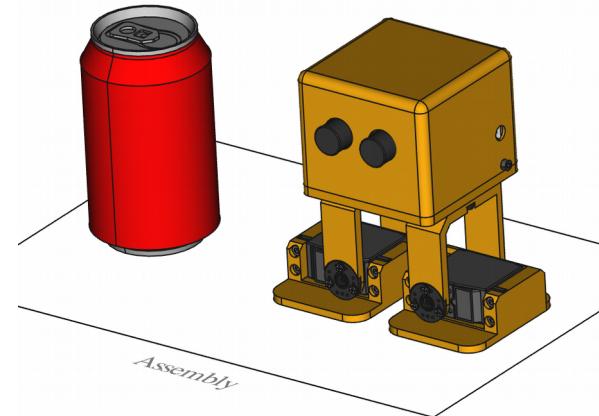
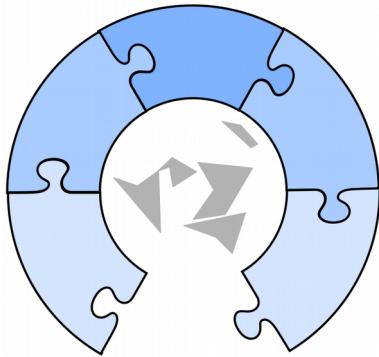


Movimiento maker y tecnologías libres



Juan González Gómez
[@Obijuan_cube](https://github.com/Obijuan)
<https://github.com/Obijuan>



Universidad
Rey Juan Carlos



III Jornadas de Robótica en la Universidad de Cádiz

III Jornadas de Robótica en la Universidad de Cádiz

- 21 y 22 de Noviembre de 2006 -

En el Salón de Actos de la Escuela Superior de Ingeniería (UCA)
c/ Chile nº1 - 11002 Cádiz

MARTES 21

- 9:30 - Apertura
- 9:45 - Robótica Modular y Locomoción
Por D. Juan González Gómez
- 10:45 - Creación de Microrobots
Por D. Daniel Quintero González
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MIÉRCOLES 22

- 9:45 - Concursos de Robótica: Eurobot e Hispabot
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Por D. Francisco Cerdón González y D. Rafael González Chacón
- 12:15 - Clausura

Organizado por **UCA** Universidad de Cádiz **AMUCA** Asociación Microrobótica de la Universidad de Cádiz

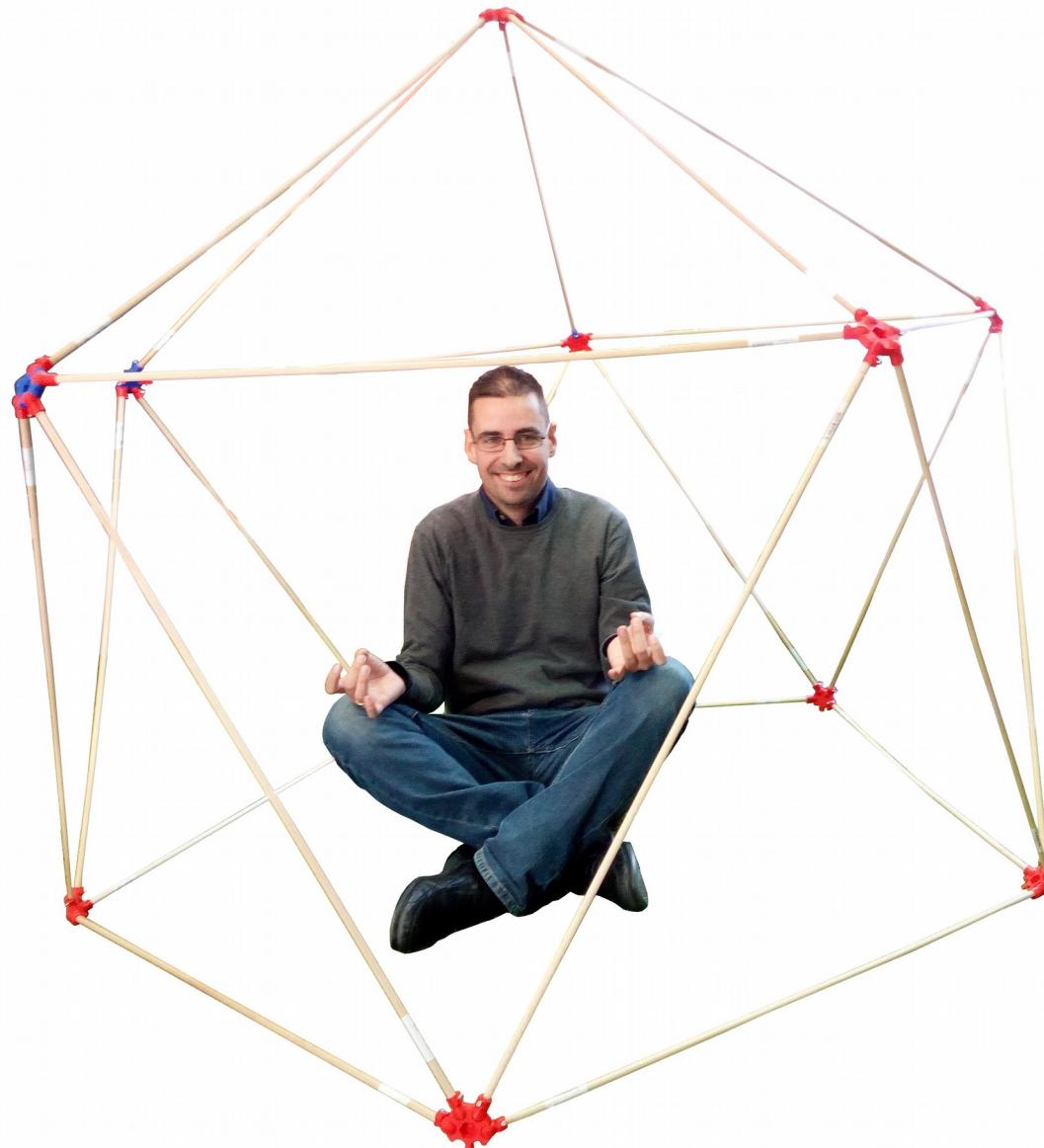
Patrocinado por **MECD** Ministerio de Educación y Ciencia **OEFCYT** Oficina Económica para la Ciencia y la Tecnología **UCA** Universidad de Cádiz **INNOVACIÓN** Instituto de Investigación en Innovación



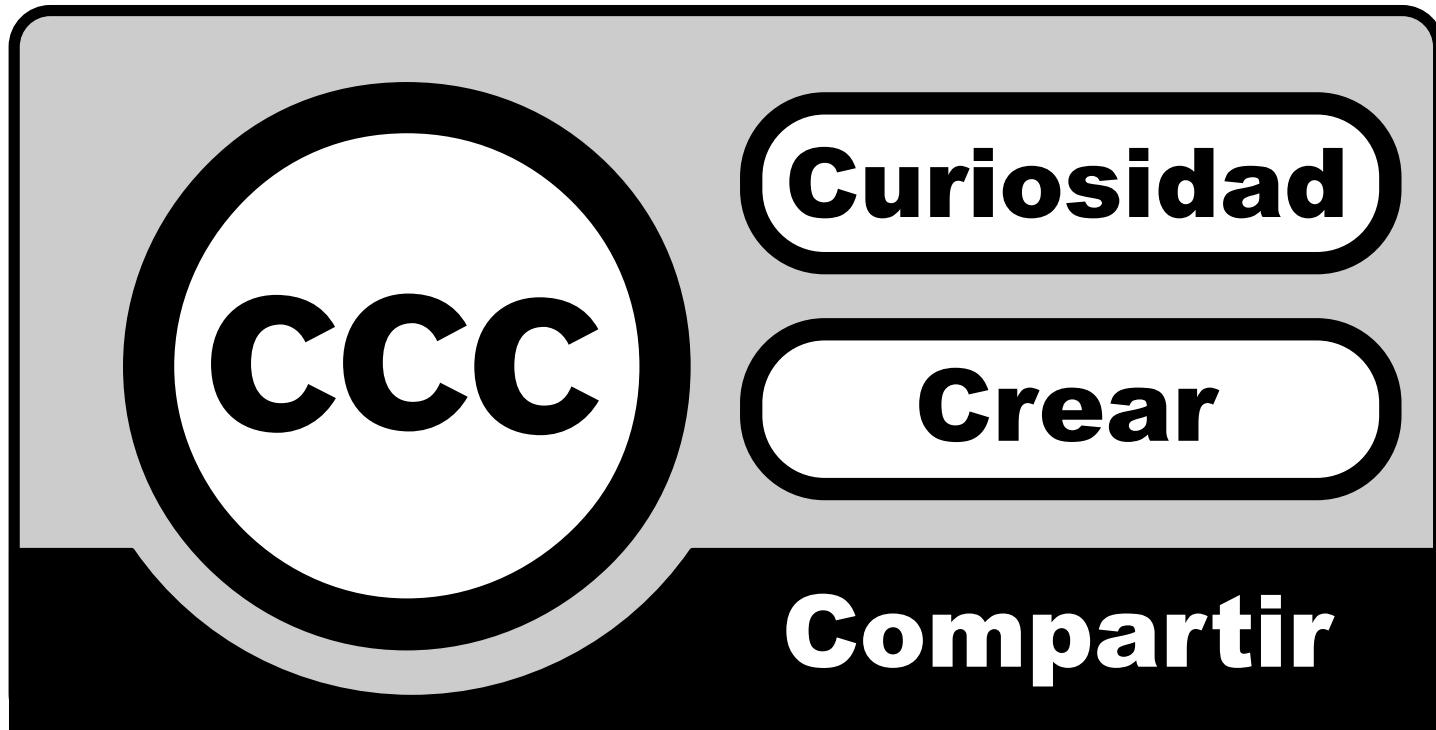
2006



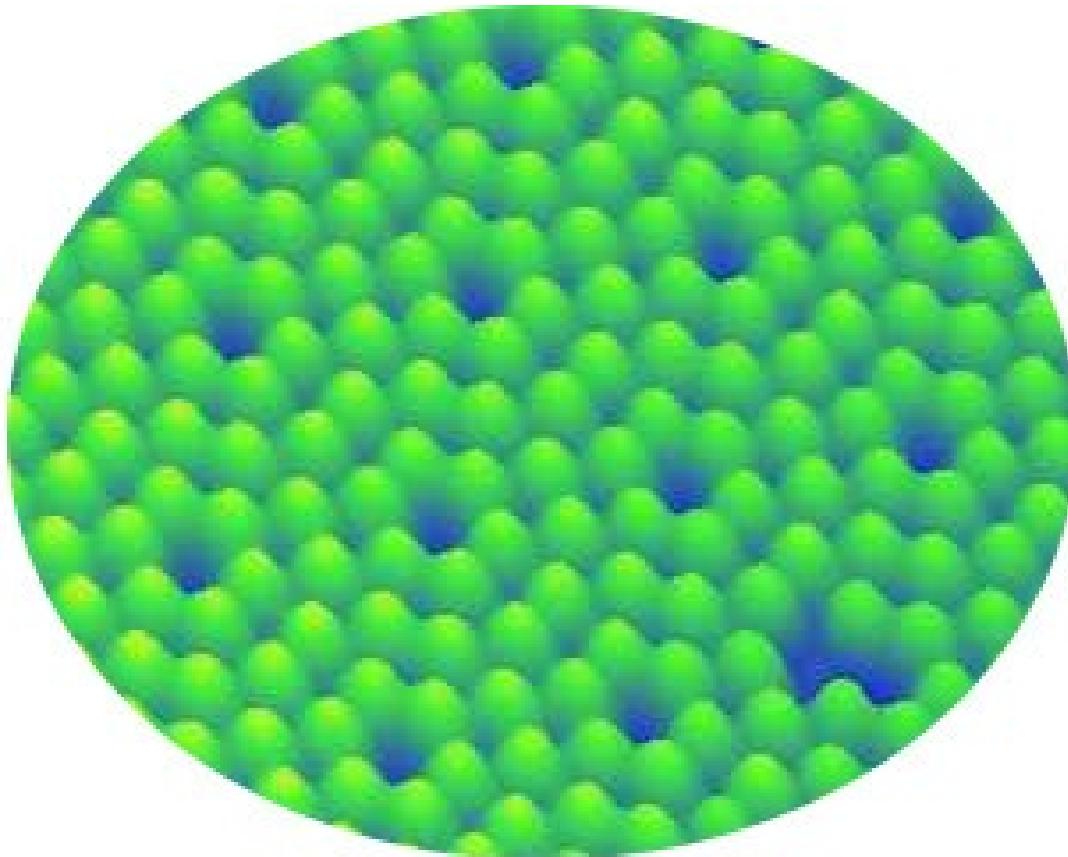
Movimiento maker



Las tres Cs

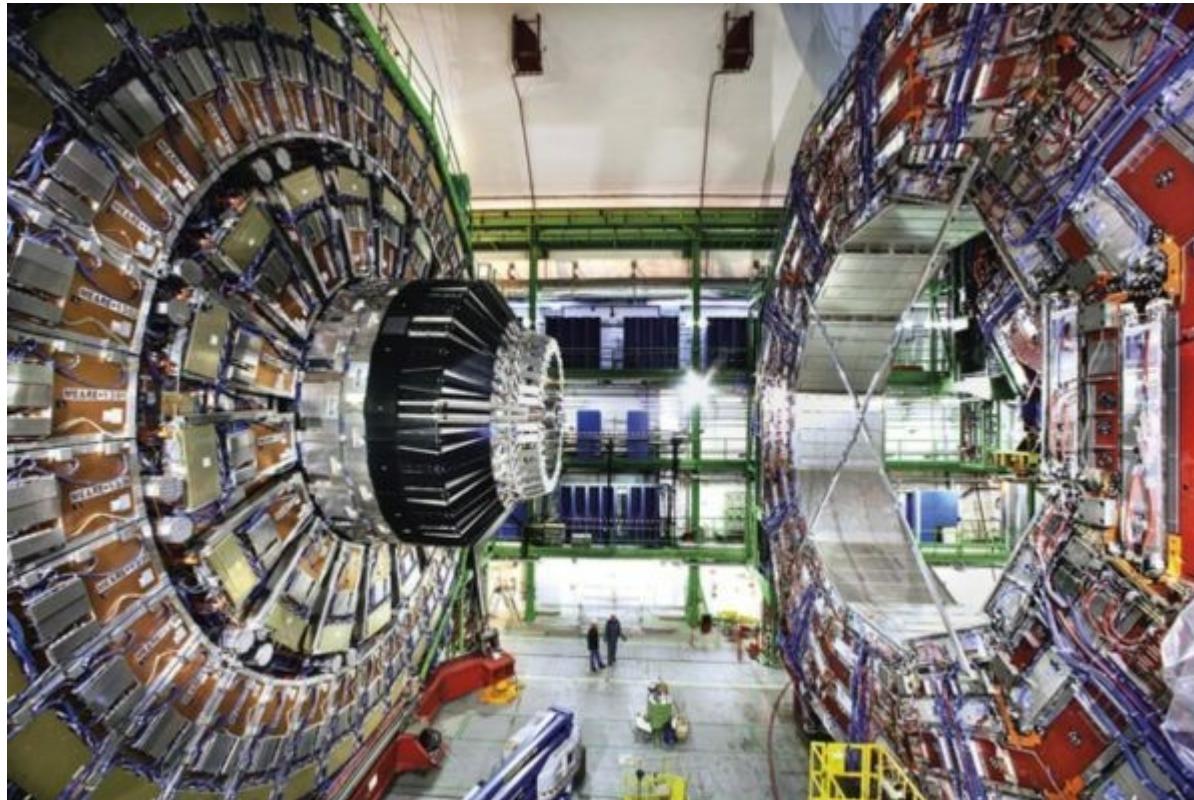


Ciencia



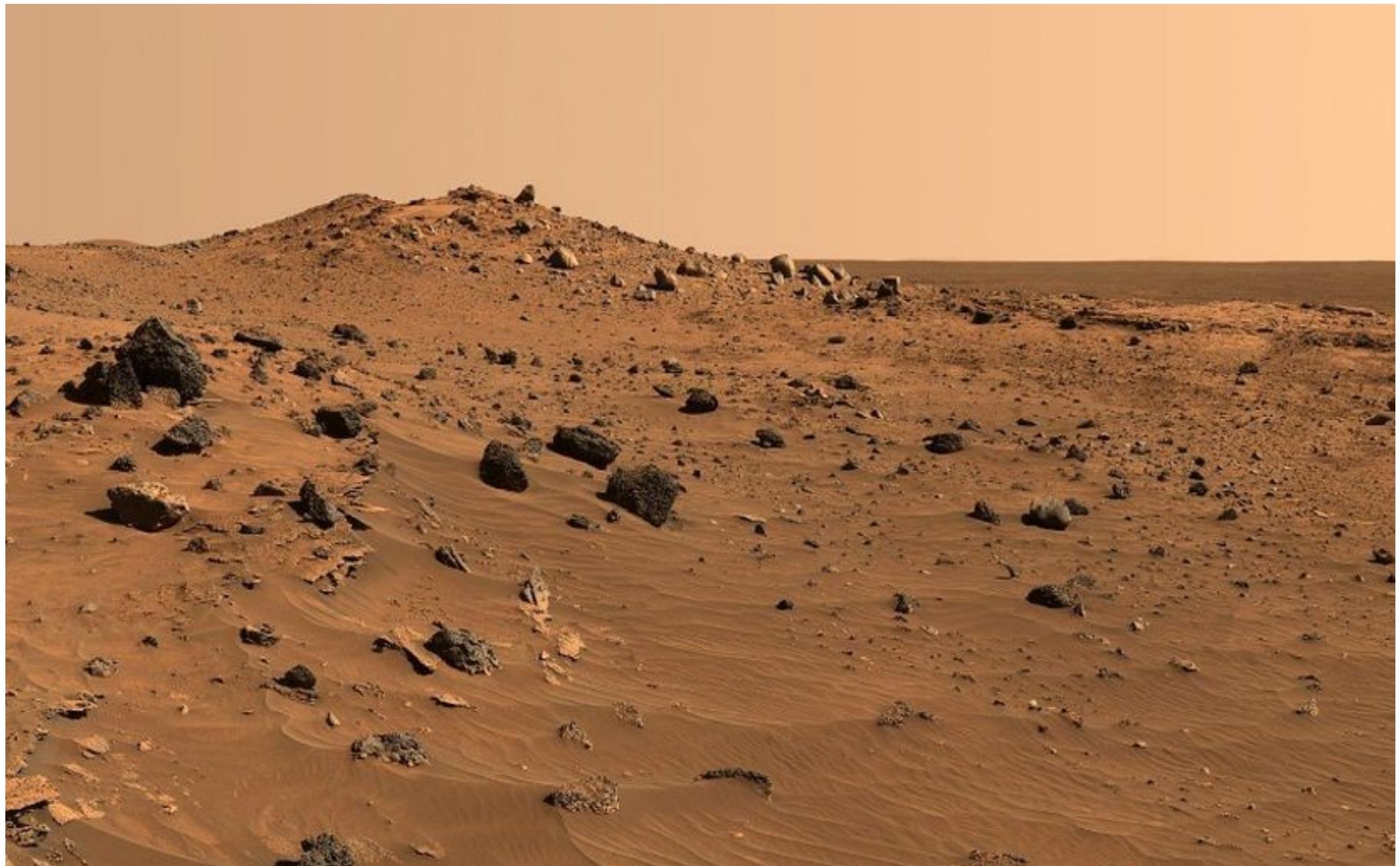
- **Motor:** Curiosidad
- Crear conocimientos
- Compartir conocimientos

Motor: La curiosidad



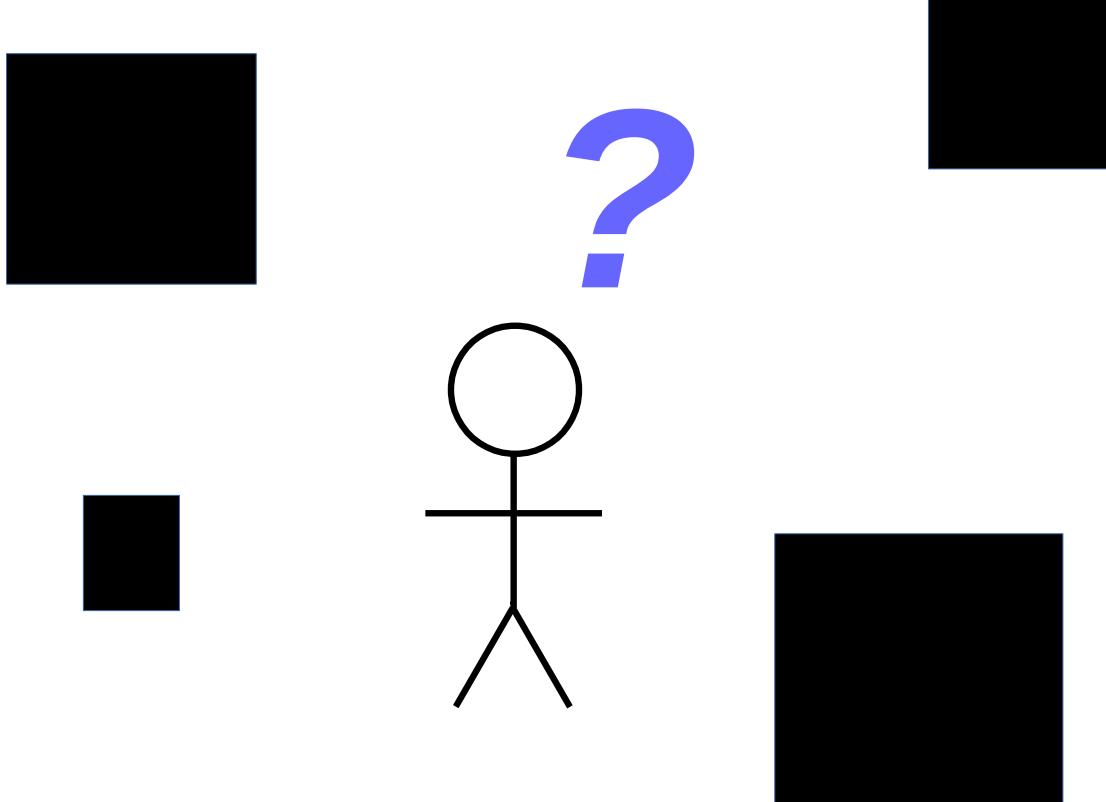
Acelerador de partículas del CERN

Motor: La curiosidad



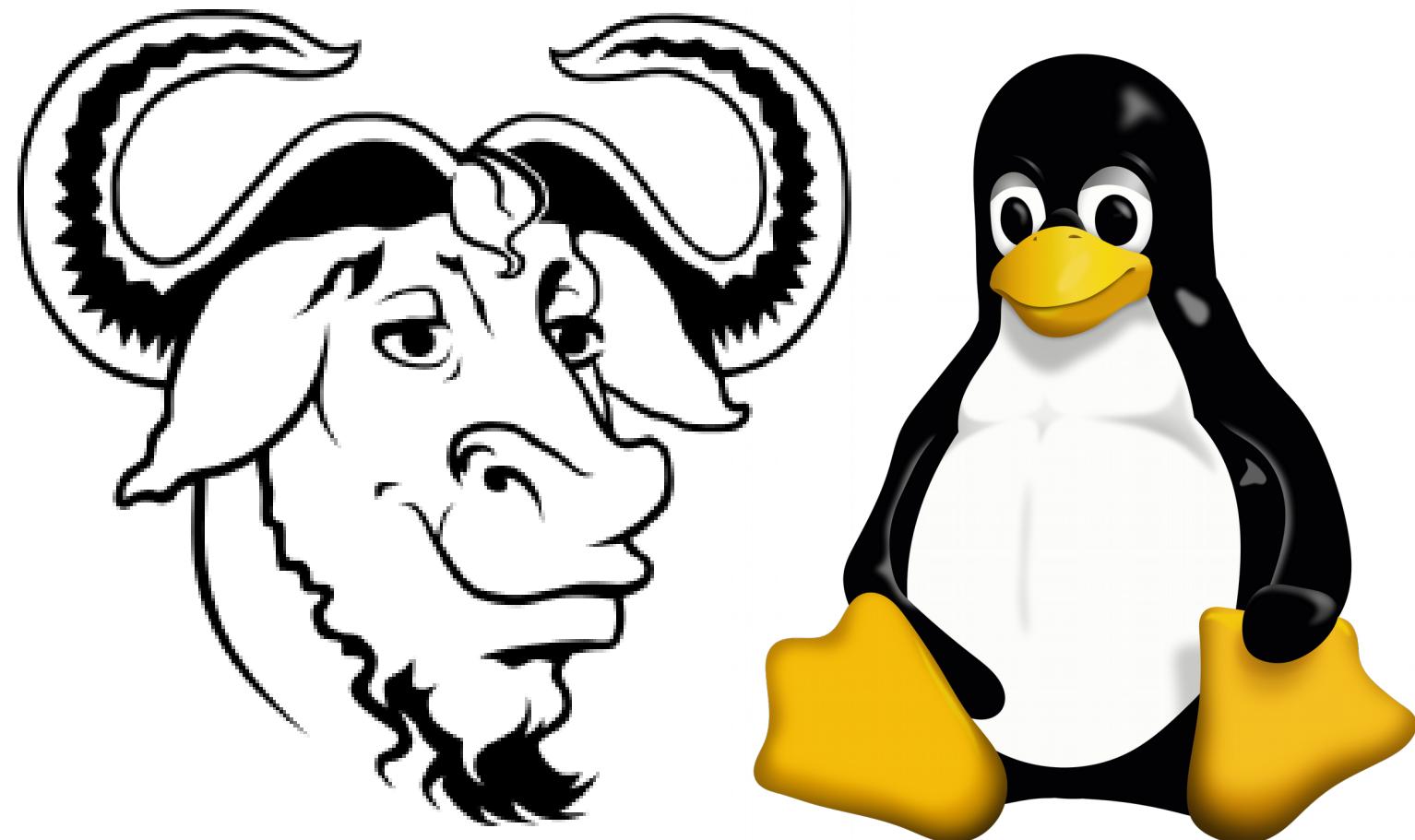
Marte

Nuevas tecnologías



Sociedad de cajas negras

Software Libre (1985)



El código...

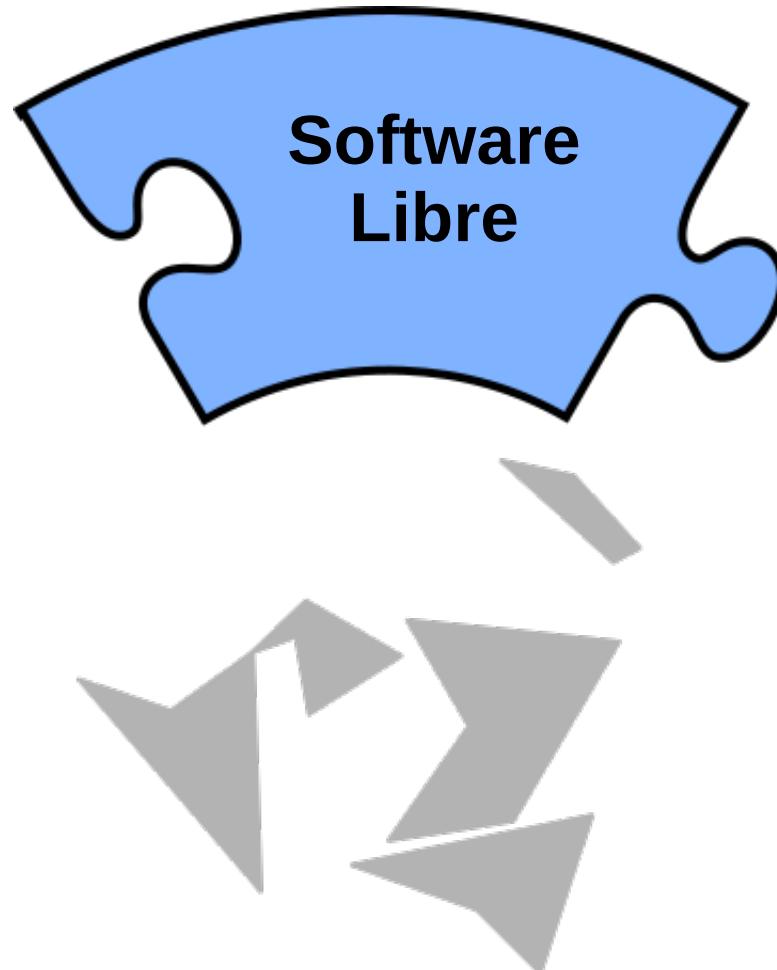
Builder3D.cpp — ~/develop/FreeCAD/src/Base — Atom

```
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;
```

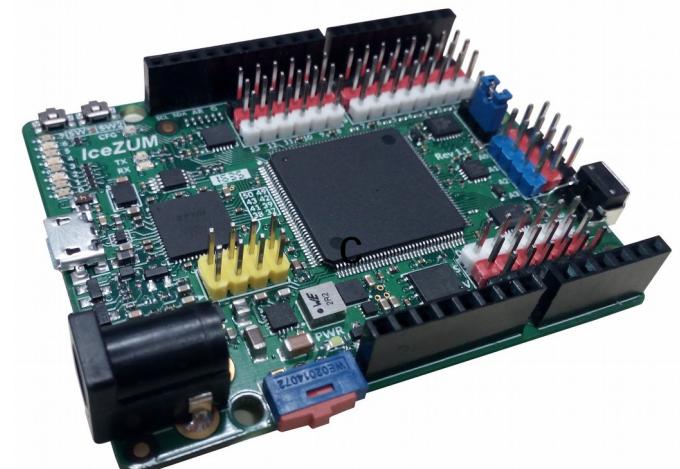
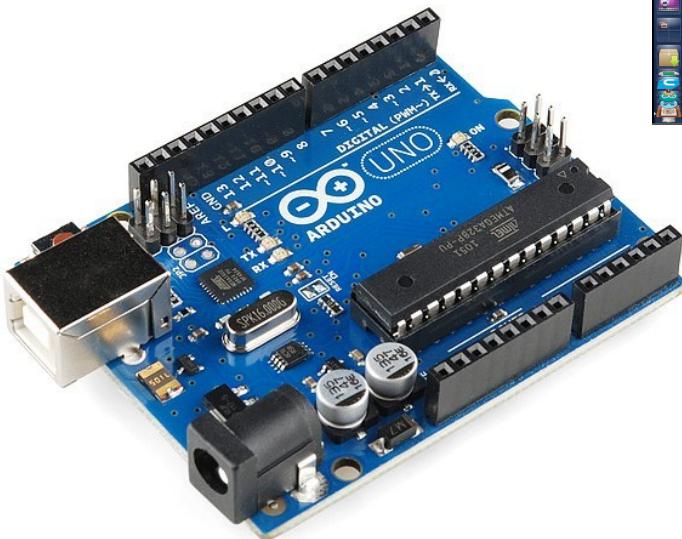
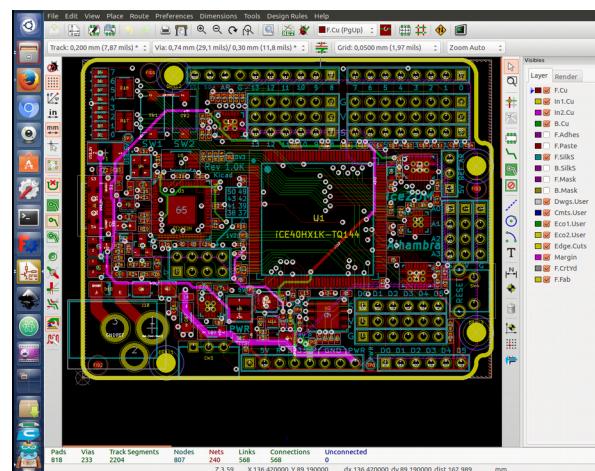
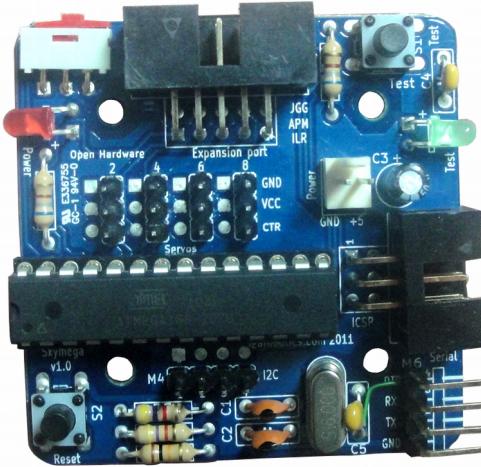
Builder3D.cpp 0 0 0 1:1

LF UTF-8 C++ master 2 updates

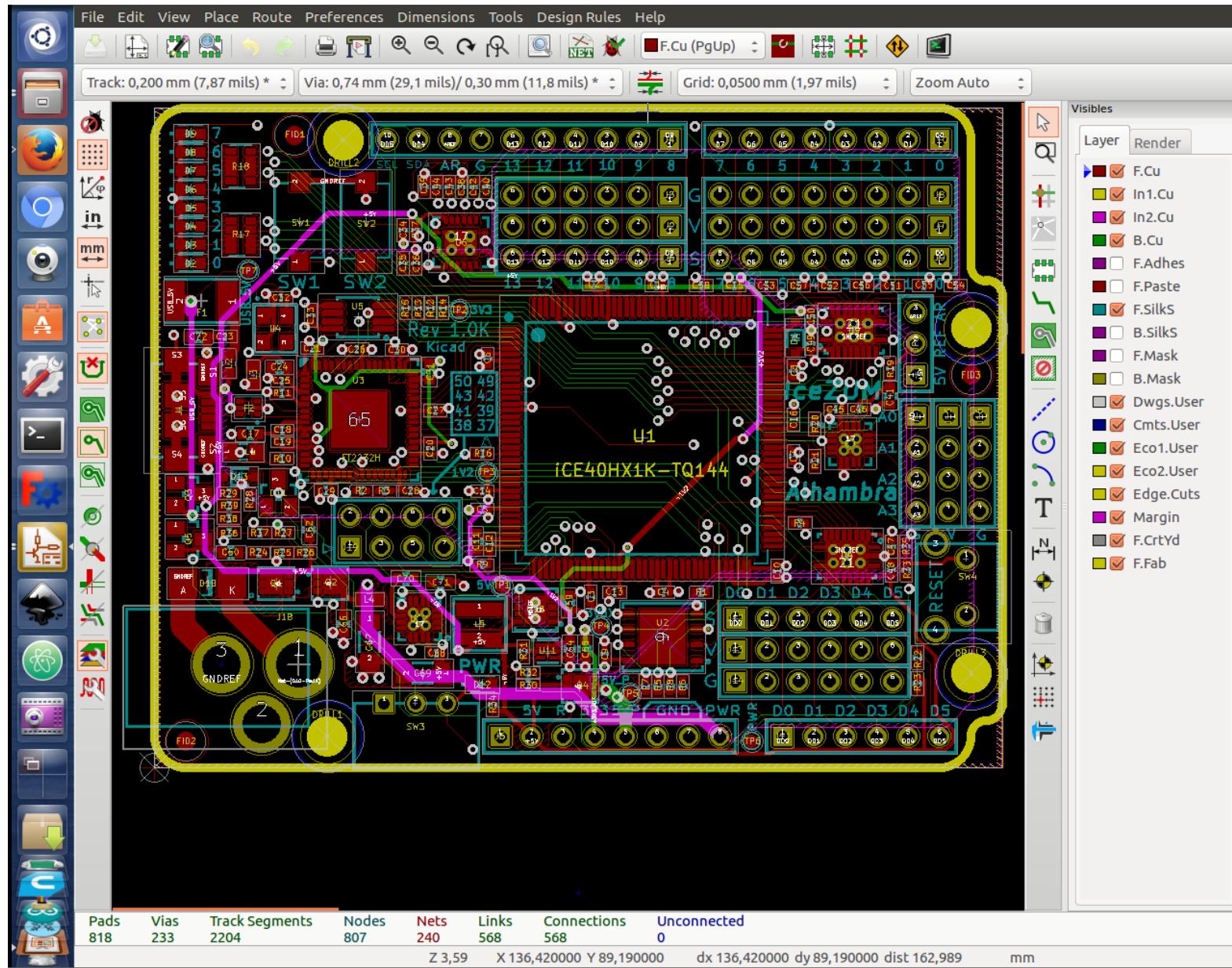
Patrimonio tecnológico de la humanidad



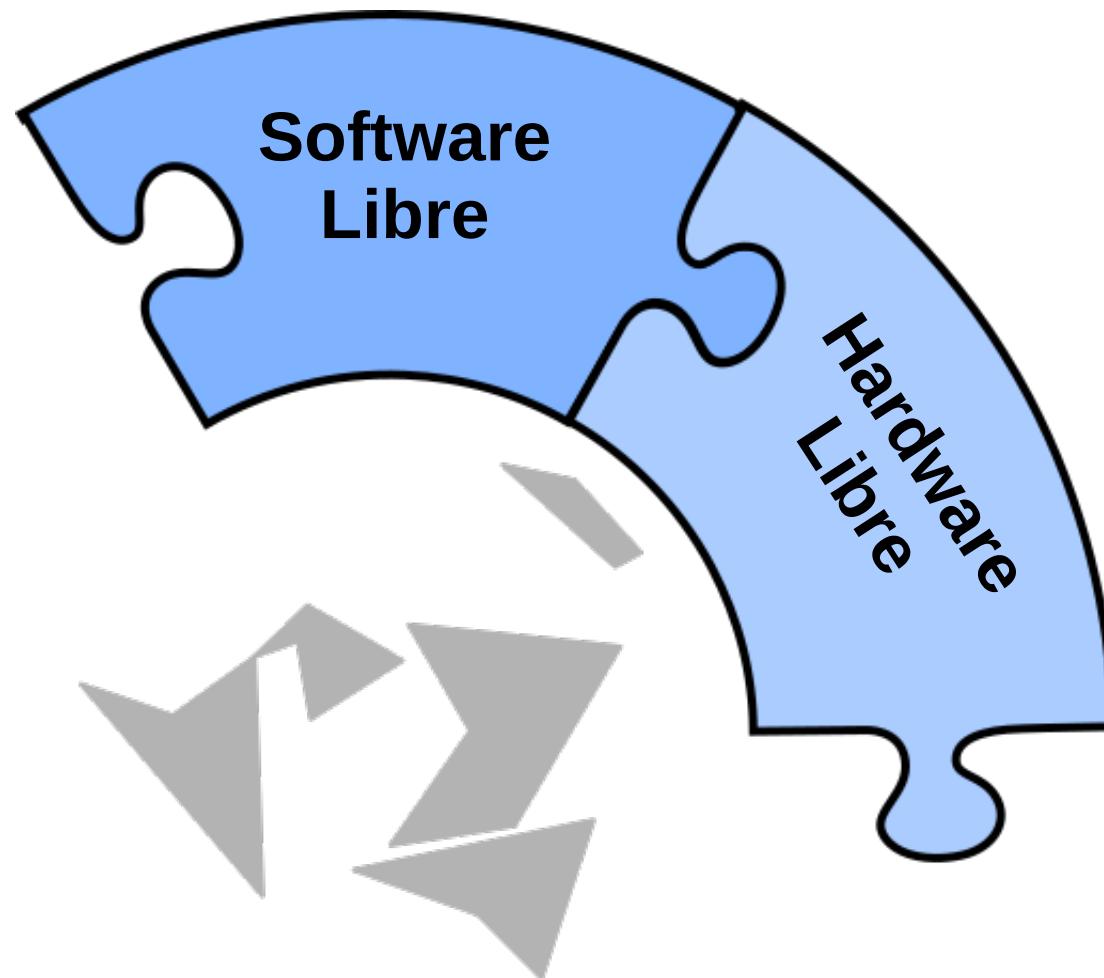
Hardware libre (2001)



Los planos...



Hardware libre



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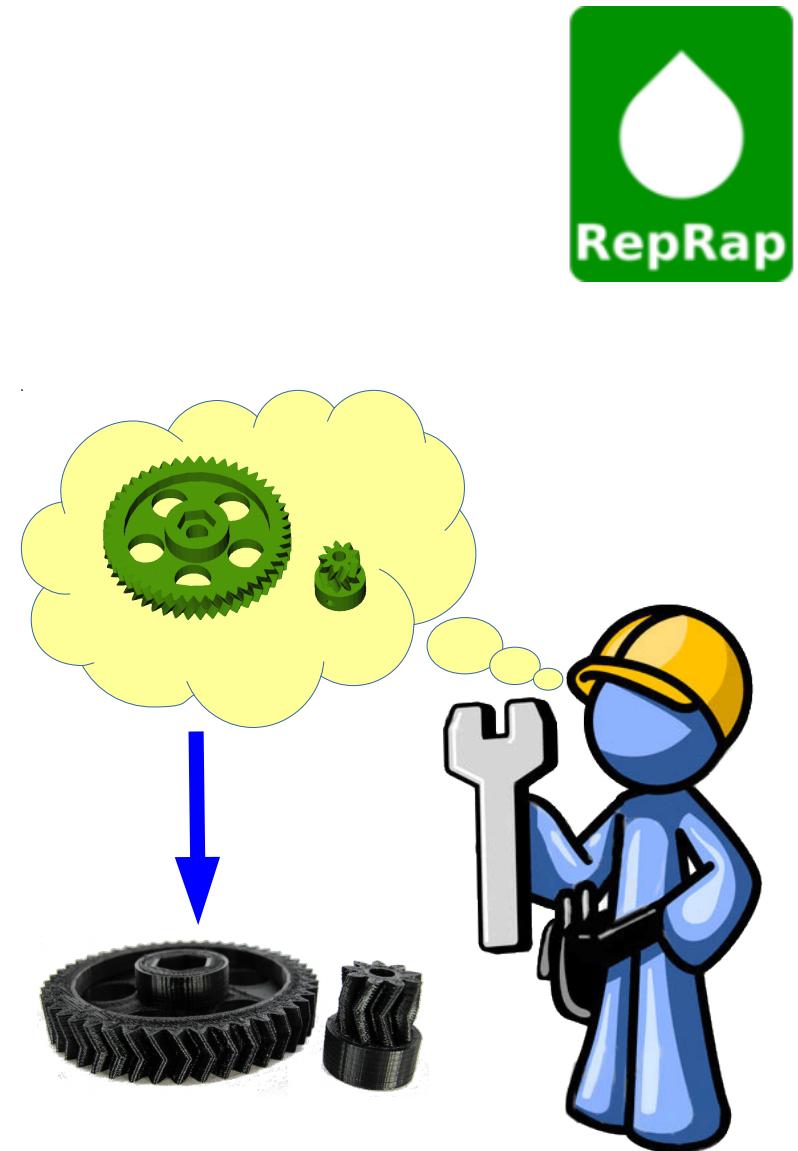
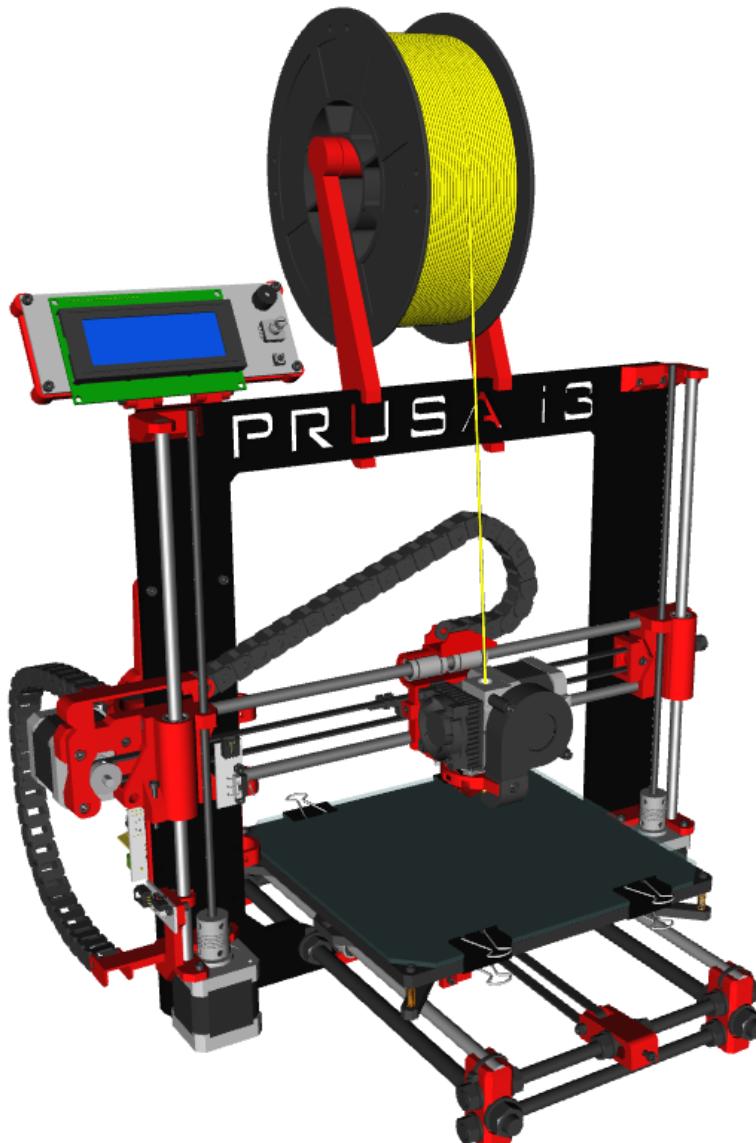
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2006



Impresoras 3D Libres (2008)



Orígenes



Con Adrian Bowyer

Taller de Reprap en MADRID

FEBRERO 2009 - MEDIALAB PRADO



Orígenes (II)

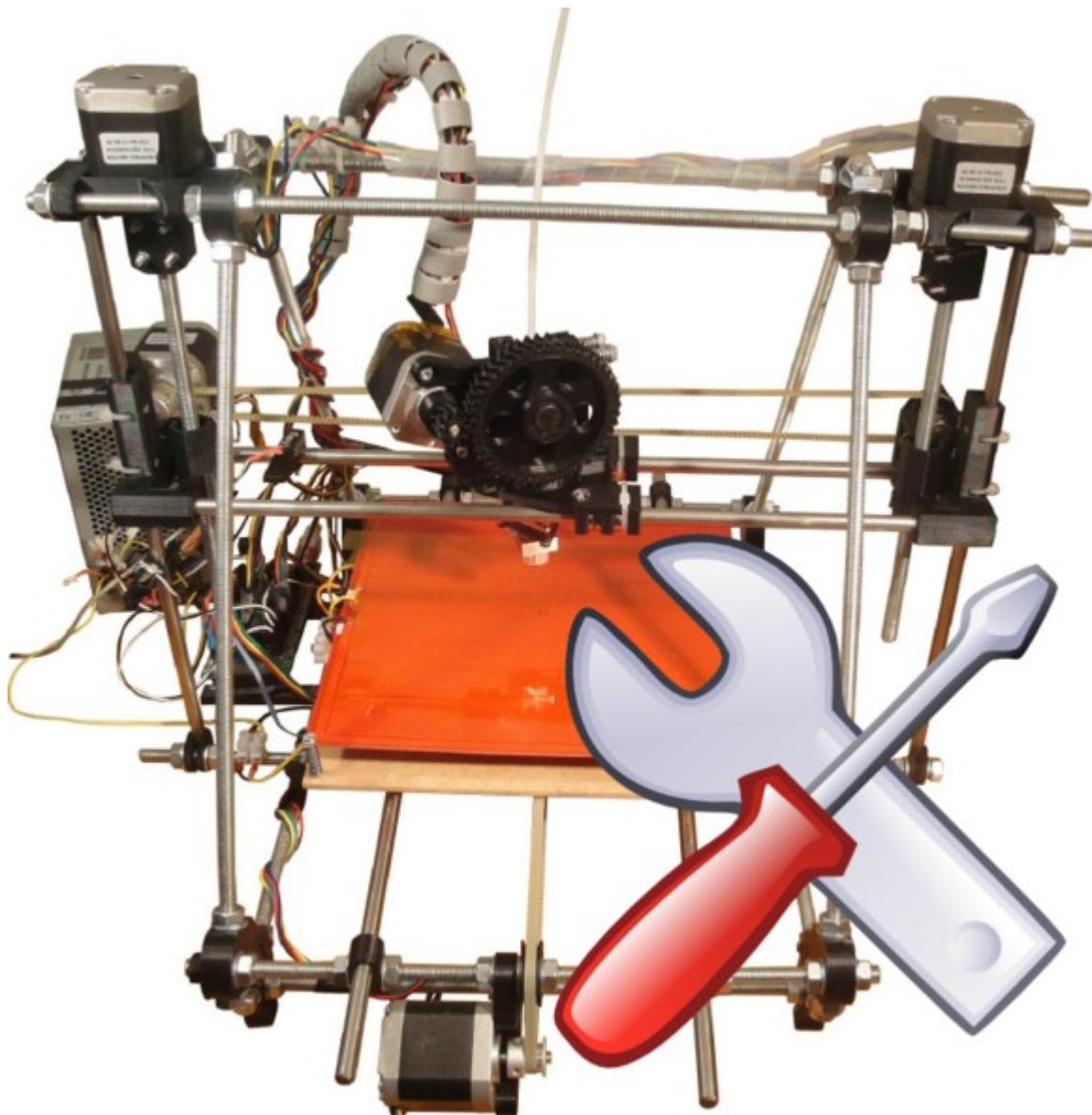


Con Zach Smith, fundador de Makerbot

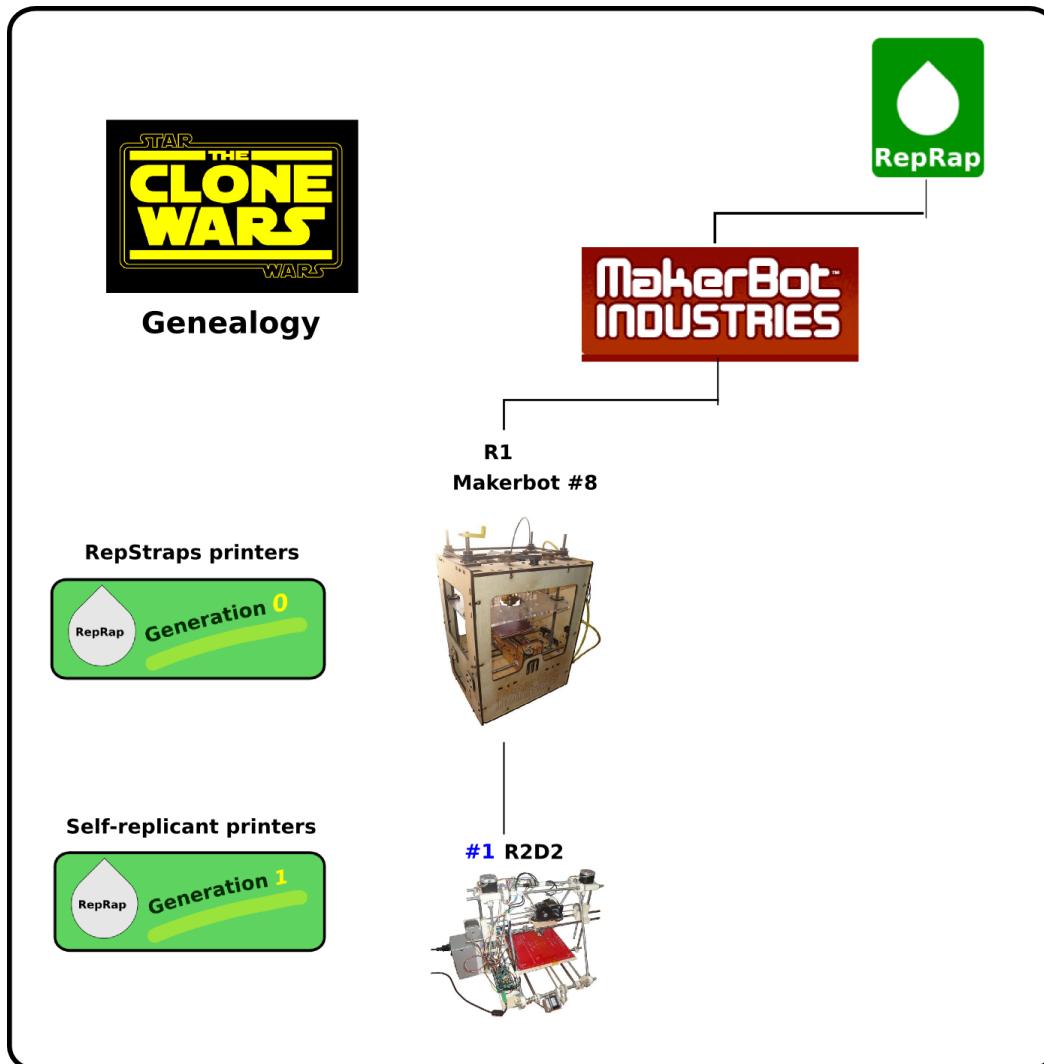


Makerbot número 8 en el mundo! 

Tutoriales Prusa i2

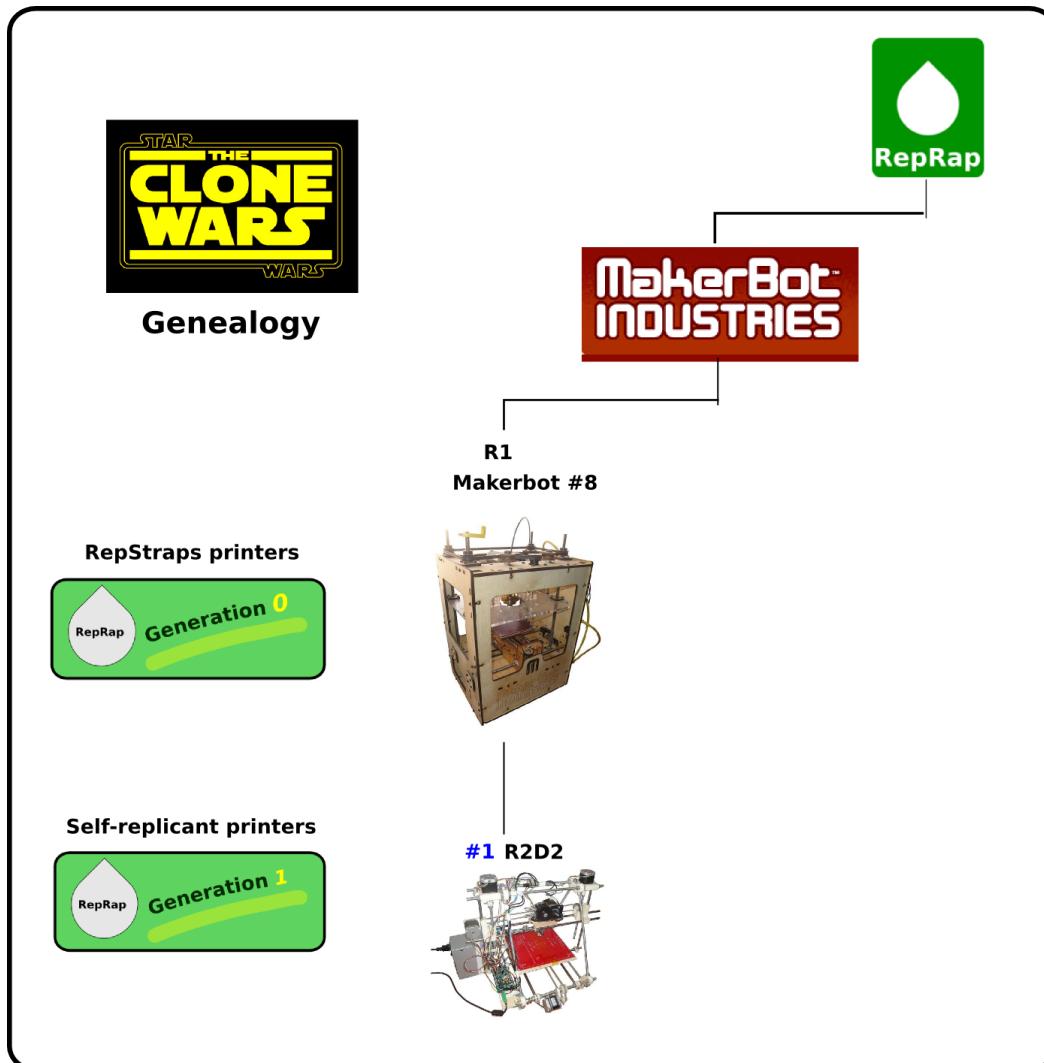


Clone wars: Dic/2011



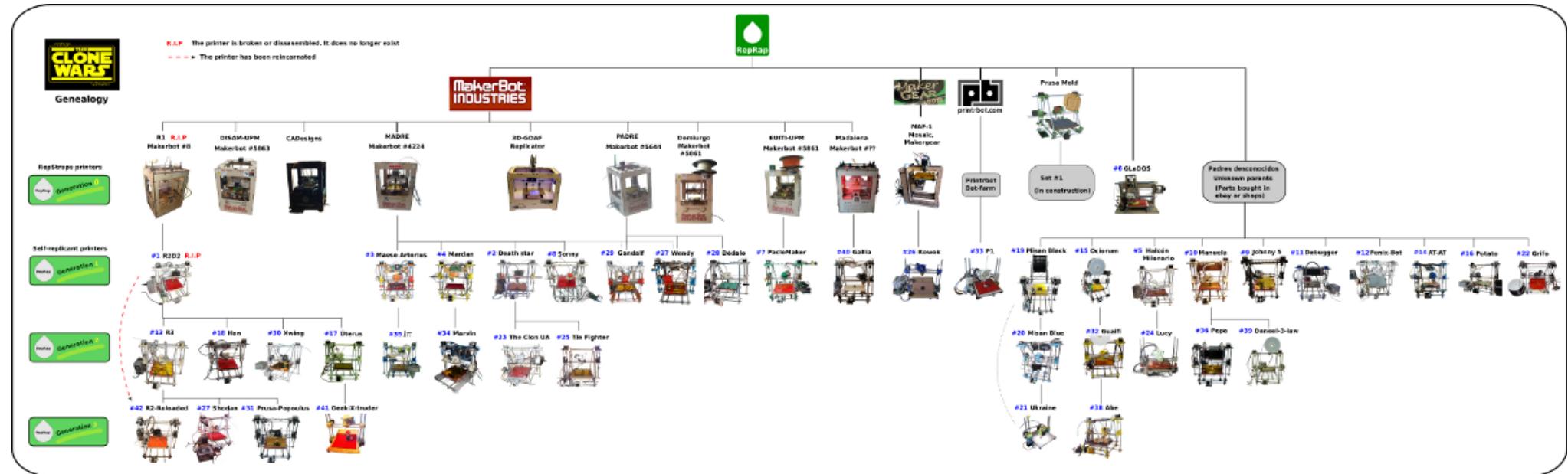
Clones: 1

Clone wars: Dic/2011



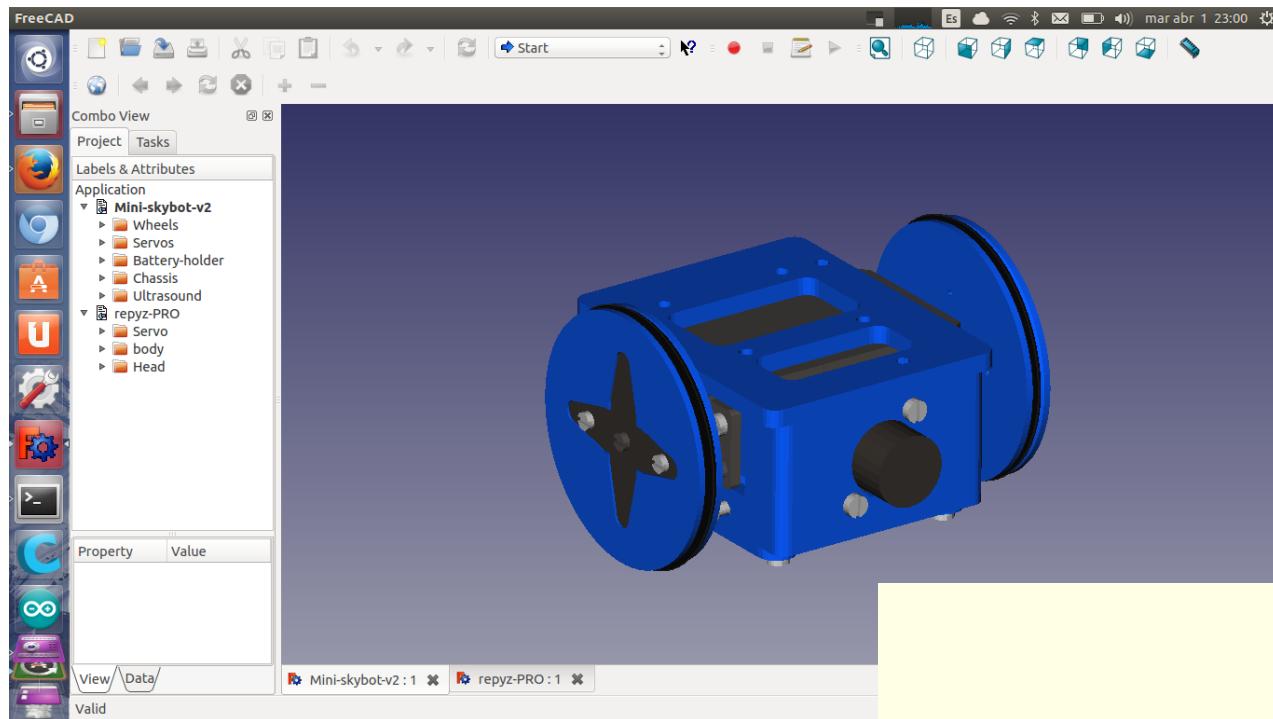
Clones: 1

Clone wars: Agosto/2012

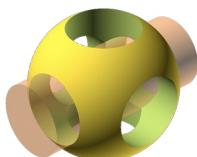


- Clones: 42
 - Crecimiento exponencial

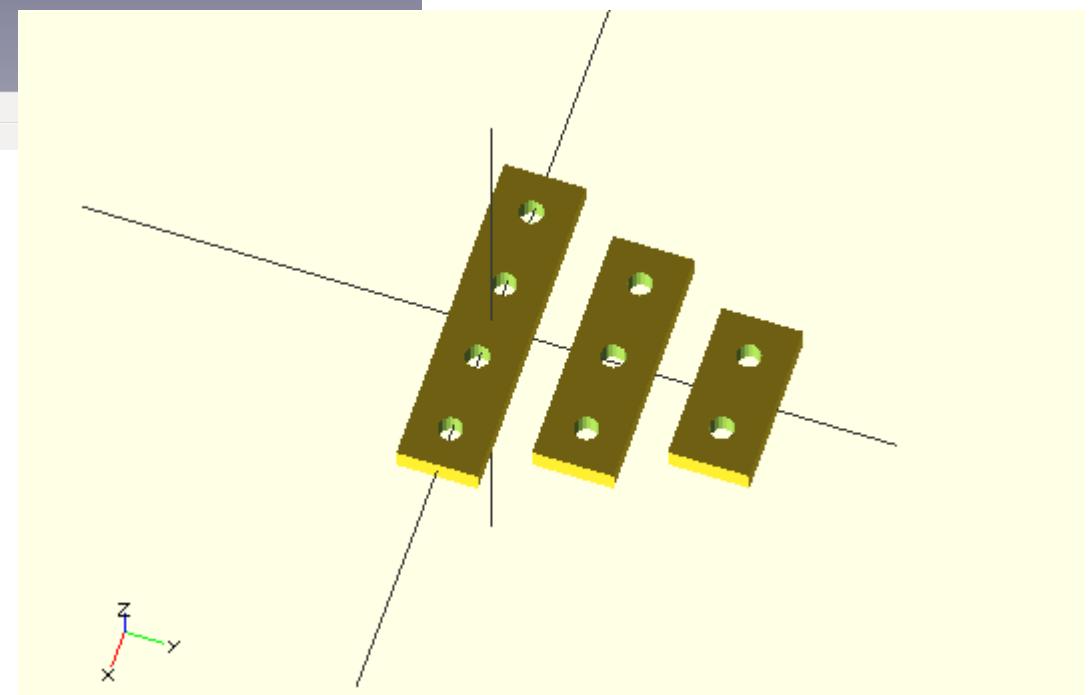
Tutoriales diseño 3D: Freecad y OpenScad



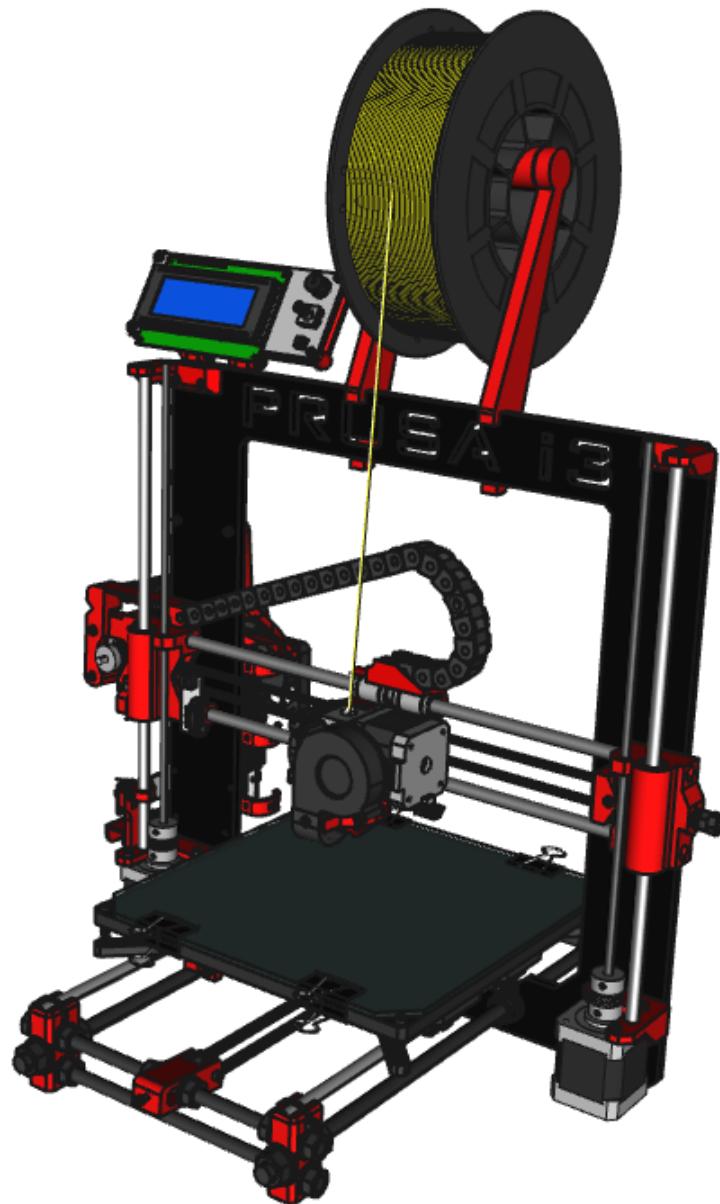
Freecad



OpenScad



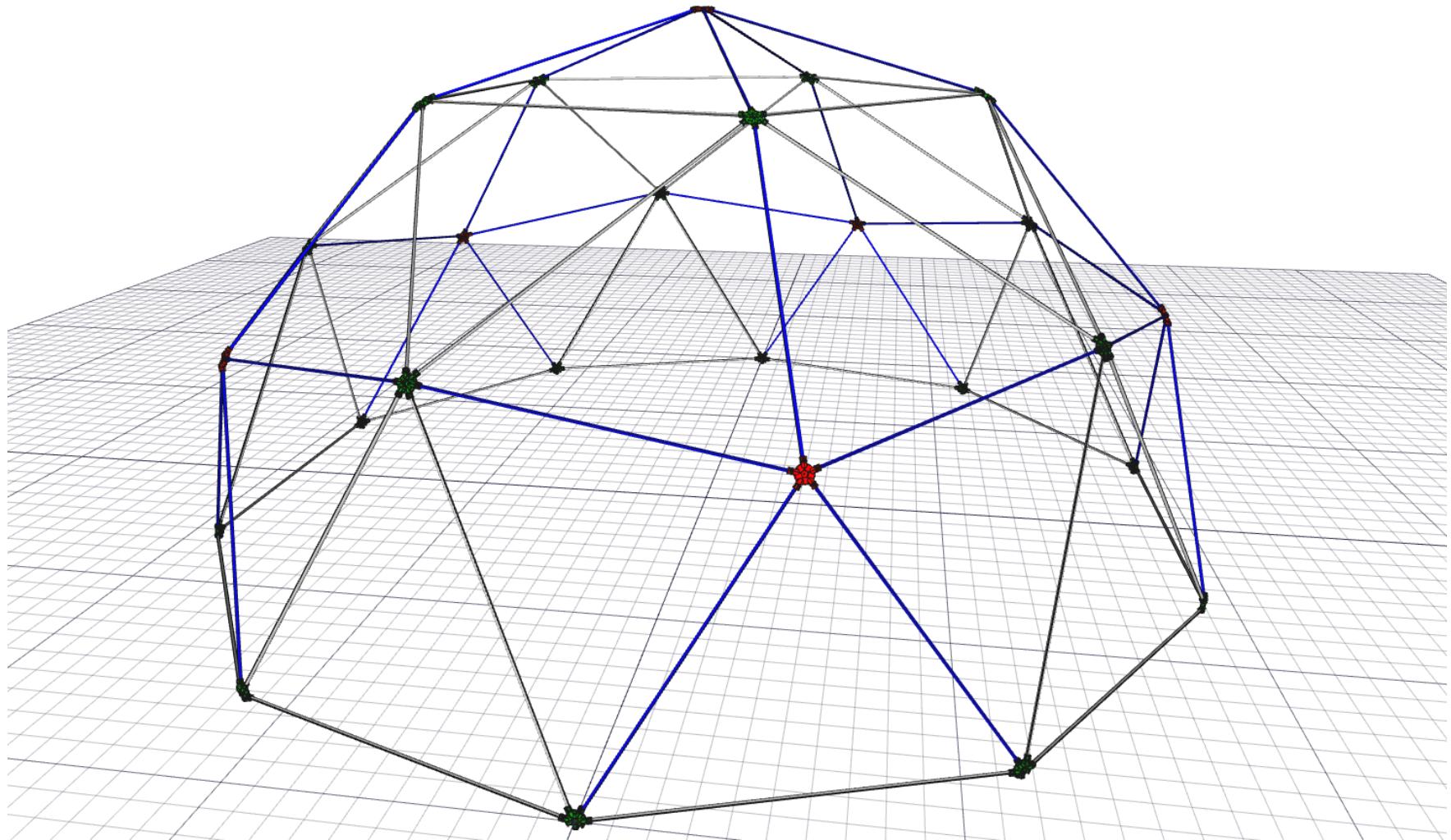
Los planos...



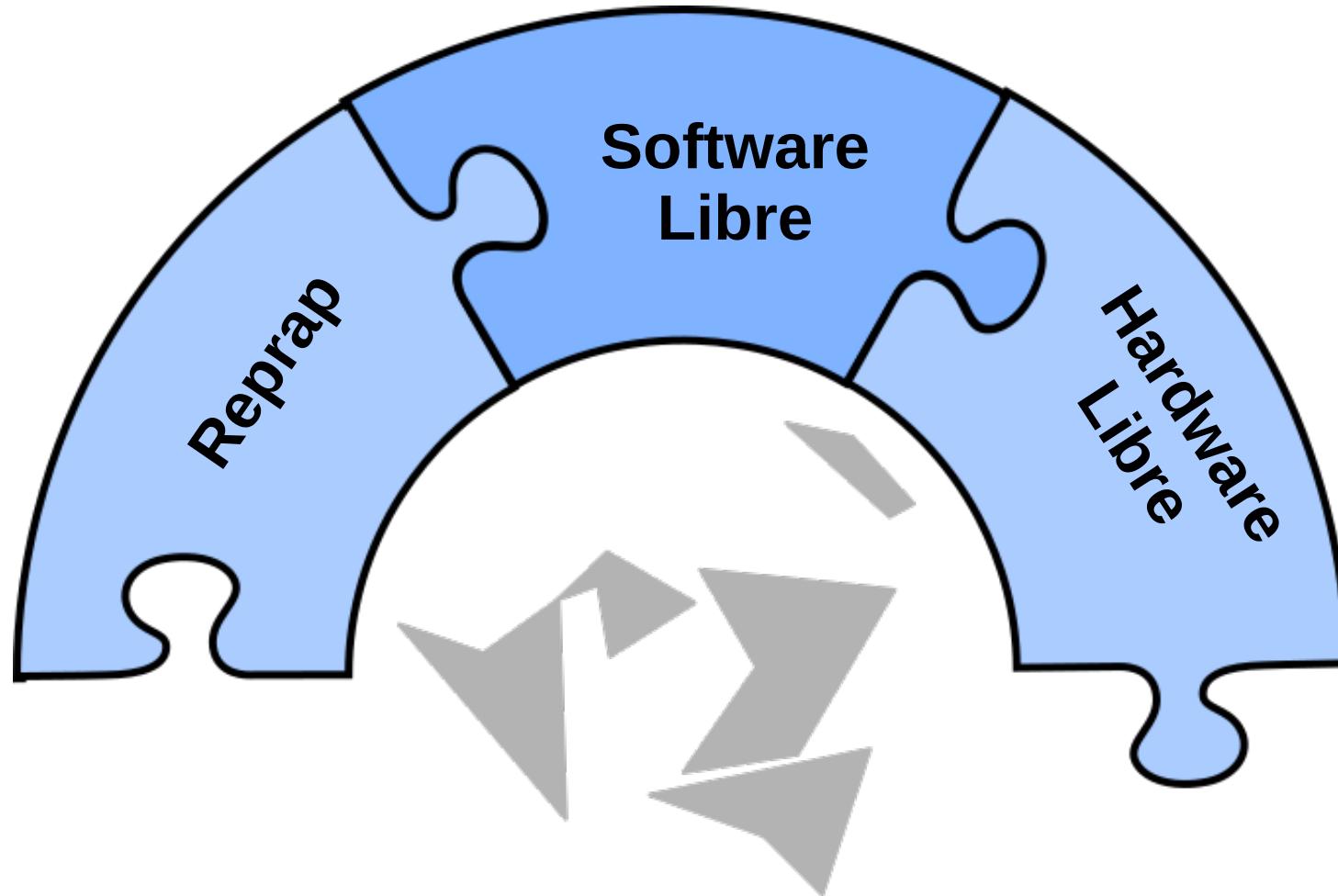
Con las impresoras 3D podemos construir otras cosas...



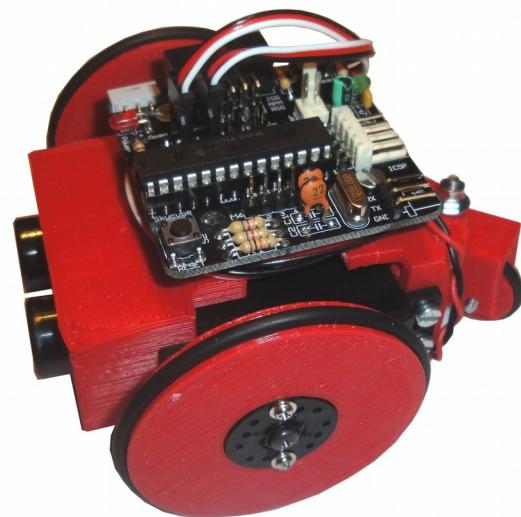
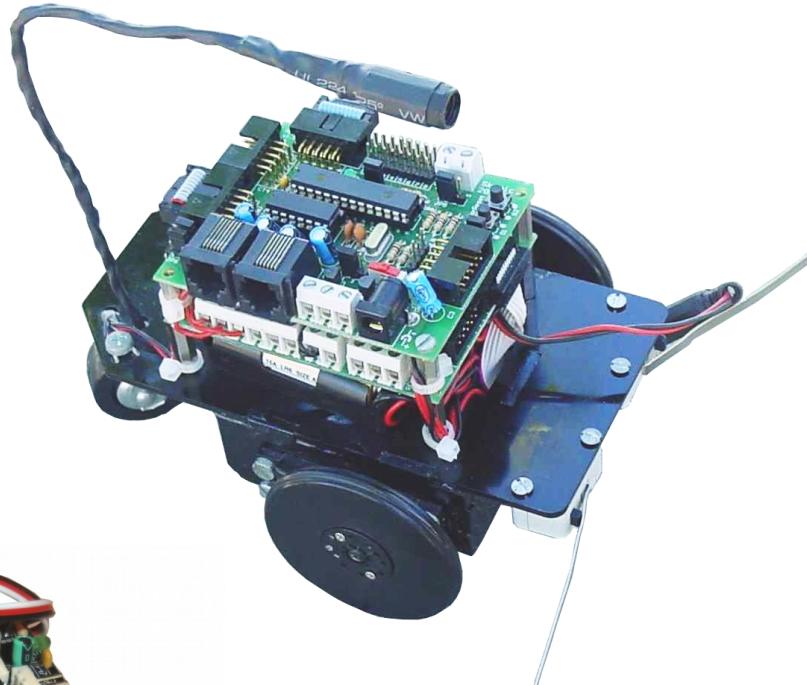
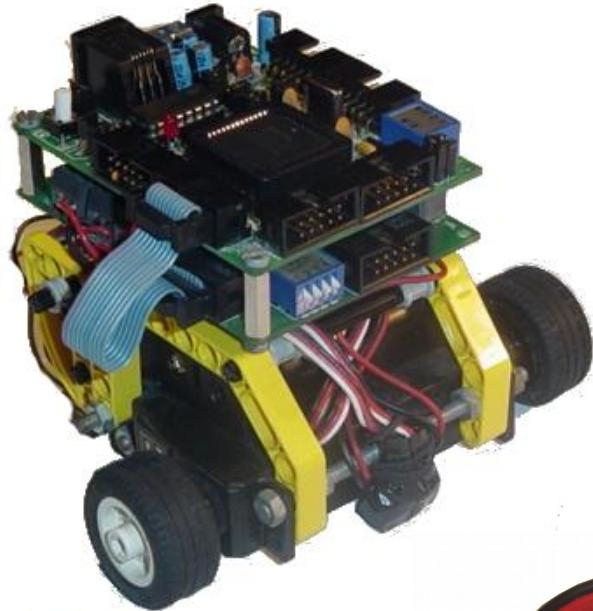
Domo



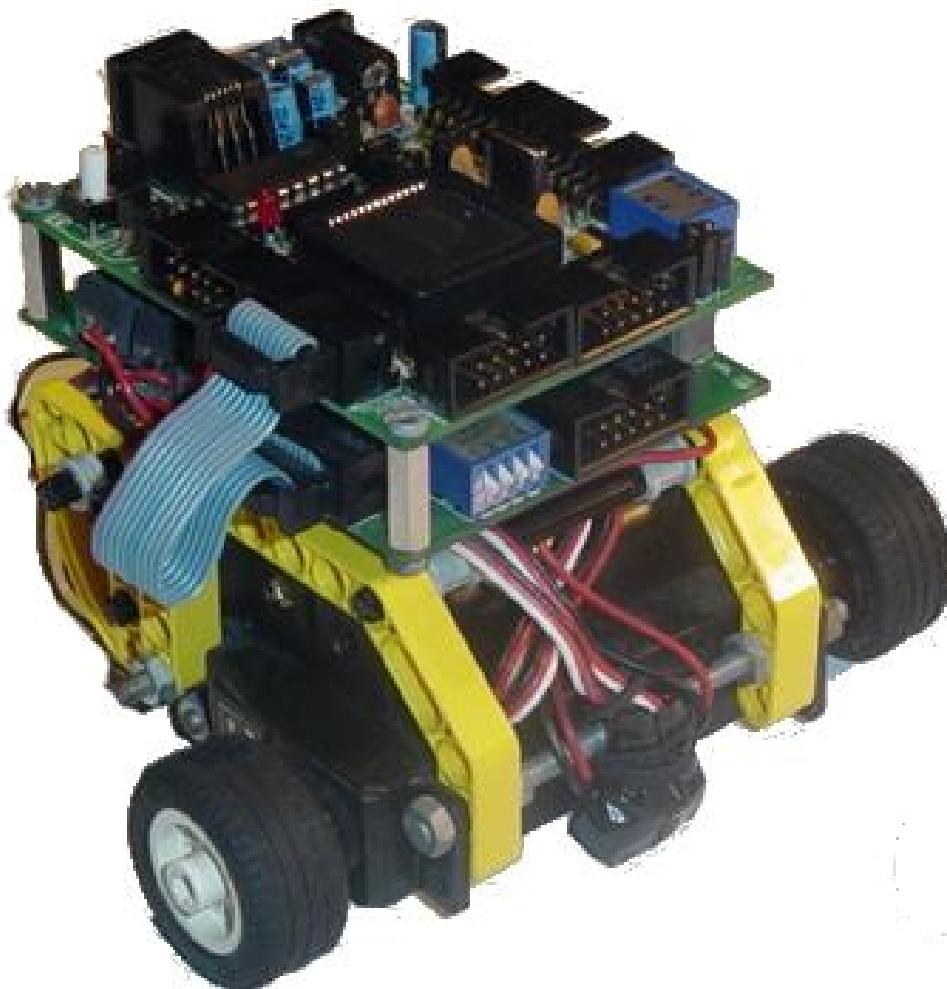
Impresoras 3D libres



Robots educativos libres



Tritt: Primer Mini-robot (1996)

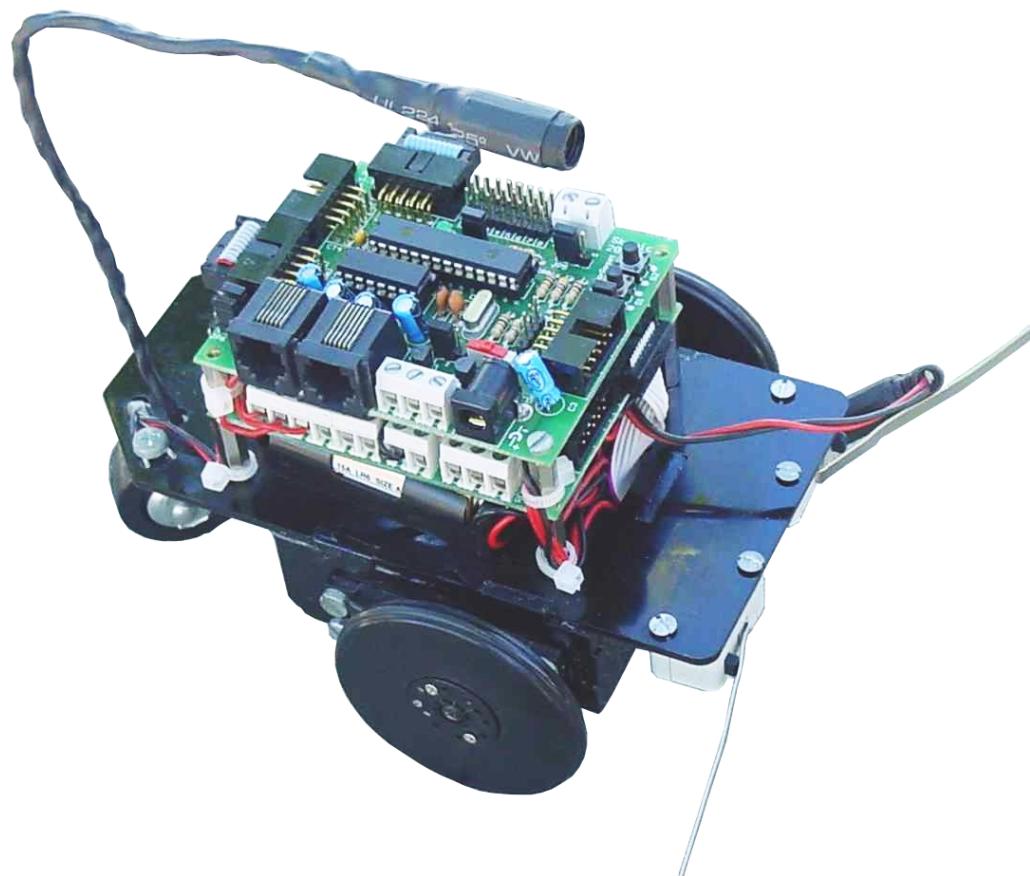


- Derivado del Rug Warrior (MIT)
- Piezas de Lego
- Servos Trucados
- Micro 6811 de Motorola
- Libre

Problemas:

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

Skybot (2005)

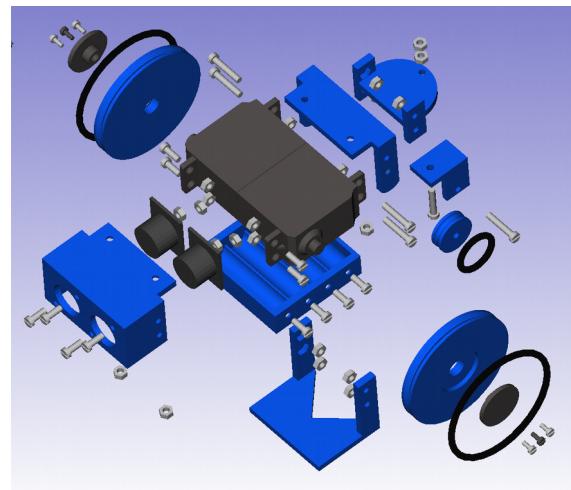
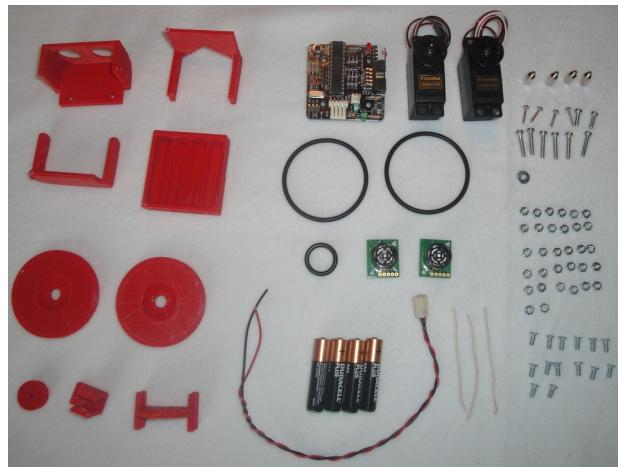
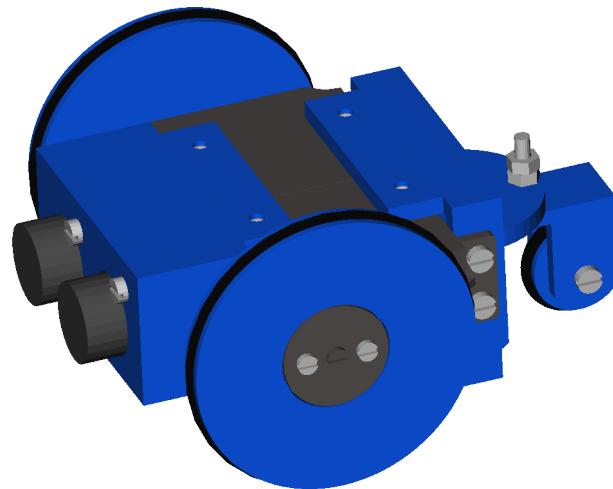
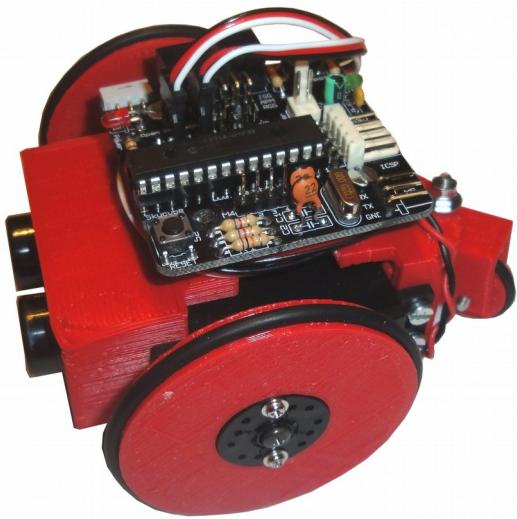


- Robot libre
- Piezas cortadas por láser
- Ruedas mecanizadas
- Tarjeta Skypic: Micro PIC16F876A

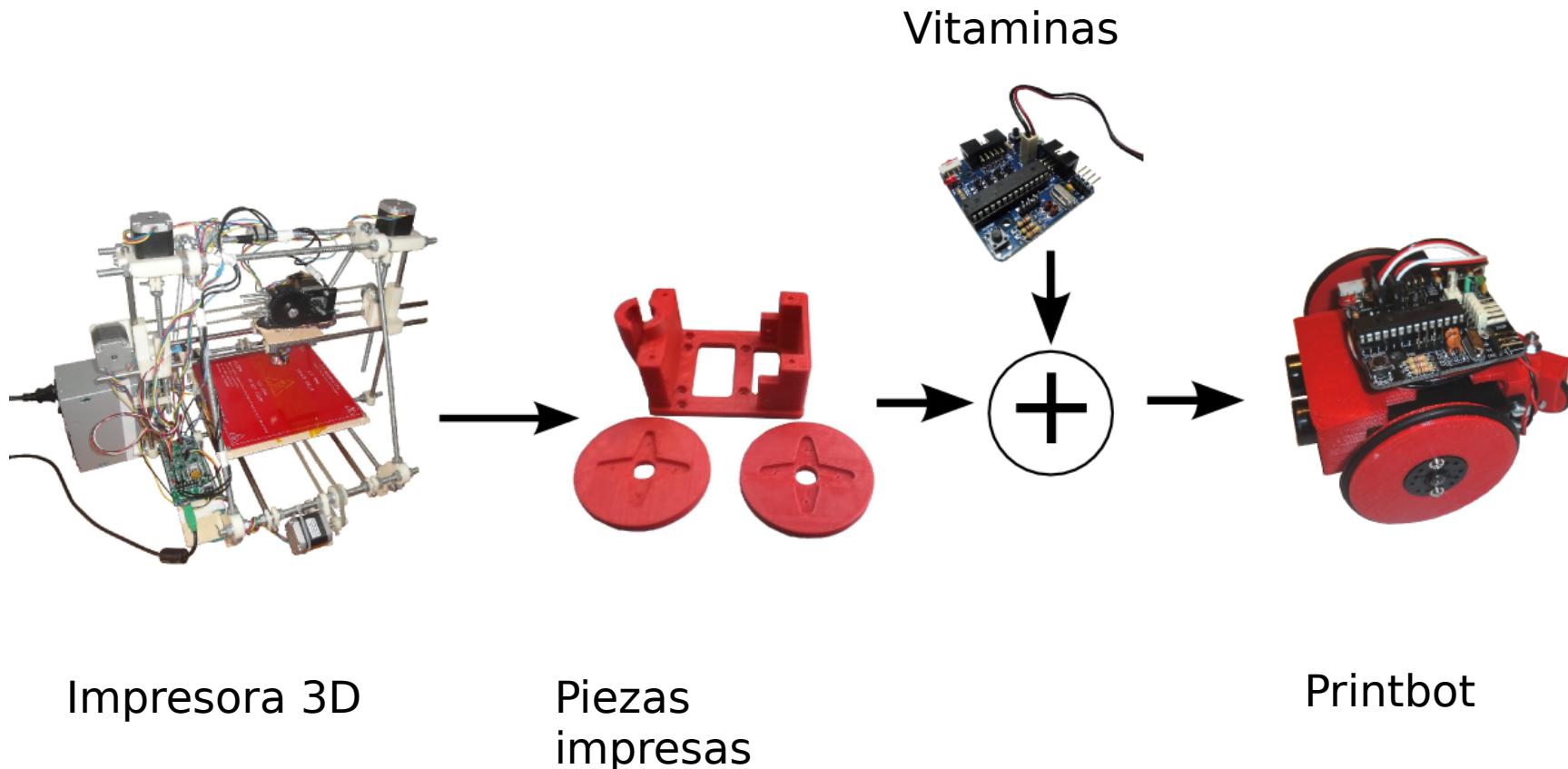
Problemas:

- ¡No evoluciona!
- ¡No hay comunidad!

Miniskybot (2011)



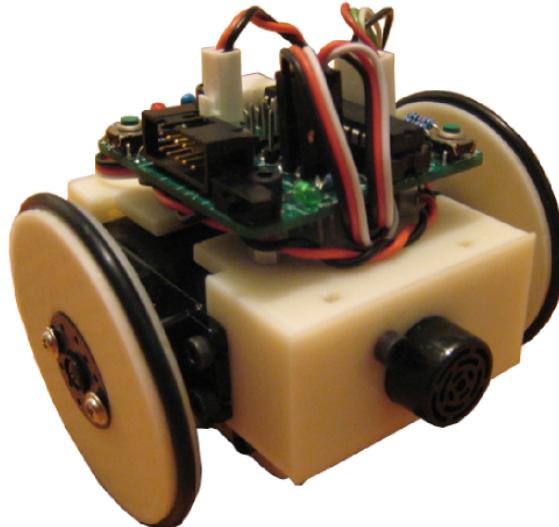
Printbots



Telecacias



• Cw Kreimer (Pittsburgh, USA)



Primera Tele-copia

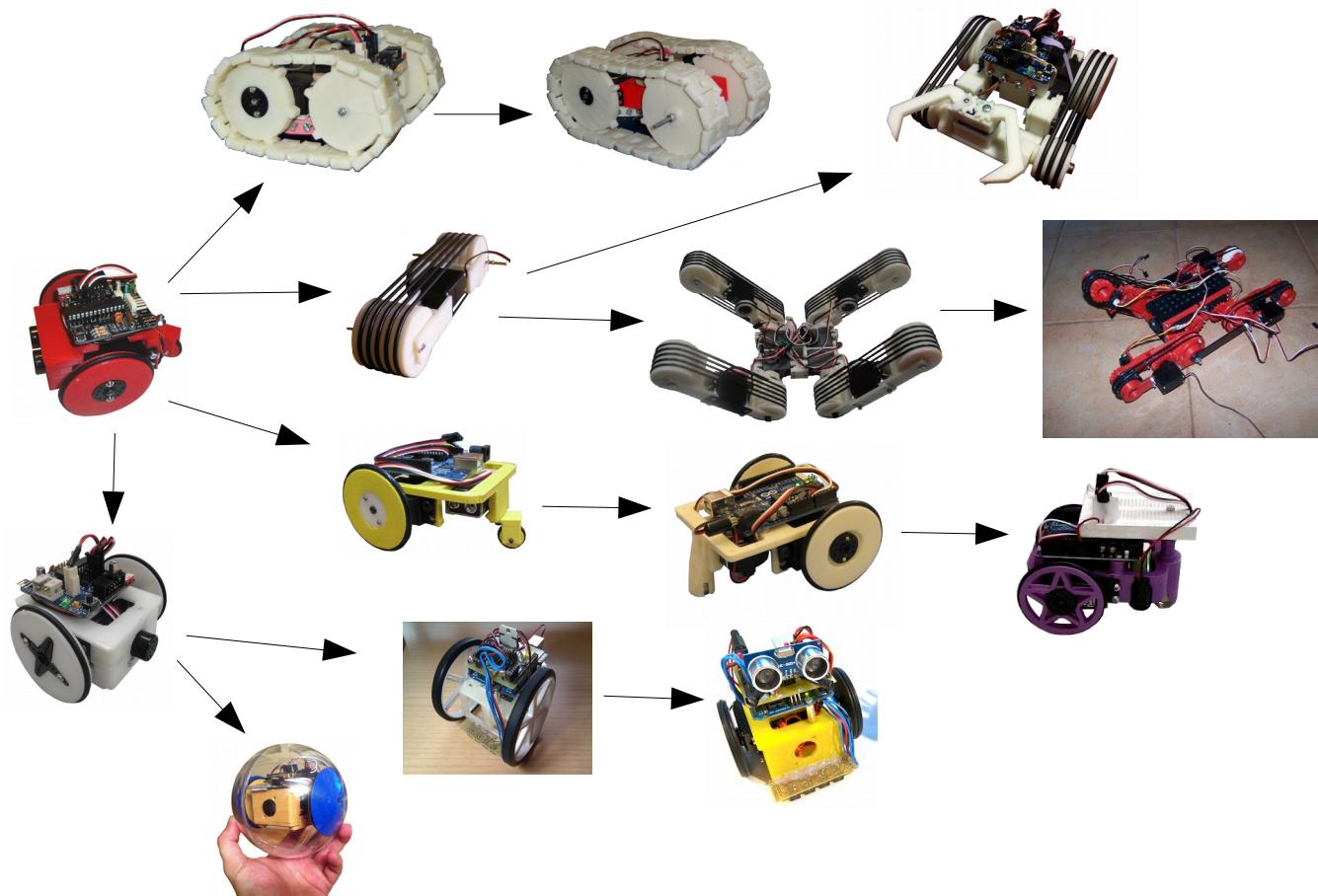


• Hackerspace Adelaida (AUSTRALIA)

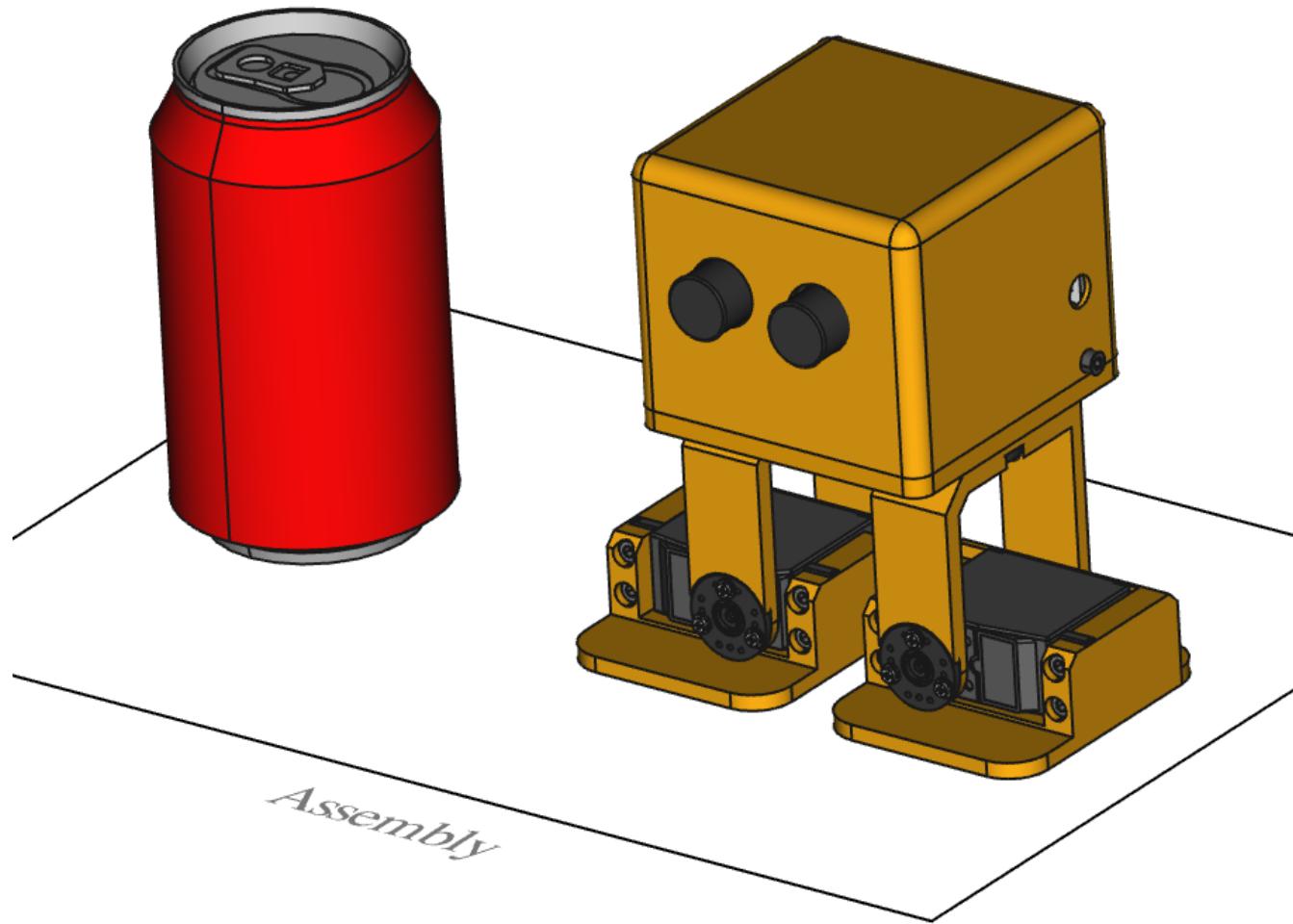


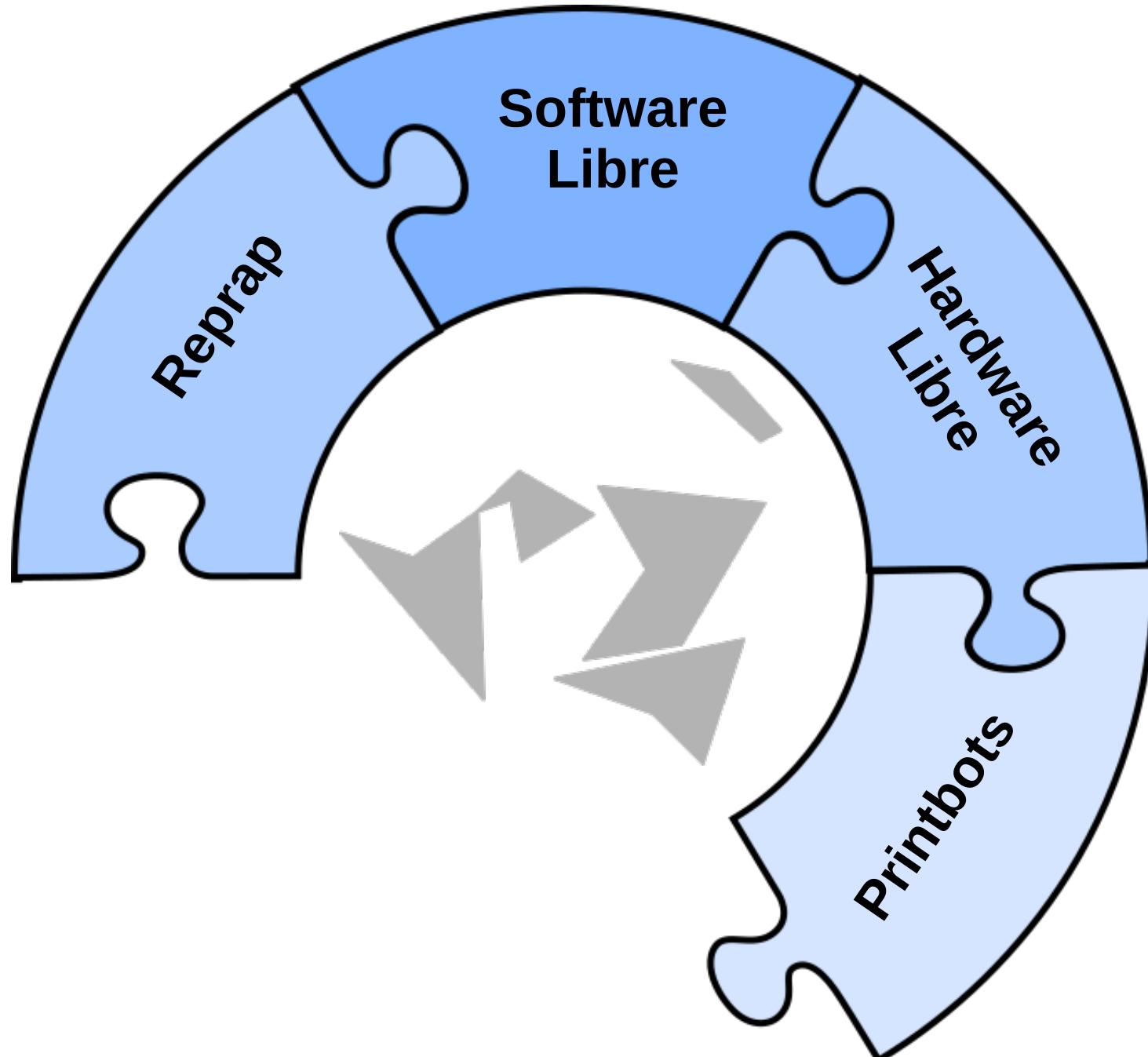
Segunda Tele-copia

Evolución y diversificación

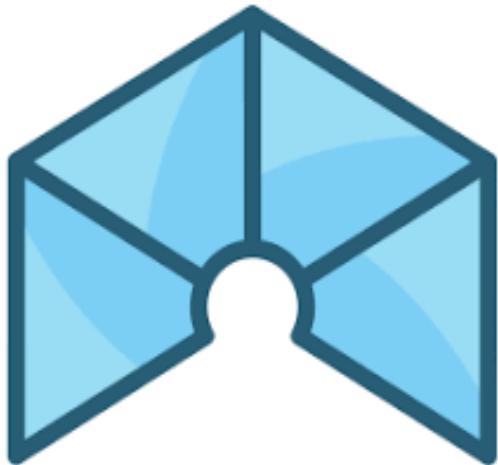
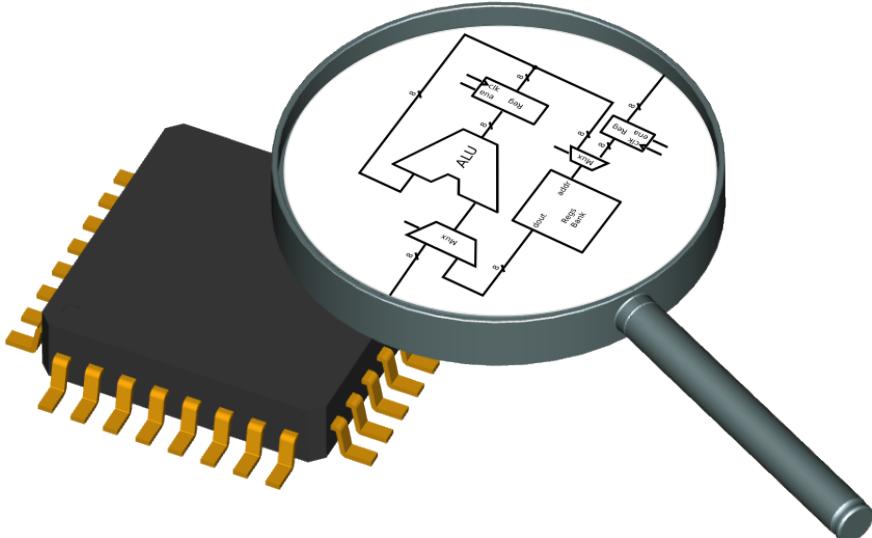


Zowi



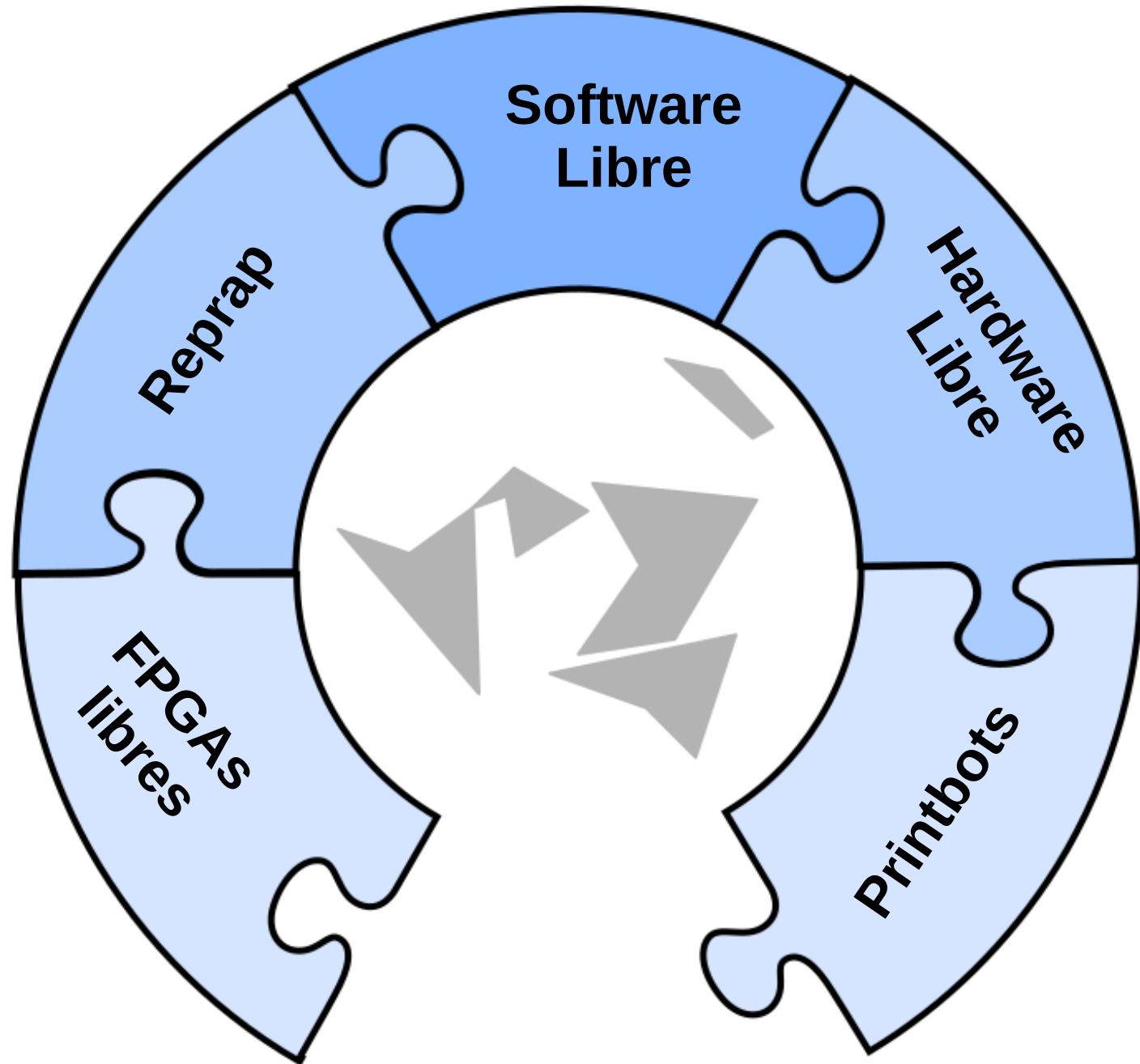


FPGAs libres (2015)



| | | | | | | | | | | | | | |
|--------------|-----------------|-----------------|----------------|-----------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------|------------------|---------------|
| | IO (1 17) | IO (2 17) | IO (3 17) | IO (4 17) | IO (5 17) | IO (6 17) | IO (7 17) | IO (8 17) | IO (9 17) | IO (10 17) | IO (11 17) | IO (12 17) | IO (13 16) |
| IO (0 16) | LOGIC (1 16) | LOGIC (2 16) | RAMT (3 16) | LOGIC (4 16) | LOGIC (5 16) | LOGIC (6 16) | LOGIC (7 16) | LOGIC (8 16) | LOGIC (9 16) | RAMT (10 16) | LOGIC (11 16) | LOGIC (12 16) | IO (13 16) |
| IO (0 15) | LOGIC (1 15) | LOGIC (2 15) | RAMB (3 15) | LOGIC (4 15) | LOGIC (5 15) | LOGIC (6 15) | LOGIC (7 15) | LOGIC (8 15) | LOGIC (9 15) | RAMB (10 15) | LOGIC (11 15) | LOGIC (12 15) | IO (13 15) |
| IO (0 14) | LOGIC (1 14) | LOGIC (2 14) | RAMT (3 14) | LOGIC (4 14) | LOGIC (5 14) | LOGIC (6 14) | LOGIC (7 14) | LOGIC (8 14) | LOGIC (9 14) | RAMT (10 14) | LOGIC (11 14) | LOGIC (12 14) | IO (13 14) |
| IO (0 13) | LOGIC (1 13) | LOGIC (2 13) | RAMB (3 13) | LOGIC (4 13) | LOGIC (5 13) | LOGIC (6 13) | LOGIC (7 13) | LOGIC (8 13) | LOGIC (9 13) | RAMB (10 13) | LOGIC (11 13) | LOGIC (12 13) | IO (13 13) |
| IO (0 12) | LOGIC (1 12) | LOGIC (2 12) | RAMT (3 12) | LOGIC (4 12) | LOGIC (5 12) | LOGIC (6 12) | LOGIC (7 12) | LOGIC (8 12) | LOGIC (9 12) | RAMT (10 12) | LOGIC (11 12) | LOGIC (12 12) | IO (13 12) |
| IO (0 11) | LOGIC (1 11) | LOGIC (2 11) | RAMB (3 11) | LOGIC (4 11) | LOGIC (5 11) | LOGIC (6 11) | LOGIC (7 11) | LOGIC (8 11) | LOGIC (9 11) | RAMB (10 11) | LOGIC (11 11) | LOGIC (12 11) | IO (13 11) |
| IO (0 10) | LOGIC (1 10) | LOGIC (2 10) | RAMT (3 10) | LOGIC (4 10) | LOGIC (5 10) | LOGIC (6 10) | LOGIC (7 10) | LOGIC (8 10) | LOGIC (9 10) | RAMT (10 10) | LOGIC (11 10) | LOGIC (12 10) | IO (13 10) |
| IO (0 9) | LOGIC (1 9) | LOGIC (2 9) | RAMB (3 9) | LOGIC (4 9) | LOGIC (5 9) | LOGIC (6 9) | LOGIC (7 9) | LOGIC (8 9) | LOGIC (9 9) | RAMB (10 9) | LOGIC (11 9) | LOGIC (12 9) | IO (13 9) |
| IO (0 8) | LOGIC (1 8) | LOGIC (2 8) | RAMT (3 8) | LOGIC (4 8) | LOGIC (5 8) | LOGIC (6 8) | LOGIC (7 8) | LOGIC (8 8) | LOGIC (9 8) | RAMT (10 8) | LOGIC (11 8) | LOGIC (12 8) | IO (13 8) |
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| IO (0 4) | LOGIC (1 4) | LOGIC (2 4) | RAMT (3 4) | LOGIC (4 4) | LOGIC (5 4) | LOGIC (6 4) | LOGIC (7 4) | LOGIC (8 4) | LOGIC (9 4) | RAMT (10 4) | LOGIC (11 4) | LOGIC (12 4) | IO (13 4) |
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| IO (0 2) | LOGIC (1 2) | LOGIC (2 2) | RAMT (3 2) | LOGIC (4 2) | LOGIC (5 2) | LOGIC (6 2) | LOGIC (7 2) | LOGIC (8 2) | LOGIC (9 2) | RAMT (10 2) | LOGIC (11 2) | LOGIC (12 2) | IO (13 2) |
| IO (0 1) | LOGIC (1 1) | LOGIC (2 1) | RAMB (3 1) | LOGIC (4 1) | LOGIC (5 1) | LOGIC (6 1) | LOGIC (7 1) | LOGIC (8 1) | LOGIC (9 1) | RAMB (10 1) | LOGIC (11 1) | LOGIC (12 1) | IO (13 1) |
| | IO (1 0) | IO (2 0) | IO (3 0) | IO (4 0) | IO (5 0) | IO (6 0) | IO (7 0) | IO (8 0) | IO (9 0) | IO (10 0) | IO (11 0) | IO (12 0) | |

Patrimonio tecnológico humanidad



Bibliotecas de conocimiento tecnológico



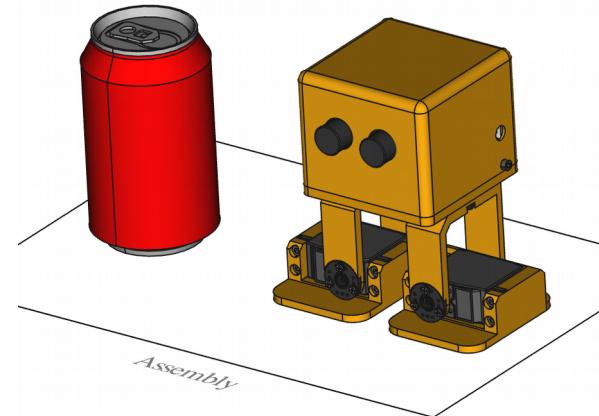
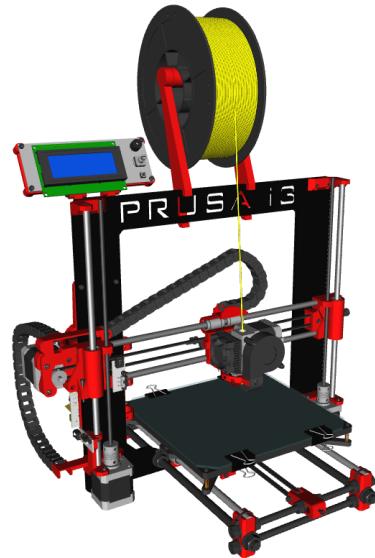
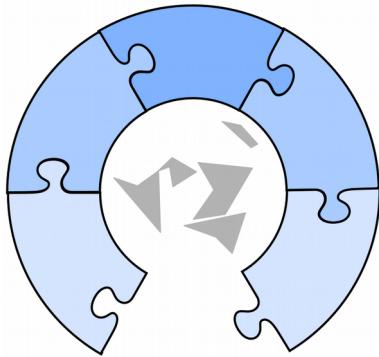
O'Reilly OpenSource award (2017)



¡Que las Tecnologías libres os acompañen!



Movimiento maker y tecnologías libres



Juan González Gómez
[@Obijuan_cube](https://github.com/Obijuan)
<https://github.com/Obijuan>

