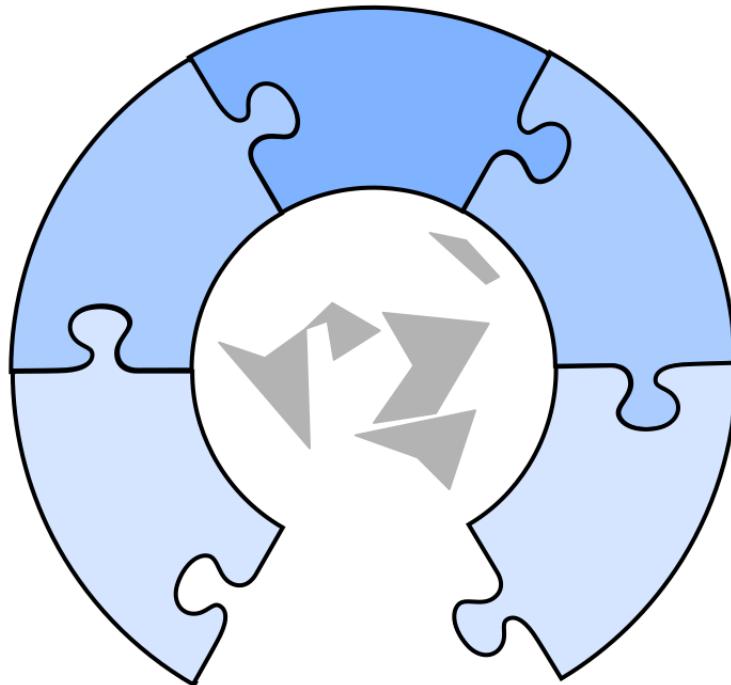


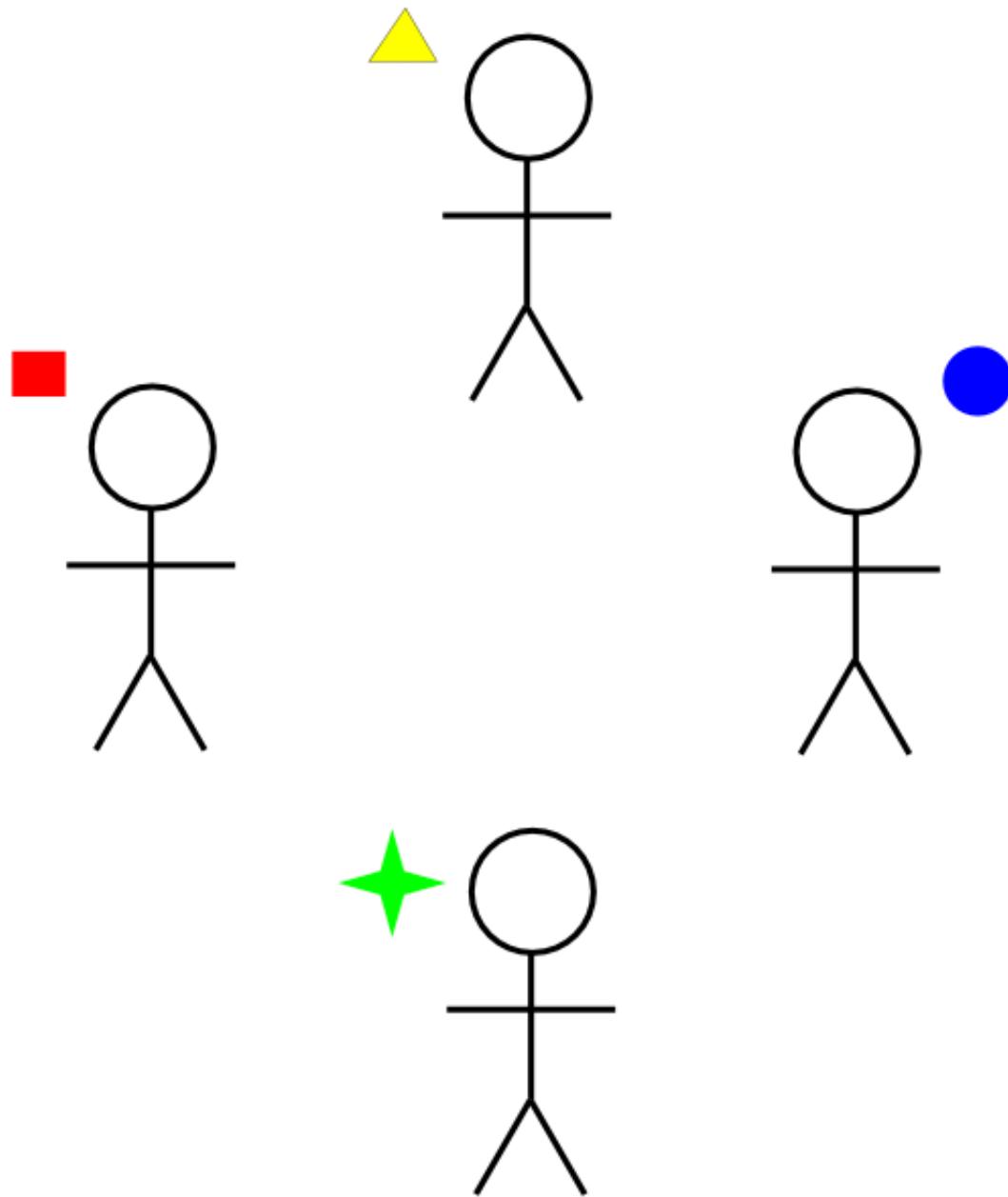
# Nosotros compartimos

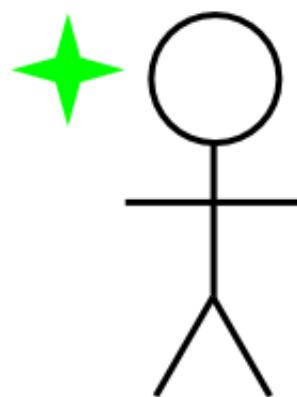
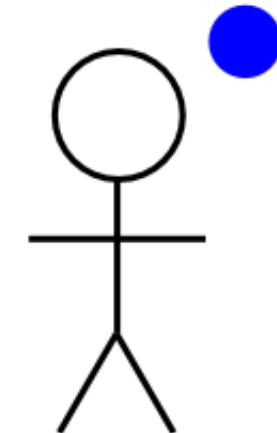
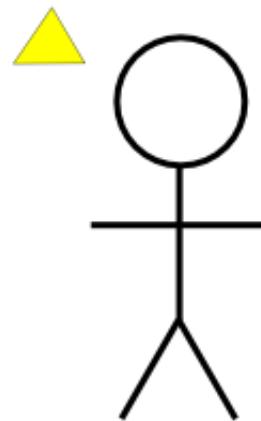
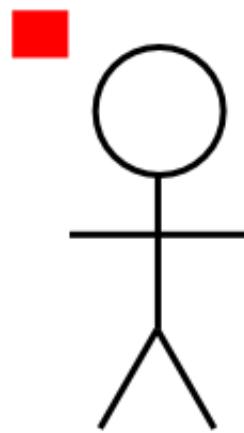


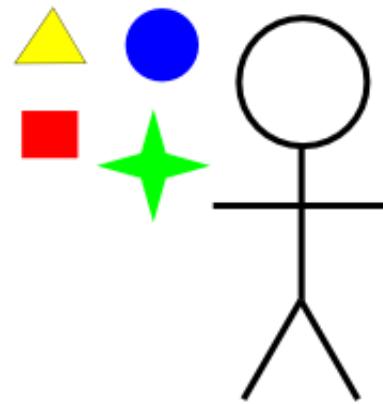
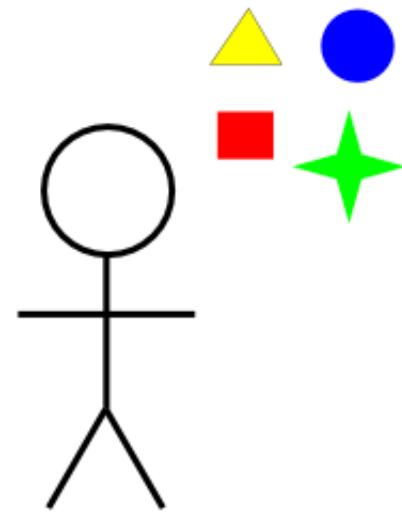
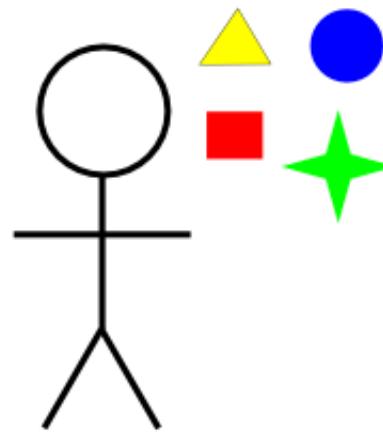
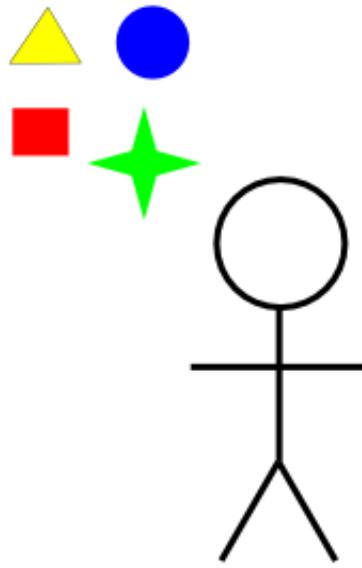
Juan González Gómez (Obijuan)

<https://github.com/Obijuan>

**Compartir es importante**

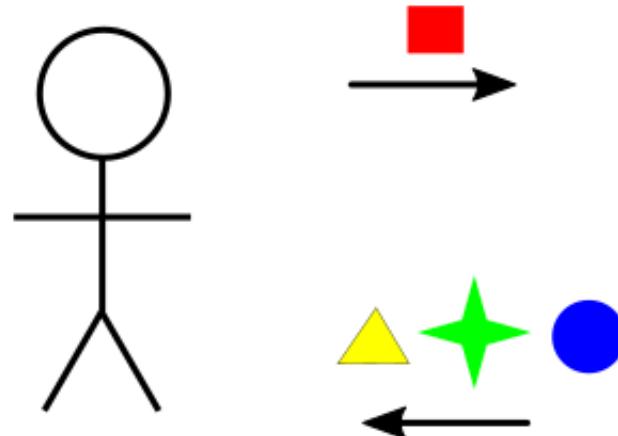






# Balance siempre positivo

Das

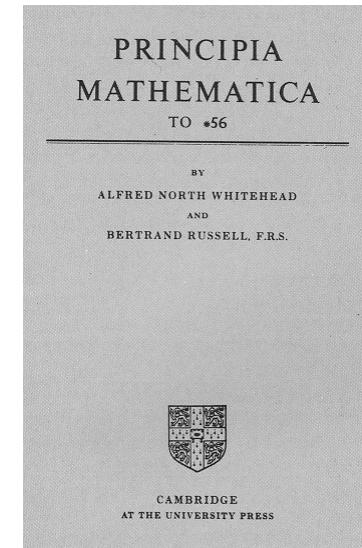


Recibes

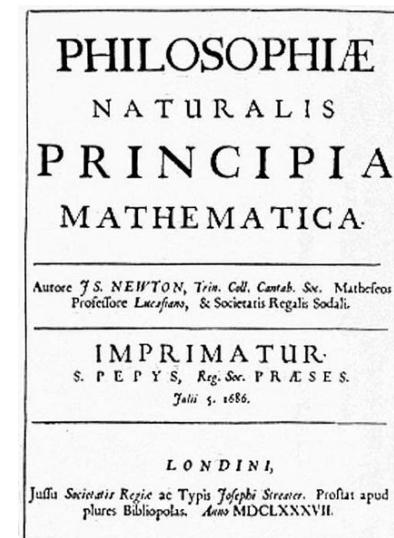
En las comunidades recibes  
siempre más de lo que das

# ¡Es el Modelo de la ciencia!

- **Funciona.** Se crea conocimiento nuevo
- Está asentado. Se lleva probando muchos siglos
- **Comunidad científica:** comunidad global de investigadores
- Comunidad no jerárquica
- Todos pueden aportar
- Derecho a crítica, a reproducir o rebatir experimentos
- Obligación de citar trabajos previos
- Obligación de **Publicar.**



## Conocimiento abierto y para todos



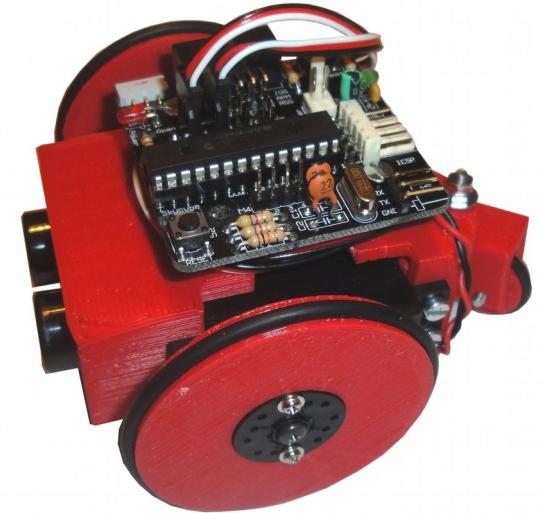
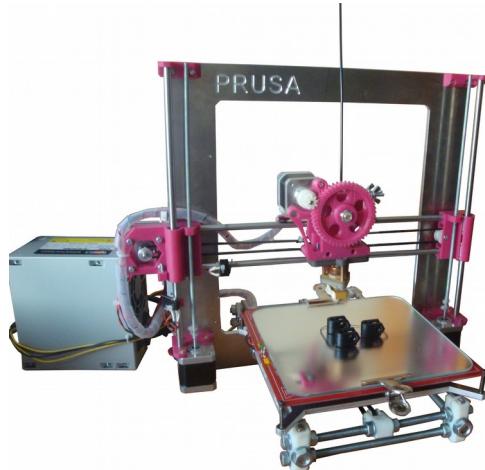
# TECNOLOGÍA



- Aplica los conocimientos
- Construcción de “aparatos”

**El conocimiento se oculta**

# Un maker es lo contrario

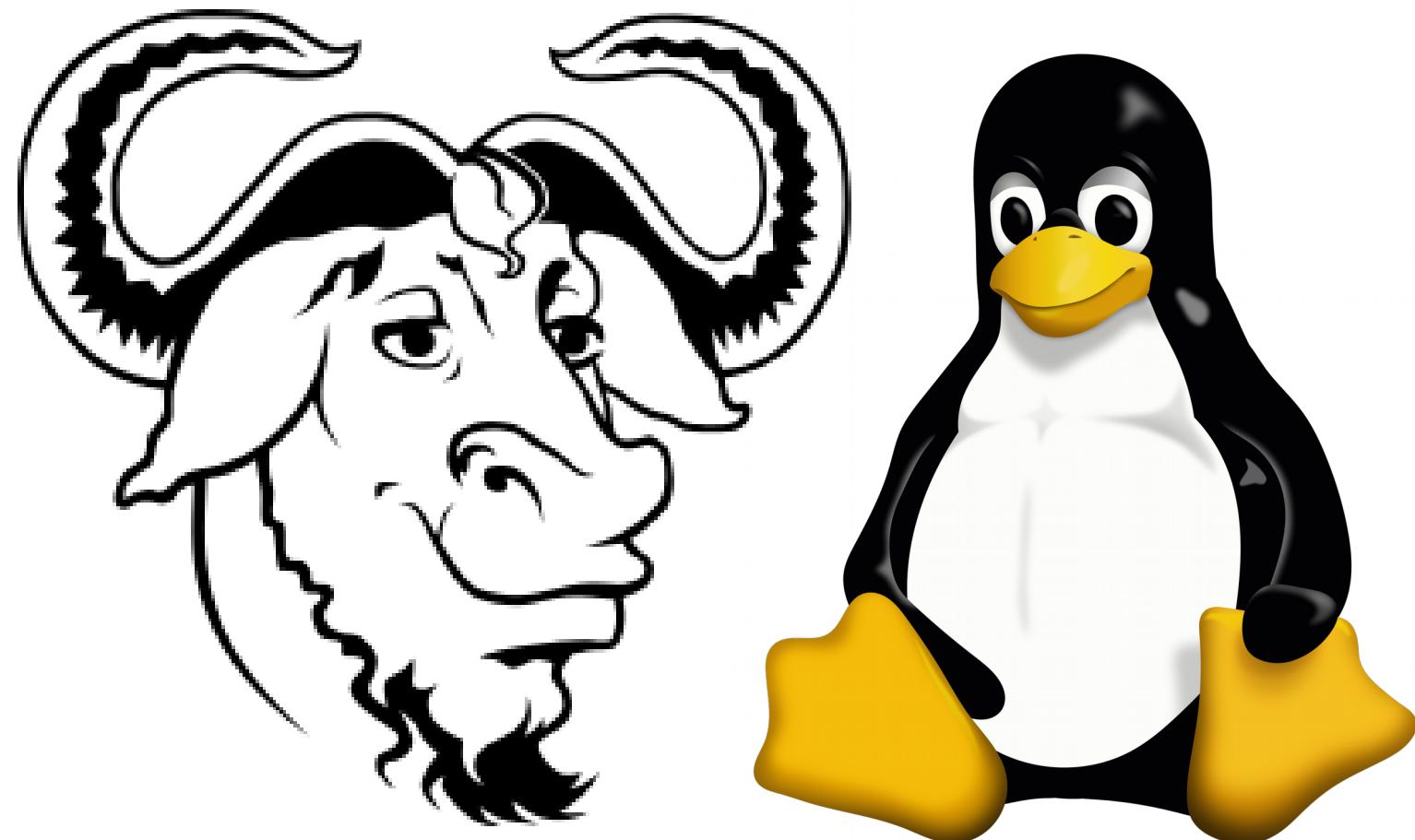


- Necesitamos ver las tripas
- Para aprender
- Para comprender
- Para crear cosas nuevas a partir de ellas
- No nos queremos limitar a comprar y usar

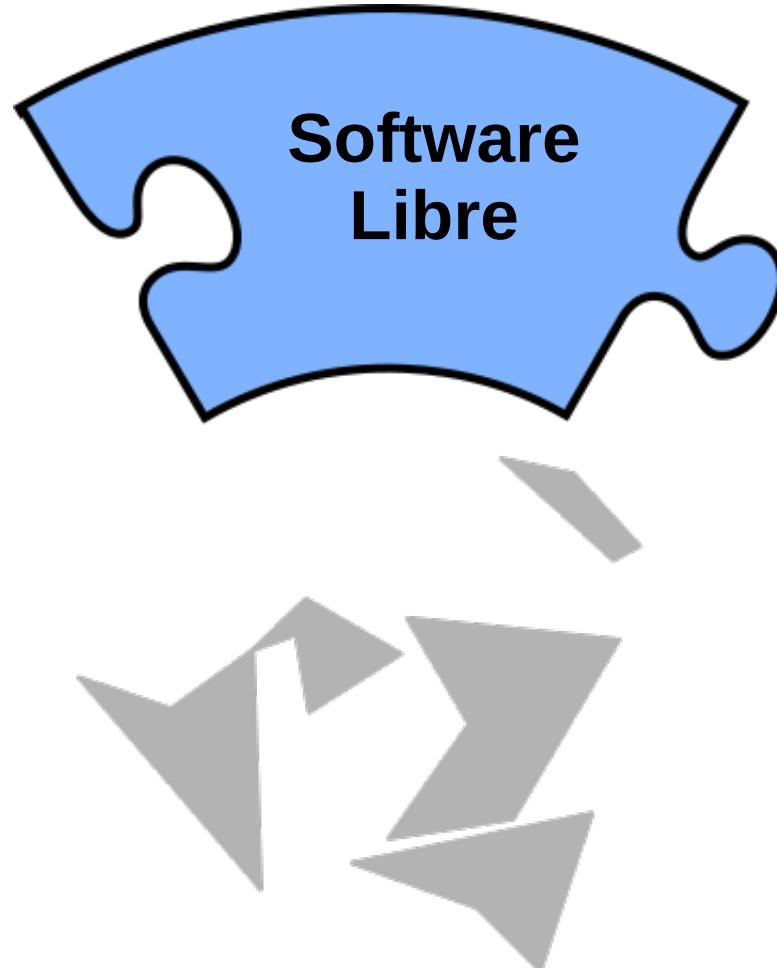
# Frustración



# **Software Libre (1985)**

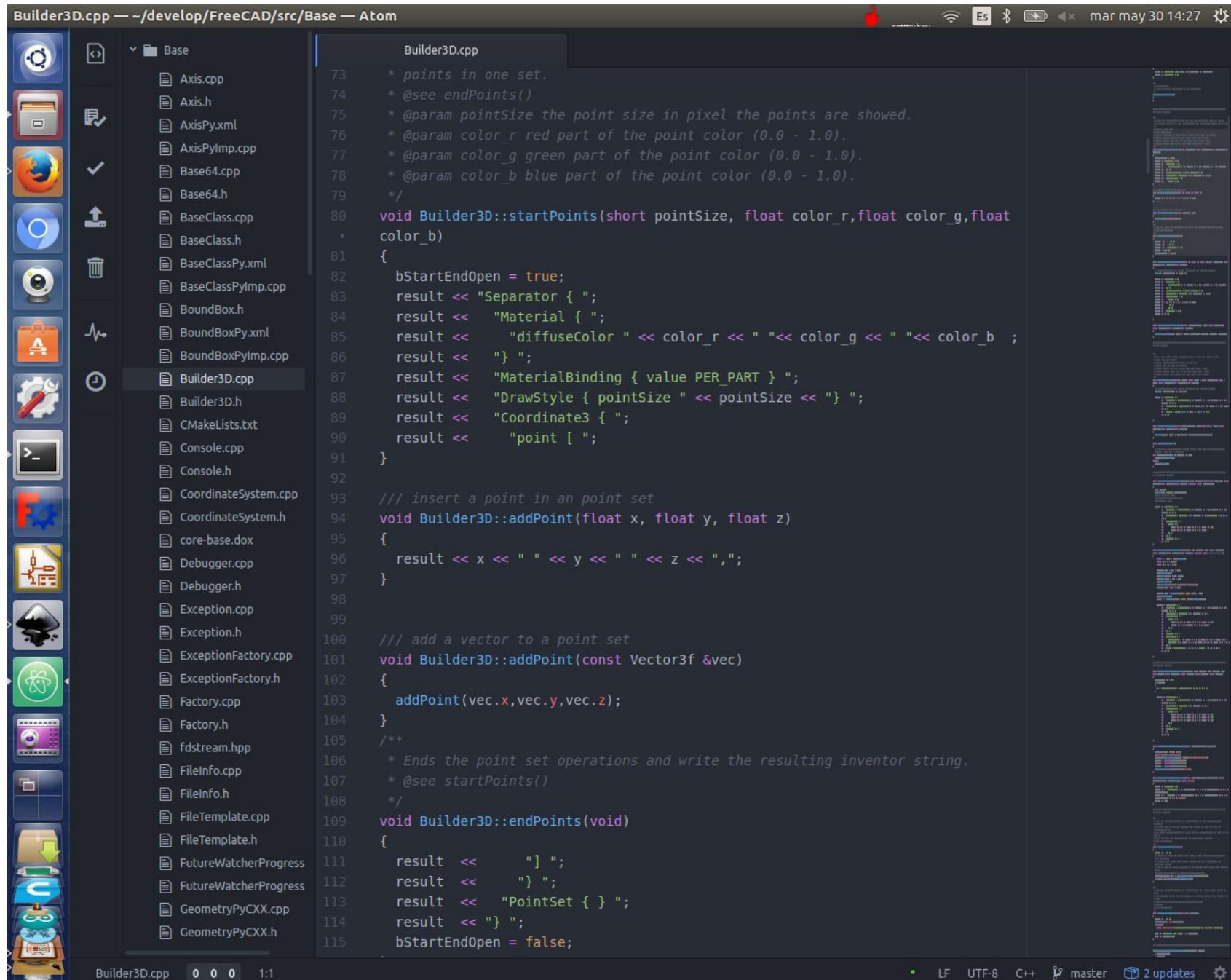


# Patrimonio tecnológico de la humanidad



# El código...

Builder3D.cpp — ~/develop/FreeCAD/src/Base — Atom



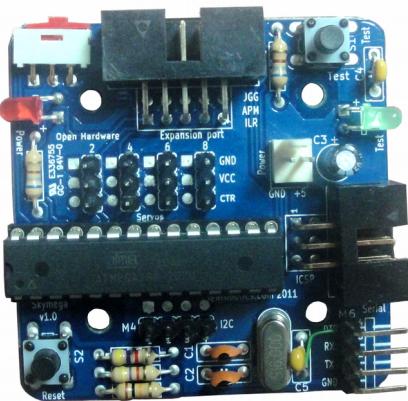
```
Builder3D.cpp
73     * points in one set.
74     * @see endPoints()
75     * @param pointSize the point size in pixel the points are showed.
76     * @param color_r red part of the point color (0.0 - 1.0).
77     * @param color_g green part of the point color (0.0 - 1.0).
78     * @param color_b blue part of the point color (0.0 - 1.0).
79 */
80 void Builder3D::startPoints(short pointSize, float color_r, float color_g, float
81     color_b)
82 {
83     bStartEndOpen = true;
84     result << "Separator { ";
85     result << "Material { ";
86     result << "diffuseColor " << color_r << " " << color_g << " " << color_b ;
87     result << " } ";
88     result << "MaterialBinding { value PER_PART } ";
89     result << "DrawStyle { pointSize " << pointSize << " } ";
90     result << "Coordinate3 { ";
91     result << "point [ ";
92
93     // insert a point in an point set
94     void Builder3D::addPoint(float x, float y, float z)
95     {
96         result << x << " " << y << " " << z << ",";
97     }
98
99     // add a vector to a point set
100    void Builder3D::addPoint(const Vector3f &vec)
101    {
102        addPoint(vec.x, vec.y, vec.z);
103    }
104 /**
105     * Ends the point set operations and write the resulting inventor string.
106     * @see startPoints()
107     */
108 void Builder3D::endPoints(void)
109 {
110     result << " ] ";
111     result << " } ";
112     result << " PointSet { } ";
113     result << " } ";
114     bStartEndOpen = false;
```

# El modelo del software libre funciona

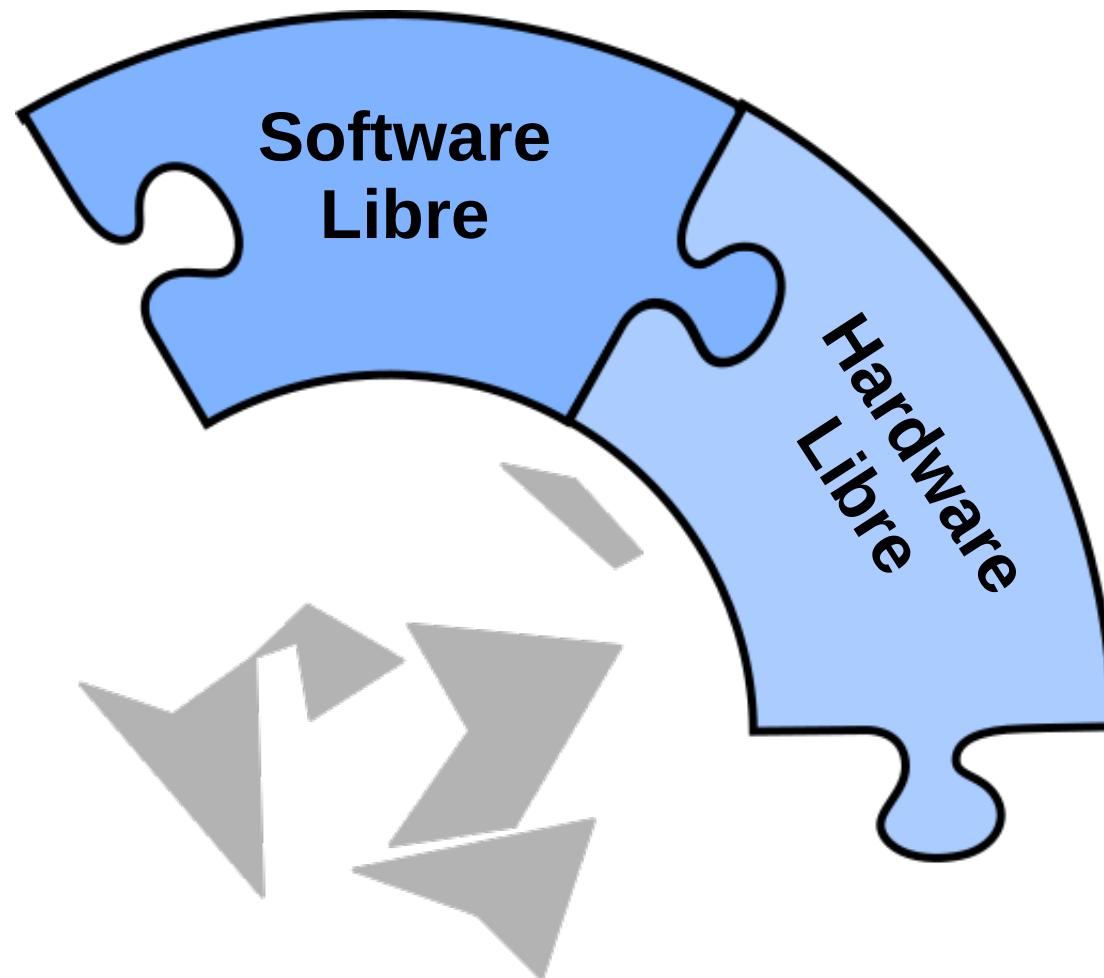


**WIKIPEDIA**  
La enciclopedia libre

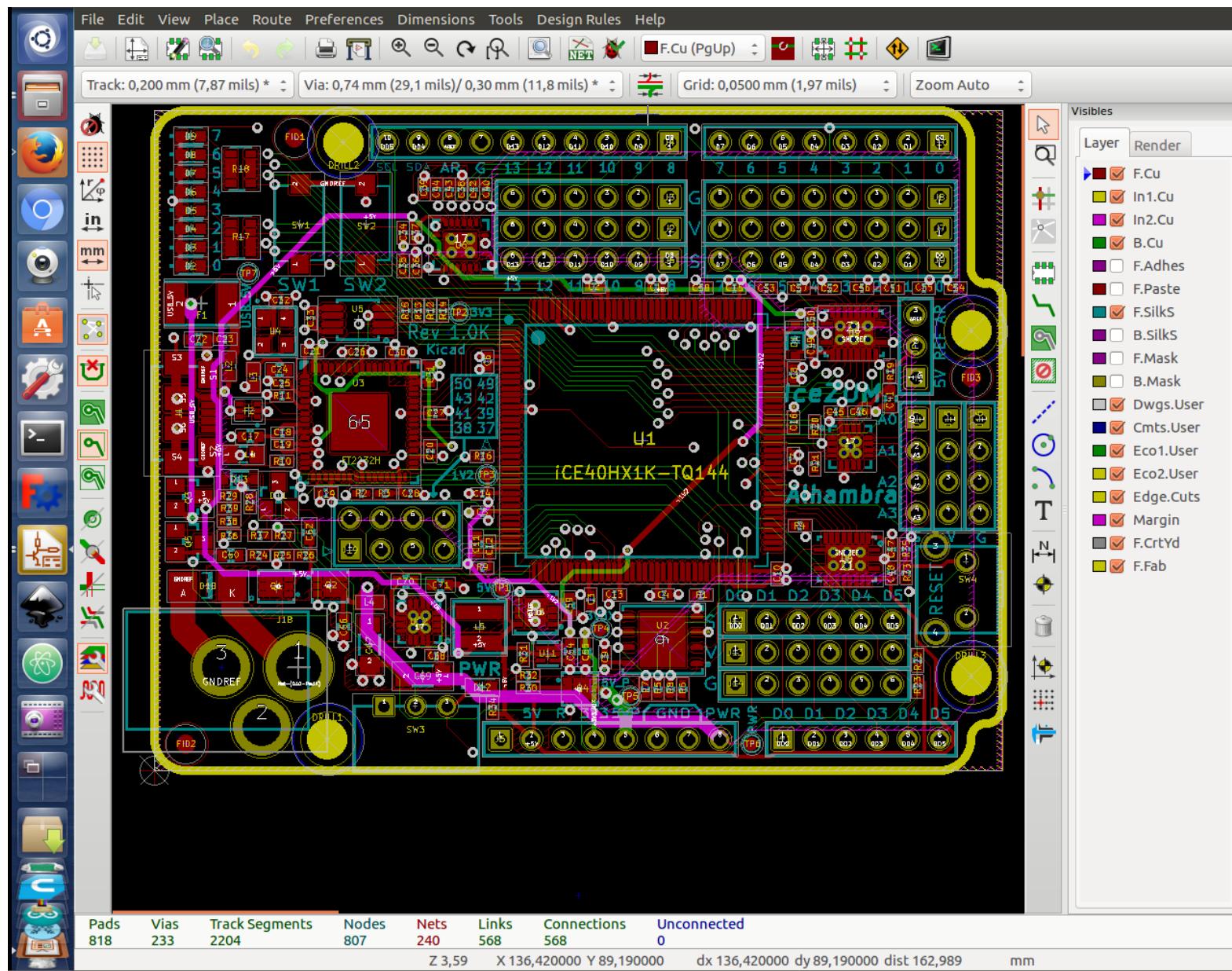
# Hardware libre



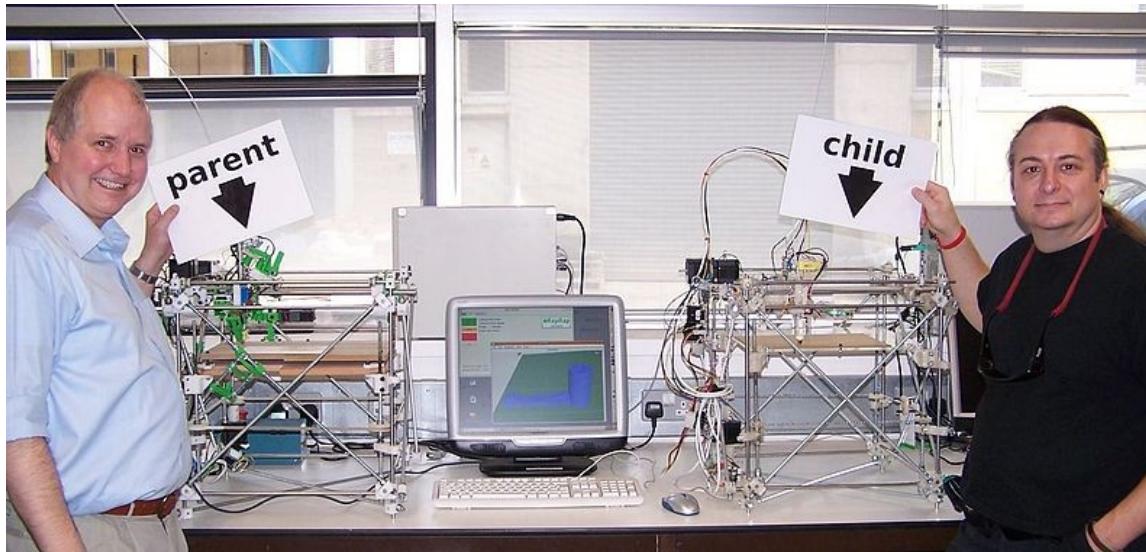
# **Hardware libre**



# Los planos...



# Reprap: Impresoras 3D Libres



## Construir una máquina auto-replicante

- **2005:** Idea original: **Adrian Bowyer** (Universidad de Bath, UK)
- **Feb/2008:** Darwin, el primer prototipo, imprime una pieza
- **Mayo/2008:** Primera auto-replicación

**Motivación:** La industria nunca desarrollará una máquina auto-replicante porque no sería rentable

# Orígenes



Con Adrian Bowyer

**Taller de Reprap en MADRID**

FEBRERO 2009 - MEDIALAB PRADO



## Orígenes (II)

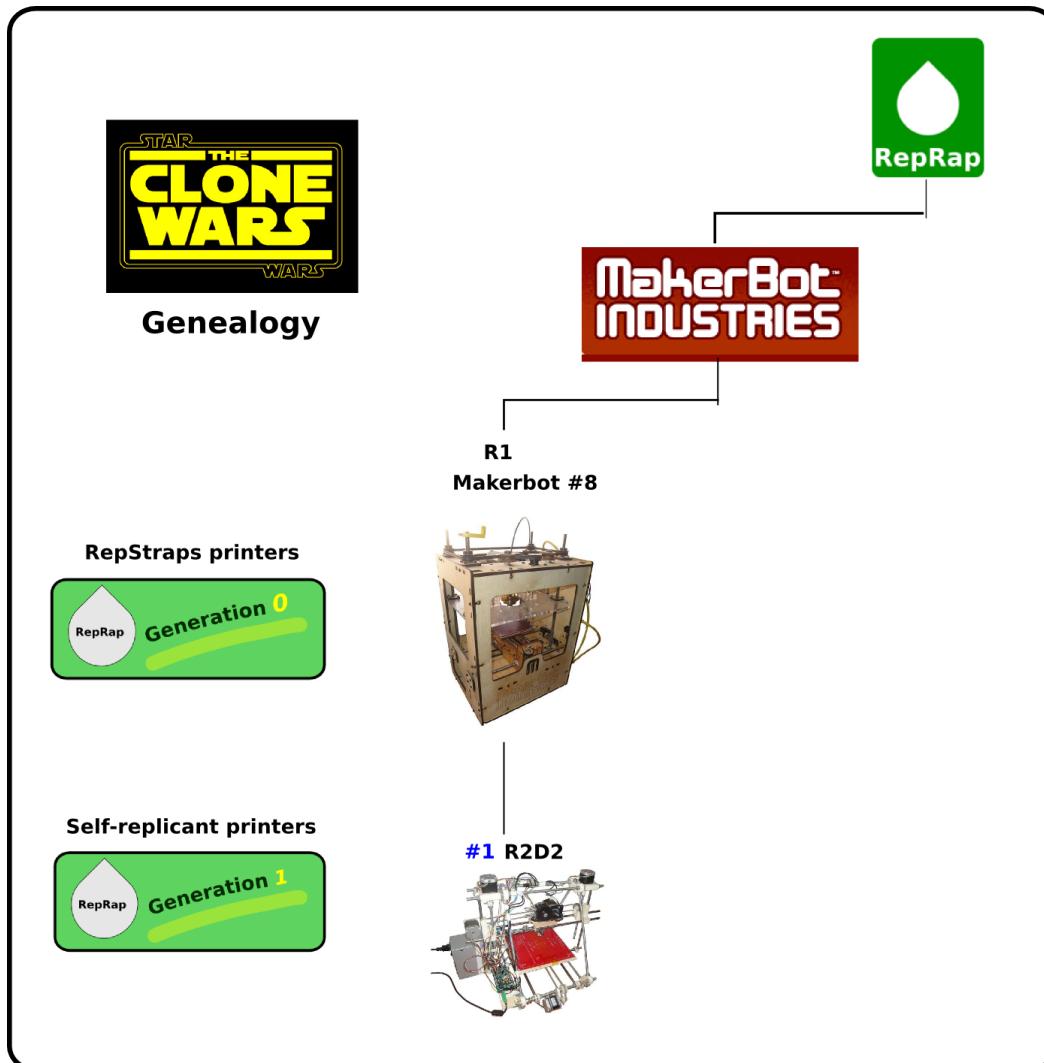


Con Zach Smith, fundador de Makerbot



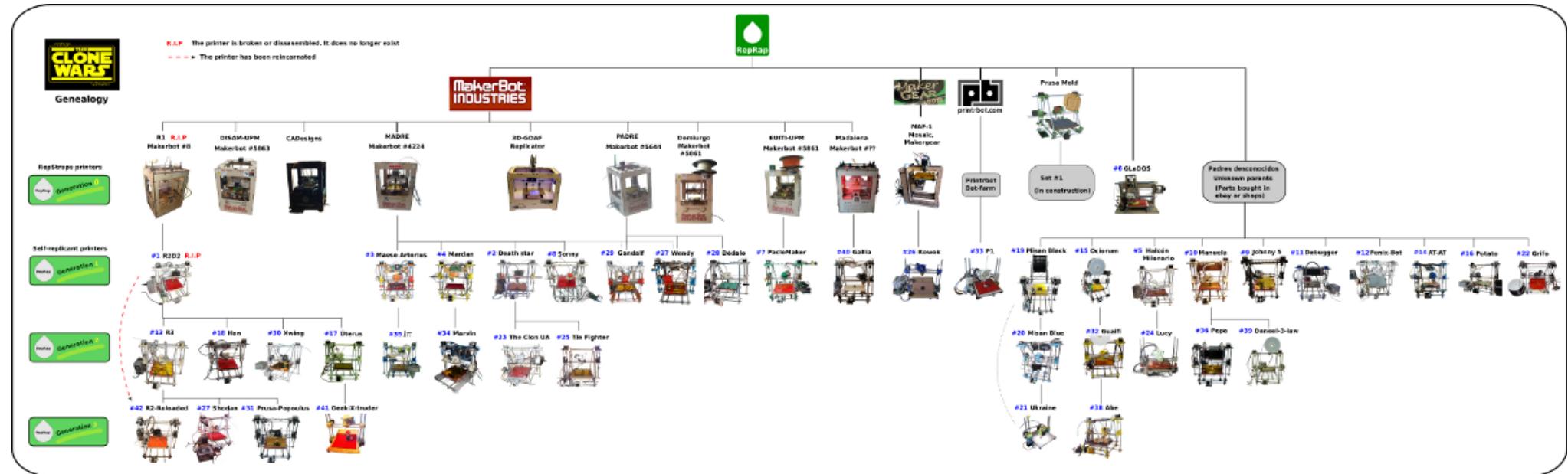
Makerbot número 8 en el mundo! 

# Clone wars: Dic/2011



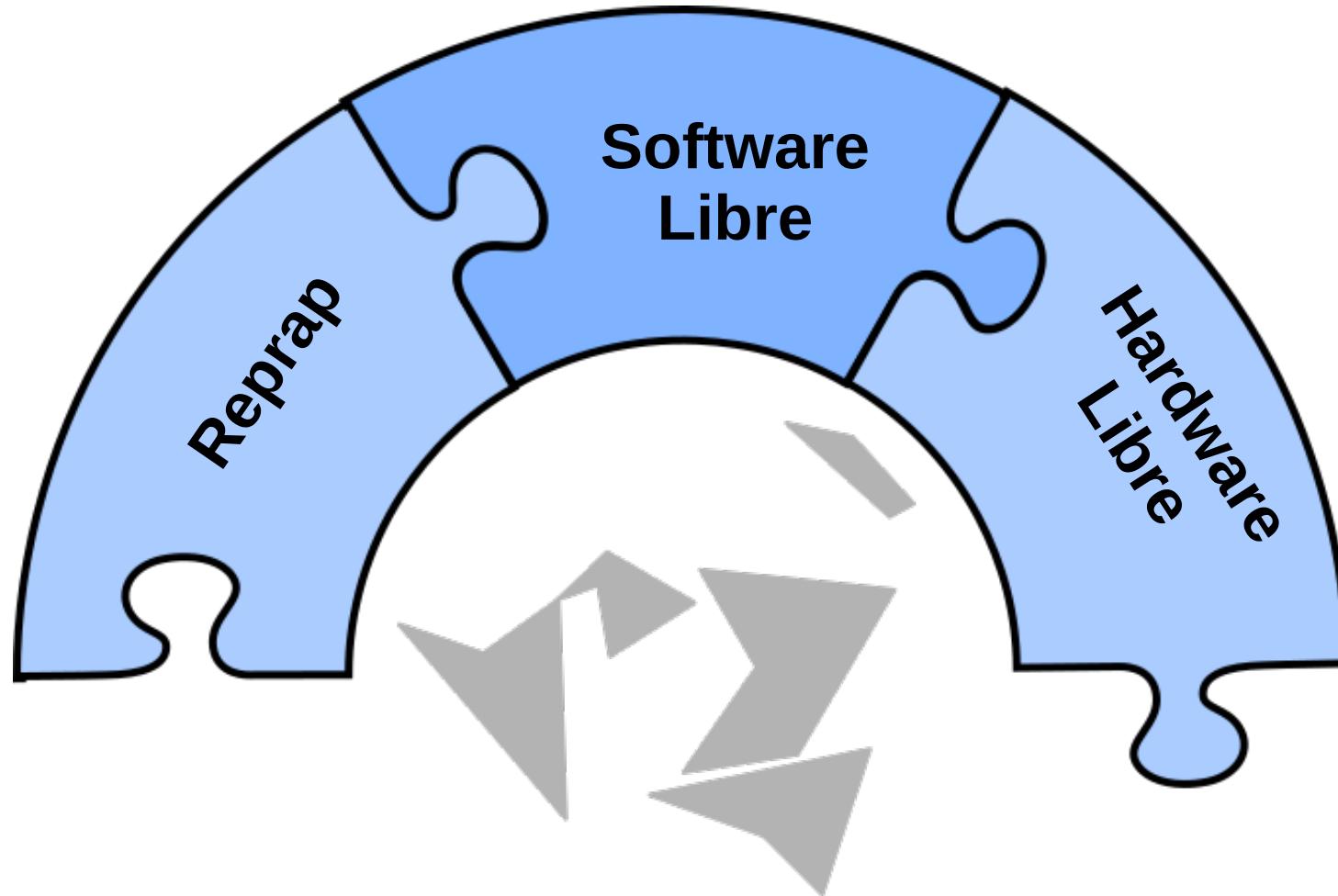
Clones: 1

# Clone wars: Agosto/2012

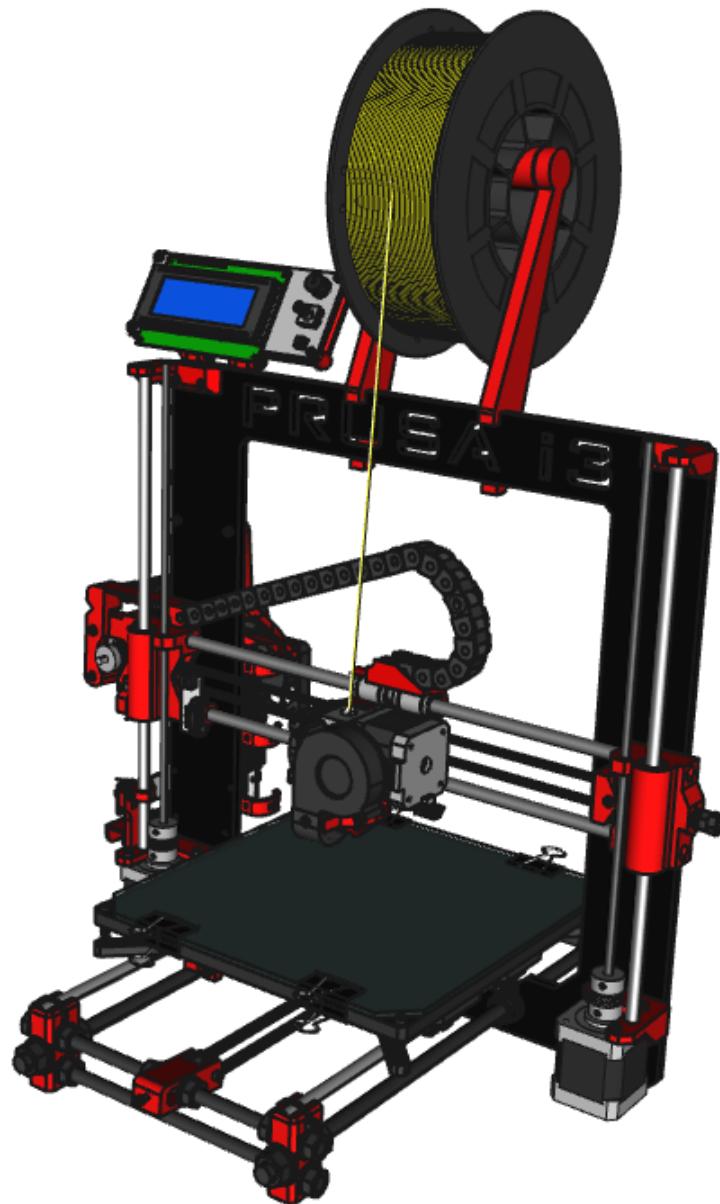


- Clones: 42
  - Crecimiento exponencial

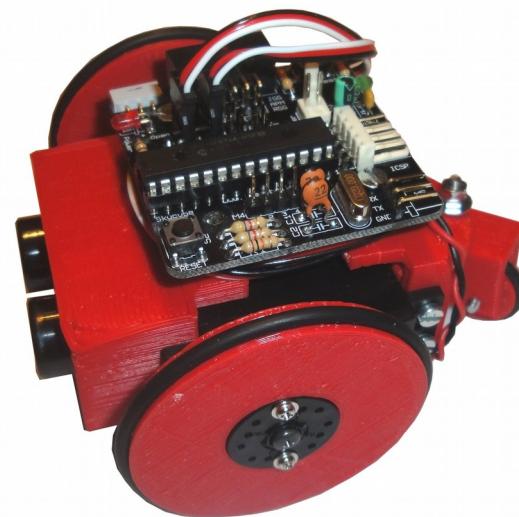
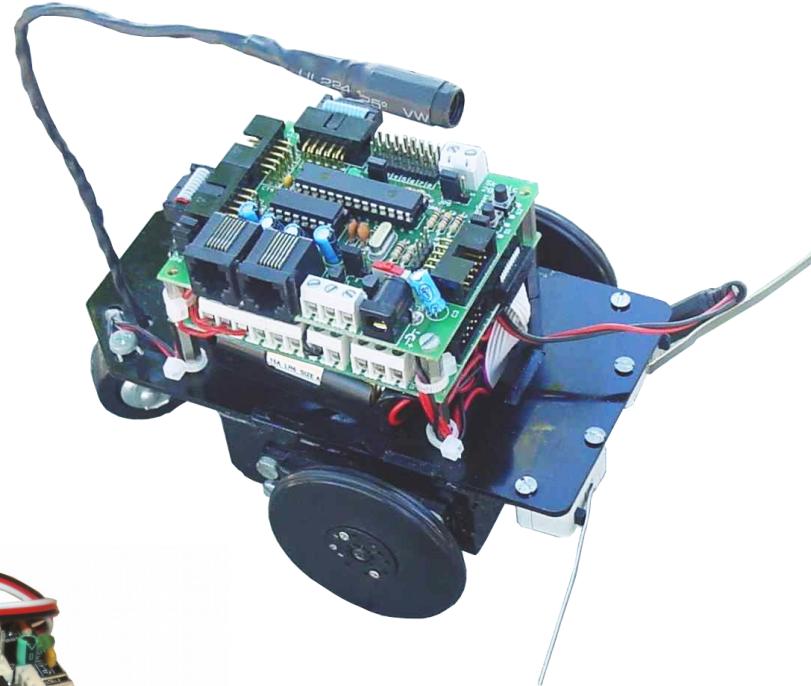
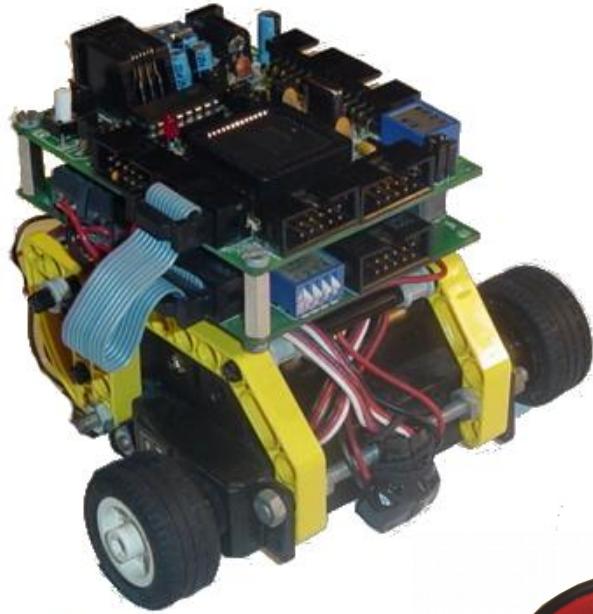
# Impresoras 3D libres



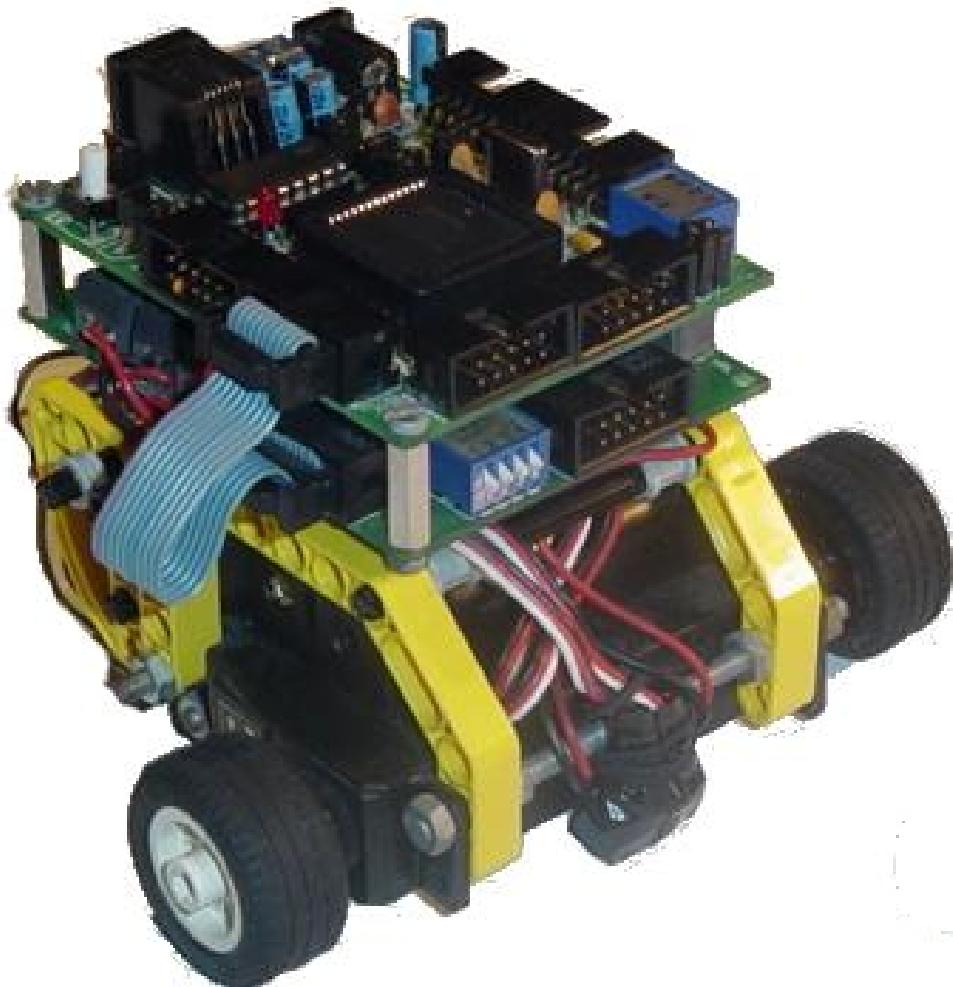
# Los planos...



# Robots educativos libres



# Tritt: Primer Mini-robot (1996)

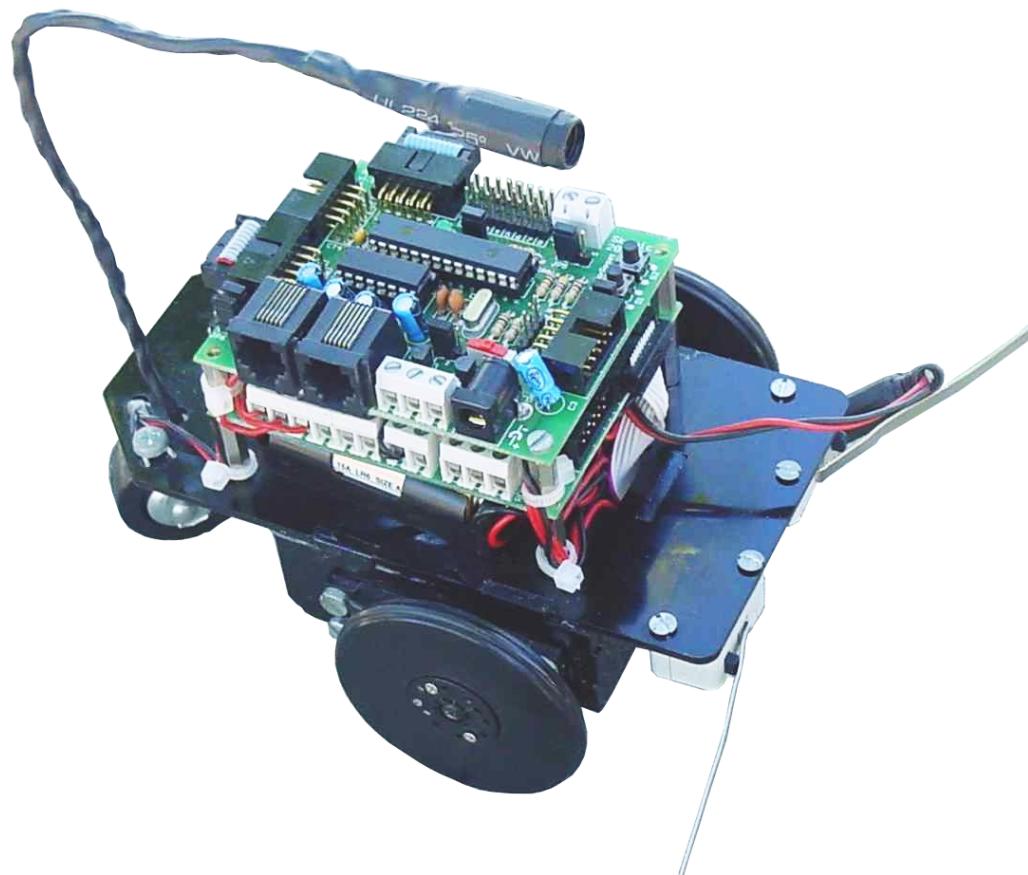


- Derivado del Rug Warrior (MIT)
- Piezas de Lego
- Servos Trucados
- Micro 6811 de Motorola
- Libre

## Problemas:

- Difícil de replicar
- No se podían construir grandes tiradas
- Ruedas

# Skybot (2005)



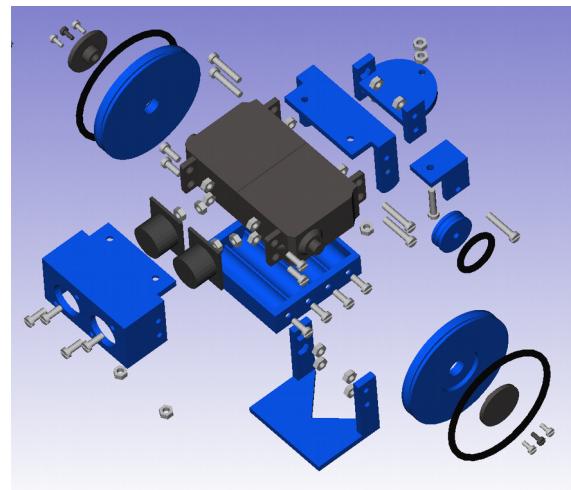
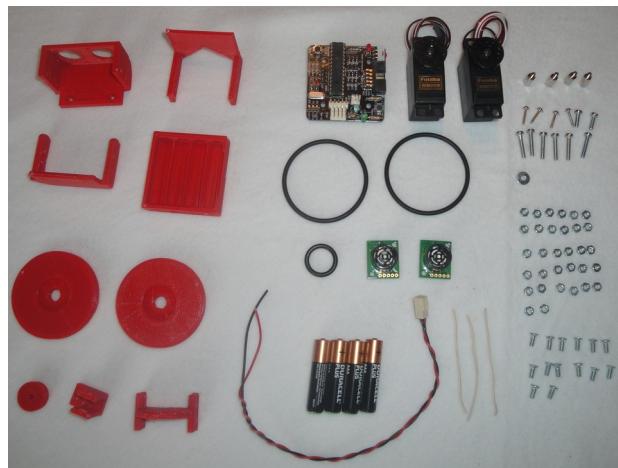
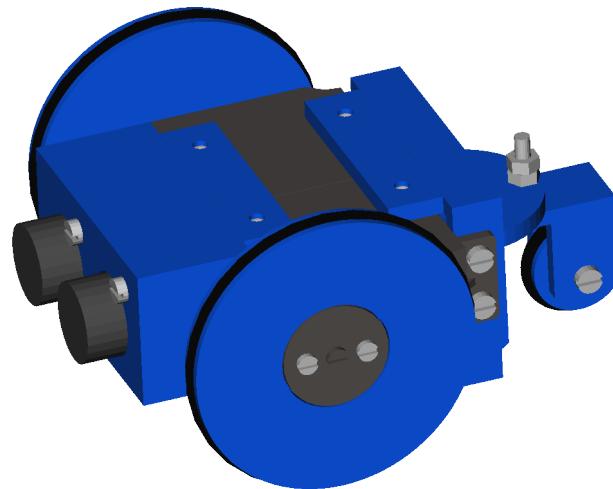
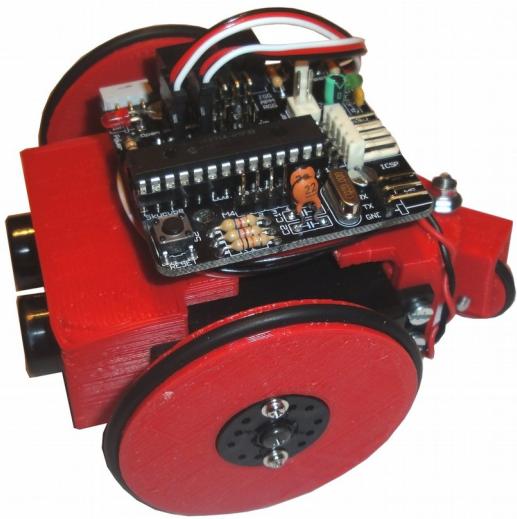
- Robot libre
- Piezas cortadas por láser
- Ruedas mecanizadas
- Tarjeta Skypic: Micro PIC16F876A

## Problemas:

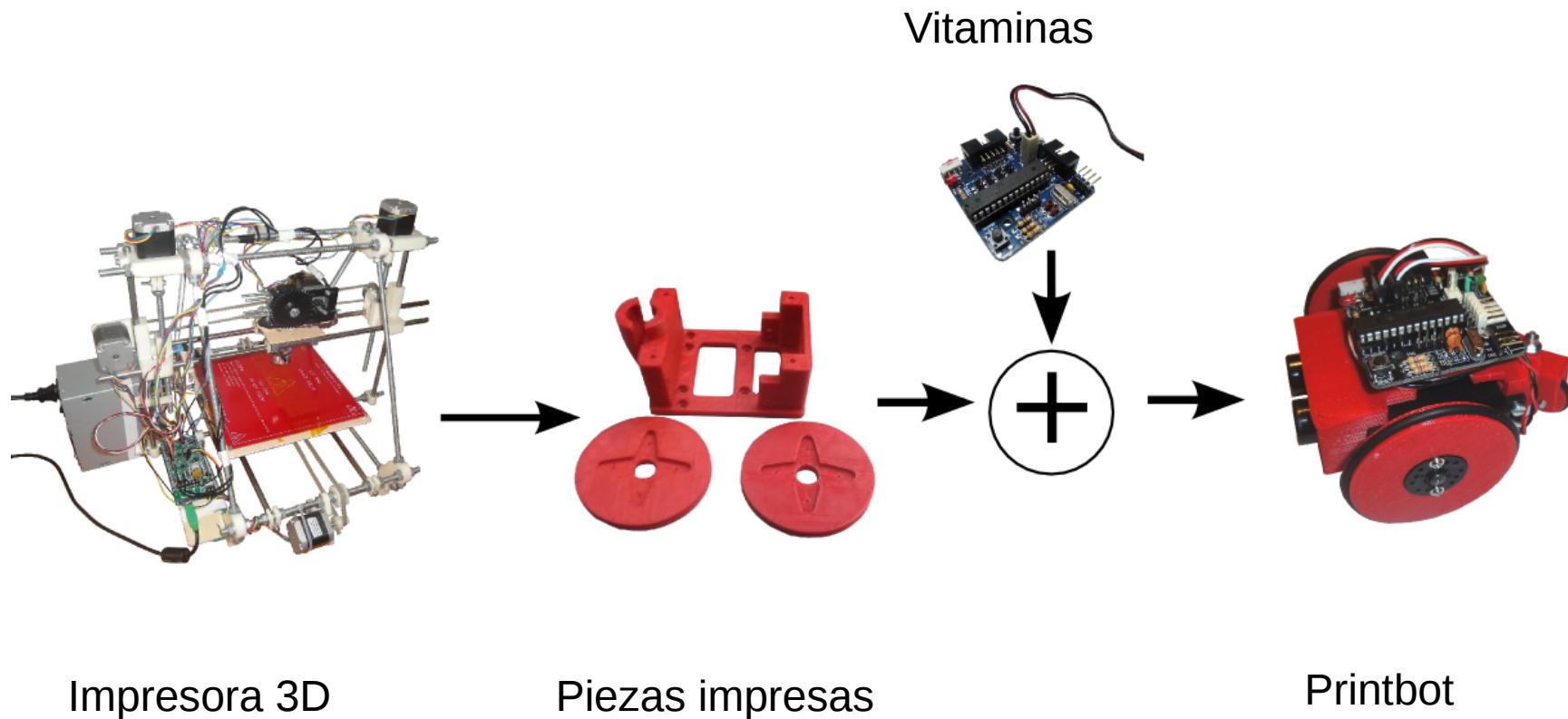
- ¡No evoluciona!
- ¡No hay comunidad!

# Miniskybot (2011)

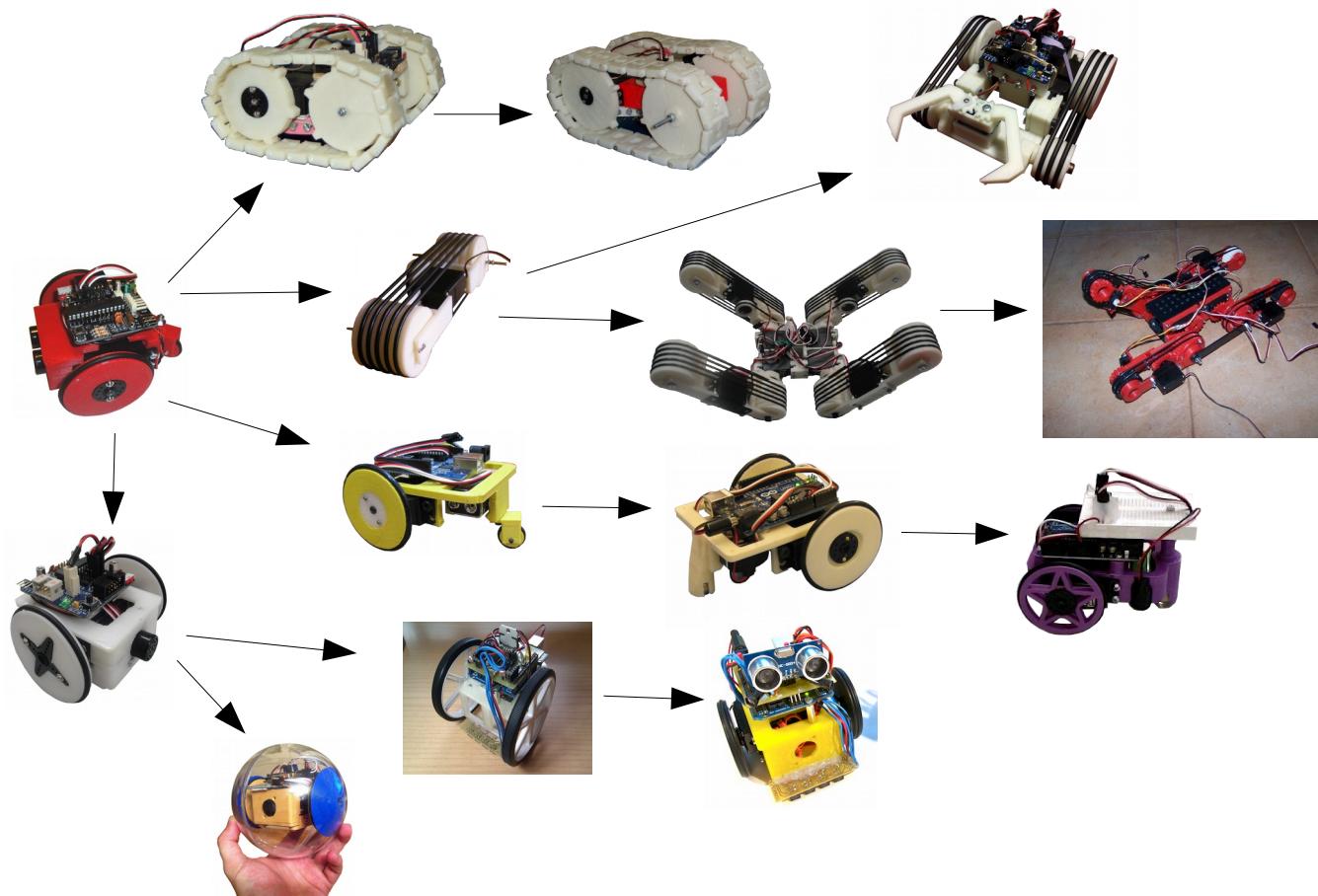
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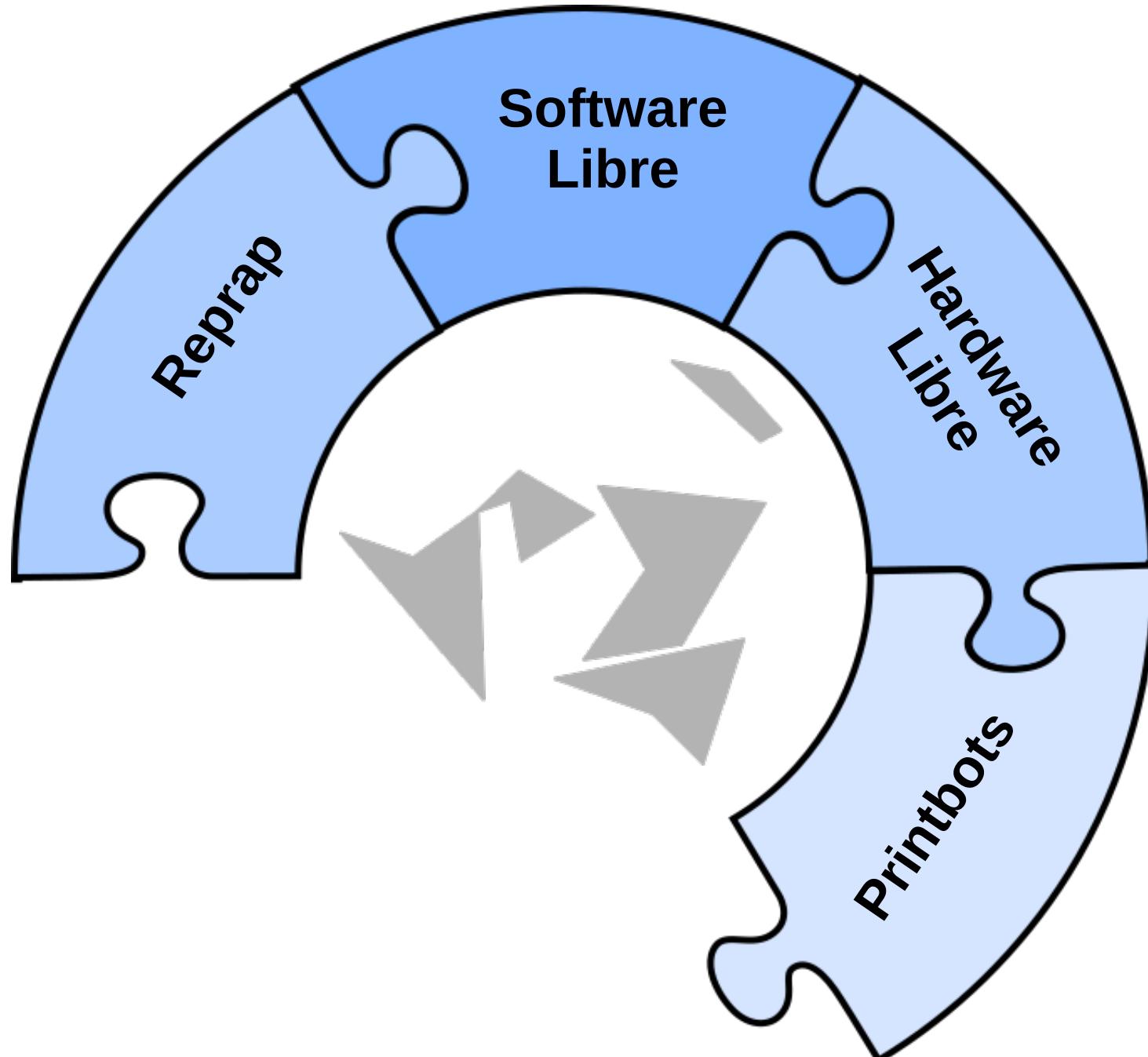


# Printbots

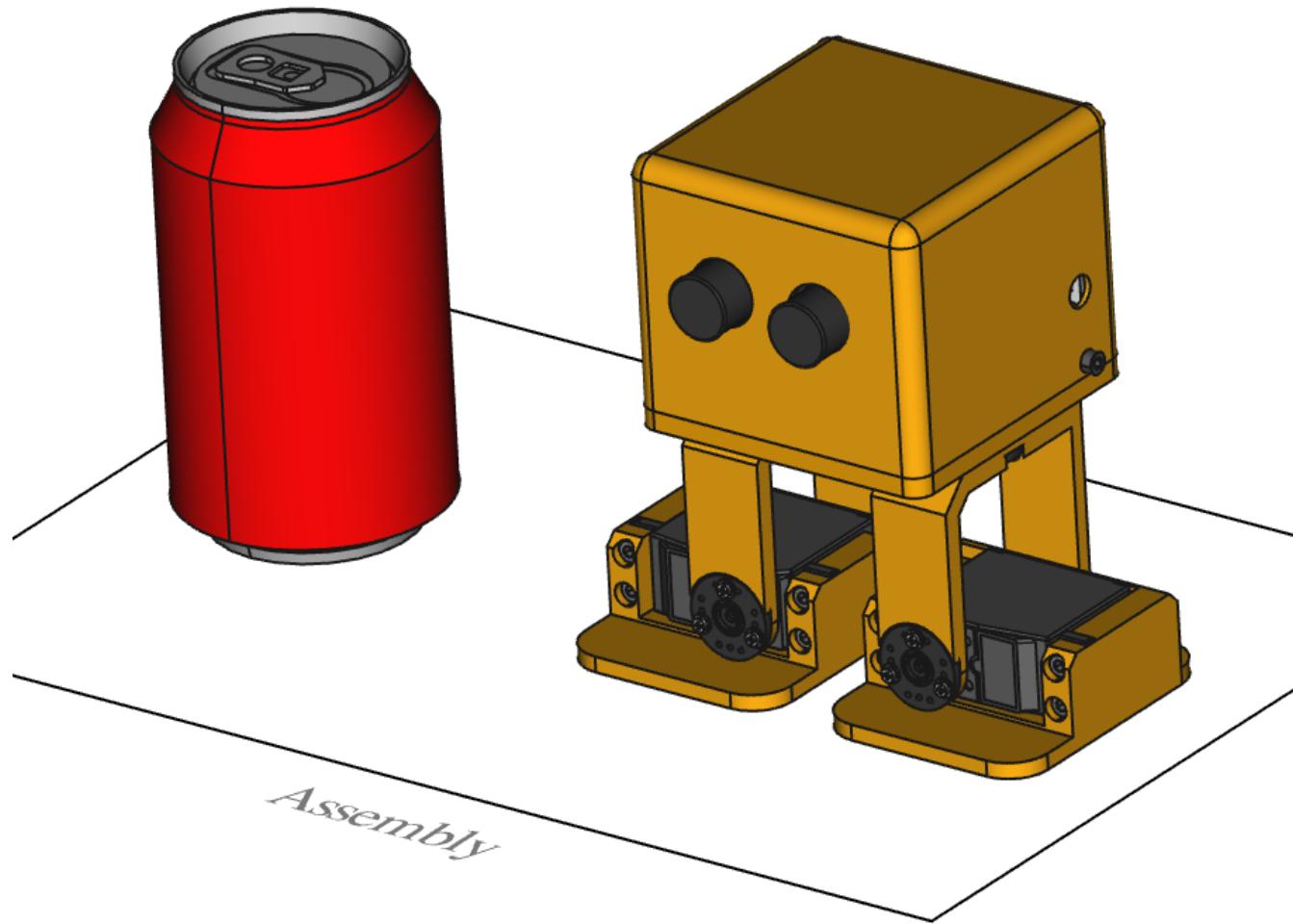


# Evolución y diversificación

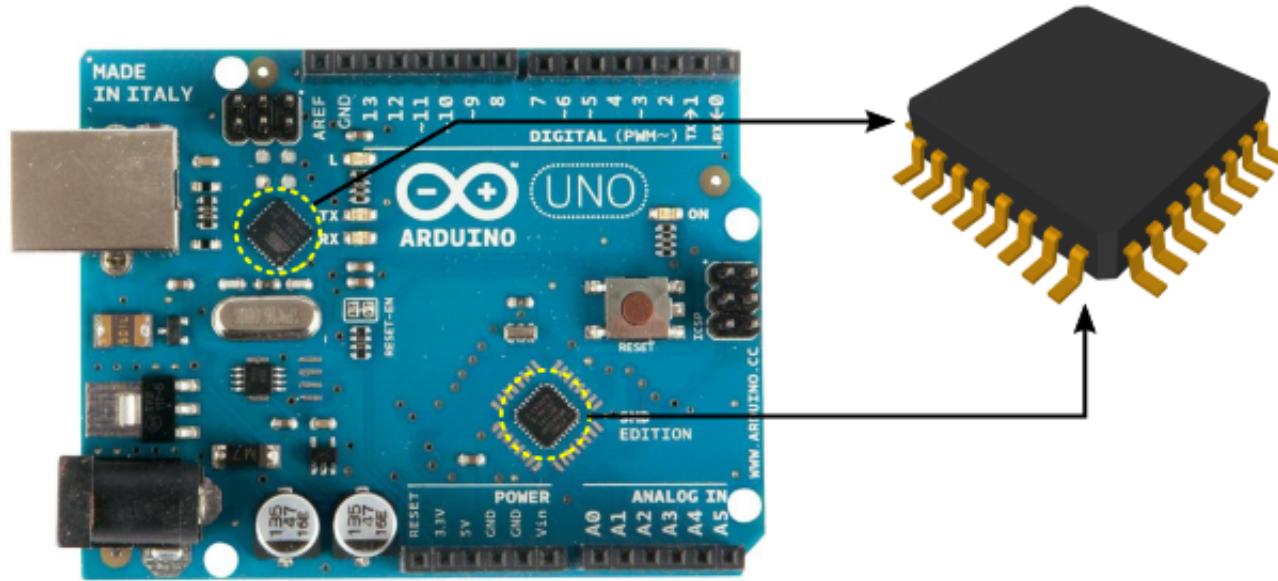




# Planos...



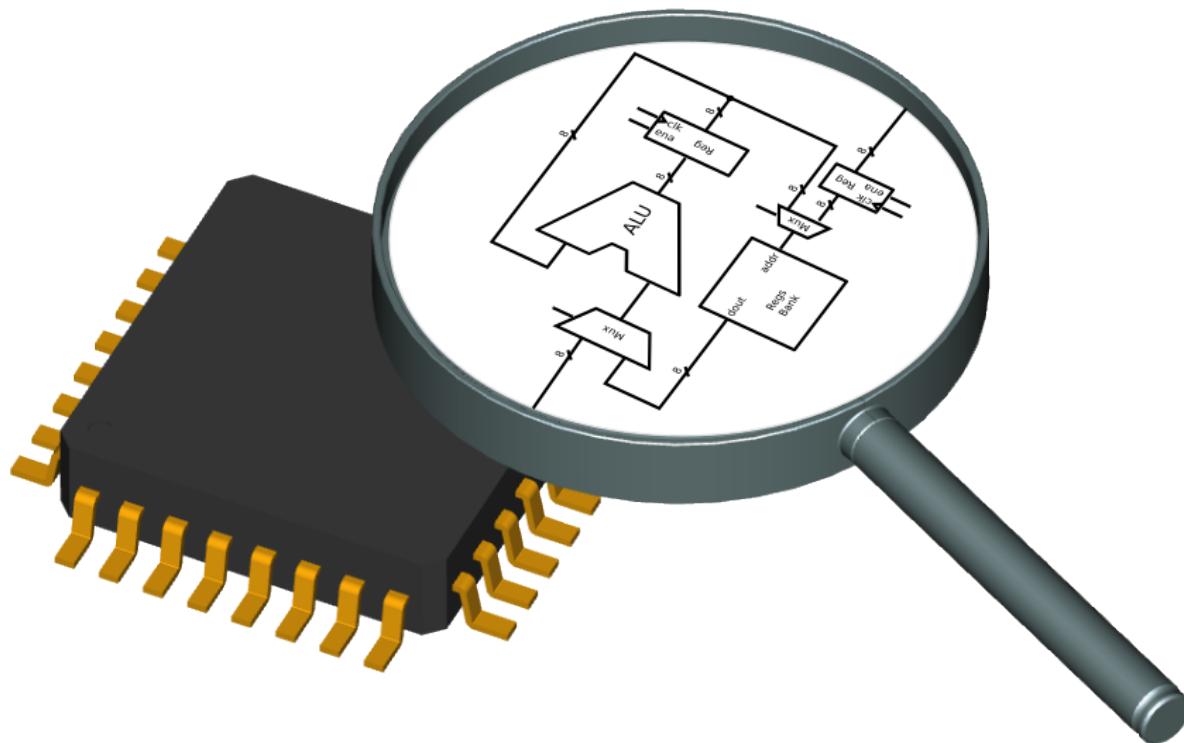
# Chips: la última frontera



- El gran invento del siglo XX
- Están por todos lados
- Muy baratos
- Los compramos y los usamos

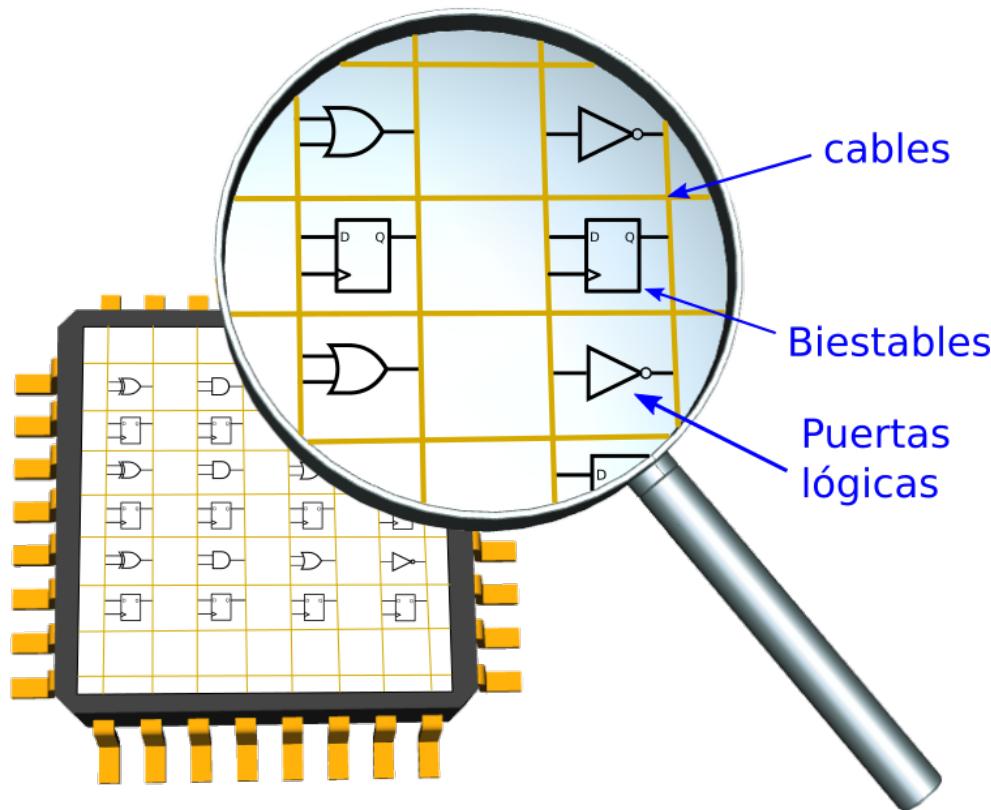
- Son **cajas negras**
- No los podemos estudiar
- No los podemos modificar
- No los podemos compartir

# Electrónica digital



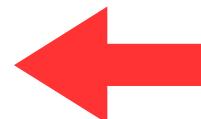
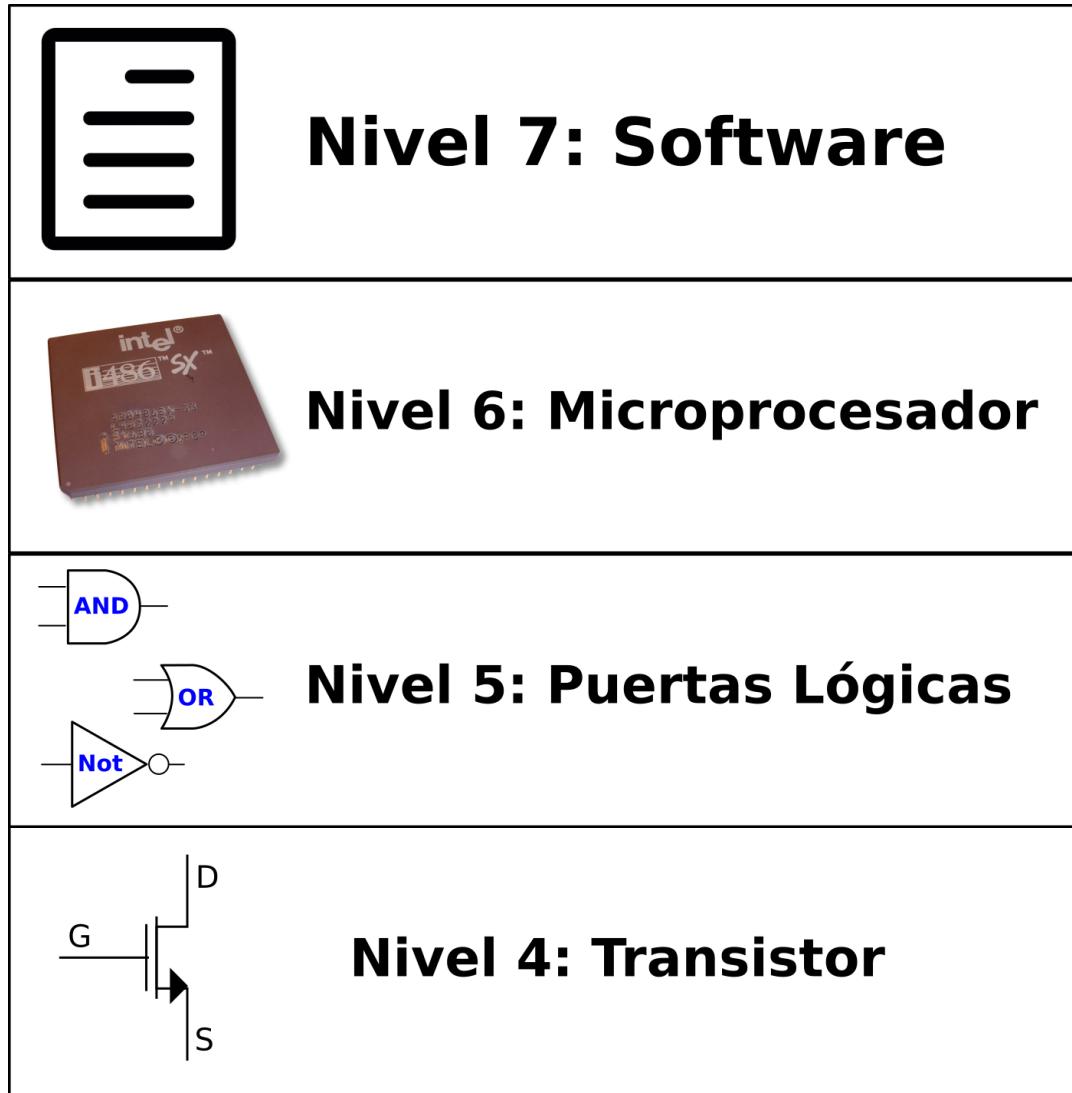
- Nivel de electrónica digital
- Información: Sólo 1s y 0s (Bits)
- Función: **Manipular, almacenar y transportar bits**

# Tecnología FPGA

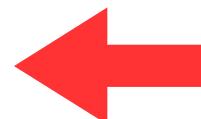


**FPGA:** Chip “en blanco” que contiene una matriz con los 3 componentes básicos: puertas lógicas, biestables y cables

# Bajando de nivel

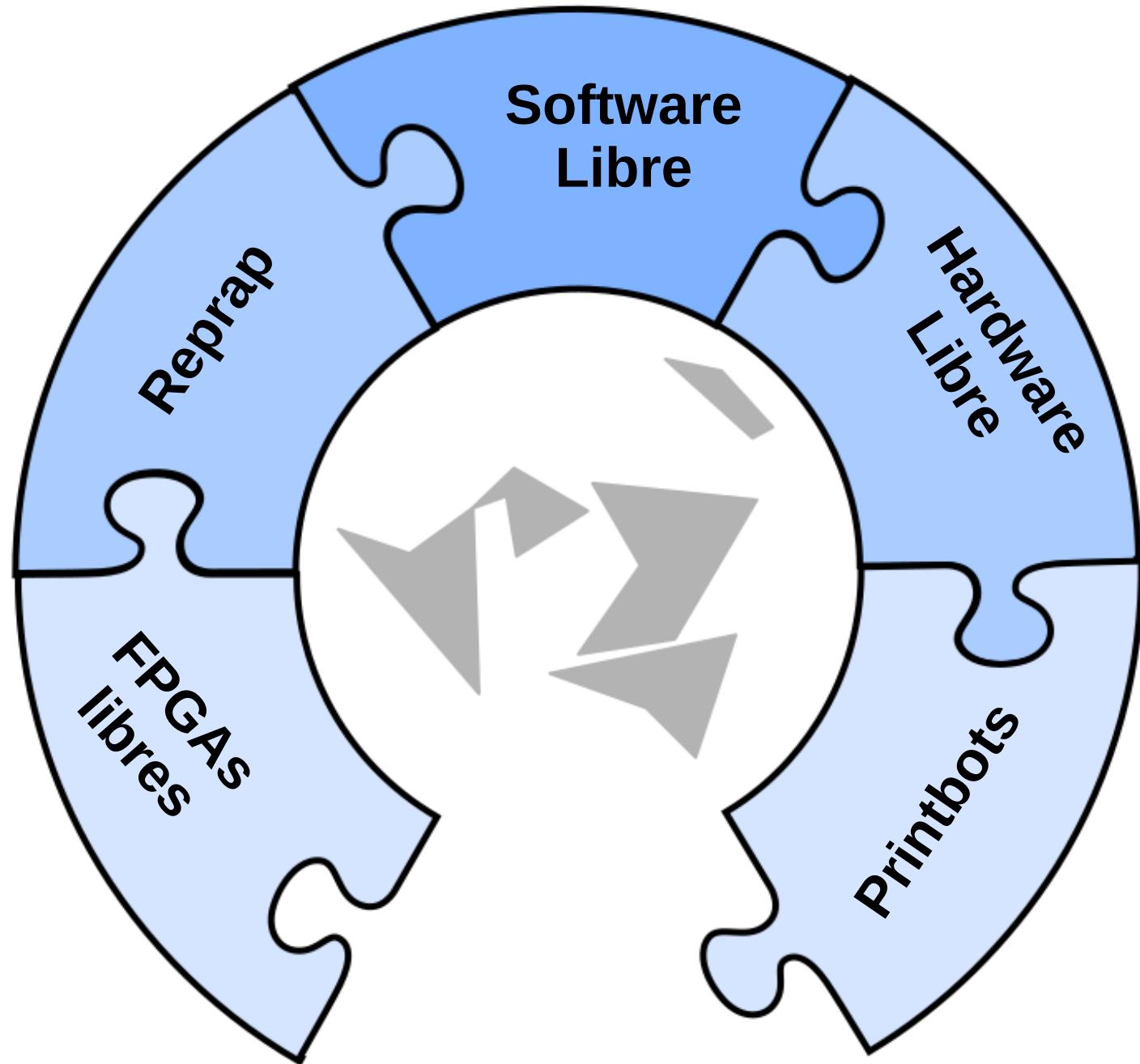


*Arduino*

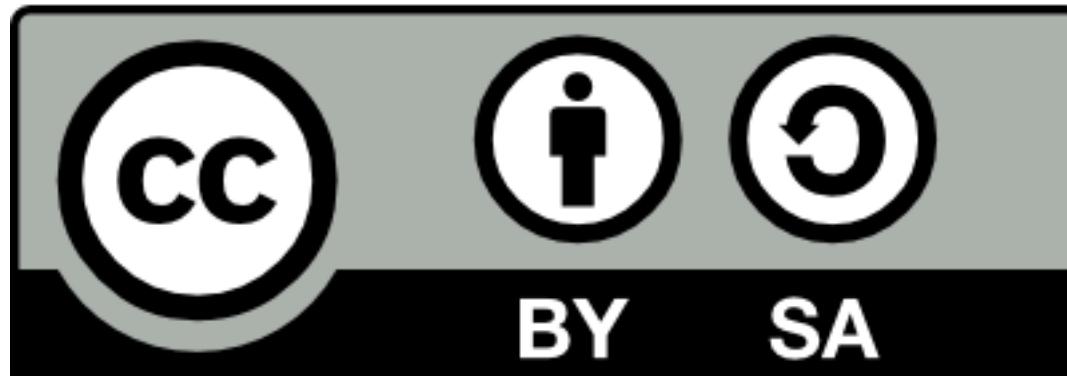
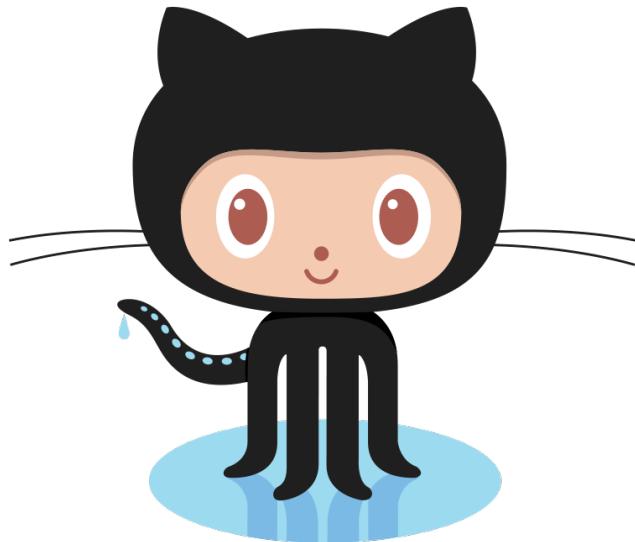


*FPGAs*

# Patrimonio tecnológico humanidad



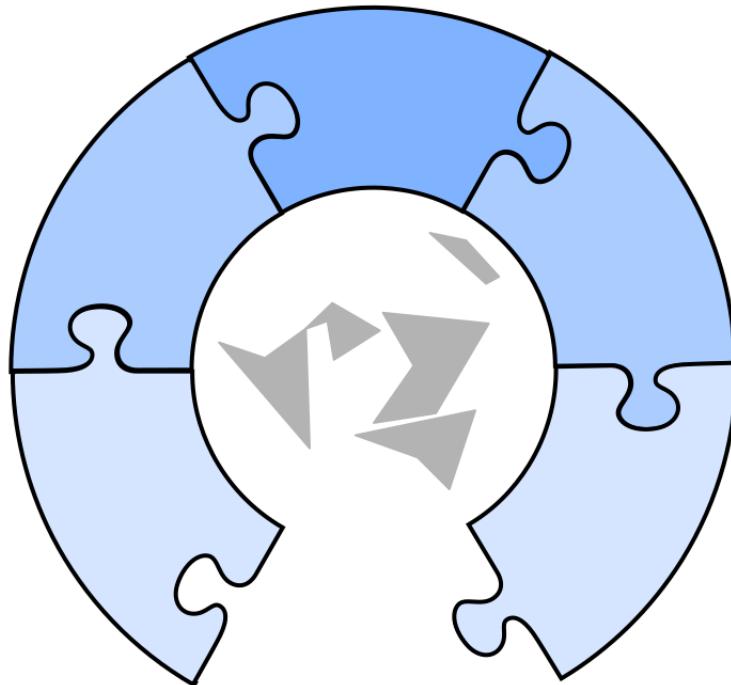
# ¡Comparte con la comunidad!



# ¡Que el software libre os acompañe!



# Nosotros compartimos



Juan González Gómez (Obijuan)

<https://github.com/Obijuan>