Student Bootcamp

A Friendly Guide for Your Fab Academy Journey

FAB ACADEMY

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GENERAL TIPS

IMPORTANT LINKS

- Fab Academy 2023
- Schedule
- Inventory
- Assessment - Nueval
- Tutorials
- Fab Academy Student Agreement
- Projects
- Programmers
- Image compression
- Video compression
- Videos of Reviews, classes, recitations

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https://fabacademy.org/2024/

The Fab Academy
2022

Schedule

Labs

Students

Presentations

Documents

Projects

Prior Years

Search:

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Schedule

Info of the class (links, tutorials...)

The Fab Academy
2022 Schedule

Jan 10- instructor boot camp
Jan 17- student boot camp, project presentations
Jan 26: principles and practices (*video*), project management (*video*)
Jan 31 *recitation*: version control (*video*)
Feb 02: computer-aided design (*video*)
Feb 09: computer-controlled cutting (*video*)
Feb 14 *recitation*: parametric+ design
Feb 16: electronics production (*video*)
Feb 23: 3D scanning and printing (*video*)
Feb 28 *recitation*: debugging
Mar 02: electronics design (*video*)
Mar 09: computer-controlled machining (*video*)
Mar 14 *recitation*: programming
Mar 16: embedded programming (*video*)
Mar 23: molding and casting (*video*)
Mar 28 *recitation*: machine building
Mar 30: output devices (*video*)
Apr 06: mechanical design, machine design (*video*)
Apr 13: break
Apr 18 *recitation*: fab ecosystem
Apr 20: input devices (*video*)
Apr 27: networking and communications (*video*)
May 02 *recitation*: education
May 04: interface and application programming (*video*)
May 11: wildcard week (*video*)
May 16 *recitation*: DEI+
May 18: applications and implications (*video*)
May 25: invention, intellectual property, and income (*video*)
May 30 *recitation*: start-ups
Jun 01: project development (*video*)
Jun 08- project presentations (08,10,13,15)
July 25- FAB17

Video of the class

Recitations: 1 every 2 weeks

Search your global time

Global lectures happen on Wednesdays at 9:00 on the US East Coast (ranging from 6:00 on the West Coast to 23:00 in Japan). Recitations happen on Mondays at the same hour, and global lab sections and regional reviews are scheduled throughout the week.

Class

Computer-Aided Design

2D design

raster

scan
GIMP BIMP pixels
Photoshop
Pixlr
MyPaint
Krita
ImageMagick GraphicsMagick Converseen encoding
Geeqie gThumb

vector

Potrace mods
Inkscape shapes Booleans clones
lodraw
Illustrator
Sketchpad
CorelDRAW
Scribus
QCAD
FreeCAD constraints
Layout

Links, tutorials, files…

3D design

types

design past, present, future
project complexity, collaboration
volume (VRep), boundary (BRep), function (FRep) representations
GUIs, scripting, hardware description languages
imperative, declarative, generative, optimization, Multidisciplinary Design Optimization

programs

SketchUp Tinkercad
Shapesmith Flood
Blender Sverchok
sculpting rendering animation
ZBrush
Rhino Grasshopper Kangaroo

Inventory

Fab Lab/Class Inventory (incomplete draft)
full inventory

Computer-Aided Design, Project Management

quantity	item	description	list unit price	extended price
Amazon				
	videoconference			
3	C920x	Logitech HD Pro Webcam, Full HD 1080p/30fps	$56.99	$170.97
1	Speak 510	Jabra Wireless Bluetooth Speaker for Softphone and Mobile Phone	$149.00	$149.00
			total	$319.97

total: $319.97

Assignments

assignment

model (raster, vector, 2D, 3D, render, animate, simulate, ...) a possible final project,
compress your images and videos,
and post a description with your design files on your class page

assignment

group assignment:

- test the design rules for your 3D printer(s)

individual assignment:

- design and 3D print an object (small, few cm^3, limited by printer time) that could not be made subtractively
- 3D scan an object (and optionally print it)

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Labs

The Fab Academy
2022

Aalto Fablab (Espoo, Finland)

AgriLab (Beauvais, France)

Al Jazri Lab (Sharjah, UAE)

Fab Lab Amsterdam - Waag (Amsterdam, Netherlands)

Fab Lab Bangalore (Bangalore, India)

Fab Lab Barcelona (Barcelona, Spain)

Fab Lab Benfica (Lisboa, Portugal)

Berytech Fab Lab (Beirut, Lebanon)

BOLD Lab Seoul (Seoul, Korea)

Fab Lab Bhutan (Thimpu, Bhutan)

C. Fabrication Laboratory (Chengdu, China)

Websites of the different Fab Labs: Student website, Group Assignments, Machine...

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Students

The Fab Academy
2022

Aalto (Espoo, Finland) → Website of the Fab Lab

- Alexander Andrew McVicker
- Matti Niinimäki

AgriLab (Beauvais, France)

- Aurore Kubica
- Christophe Chamot
- jules topart

→ Website of the students

Amsterdam - Waag (Amsterdam, Netherlands)

- Bas Pijls
- Benjamin Doerig
- Bente van Bourgondiën
- Joany Beer
- Jonathan Blok
- Paola Zanchetta Muñoz
- Saco Heijboer
- Sander Blom

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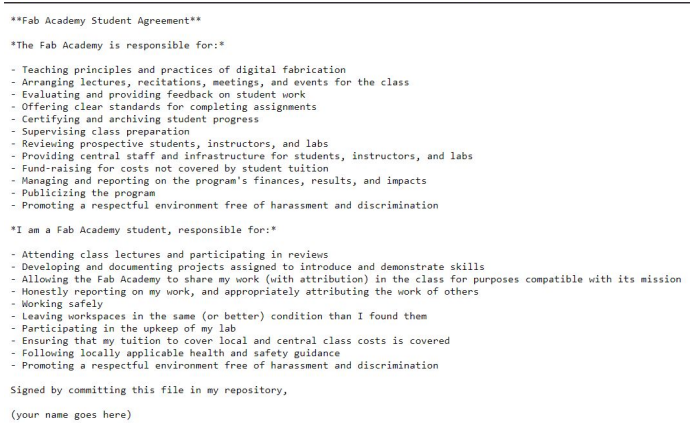
Documents

Assessment

Tutorials

Agreements: labs instructors students

Tutorials created by Fab Academy instructors/students



```
**Fab Academy Student Agreement**

*The Fab Academy is responsible for:*

- Teaching principles and practices of digital fabrication
- Arranging lectures, recitations, meetings, and events for the class
- Evaluating and providing feedback on student work
- Offering clear standards for completing assignments
- Certifying and archiving student progress
- Supervising class preparation
- Reviewing prospective students, instructors, and labs
- Providing central staff and infrastructure for students, instructors, and labs
- Fund-raising for costs not covered by student tuition
- Managing and reporting on the program's finances, results, and impacts
- Publicizing the program
- Promoting a respectful environment free of harassment and discrimination

*I am a Fab Academy student, responsible for:*

- Attending class lectures and participating in reviews
- Developing and documenting projects assigned to introduce and demonstrate skills
- Allowing the Fab Academy to share my work (with attribution) in the class for purposes compatible with its mission
- Honestly reporting on my work, and appropriately attributing the work of others
- Working safely
- Leaving workspaces in the same (or better) condition than I found them
- Participating in the upkeep of my lab
- Ensuring that my tuition to cover local and central class costs is covered
- Following locally applicable health and safety guidance
- Promoting a respectful environment free of harassment and discrimination

Signed by committing this file in my repository,

(your name goes here)
```

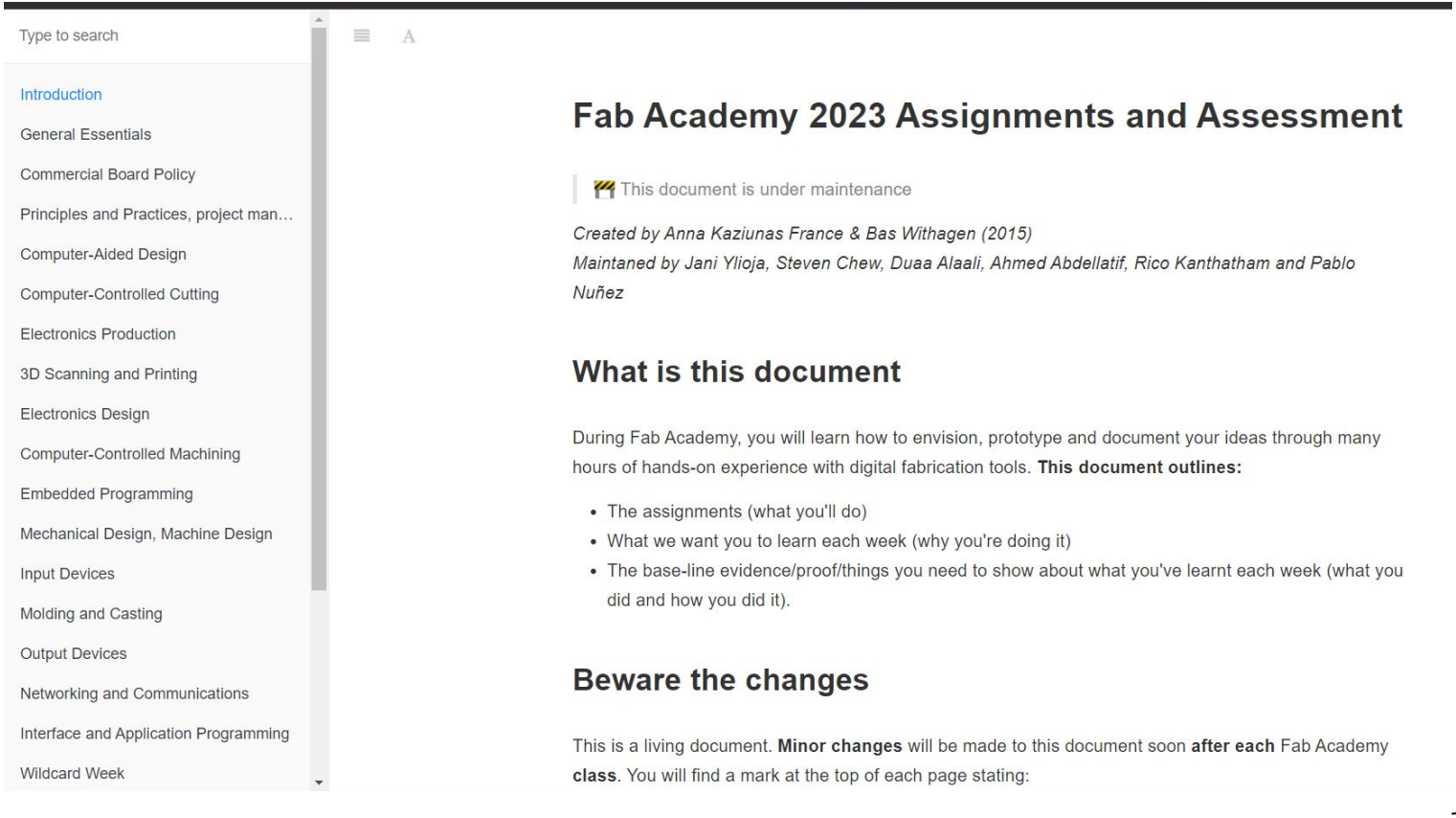
Fab Academy 2022 Documents

- The assignments (what you'll do)
- What we want you to learn each week (why you're doing it)
- The base-line evidence/proof/things you need to show about what you've learnt each week (what you did and how you did it).

CRITERIA FOR NUEVAL

You should **read it**, and **upload a copy signed** to your repo.

Assessment



CRITERIA FOR YOUR EVALUATION: **NUEVAL**

You have a section for each assignment

https://fabacademy.org/2024/

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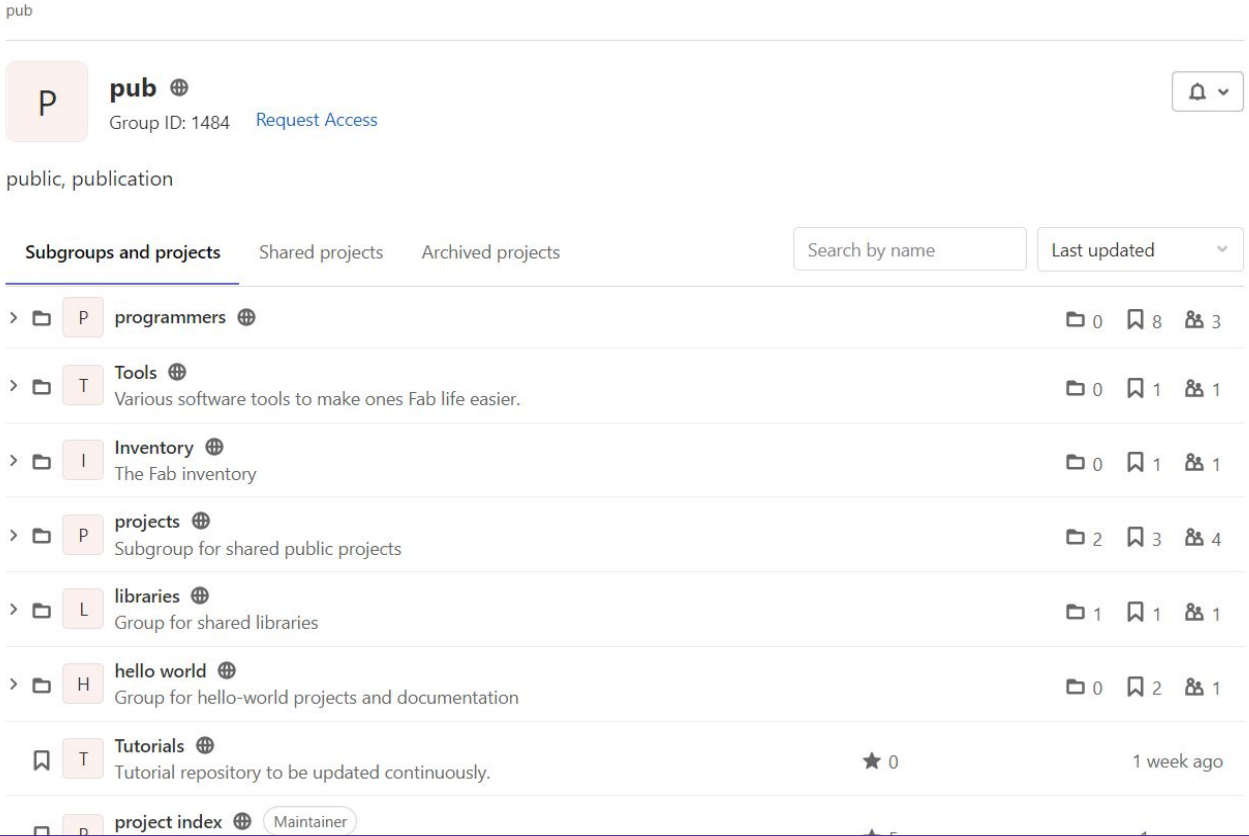
Projects



You will find the new programmers, libraries, hello world, Resources…

https://fabacademy.org/2024/

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Prior Years

The Fab Academy
2022

Prior Years

- 2021
- 2020
- 2019
- 2018
- 2017
- 2016
- 2015
- 2014
- 2013
- 2012

You can find other students from other years, projects... all the documentation from past years.

https://fabacademy.org/2024/

The Fab Academy
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Search:

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Search tool for any project, tool, machine, student... It's super powerful.

Vimeo: Videos

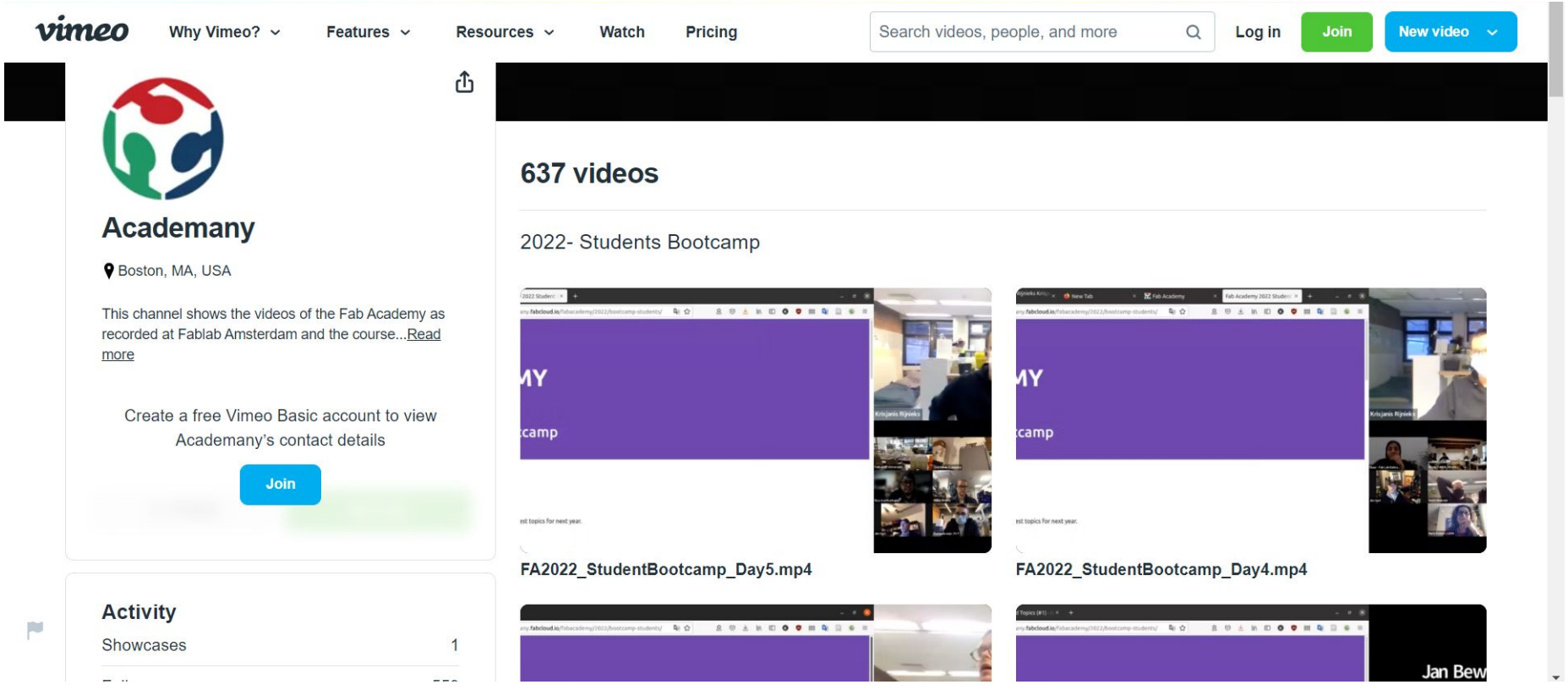


Image compression

GIMP
- compress
- resize
- batch

ImageMagick

list formats:
```
convert -list format
JPG: compressed
PNG: uncompressed
```
convert PNG to JPG:
```
convert input.png output.jpg
```
convert all PNGs to JPGs:
```
mogrify -format jpg *.png
```
convert SVG to PNG at 1000 DPI:
```
convert -density 1000 -units PixelsPerInch input.svg output.png
```
compress JPG to quality 50% width 1000:
```
convert input.jpg -quality 50% -resize 1000 output.jpg
```
compress all JPGs to quality 50% width 1000:
```
mogrify -quality 50% -resize 1000 *.jpg
```

Video compression

HTML5 MP4 ffmpeg encoding

variable bit rate 1080p MP3:

```
ffmpeg -i input_video -vcodec libx264 -crf 25 -preset medium -vf scale=-2:1080 -acodec libmp3lame -q:a 4 -ar 48000 -ac 2 output_video.mp4
```

fixed bit rate 1080p MP2:

```
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -vf scale=-2:1080 -acodec mp2 -b:a 256k -ar 48000 -ac 2 output_video.mp4
```

no audio:

```
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -vf scale=-2:1080 -an output_video.mp4
```

crop size (width:height:xoffset:yoffset):

```
ffmpeg -i input_video -vf crop=1500:800:200:100 -vcodec libx264 -b:v 1000k -an output_video.mp4
```

trim time (-ss start time, -t duration):

```
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -an -ss 00:00:10 -t 00:00:10 output_video.mp4
```

mix audio and video:

```
ffmpeg -i input_video -vcodec libx264 -b:v 1000k -vf crop=1120:876:0:100 -i input_audio -acodec mp2 -b:a 256k -ar 48000 -ac 2 -ss 00:00:20 -t 00:00:20 output_video.mp4
```

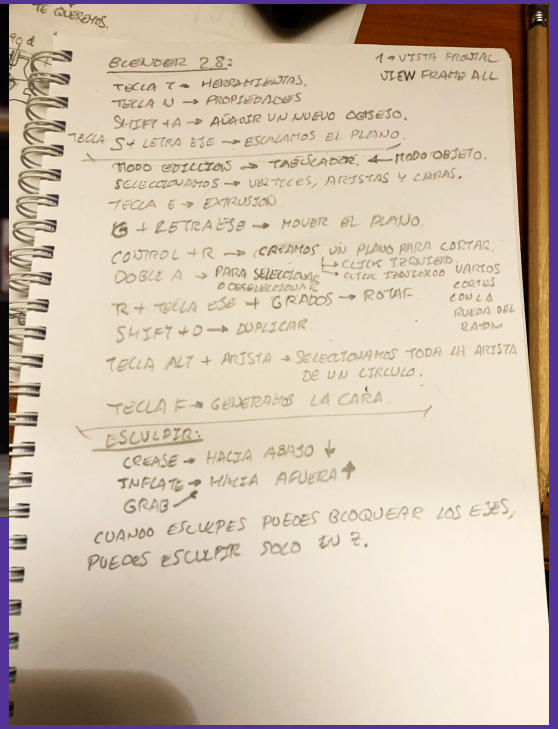
crop, pan, composite:

```
ffmpeg -i input_video_1 -i input_video_2 -filter_complex '[1:v]crop=175:95:930:860[cropout];[cropout]scale=350:190[scaleout];[0:v][scaleout]overlay=10:10[outv]' -map '[outv]' -vcodec libx264 -b:v 1000k -map 0:a
```

numbered images to video:

```
ffmpeg -r 30 -i %04d.jpg -vcodec libx264 -b:v 1000k -vf scale=-2:1080 -an output_video.mp4
```

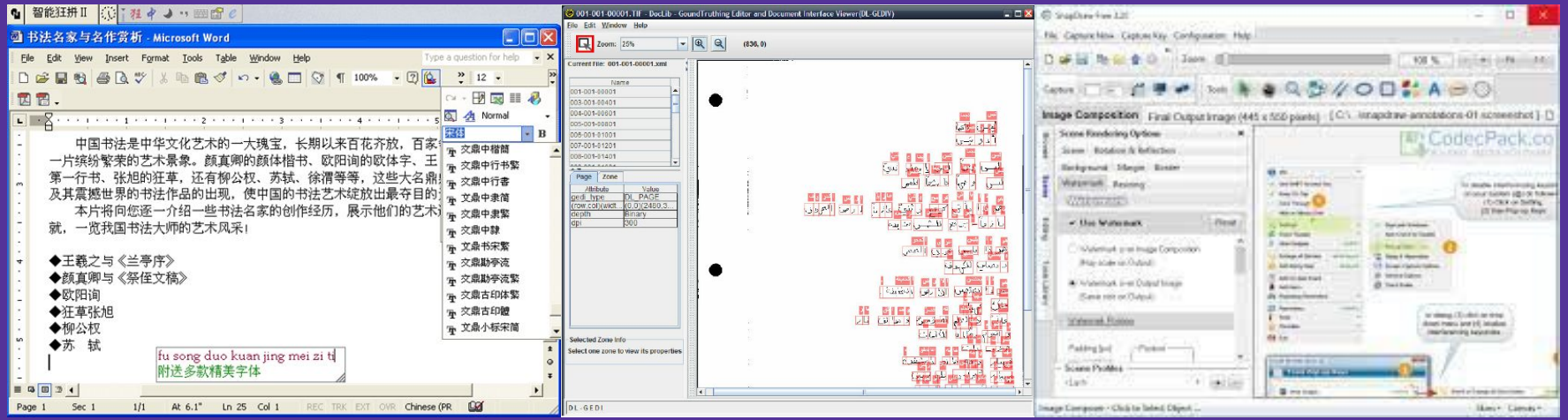
Keep and Write Notes In A Small **Notebook**



Youtube: Surviving Fab Academy

- **Fast. Convenient. Better for memory recall**
- Supplement to digital documentation
- Document as you go
- Quick sketches

English for Documentation…Please



General Recommendation: Switch Software to English for documentation.
If not possible, clarify images with detailed English explanations describing the procedural steps you made.

English is the communication standard for Fab Academy…and required for Global Evaluation.

The Assessment Book

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¿Whats is this document for?

The Assessment Book

- The assignments (what you'll do)
- What we want you to learn each week (why you're doing it)
- The base-line evidence/proof/things you need to show about what you've learnt each week (what you did and how you did it).

https://fabacademy.org/2024/nueval/

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NUEVAL

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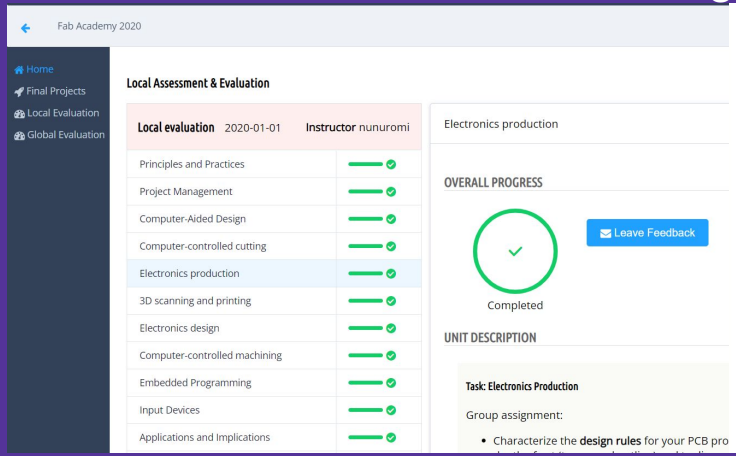
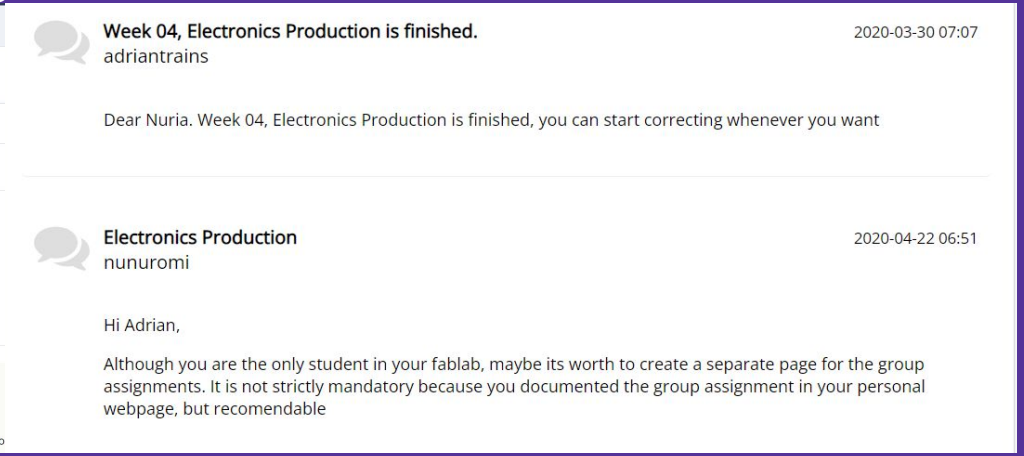
Communicate…to Make Progress

It's a tool for all the people involved in the Fab Academy learning environment: Student, Local instructor and Global Evaluator. The only way to keep tracking of the learning path.

- Give feedback to both your **local** evaluator as well as your **global** evaluator.
- Work with evaluators toward graduation success!





A

How to make (almost) good photos and video

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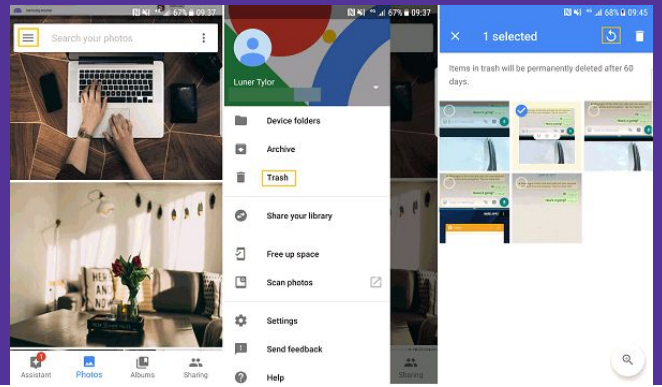
Prepare you **camera**, **smartphone** and your **computer**

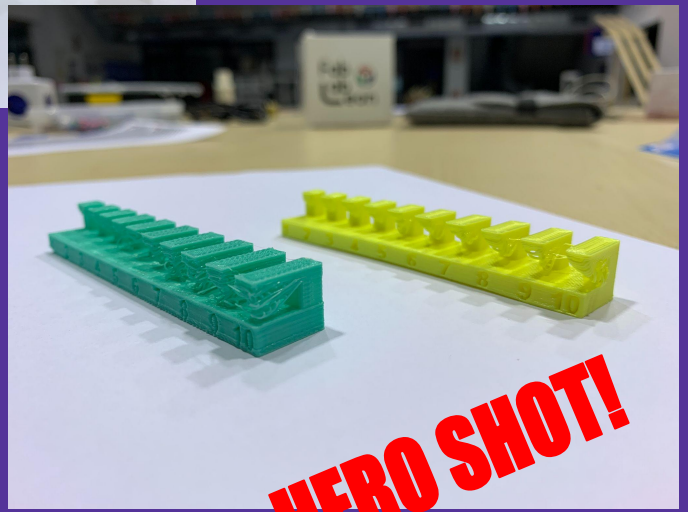
- **Smaller Image Size**
  - Open the **Camera** app on your device
  - Tap on the **Settings** icon which should look like gear as always
  - Select **Picture Quality**
  - Choose a reasonable image **File Size** > 1MB



- Compress **Photo** size -> **Image Magick**
- Compress **Video** size -> **FFMPEG**

- **Canva**
  - Templates.
  - Compress image
  - Video editing

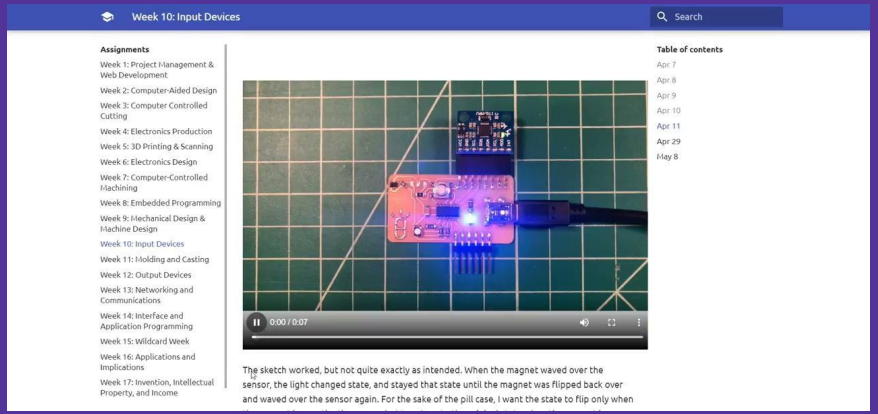
One Good Photo is Worth 1000 Words



- Good light. Good focus. Horizontal.
- YOU making things

Save Videos In the Repository

- Horizontal
- Short
- No watermark



Time Management

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Time Management: The Weekly Marathon

R

Wednesday
- *Neil Class Materials

Friday
- *Group Assignment Work
- *Individual Assignment Work

Sunday
- Final Assignment Work
- Documentation

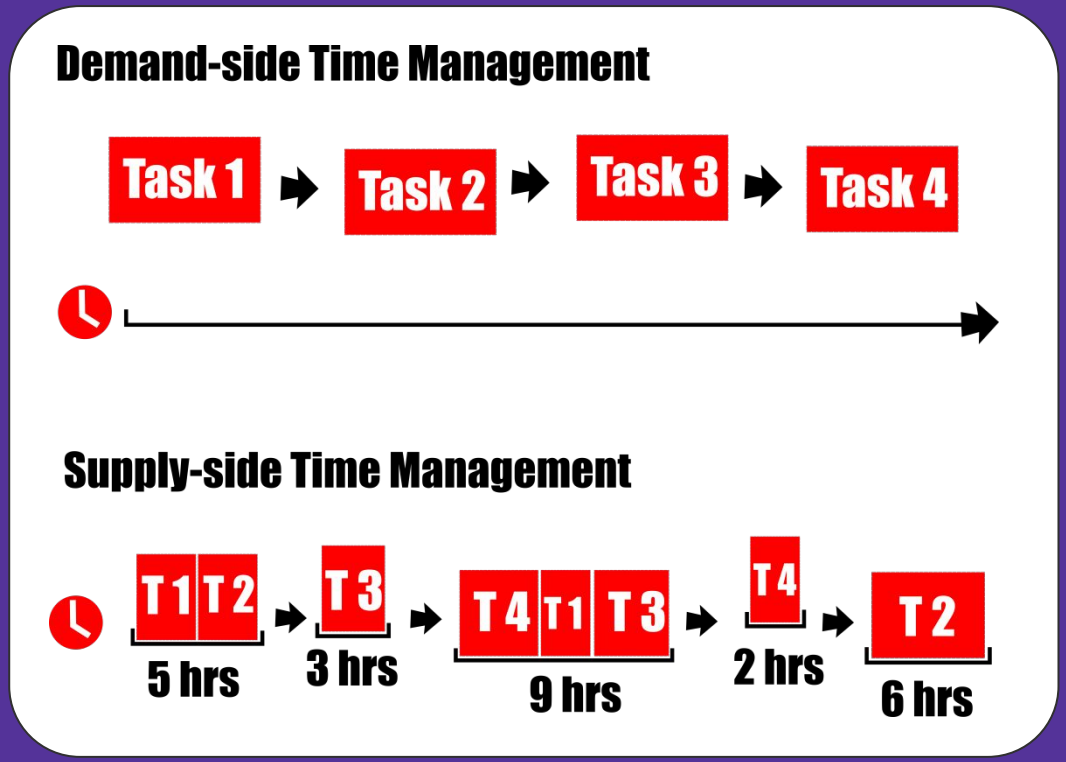
Tuesday
- Regional Review
- Finalize Weekly Documentation

Thursday
- *Local Review with your instructor
- Research
- *Design work

Saturday
- *Individual Assignment work
- Documentation
- > Global Open Time

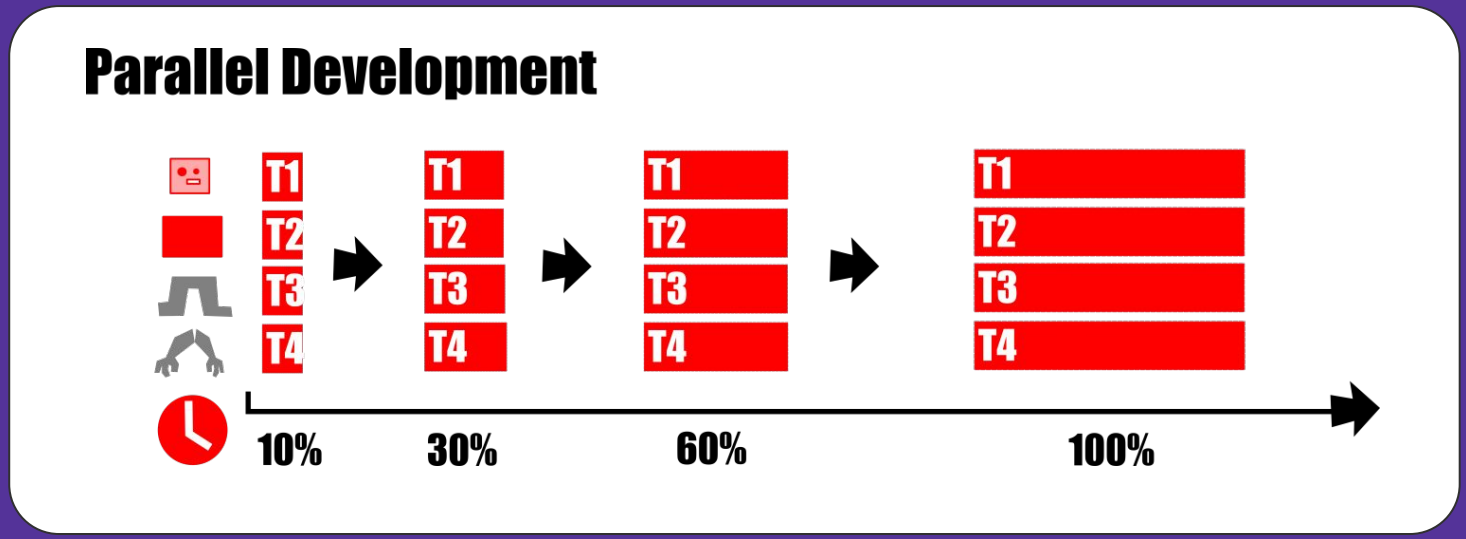
Monday
- *Recitation
- Local Review

Parse Your **Available Work Time**



- Use **Supply-Side** not Demand-Side
- Assess available **time…not tasks**
- Fit tasks into available time

Parallel not Series



- Progress **all tasks** at a **parallel pace**
- Don’t finish one before starting the next task

Global Open Time

Friendly Guides for Your Fab Academy Journey

Pablo Nuñez
Rico Kanthatham
Adrián Torres

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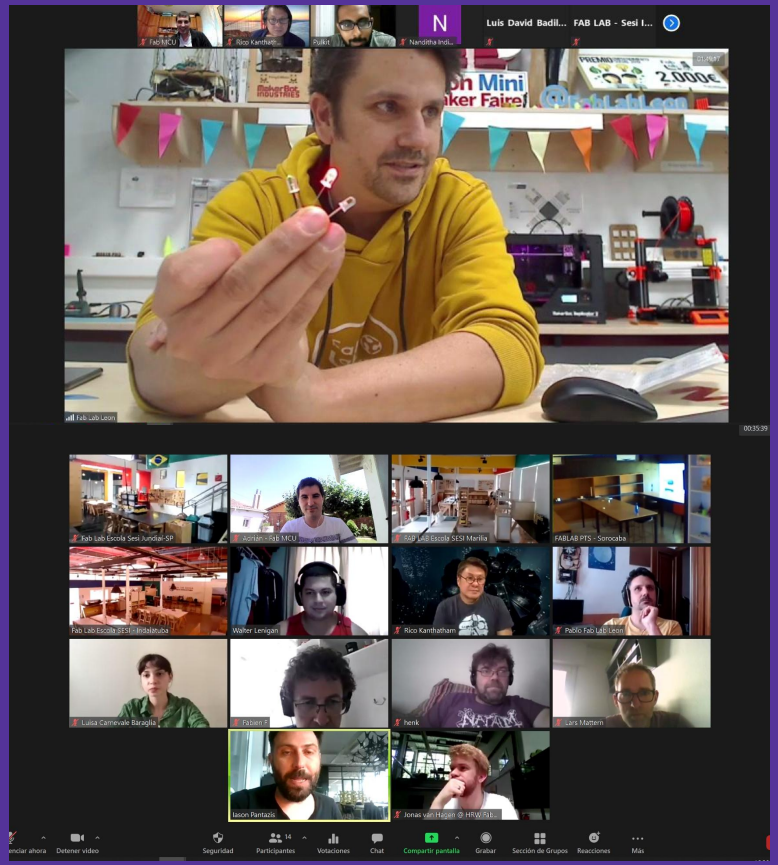
You Are Not Alone.

Where everybody knows your name...

and your face :)

What is Global Open Time?



10:00AM - 12:00AM EDT Saturday Zoom MCU Room

- Get together with **friends**...in a **fun** place
- **Discuss questions and concerns**...find answers...most of the time :)
- Seek advice to **focus and redirect** assignments or Final Project

Enjoy every moment of your Fab Academy journey...
We are here for you.

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FINAL PROJECT

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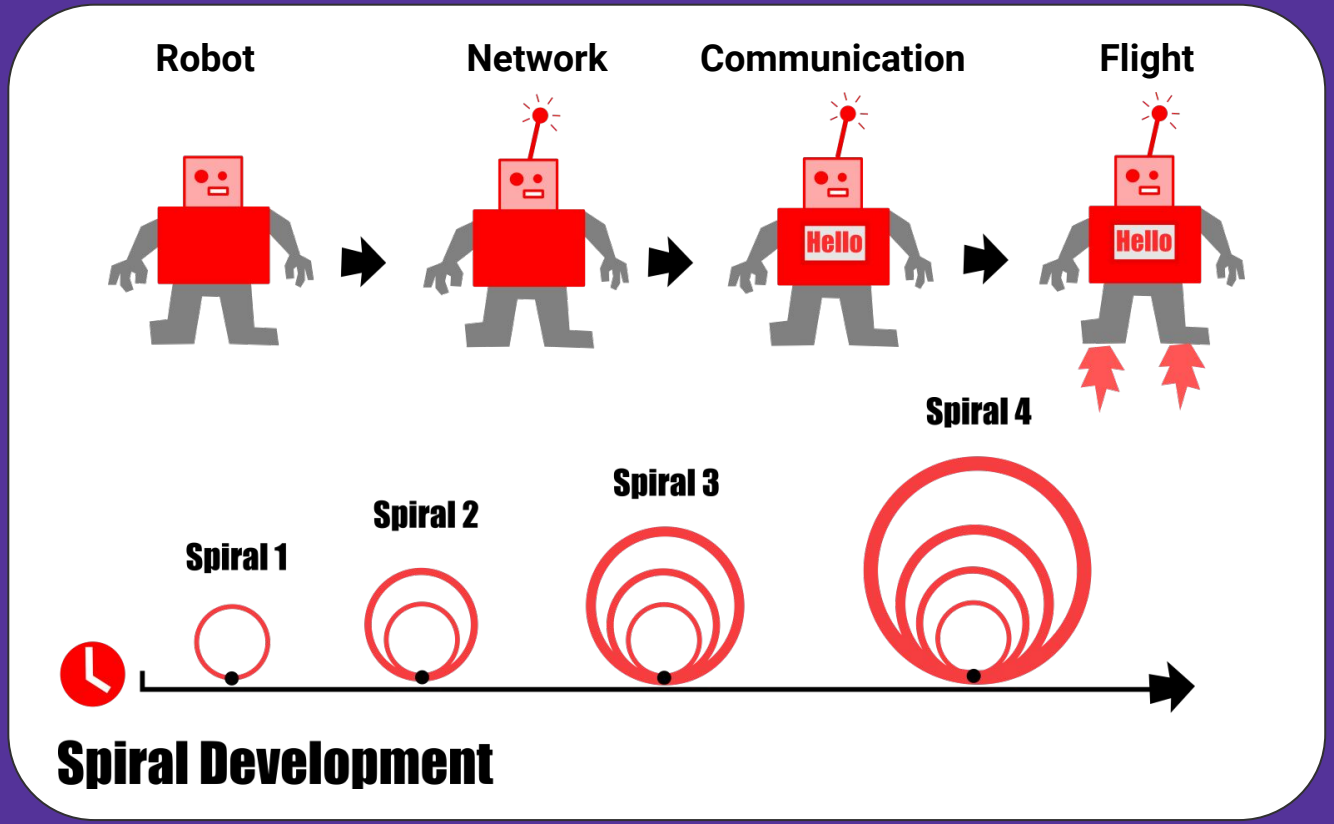
Fab Academy Final Project Requirements

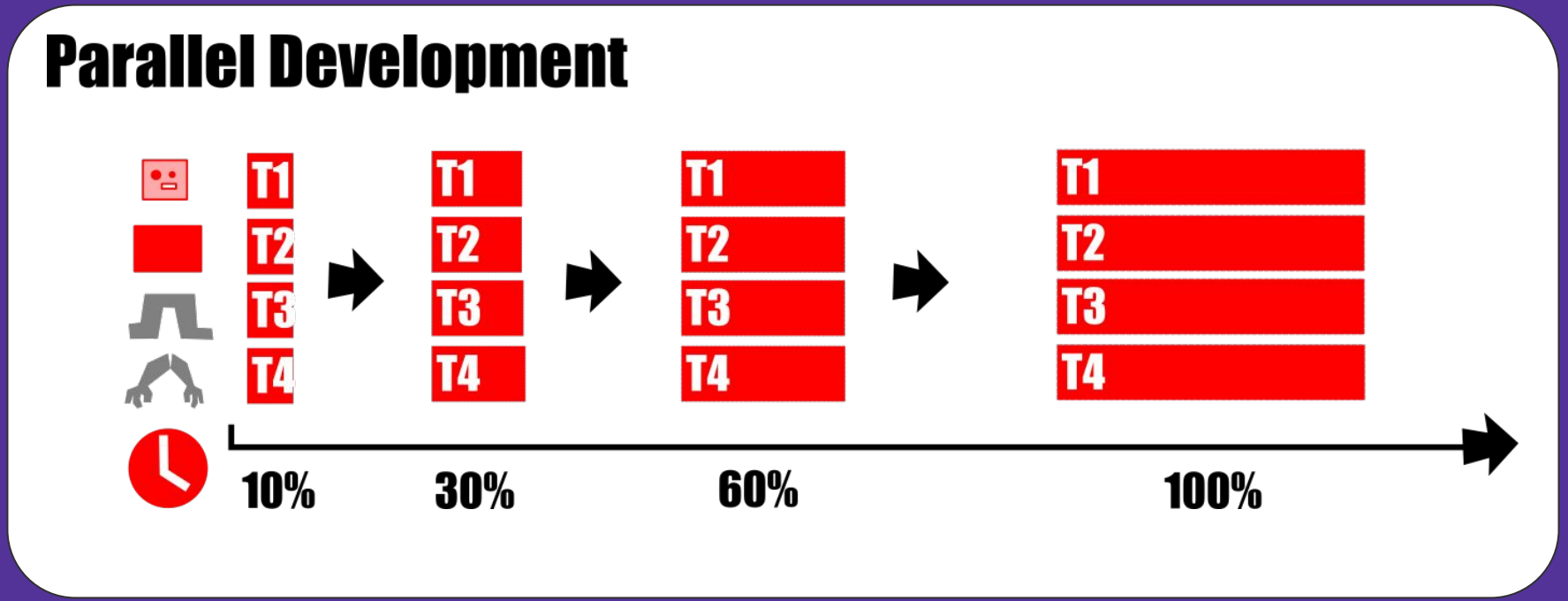
- Incorporate 2D and 3D design
- Additive and subtractive fabrication processes.
- Electronics design and production
- Embedded microcontroller design, interfacing and programming
- System integration and packaging

Align your personal goals with the final projects requirements.
Motivation >> Success.

Make Complete Incremental Project Versions



Complete Sub-Systems In Parallel



Final project: The Good, the Bad and the Ugly

THE GOOD ONE

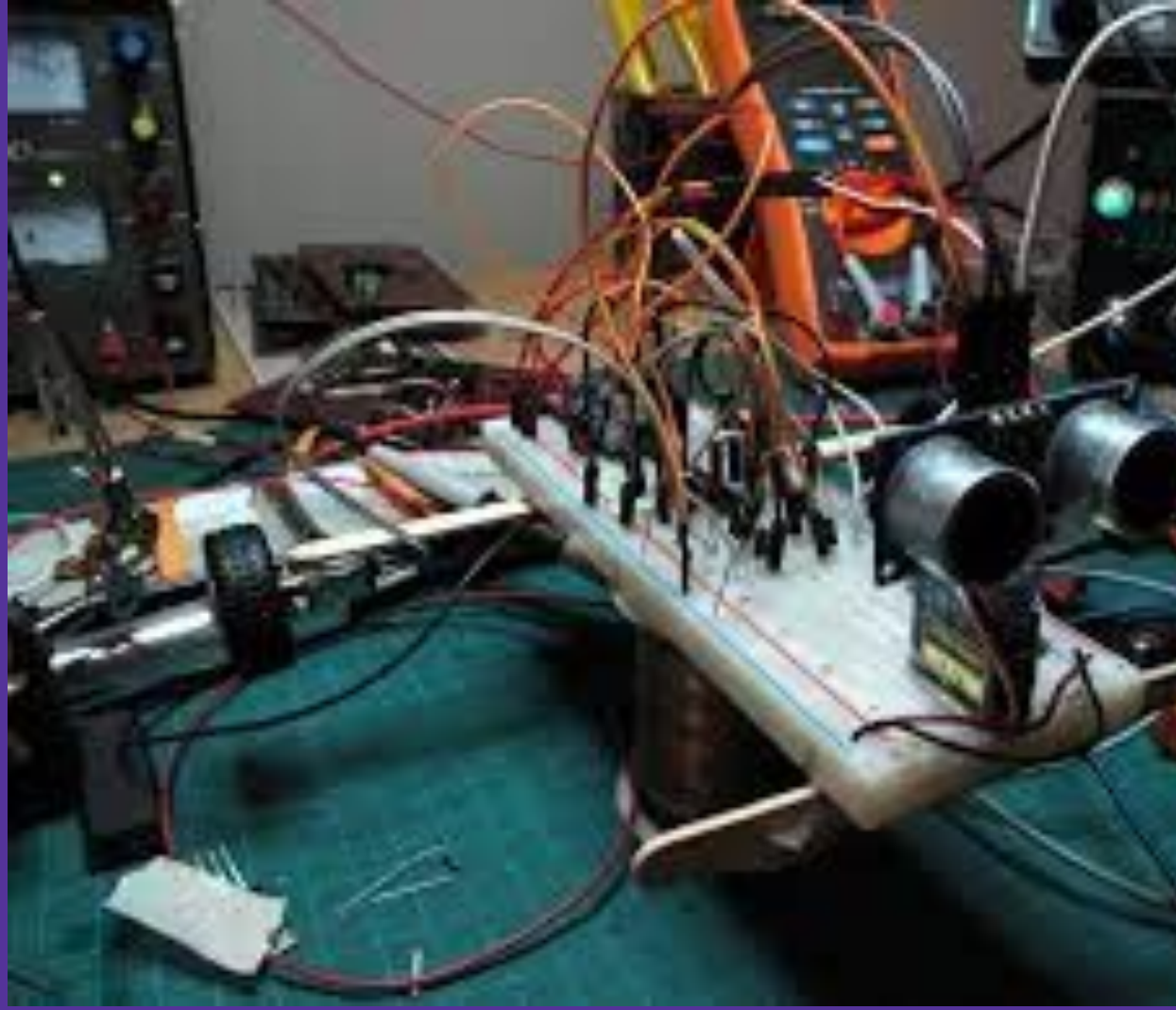
- Simple (KISS)
- Clear Purpose (its clear what should do)
- Nice Designed (not a box)

…it's your objective.

THE BAD ONE

- Complex
- Unclear Purpose
- Awkward Design

…but it still does what it's supposed to do.



THE UGLY ONE

- Doesn’t Work
- Doesn’t Meet Requirements
- Hard to watch

…it does not show your mastery in anything