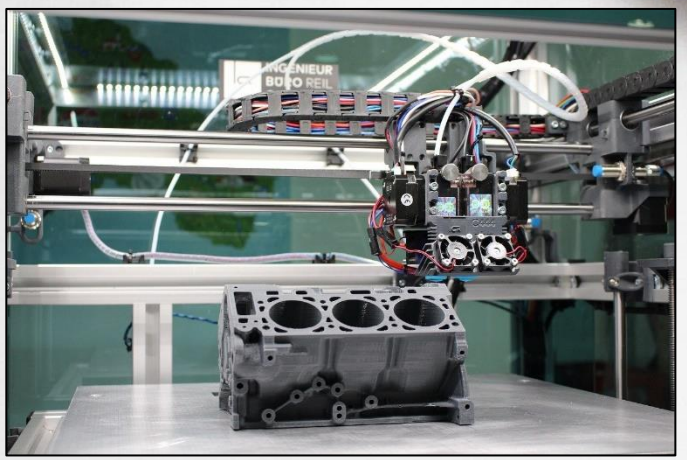
Entertainment

Marketing

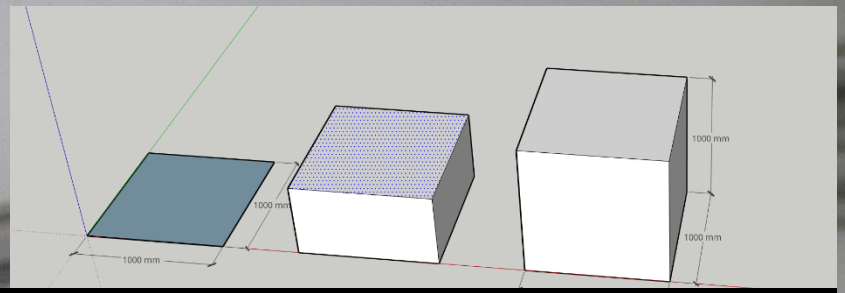




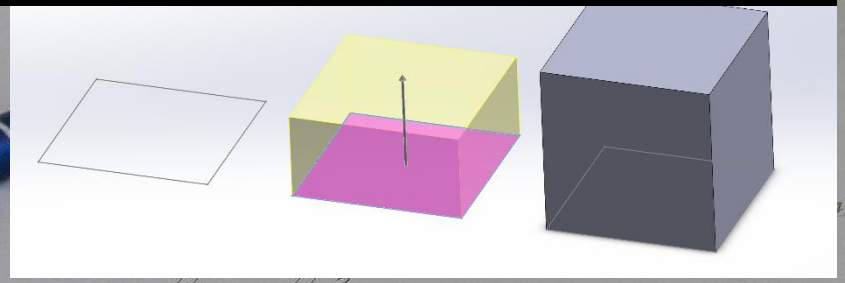


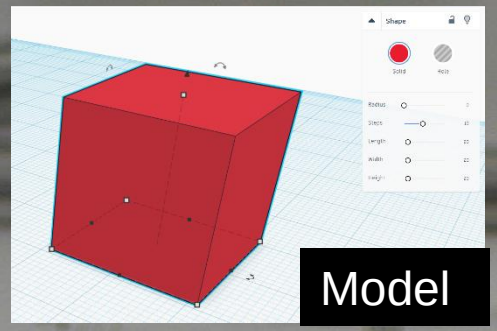


3D-modelling
HOW?

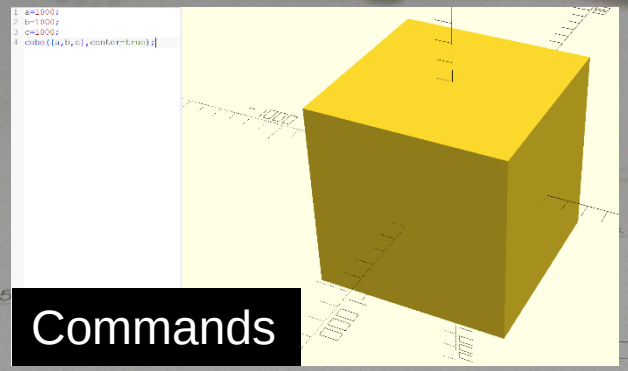


Sketching -> Dimensioning ->
Extrusion/Cutting

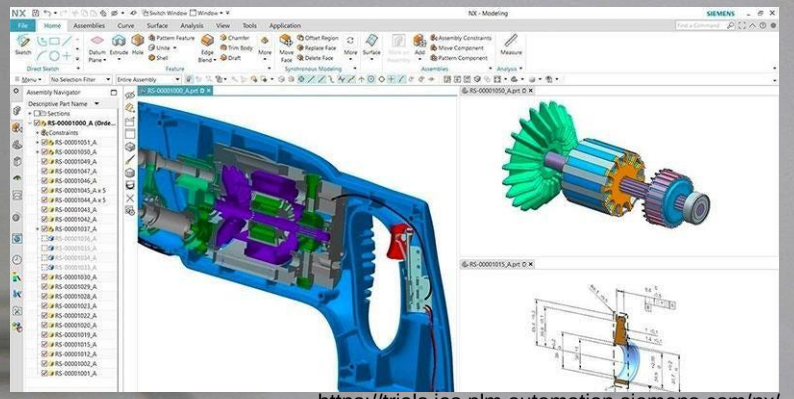




Model

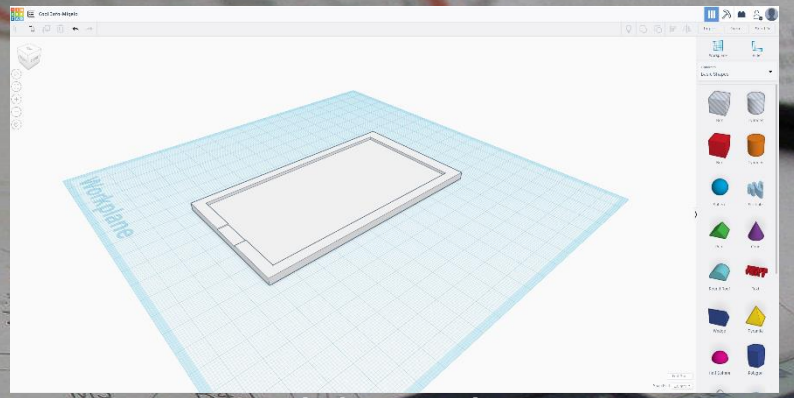


Commands



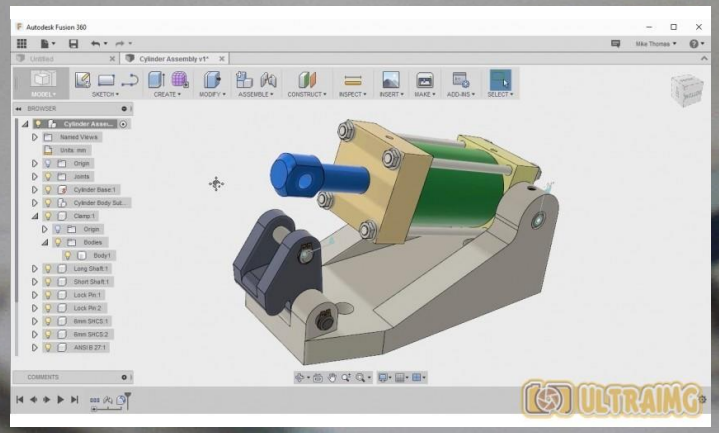
https://trials.ias.plm.automation.siemens.com/nx/

Siemens NX

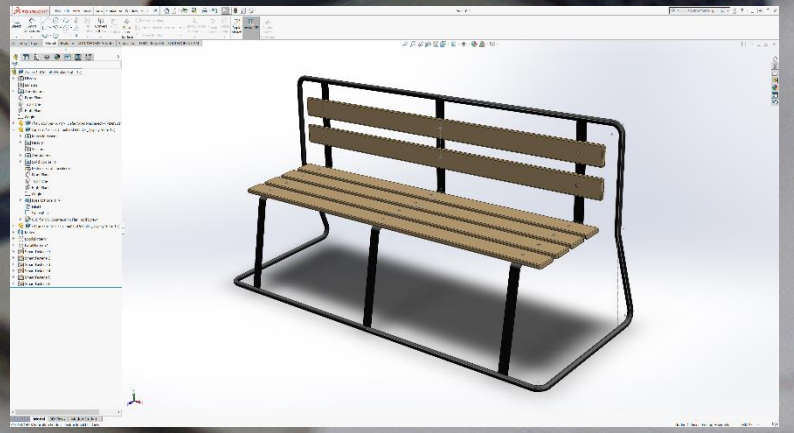


Tinkercad

SketchUp



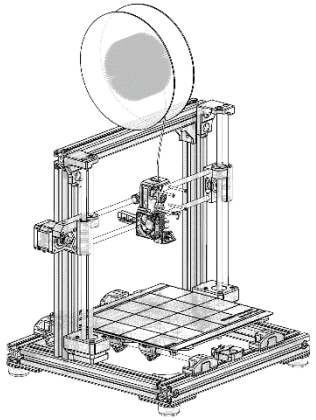
Fusion 360

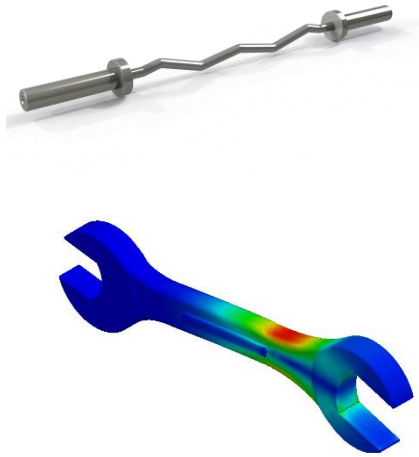


SolidWorks

SolidWorks

- 3D-modelling program which pays normally
- Free during studies
- Highly versatile
- The basics are easy to learn
- Lots of tutorials available (quality varies)





3D printing

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THINK FUTURE.

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3D printing

- 3D printing has become significantly more common in various fields and will continue to do so in the future, especially in industry, but also among consumers
- Printing can significantly reduce costs compared to outsourcing work or creating prototypes/mockups, for example, in product development
- The most common methods of plastic printing include FDM, SLS, and SLA
- Metal printing is not yet very common – the SLS method is also largely used
- All 3D printing methods are based on the same principle: the 3D model is sliced horizontally into different layers, which are printed on top of each other

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3D printing – plastic

- FDM method (Fused Deposition Modeling)
  - The plastic is extruded in layers as a thin wire, which is melted to the previous layer
  - Supporting material is required for printing (depending on the piece to be printed)
  - Often an inexpensive solution
  - Lots of different printers in different price ranges
  - Diverse filament range
    - ABS
    - PLA
    - PET
    - Nylon
    - PVA
    - Etc…

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https://www.youtube.com/watch?v=FqQAjkZOBeY

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3D printing – plastic

- SLS method (Selective Laser Sintering)
  - The plastic powder is melted with a laser beam in layers, increasing the structure
  - Printing chambers are typically small, e.g. 280 x 280 x 365 → limits the size of printable pieces
  - Can use a wide range of different materials
    - Polyamide
    - Glass-reinforced polyamide
    - Elastic plastics
    - Electrically conductive plastics

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https://www.youtube.com/watch?v=9E5MfBAV_tA

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3D printing – plastic

- SLA method (Stereolithography)
  - Photopolymers (resin) are used as a manufacturing material
  - In the printing method, the resin is poured into a substrate with a transparent base against which the printing platform descends
  - The light spot of the UV laser is focused through several mirrors on the print substrate, on the surface of which the resin hardens
  - The printing tray rises from the tray after each layer and this is repeated until the piece is finished
  - The advantages of the SLA method compared to FDM and SLS methods are that SLA is capable of good surface qualities and precise details
  - However, the SLA method is not safe without protective equipment, and in addition to the printing itself, the pieces must be post-cured in a UV chamber

https://www.youtube.com/watch?v=yW4EbCWaJHE

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Plastic printing

- Benefits
  - Enables difficult geometries
  - The complexity of the piece does not increase the cost
  - Color options
  - Lightening structures
- Constraints
  - Physical size of the piece is limited
  - Structural strength

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3D printing – metal

- Powder bed method
  - The metal powder is melted with a laser beam in layers, increasing the structure (SLS method)
  - Printing chambers are typically small, e.g. 280 x 280 x 365
  - You can use different materials, e.g.
    - Acid-proof steel
    - Aluminium alloy
    - Tool steel
    - Titanium

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https://www.youtube.com/watch?v=8uiae6jYcmU

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Metal printing

- Benefits
  - Also enables difficult shapes that have traditionally been difficult or even impossible to implement
  - Allows several parts to be combined into one part the assembly becomes part
  - Lightening structures
  - In prototyping, the price is significantly lower than when manufactured using traditional methods
  - Making changes to the prototype is easy compared to traditional manufacturing methods
- Constraints
  - When printing with modern technology, support structures are still very often required for the piece to be printed, which must be removed, for example, by machining

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https://www.youtube.com/watch?v=ZYG7B8L91CI

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https://www.youtube.com/watch?v=54o6aCVebsw

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