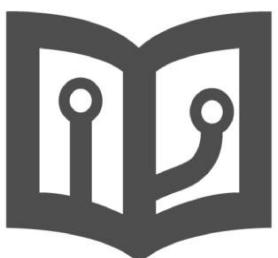


# Hello Hub Build Guide

Roland Wells

Published  
with GitBook



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# Building a Hello Hub

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Welcome to the official Hello Hub Build Guide.

Hello Hubs are community-built, off-grid internet kiosks for education and development.

**Ready to build? [Get to it!](#)**

The structure plans, software, and hardware specifications, along with tutorials and instructions to build and deploy a Hello Hub contained in this guide are Open Source, which means they are available for anyone to freely download and use, improve, contribute back or re-release.

The most recent version of this guide can always be found @ <http://build.hellohub.org>, or at the following urls for printable/ebook formats:

- Printable PDF <http://build.hellohub.org/pdf>
- ePUB ebook format: <http://build.hellohub.org/epub>
- Mobi ebook format: <http://build.hellohub.org/mobi>

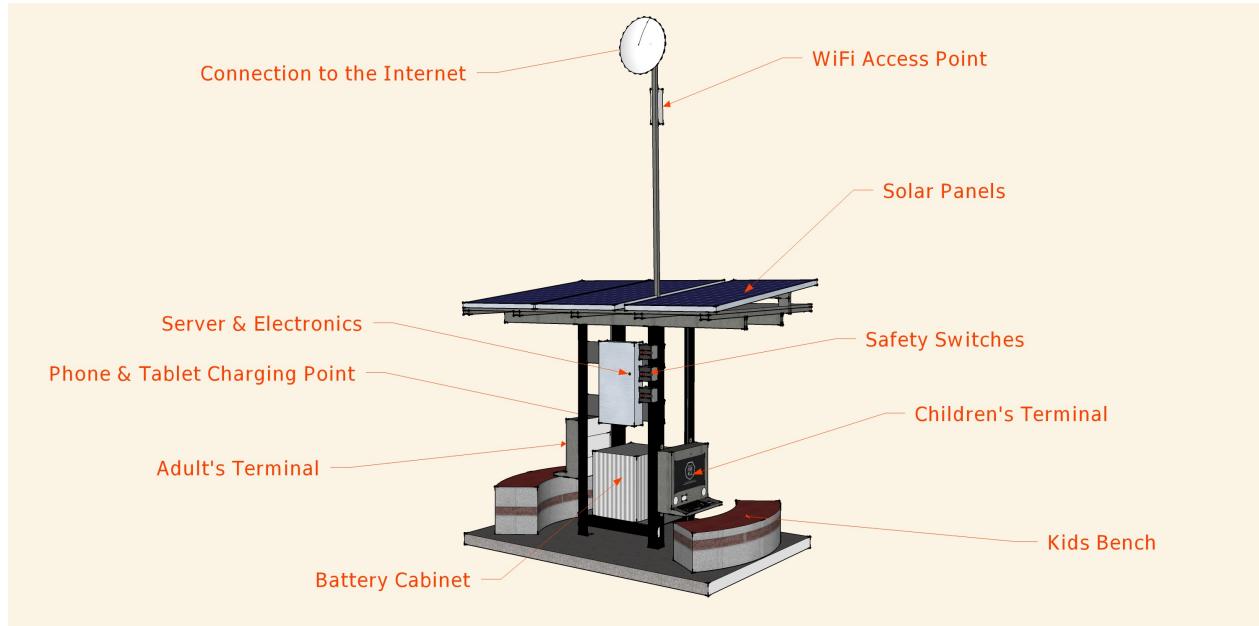
If you would like to contribute to the Hello Hub project by editing, adding to, or organizing this guide, head over to the [Git repo](#) and [file an issue](#).



Initial development of Hello Hubs is being supported by [Projects For All](#). To learn more about Projects For All's use of Hello Hubs in education and community development, see [Project Hello World](#).

# Overview

A Hello Hub is a community-built & owned internet kiosk that provides education, communication, and community development resources.



Each Hello Hub has two computer “terminals”, one server, one WiFi access point, one charging shelf, and one workbench.

The Internet terminals provide a computer workstation that any student or community member (or group of community members) can use for a wide range of activities. There are a wide range of educational applications built into the kiosk system, as well as standard applications such as an office suite, media editing tools etc. Each terminal will have a fixed bench seat, where up to 4 users can comfortably access the terminal at one time. Each terminal will also have a built-in camera (for still, video and web video conversations), microphone, and speakers. The server's function is to load the system to the terminals, manage the Internet connection to the world, route traffic from the WiFi access point, conduct regular backups, provide administrative notifications about the health and status of the Hello Hub system, and record usage data for the community and its partners. (It should be noted that no recording of data will be conducted without the explicit consent of the community and users).

Each Hello Hub will have a 24/7 WiFi access point providing an Internet connection for community members' own devices, such as mobile phones, tablets, computers, or other devices that require WiFi access.

Each Hello Hub will have a built-in electronics workbench with equipment for the maintenance of the Hello Hub itself. The workbench can also be used for community-led technical experimentation and innovation.

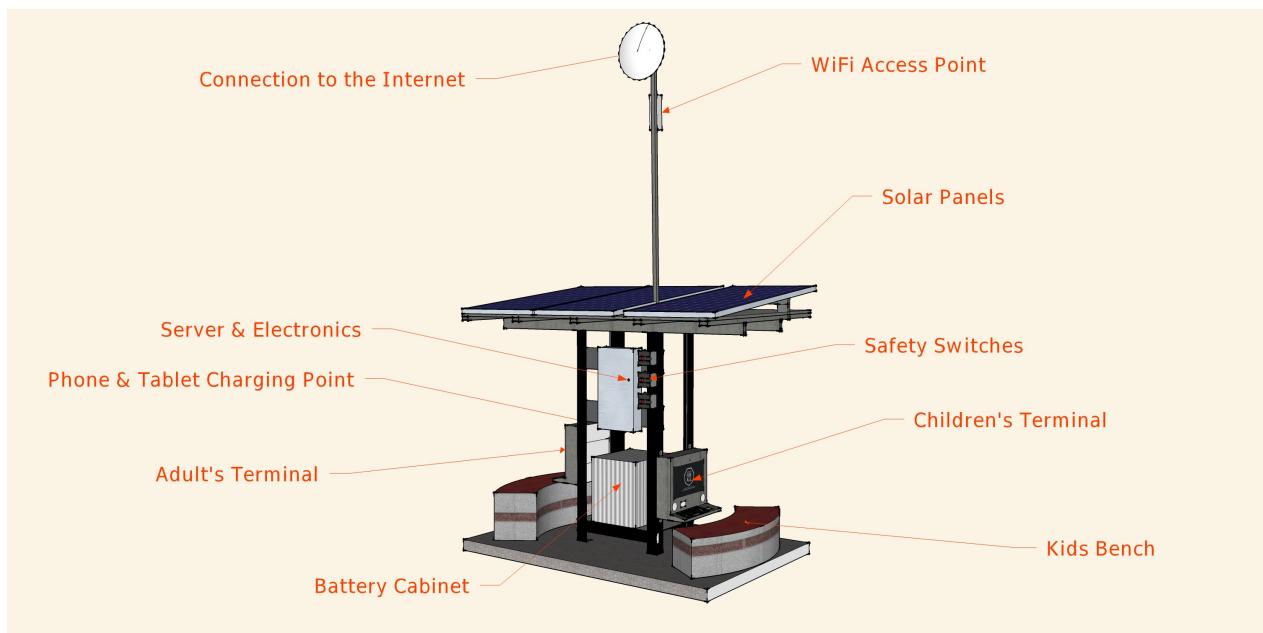
Internet connection will vary with each Hello Hub, depending on the location and options available. The kiosk is powered by an off-grid solar power system.

# Standard Design

This section outlines a standard Hello Hub "reference" design. The intention is to lay out a common design that can be easily altered to take into account local conditions and availability of materials.

## Standard Design Statement

The Hello Hub will be a stand-alone structure, accessible from all sides. The central structure will be square or rectangular in shape, and will be covered by an overhanging roof to reduce weather and sun-glare during use. The roof will also serve as a mounting platform for the solar panels that provide power to the Hello Hub. The two opposing short sides will each contain a computer terminal, with the features described here (link is external). Set-back from each terminal will be a bench that can seat 4 users. One long side will contain access to the Hello Hub systems and control components, and the other long side will contain an electronic workbench and charging shelf.



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itself. The workbench can also be used for community-led technical experimentation and innovation.

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# **Standard Features**

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## **Rugged, site built structure:**

---

Built by community users, from local materials  
Wide roof providing shade and basic protection from the elements  
Fixed bench seats providing up to 4 spaces per terminal (8 seats per kiosk, with room for bystanders to participate)  
Easy access to internal equipment cabinets  
Stand-alone and self-sufficient

## **2 computer terminals consisting of:**

---

rugged and waterproof touch panel monitors mounted to opposite sides of the kiosk panel mounted rugged and waterproof keyboard below the monitor speakers, microphone and webcam

The computer terminals provide a computer workstation that any student or community member (or group of community members) can use for a wide range of activities. There are a wide range of educational applications built into the kiosk system, as well as standard applications such as an office suite, media editing tools etc.

## **Community WiFi access point:**

---

Each Hello Hub will have a 24/7 WiFi access point providing an Internet connection for community members' own devices, such as mobile phones, tablets, computers, or other devices that require WiFi access.

## **Device Charging:**

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Each Hello Hub will have a shelf for plugging in and charging user devices such as mobile phones and tablets (with 5VDC USB power requirement)

## **Electronics workbench:**

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Each Hello Hub will have a built-in electronics workbench with equipment for the maintenance of the Hello Hub itself. The workbench can also be used for community-led technical experimentation and innovation.

## **Independent power and communications:**

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solar or wind (or both) powered satellite network connectivity w/ mobile network as backup

## **Unified and personalized user experience:**

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Each user will have a personal login to the system which will load a personalized desktop. Personal settings, files and activities will be saved to the individual user's login. The users personalized desktop is accessible from either terminal (by logging in) and from any terminal that is connected to the kiosk (in the case of an expanded roll-out to an adjacent community or learning facility).

## **Modular systems:**

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The kiosk systems are designed in a modular fashion, components can be easily deactivate, replaced, upgraded without the need for the whole kiosk to be taken offline.

## **Built-in education and community tools**

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The terminals will run a customized version of Edubuntu, which contains a large number of built-in educational resources. In addition to the base system resources, the kiosk will provide easy access to a community developed list of resources, both built-into the kiosk and internet-based.

## **Remote access for maintenance and assistance**

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Each Hello Hub is remotely accessible by community authorized support personnel, who can assist with any maintenance or systems problems, or upgrade requests!

# Structure & Hardware Build Guide

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This chapter contains instructions for building the Hello Hub structure and installing the system components.

- Preparing the site
- Building the structural frame.
- Installing the Solar PV power system
- Installing the Hello Hub kiosk components to the structure
- and connecting everything together!

The Hello Hub is designed to be mostly built from off-the-shelf parts, as well as to allow for flexibility and local conditions.

# Preparing the Site

---

In most cases, the Hello Hub will be built on top of a small concrete slab. The concrete slab provides a stable base for the Hello Hub structure to attach to, as well as a foundation for the benches to be built upon.

The slab is a simple 4" reinforced concrete slab. The process, in most cases, of building the slab is:

- Stake out the slab area
- Clear grass and excavate 4 inches of topsoil
- Place and compact 2 inches of 1" gravel or equivalent
- Build forms
- Mix concrete
- Pour and level
- Float and smooth
- Cure

## Staking out the slab area

---

Stake out an area that is 6' wide by 9' long. Check the square by checking the diagonal measurement both ways (they should be the same.)

## Clear and Excavate

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Using shovels and hoes, remove the grass and top 4 inches of soil in the marked slab area, and extend out 4 inches past the staked area.

## Compacted Gravel Base

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Place gravel and use a tamper to compact, up to 2 inches in the whole excavated area.

## Build Forms

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Using 4" wide scrap lumber with at least one straight edge, build the forms 6' wide by 9' long. Place on the excavated area, square using the same method above and stake the outside of the forms to reinforce.

## Mix concrete

---

Using the ratio 1-2-3, mix small batches of gravel (aggregate), sand and portland cement. Depending on local practices, this can be mixed on the ground in larger quantities or in a wheelbarrow in smaller quantities. Pour each mixed batch into the formed area, use a shovel or trowel to agitate the poured mix to make sure the concrete fills all the voids. Level by moving a long straight board back and forth across the slab as you move from one end to the other.

## Float and smooth

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Once the slab has been poured, a thin layer of water will form on top of the mix. Wait for this water to be absorbed before you do a final smooth with a float or trowel.

## Curing

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Cover the slab with plastic sheeting or a tarp and wait at least 24 hours before continuing the work.

## **Building the Hello Hub Structure**

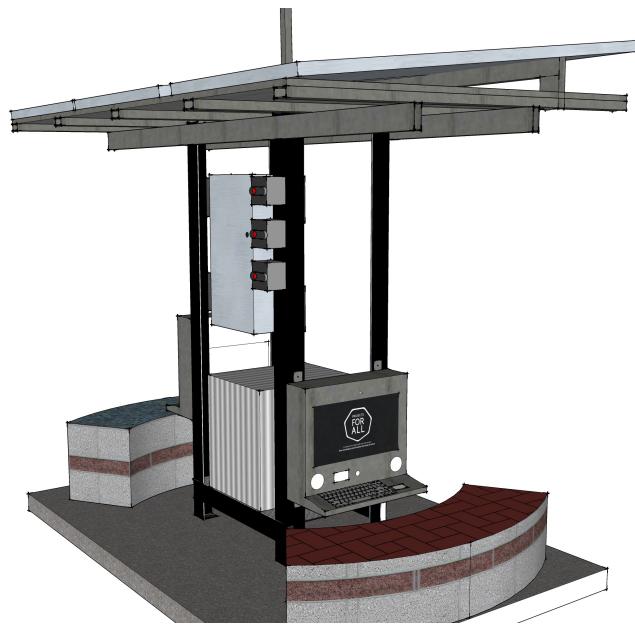
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There are several options included below on how to build the Hello Hub base structure. This list is not exhaustive, and could easily be adjusted to use different, locally available, materials.

An example of this is the building materials of the benches, they are specified as concrete block with tile covering, however they could easily be made out of bricks or wood.

# Rapid Build 4-post Structure

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## Overview

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This module includes the parts list, design specification, and build description for a rapid build Hello Hub structure, using (readily available) 4-post server racks as the primary structural component of the Hello Hub.

Note: This structure uses a standard steel or aluminium 19" server rack. There are many different racks available from many different manufacturers. These instructions are based on the 44U Open Frame rack from Rack Solutions, and has been tested by the Project Hello World team in real-world Hello Hub installations.

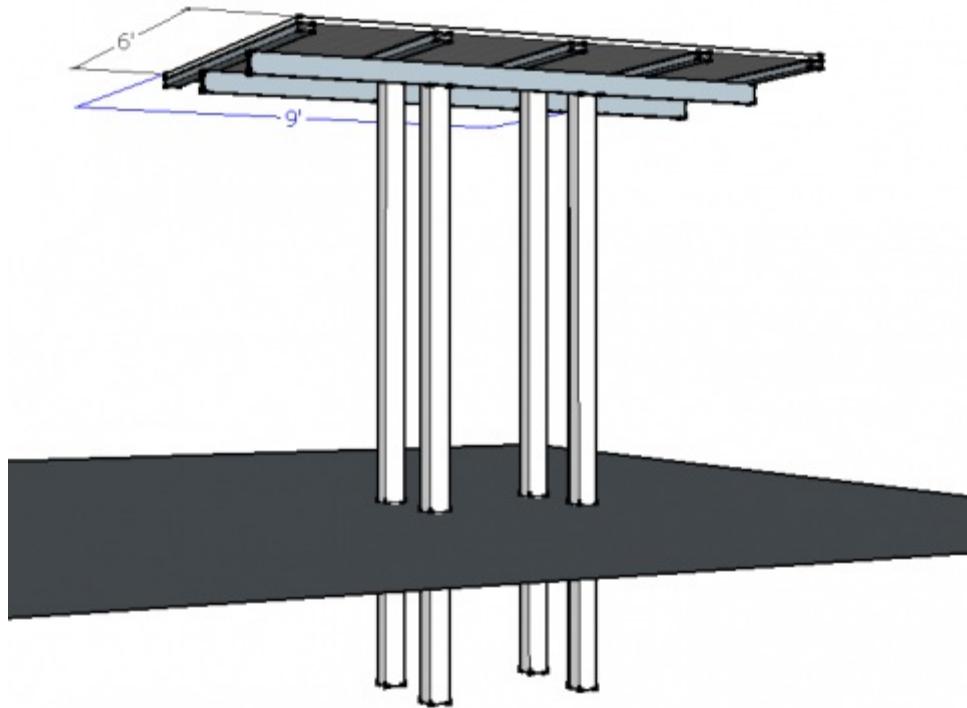
19" racks offer modular mounting options, and can be shipped flat-packed, saving on shipping/transport costs. They are generally a slightly smaller footprint than the site-build steel option. Perhaps the biggest advantage is that using the 19" rack based structure means no welder is required on site.

The process for assembling and installing the rack is:

- Assemble Rack on the Ground
- Set Rack on Slab
- Secure Rack to Slab
- Mount the Battery Shelves
- Install the Solar PV Steel Framing
- Install the structural side panels.

# Steel Structure Framing

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## Overview:

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Note: This version of the structure does not require a slab foundation, so can be used in areas where slab construction is impractical. A welder however, is required.

This module includes the parts list, design specification, and build description for the steel framing portion of the kiosk. The steel framing is the structural component of the kiosk and is designed to be permanently installed, strong and require very little maintenance.

## Parts list:

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Name	Quantity	Item
Post	4	4" x 4" Structural Steel Square tube, with 1/4" wall thickness
Beam	2	1.5" x 4" Structural Steel Square tube, with 1/8" wall thickness
Purlin	5	1.5 x 3" Structural Steel Square tube, with 1/8" wall thickness
Panel	2	10' x 3' Metal Roof panels (ribbed or corrugated, high gauge preferred)
Bracket	10	Angle bracket
Fastener	5lb	Self-tapping metal screw 3/4" #12

Fastener	5lb	Self-tapping metal screw 1 1/2" #12
Rock	100lb	Clean 1" Gravel
Concrete	8	bags of general concrete mix
Water	1	Water for concrete mixing
Wood bracing	4	Sufficient to hold frame in place while concrete sets

## Tools Required:

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- Cordless drill or impact driver 18v+ with drill and driver bits
- Level
- Wheelbarrow
- Drill bits
- Shovel
- Buckets
- Paintbrushes

## Build Instructions:

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1. Construct each side frame according to Figure 1 & Figure 2. Top framing shall be welded to the vertical columns.  
Note: A slight slope is desired, this can be accomplished by setting the frame members  $\frac{1}{2}$ " vertical offset, or can be accomplished by welding the top frame  $\frac{1}{2}$  down the vertical support on one frame (preferred).

2. Set assembled framed into foundation holes. Foundation consists of clean rock, compacted (to allow for water to drain) supporting frame, with at least 2 bags of concrete mix placed around each vertical framing piece. Loose ground fill added to hole until level with grade. Foundation shall be at least 3 feet deep.

3. Roof pieces is attached to set frame with brackets and self-tapping screws.

4. Roof panels are attached to roof pieces with self-tapping screws.

5. Equipment panels will be attached to frame as needed with self-tapping screws.

## Design & Dimensions:

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Figure 1: Front-view

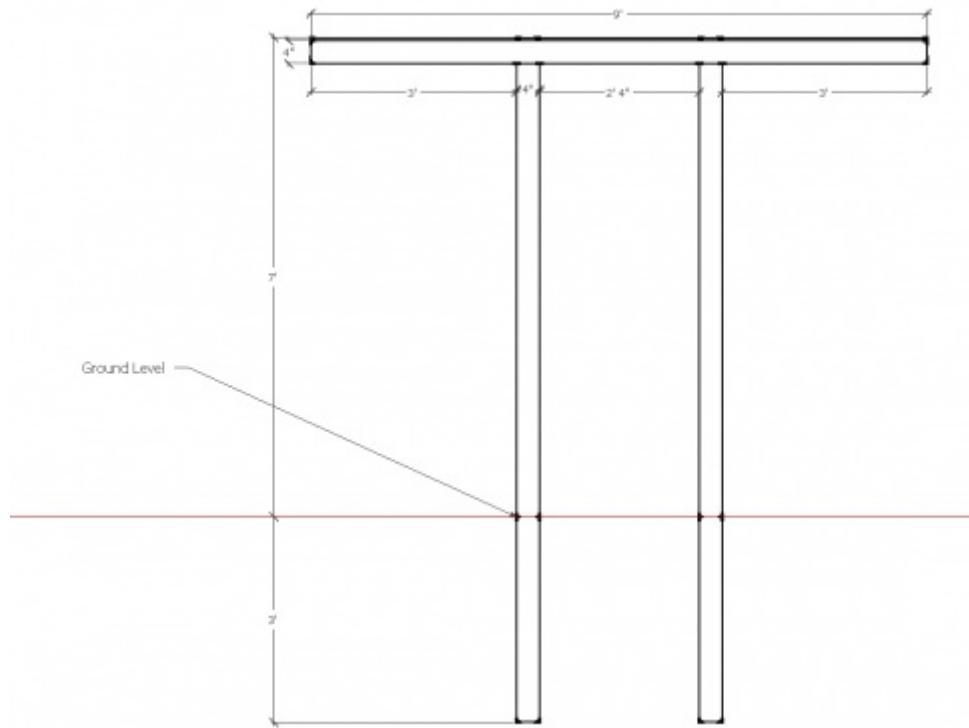


Figure 2: Top-view

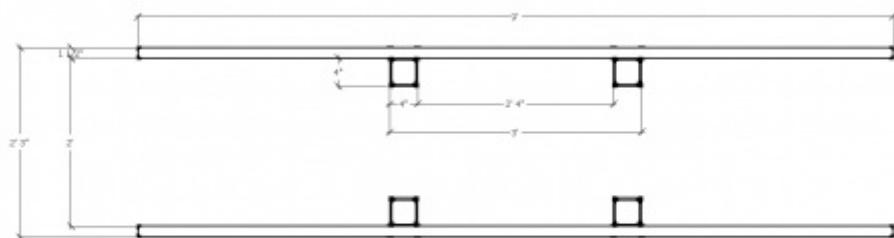


Figure 3: Side-view

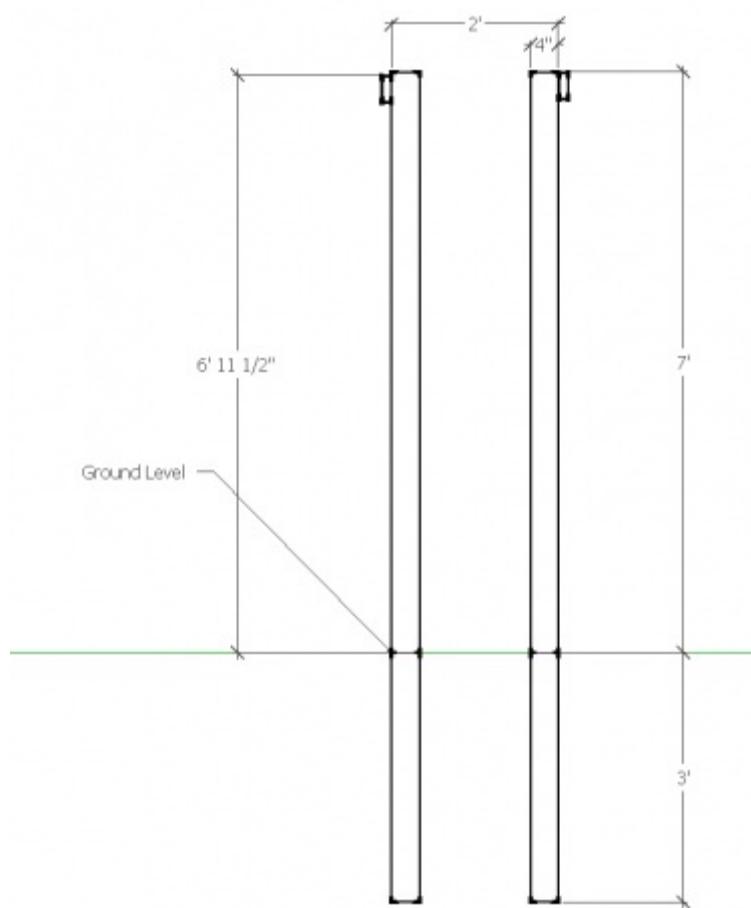
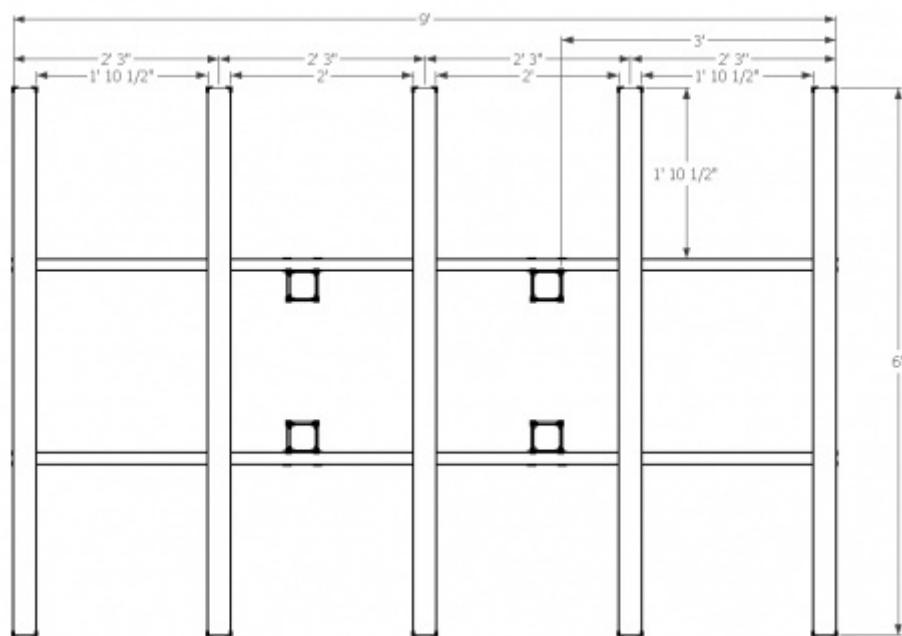
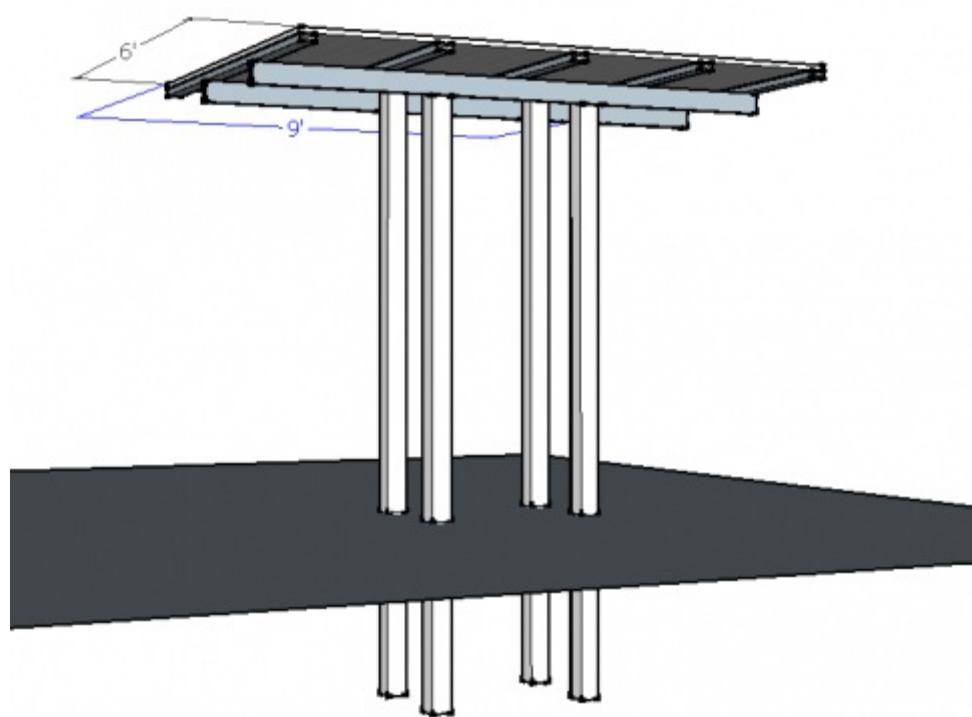


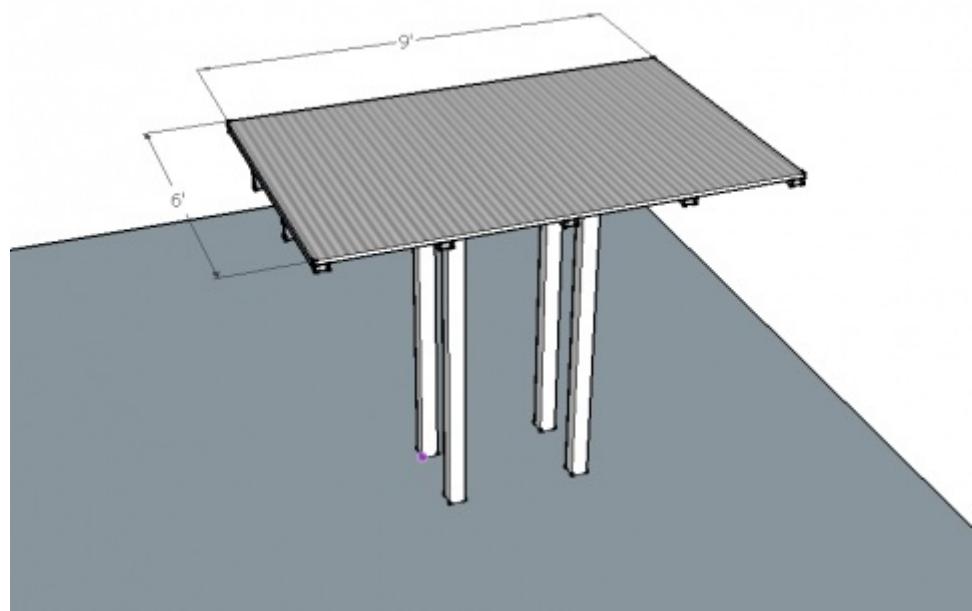
Figure 4: Top-view with Roof framing



Render 1: ISO Ground Level



Render 2: ISO Roof Detail



## Troubleshooting

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# **Power & Solar - System check and restart**

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This section takes you through the process of safely checking and turning on the power for the Hello Hub. We start by making sure the system is off, then we do a system inspection, and then we turn the system back on.

## **Turning the system Off**

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- Turn off system breaker
- Turn off solar breaker
- Turn off battery breaker

## **Power System Inspection**

---

### **Solar Panels**

Solar panels should be connected as installed and all cables in good condition.

### **Batteries**

Batteries should be connected as installed and all cables in good condition.

### **Power to System**

Power wires to system server should be connected as installed and in good condition.

### **System case**

Open the server case and inspect the wires. The power wires should be connected to the power supply and in good condition.

## **Turning the system on**

---

- Turn on battery circuit breaker
- Turn on solar circuit breaker
- Check solar charge controller for proper operation. One of the blue LED's should be lit (assuming daylight)
- Turn on system breaker
- Check for the Power Supply LED to be flashing steadily inside the server case. (or in the case of the system autobooting, the fan should be on).

# Server / CPU

---

This section takes you through the process of fixing problems with the server (the system). If the Hello Hub is off for an unknown reason, start with [troubleshooting and restarting the power system](#). If the problem is only with one user terminal, and the other is operating properly, [troubleshooting the top box / user terminal](#) is probably the place to start.

The steps below assume the system is off on both screens and there is no wifi access.

## Checking the System State

---

There are a number of ways to check the system state. Begin by doing a visual inspection of both user terminals, the top boxes, the keyboards & monitors, and inside the server box.

Look for:

- Obvious damage to any of the equipment or cables
- Disconnected cables or cables connected incorrectly.
- Any evidence of burned out components (that could indicate an electrical short).

Fix or replace any damaged equipment found.

## Starting the system

---

### Check for power and turn system off

After you open the system, check the LED on the power supply. If it is blinking steadily, and the system fan is off, then the system is off. If the led is on and the system fan is also on, then the system has been turned on. If the system is on, but neither user terminal is working (and the top box power is confirmed working) then proceed to power the system off.

To power off the system, hold down the system power button (bottom left of the motherboard mount) briefly. If the system doesn't stop within 1 minute, you can perform a hard system off by holding the system power button down for around 8 seconds (or until the system fan turns off).

### Turn top boxes on

Prior to turning on the system, make sure that the top boxes are powered on. This will allow you to view the boot-up messages and fix any system issues needed at boot.

### Turn the system on

Press the system power button (bottom left of the motherboard mount) briefly to turn the server on. The power supply LED will stop blinking and turn on solid, and the system fan will turn on.

### Booting

After turning the power on, the system will attempt to boot. One of the user terminals will display the BIOS messages

(mostly text) and then the Edubuntu system will start. You may see a light colored screen with "Edubuntu" displayed on it. That is a good sign that the system is starting. Depending on system checks, the booting process could take up to 5 minutes to start.

**IMPORTANT NOTE:** Do not press any keys on the keyboard while the system is booting, pressing keys may stop the boot process completely and you will have to start over.

## Disk Checks

If the system displays a message about the disk checking, it could ask to press "F" to attempt to check and fix the filesystem or checks. This is safe to do and you should press the "F" key on the keyboard on the terminal that is displaying the message. In some cases, the system may be confused about which keyboard is connected to which monitor, so you may have to press the "F" key on the other keyboard (confusing!)

# **Fallback Boot Procedure**

---

Use this procedure if the system is not booting properly, as described in the prior section.

Note: This section assumes that power system checks have been completed, and a normal boot has failed. System should be OFF to begin this procedure.

## **Disconnect the non-primary top box**

---

Disconnect the blue usb and the power supply cables that lead to the non-primary top box. This will depend on the hub hardware you have installed, but is usually the top box connected to the add-in video card.

## **Plug the primary keyboard directly to the motherboard.**

---

Remove the top box cover from the primary side. Unplug the keyboard usb and extend to the server case. Disconnect the primary top box USB cable from the system and plug the keyboard directly into the same port.

## **Turn on system**

---

Boot the system on by pressing the system power on/off switch momentarily. The power supply LED should turn solid on, and the fan should start running.

## **Bios post**

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The system motherboard will display a very brief text-based message for several seconds indicating it is booting up. The screen will then go blank. This can happen very quickly, so you might miss it.

## **Boot issues**

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Wait 30 seconds

## **Top Box / Terminals**

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## **Network / Connection to the Internet**

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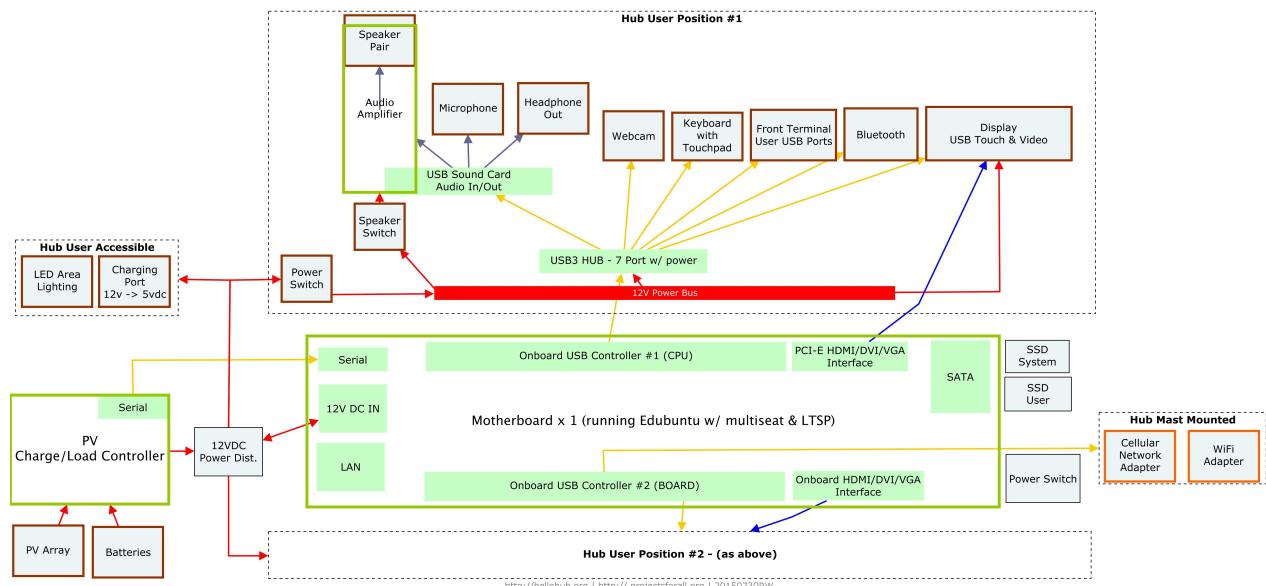
**WiFi**

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## Reference Documents

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# Hello Hub Block Diagram



# Software List

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## ubuntu-edu-preschool

---

- [blinken](#) - KDE version of the Simon electronic memory game
- [gamine](#) - Interactive game for young children
- [gcompris](#) - Educational games for small children
- [kanagram](#) - jumble word puzzle
- [khangman](#) - Hangman word puzzle
- [ktuberling](#) - stamp drawing toy
- [tuxpaint](#) - A paint program for young children
- [klettres](#) - foreign alphabet tutor for KDE
- [pairs](#) - memory and pairs game

## ubuntu-edu-primary

---

- [celestia-gnome](#) - real-time visual space simulation (GNOME frontend)
- [gcompris](#) - Educational games for small children
- [kalzium](#) - periodic table and chemistry tools
- [kanagram](#) - jumble word puzzle
- [kbruch](#) - fraction learning aid for KDE
- [khangman](#) - Hangman word puzzle
- [kig](#) - interactive geometry tool for KDE
- [kmplot](#) - mathematical function plotter for KDE
- [ktouch](#) - touch typing tutor for KDE
- [ktuberling](#) - stamp drawing toy
- [kturtle](#) - educational programming environment
- [kwordquiz](#) - flashcard learning program
- [klettres](#) - foreign alphabet tutor for KDE
- [kalgebra](#) - algebraic graphing calculator
- [kgeography](#) - geography learning aid for KDE
- [kstars](#) - desktop planetarium for KDE
- [laby](#) - Learn how to program with ants and spider webs
- [lybniz](#) - mathematical function graph plotter
- [marble](#) - globe and map widget
- [parley](#) - vocabulary trainer
- [ri-li](#) - a toy train simulation game
- [step](#) - interactive physical simulator for KDE
- [tuxmath](#) - math game for kids with Tux
- [tuxpaint](#) - A paint program for young children
- [tuxtype](#) - Educational Typing Tutor Game Starring Tux
- [pairs](#) - memory and pairs game

## ubuntu-edu-secondary

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- [calibre](#) - e-book converter and library management

- [celestia-gnome](#) - real-time visual space simulation (GNOME frontend)
- [dia-gnome](#) - Diagram editor (GNOME version)
- [inkscape](#) - vector-based drawing program
- [kalzium](#) - periodic table and chemistry tools
- [kbruch](#) - fraction learning aid for KDE
- [kig](#) - interactive geometry tool for KDE
- [kmplot](#) - mathematical function plotter for KDE
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- [kgeography](#) - geography learning aid for KDE
- [kstars](#) - desktop planetarium for KDE
- [laby](#) - Learn how to program with ants and spider webs
- [lightspeed](#) - Shows how objects moving at relativistic speeds look like
- [lybniz](#) - mathematical function graph plotter
- [marble](#) - globe and map widget
- [melting](#) - compute the melting temperature of nucleic acid duplex
- [parley](#) - vocabulary trainer
- [pencil](#) - animation/drawing software
- [ri-li](#) - a toy train simulation game
- [step](#) - interactive physical simulator for KDE
- [chemtool](#) - chemical structures drawing program
- [fritzing](#) - Easy-to-use electronic design software
- [einstein](#) - Puzzle game inspired on Einstein's puzzle

## ubuntu-edu-tertiary

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- [calibre](#) - e-book converter and library management
  - [celestia-gnome](#) - real-time visual space simulation (GNOME frontend)
  - [dia-gnome](#) - Diagram editor (GNOME version)
  - [inkscape](#) - vector-based drawing program
  - [kalzium](#) - periodic table and chemistry tools
  - [kmplot](#) - mathematical function plotter for KDE
  - [ktouch](#) - touch typing tutor for KDE
  - [kturtle](#) - educational programming environment
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  - [lightspeed](#) - Shows how objects moving at relativistic speeds look like
  - [lybniz](#) - mathematical function graph plotter
  - [marble](#) - globe and map widget
  - [melting](#) - compute the melting temperature of nucleic acid duplex
  - [pencil](#) - animation/drawing software
  - [step](#) - interactive physical simulator for KDE
  - [yorick](#) - interpreted language and scientific graphics
  - [cantor](#) - interface for mathematical applications
  - [rocs](#) - graph theory IDE
  - [chemtool](#) - chemical structures drawing program
  - [fritzing](#) - Easy-to-use electronic design software
-

Edubuntu application list created with a slightly modified version of this [script](#)

# Software List with Screenshots

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## ubuntu-edu-preschool

---

- [blinken](#) - KDE version of the Simon electronic memory game



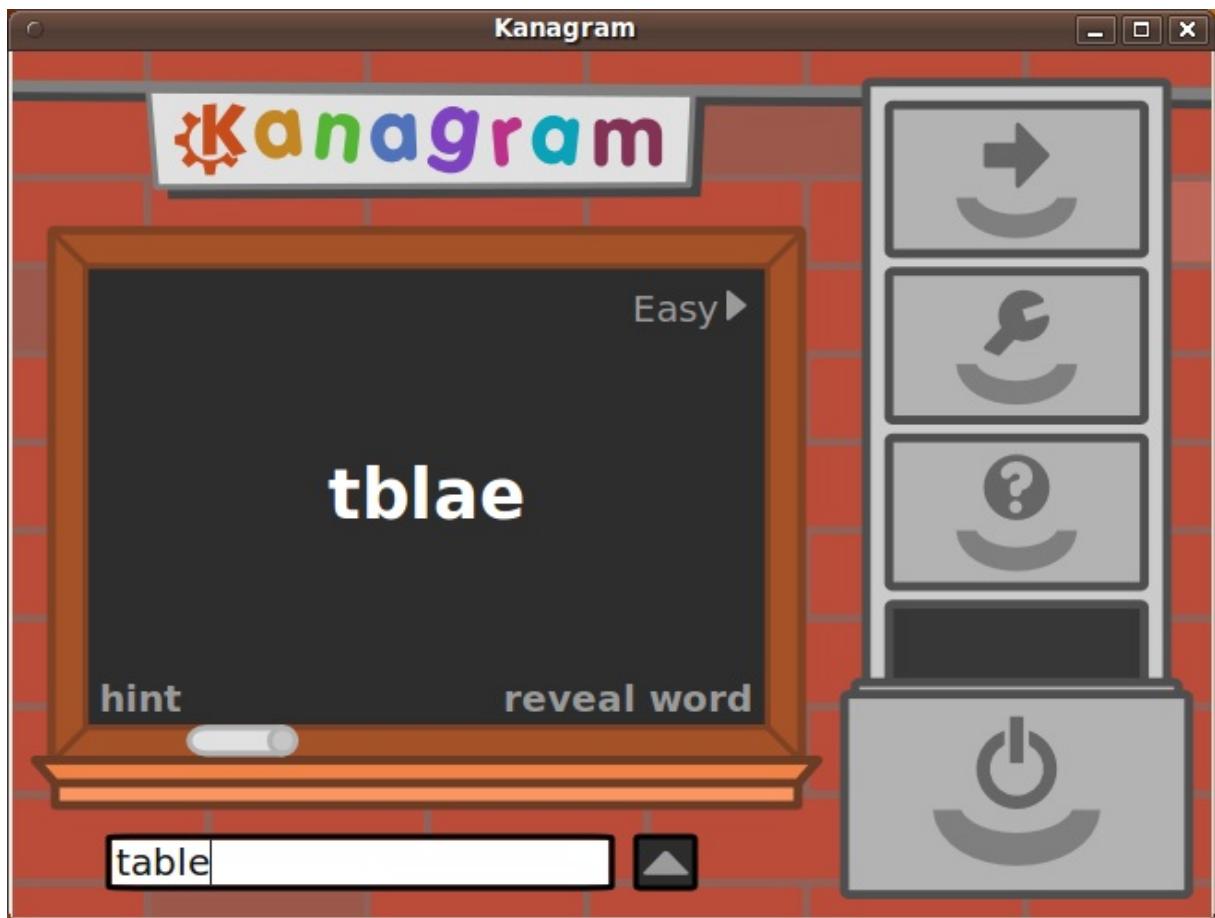
- [gamine](#) - Interactive game for young children



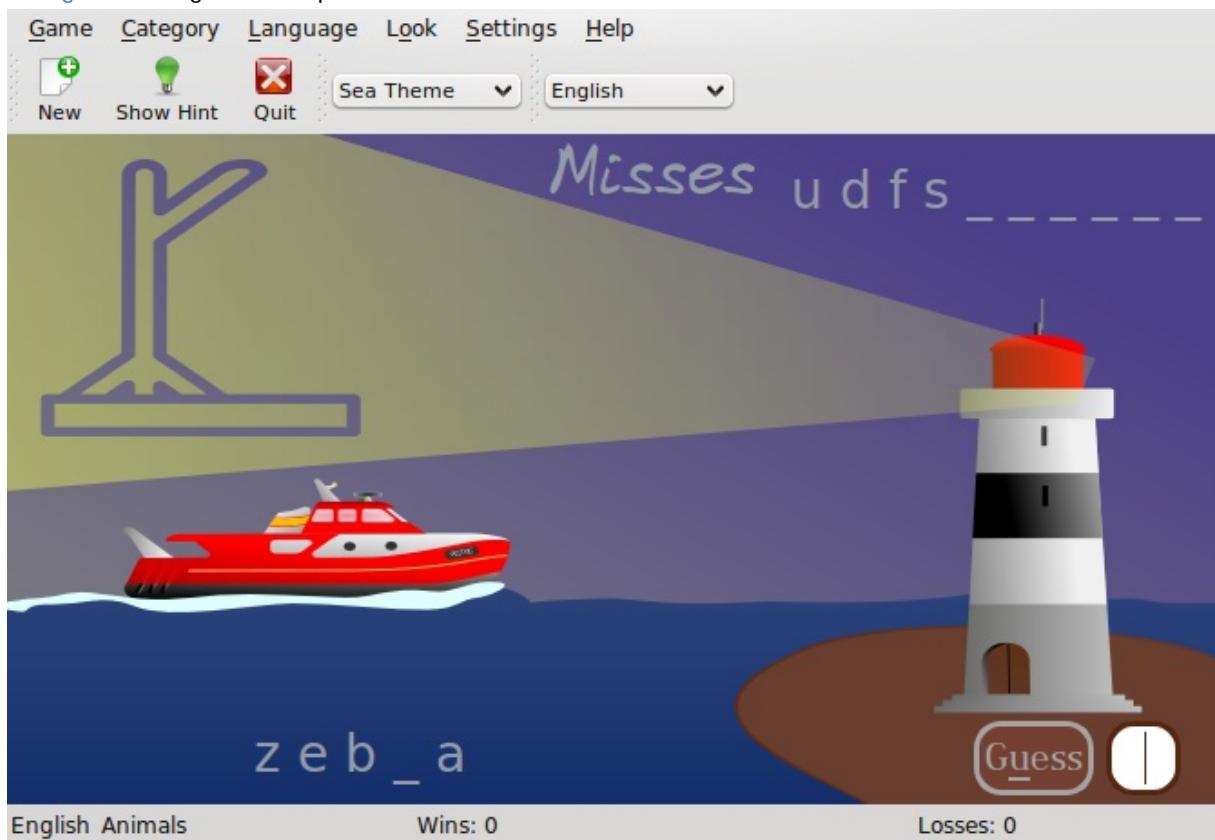
- [gcompris](#) - Educational games for small children



- [kanagram](#) - jumble word puzzle



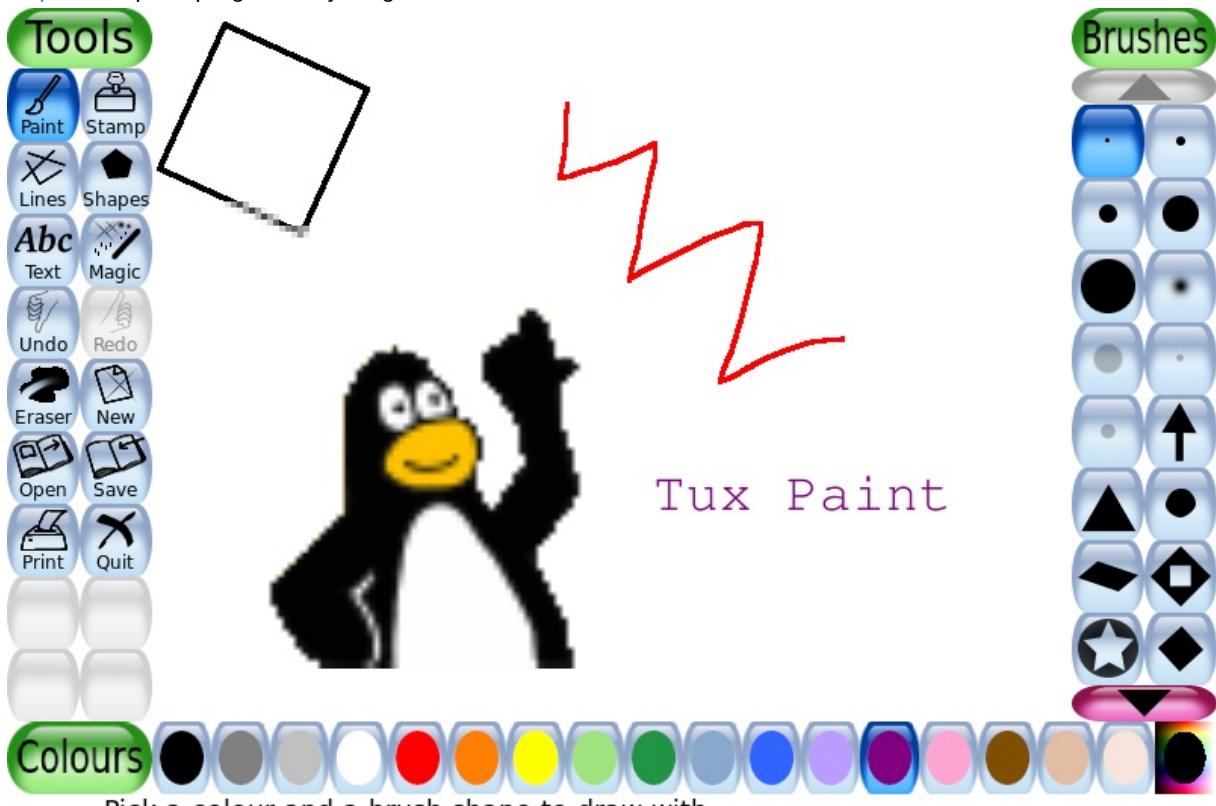
- [khangman](#) - Hangman word puzzle



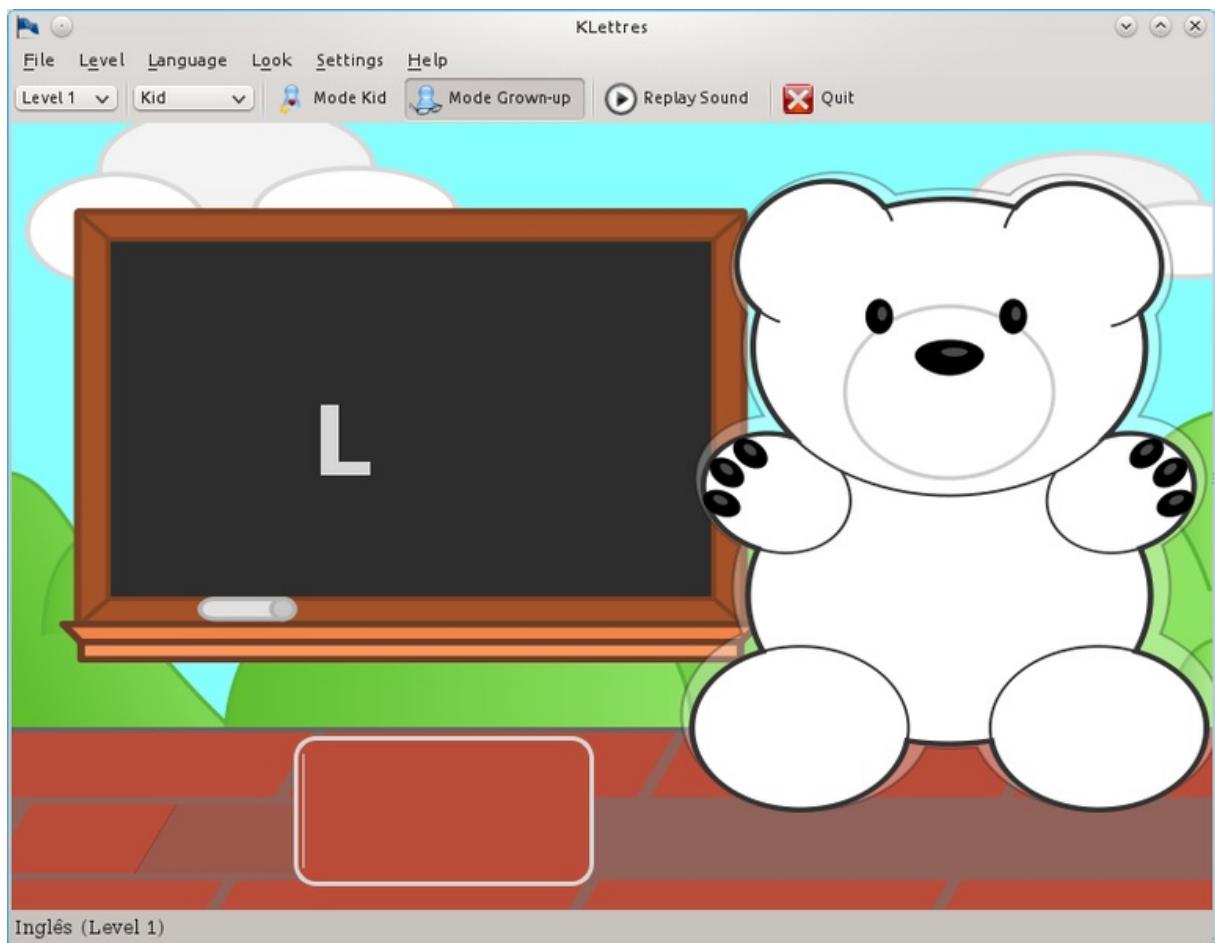
- [ktuberling](#) - stamp drawing toy



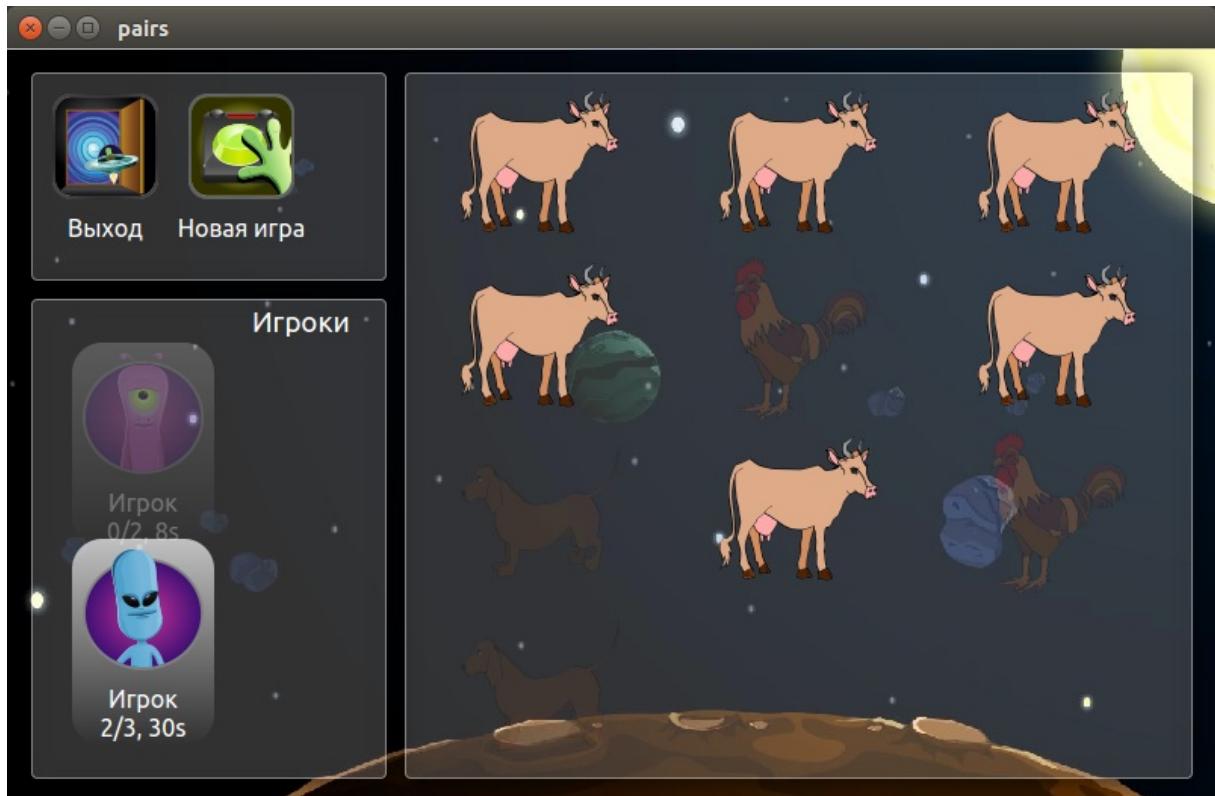
- [tuxpaint](#) - A paint program for young children



- [klettres](#) - foreign alphabet tutor for KDE

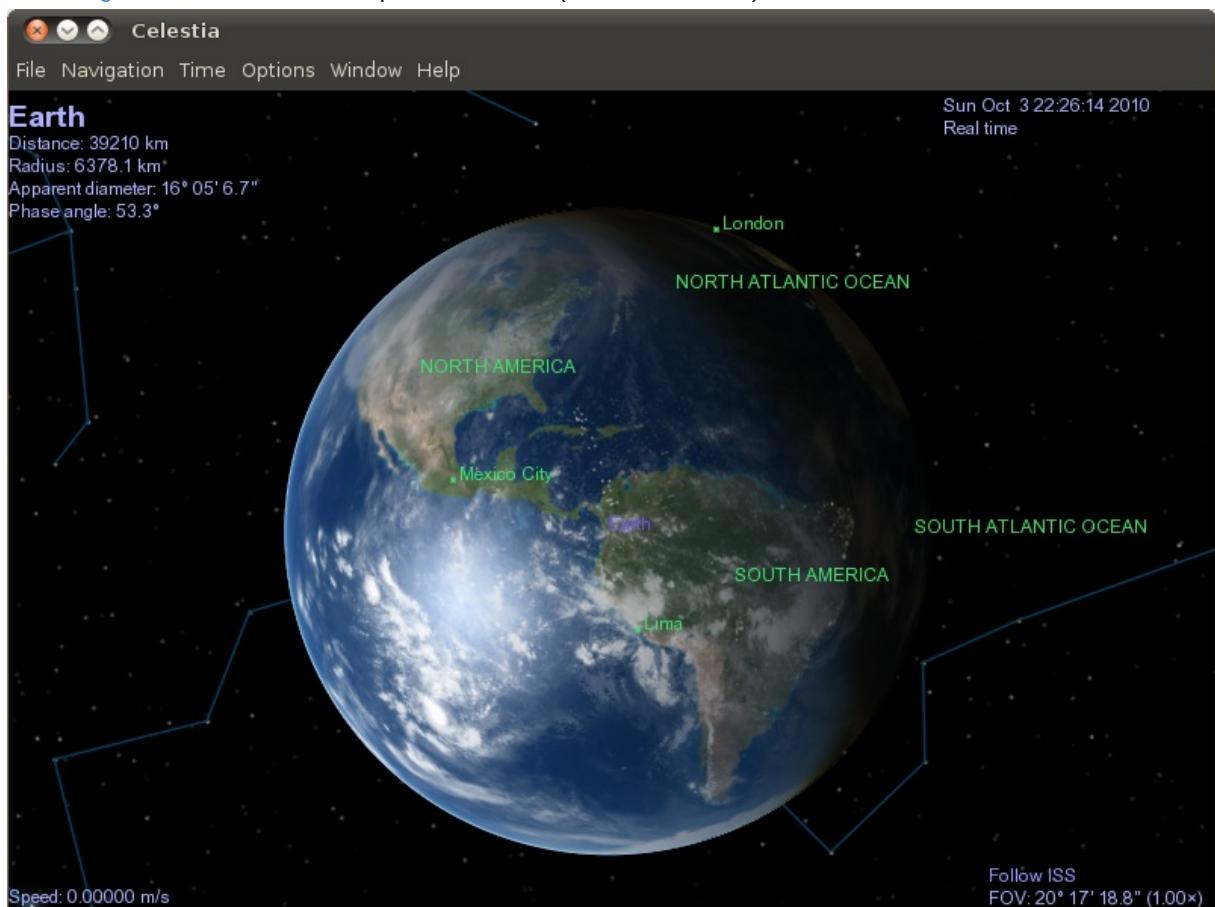


- [pairs](#) - memory and pairs game



**ubuntu-edu-primary**

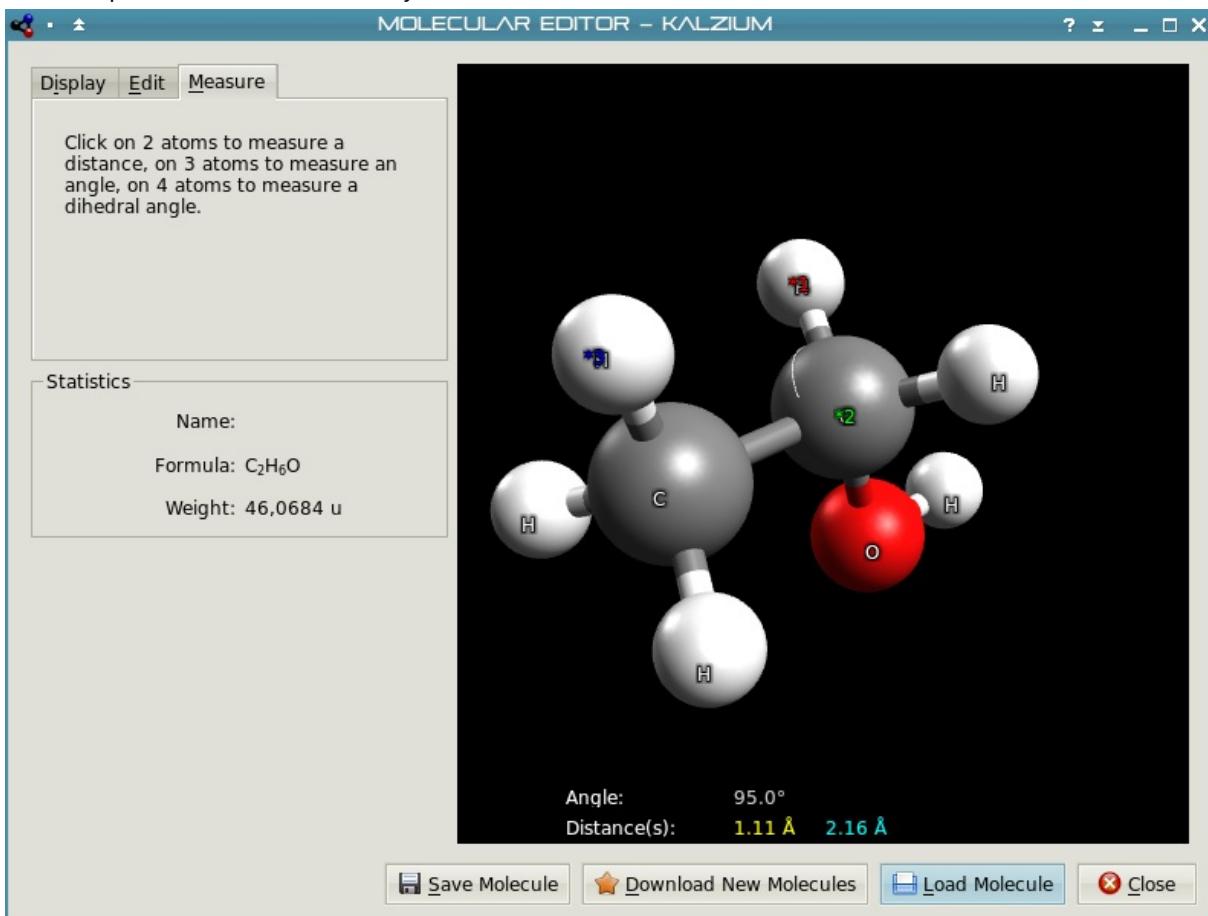
- [celestia-gnome](#) - real-time visual space simulation (GNOME frontend)



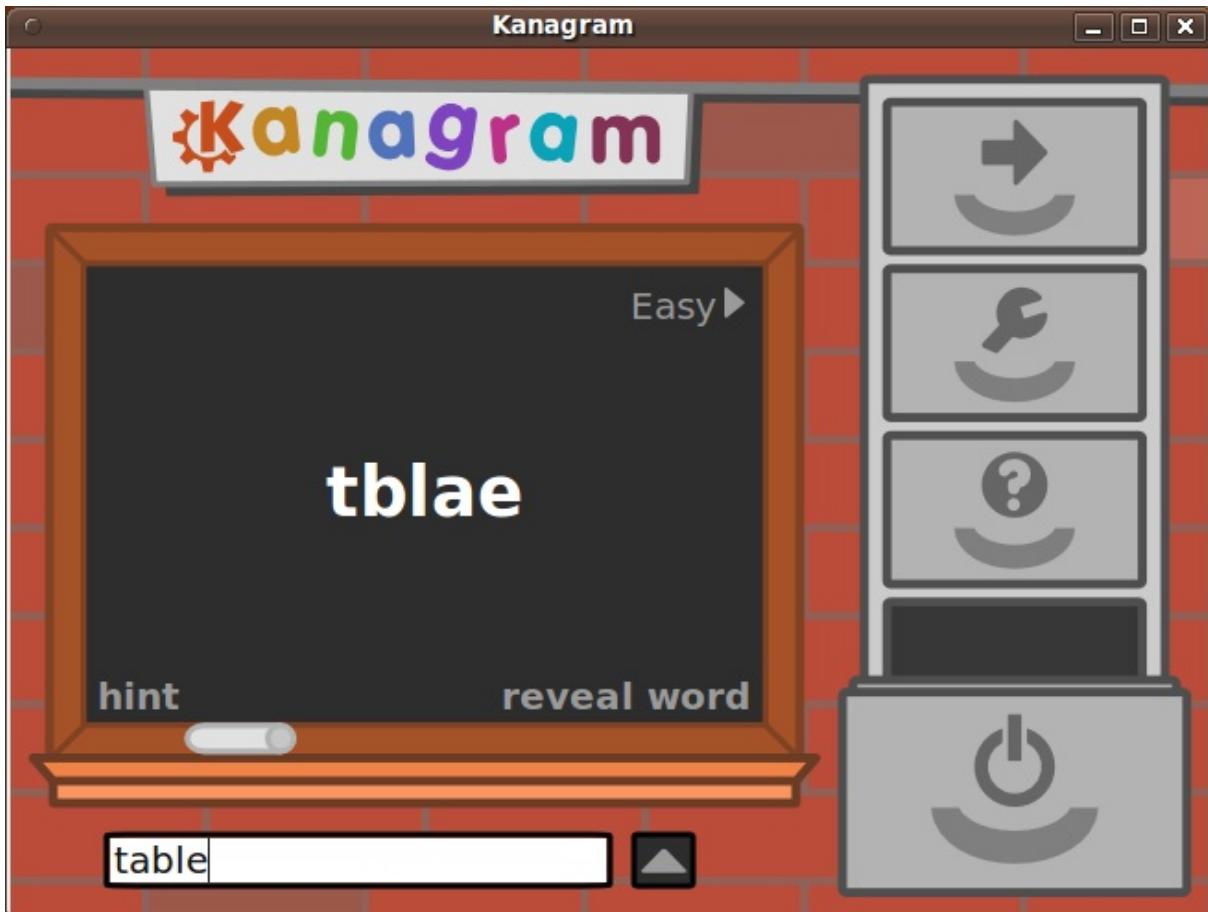
- [gcompris](#) - Educational games for small children



- [kalzium](#) - periodic table and chemistry tools



- [kanagram](#) - jumble word puzzle



- [kbruch](#) - fraction learning aid for KDE

**Options:**

Question:  
Mixed number:   
Number of terms: 2  
Maximum denominator: 10

Answer:  
Mixed number:   
Reduced form:

Solution:  
Mixed number:

Operations:  
Addition:   
Subtraction:   
Multiplication:   
Division:

**Arithmetic**

$1 - \frac{1}{4} =$

**Correct!**

**Questions:**

Correct: 21	70%
Incorrect: 4	13%
Skipped: 5	16%

**30**

**Next** **Skip**

- [khangman](#) - Hangman word puzzle

**Game** **Category** **Language** **Look** **Settings** **Help**

New Show Hint Quit Sea Theme English

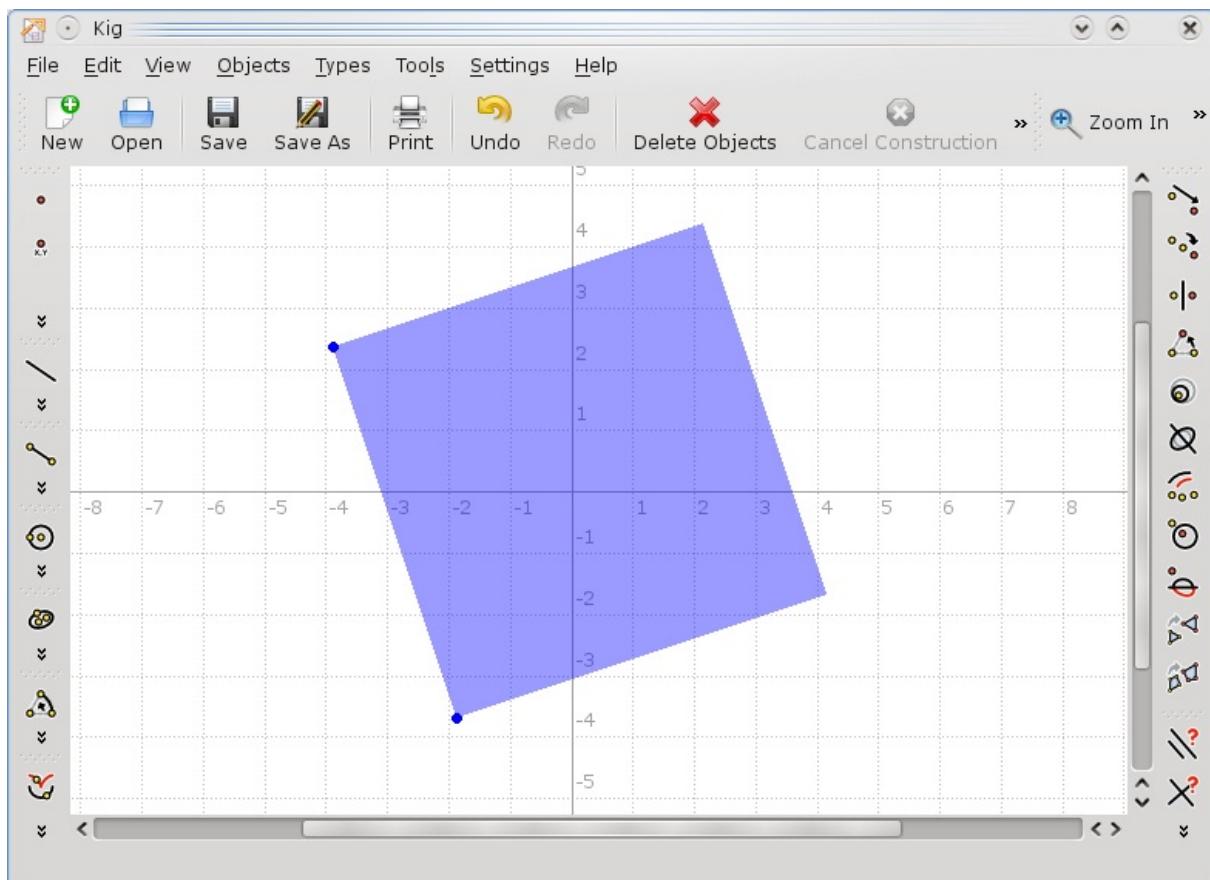
Misses u d f s \_ \_ \_ \_ \_

z e b \_ a

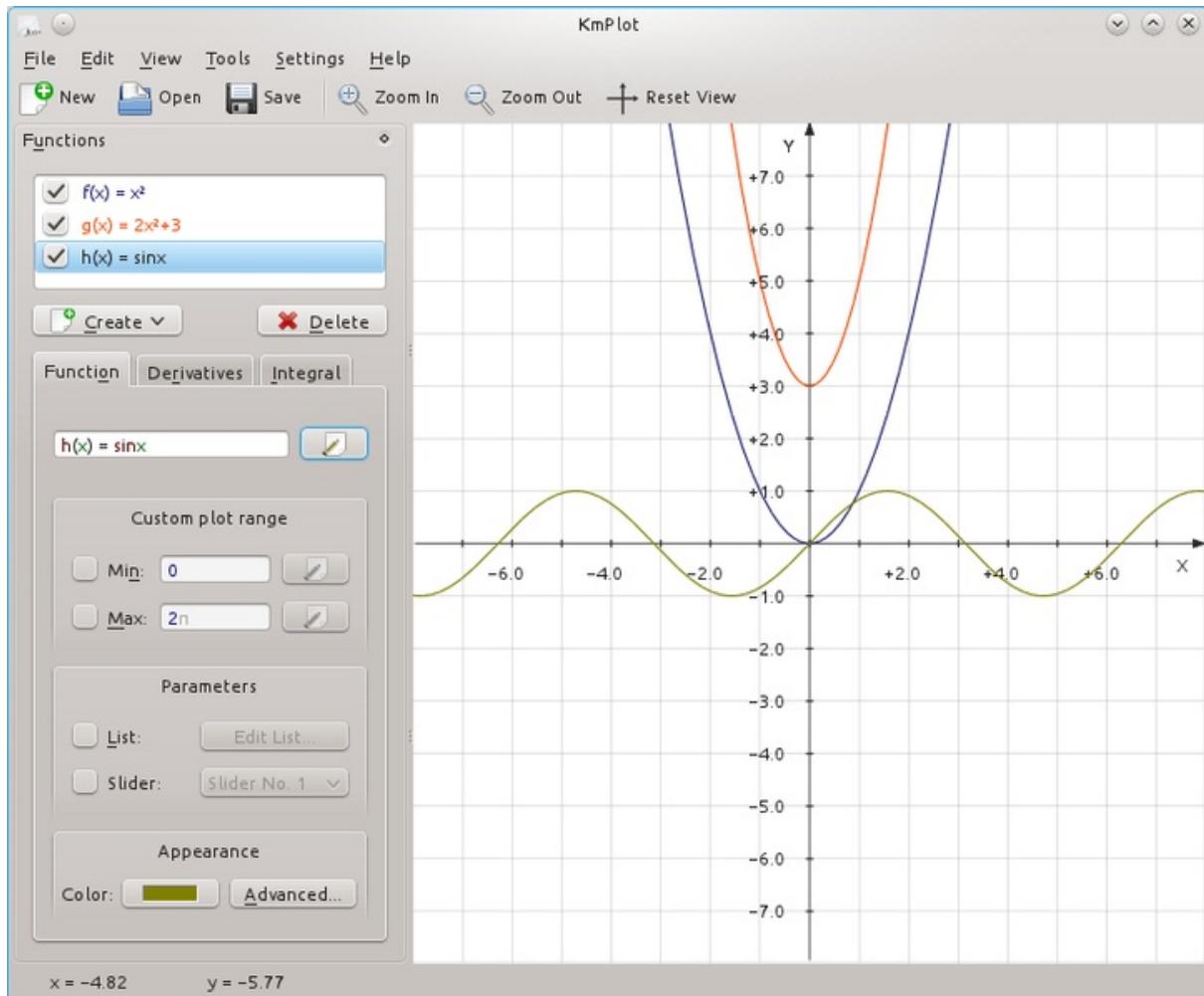
**Guess**

English Animals Wins: 0 Losses: 0

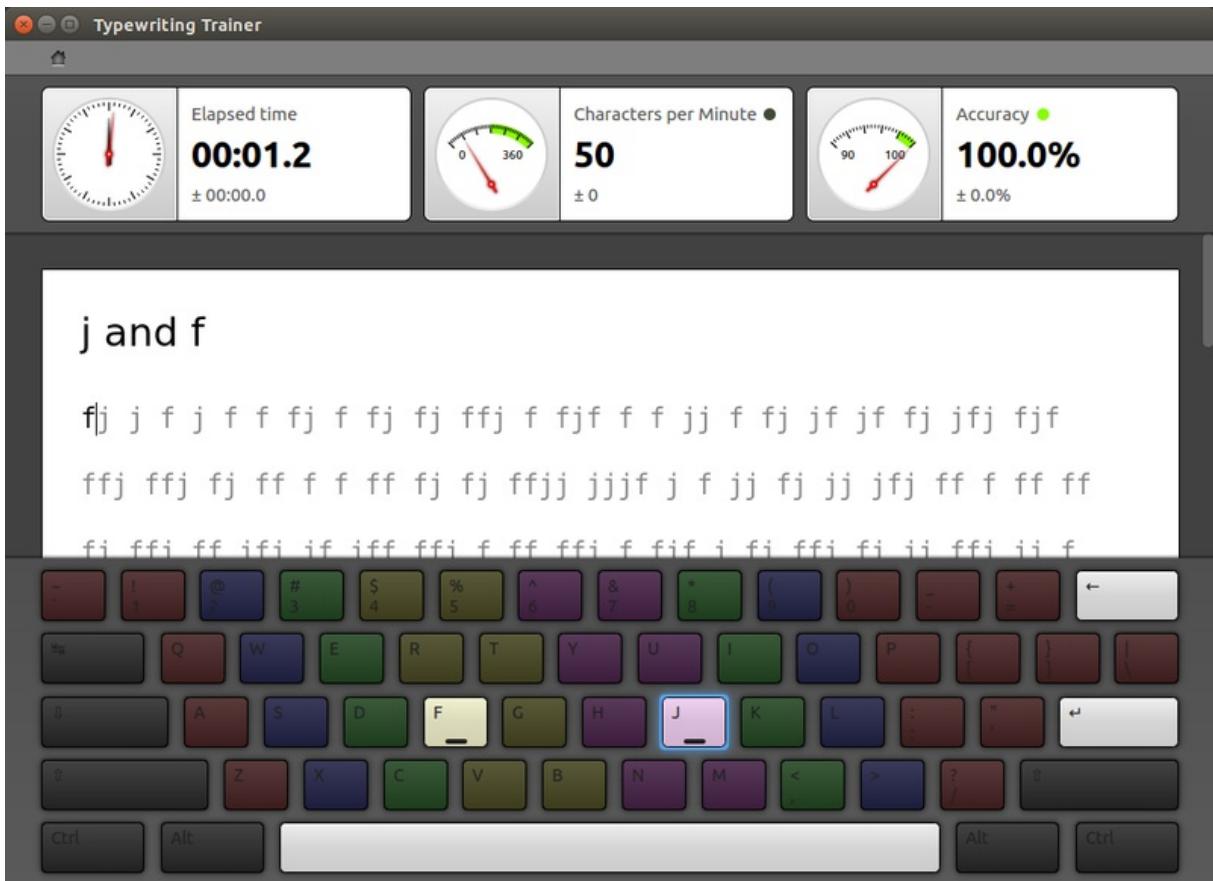
- [kig](#) - interactive geometry tool for KDE



- **kmplot** - mathematical function plotter for KDE



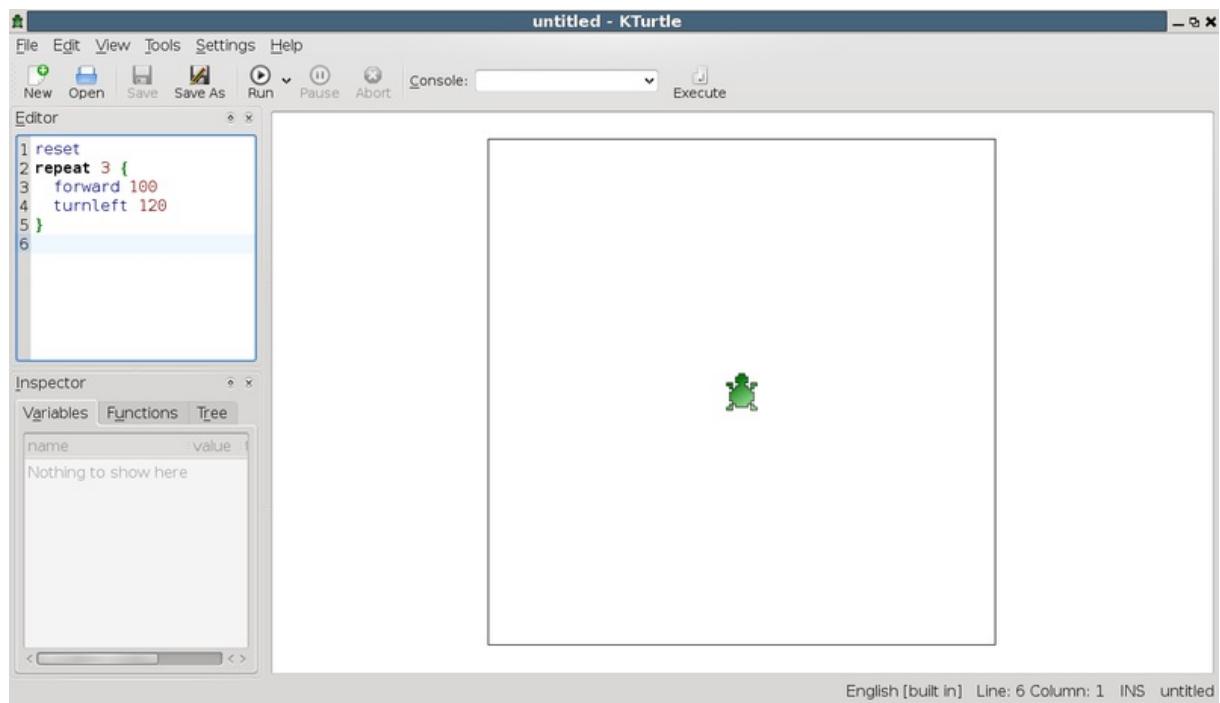
- [ktouch](#) - touch typing tutor for KDE



- [ktuberling](#) - stamp drawing toy



- [kturtle](#) - educational programming environment



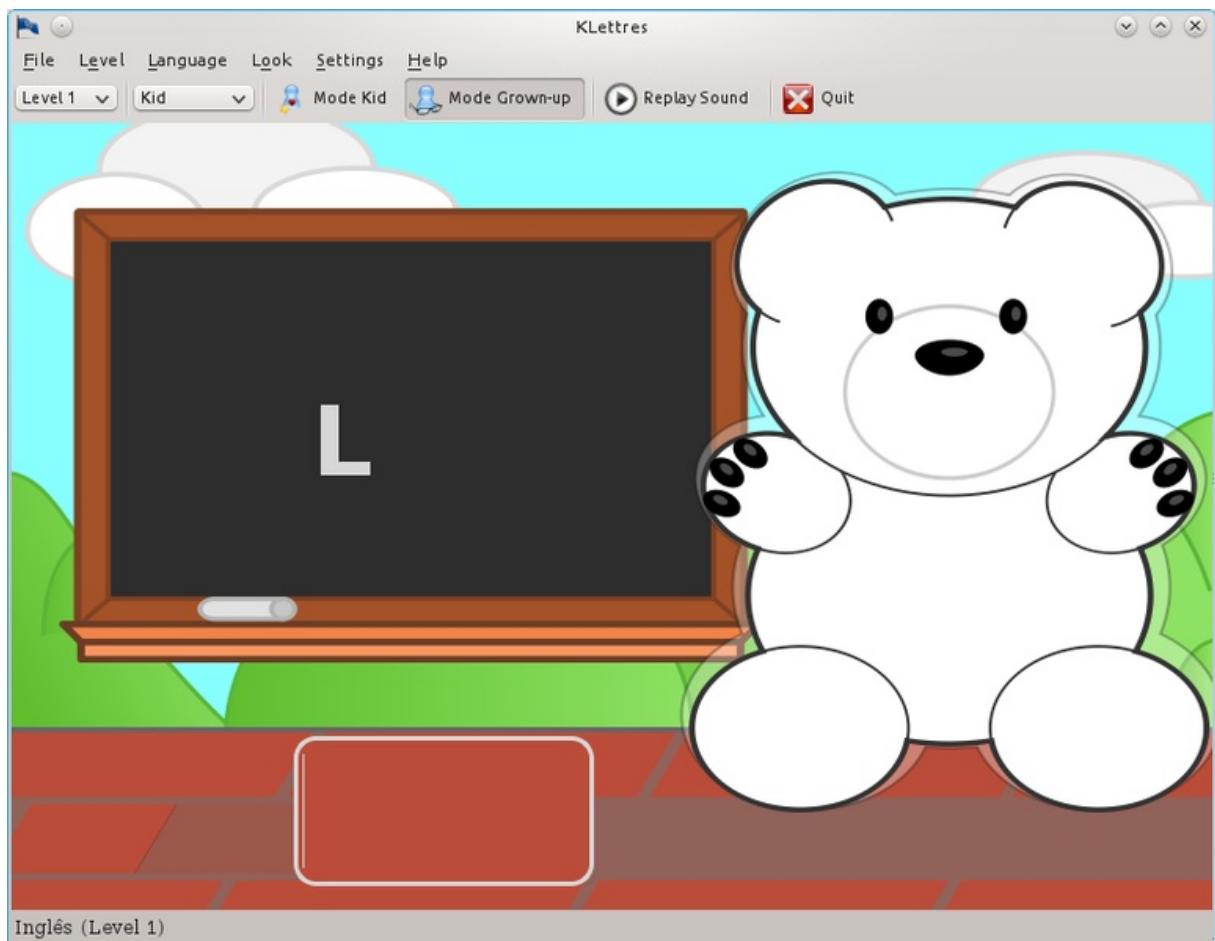
- [kwordquiz](#) - flashcard learning program

The screenshot shows the KWordQuiz application window titled "Untitled [modified] - 'KWordQuiz'". The interface has a menu bar with File, Edit, Vocabulary, Mode, Quiz, Settings, and Help. Below the menu is a toolbar with New, Open, Save, Print, Print Preview, Undo, Redo, Cut, Copy, Paste, and other buttons. The main area is divided into two columns. Column 1 contains the word "Edubuntu". Column 2 contains a list of three multiple-choice options:

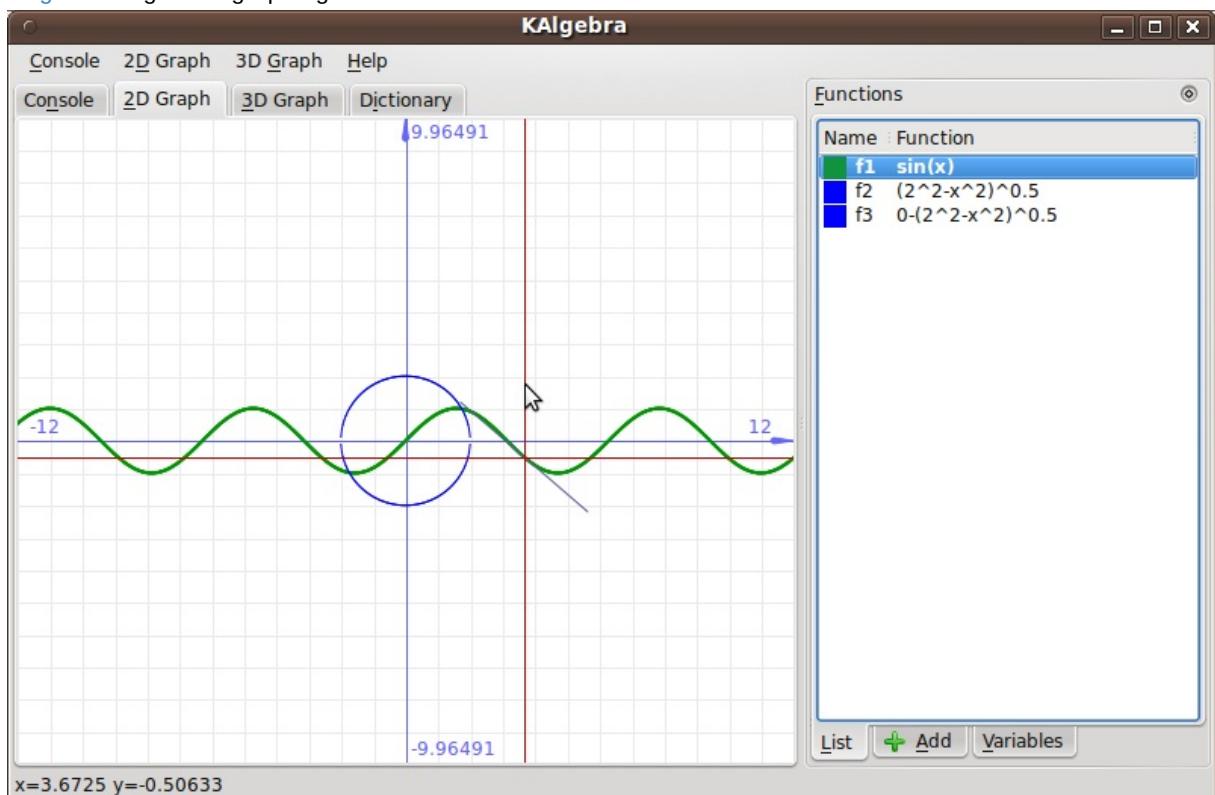
- 1 A Linux distribution
- 2 A Ubuntu derivative for Educators and Students
- 3 A Linux distribution based on Debian

On the right side of the window, there are several buttons with icons: Check (green checkmark), I Know (lightbulb), I Do Not Know (crossed-out X), Hint (book), Play Audio (play button), Restart (refresh), and Repeat Errors (recycling symbol). At the bottom left, there is a logo with a question mark and the number 3.

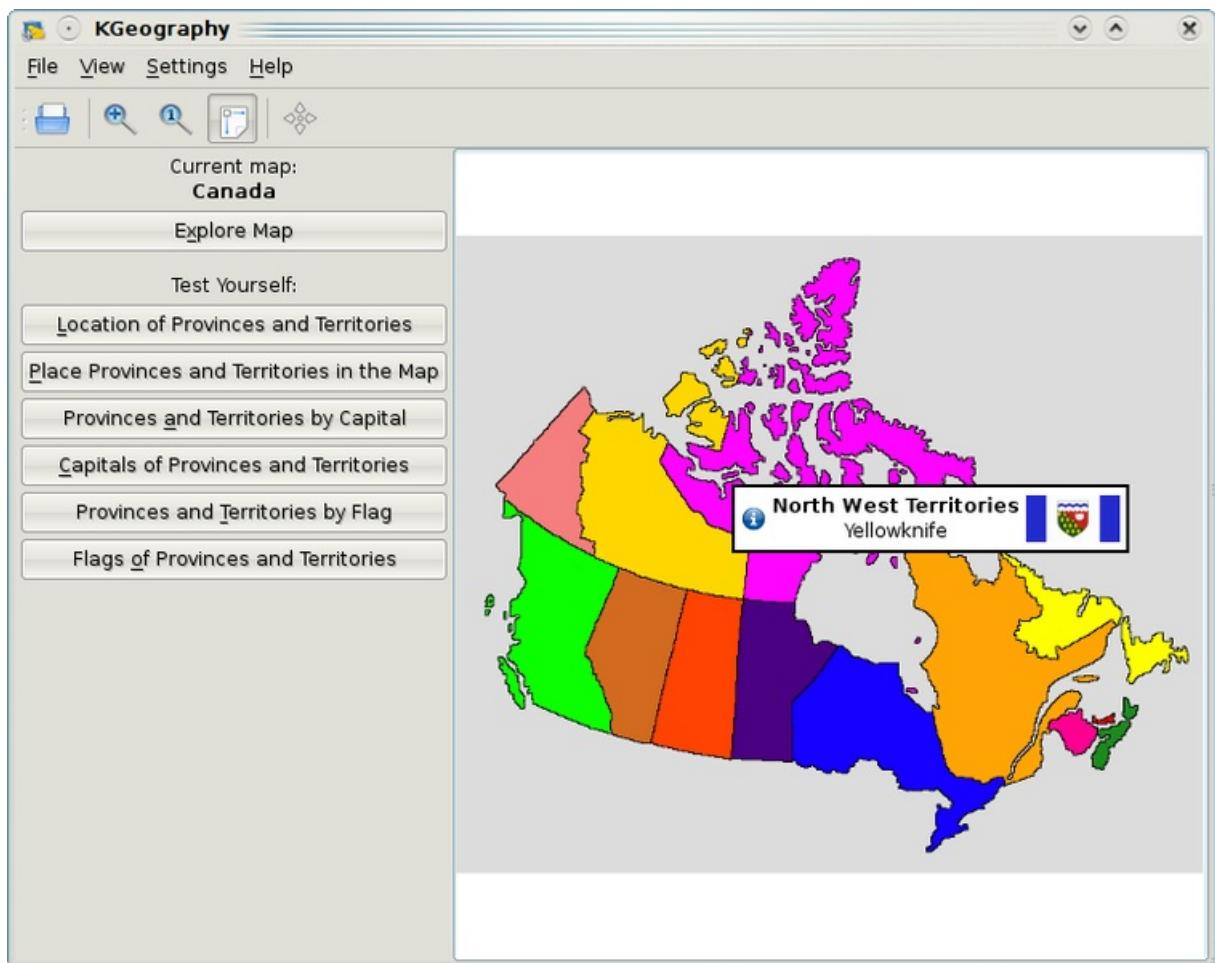
- [klettres](#) - foreign alphabet tutor for KDE



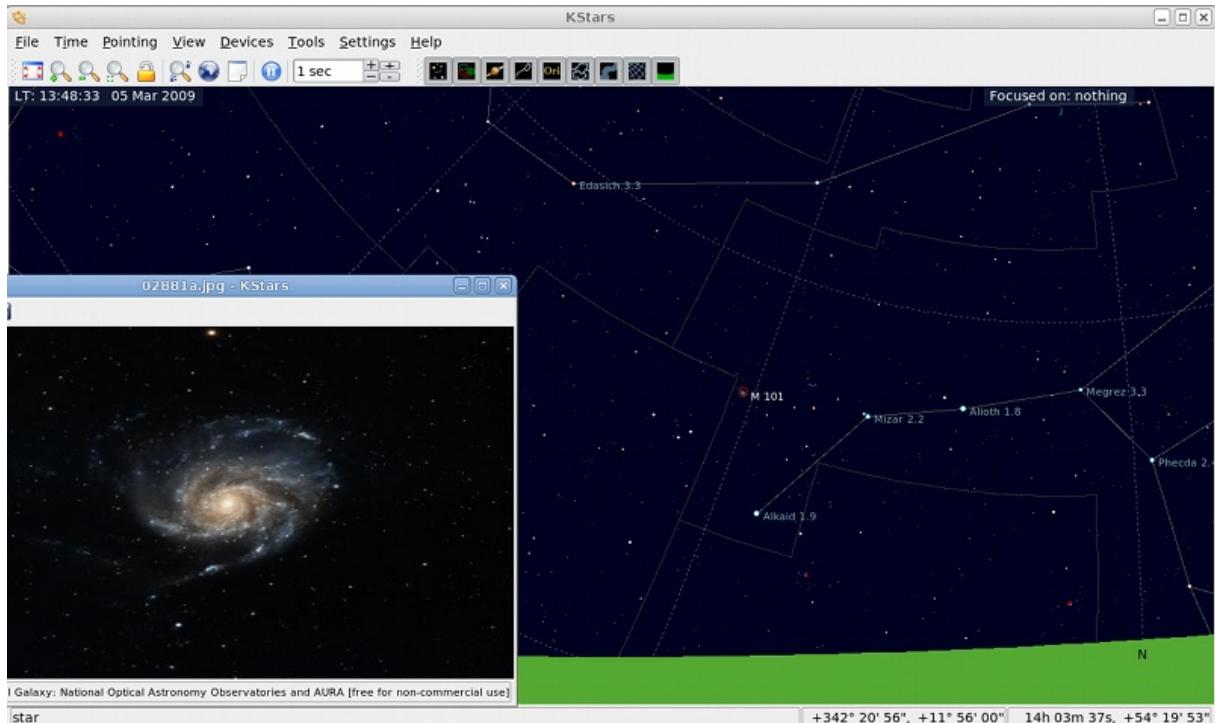
- [kalgebra](#) - algebraic graphing calculator



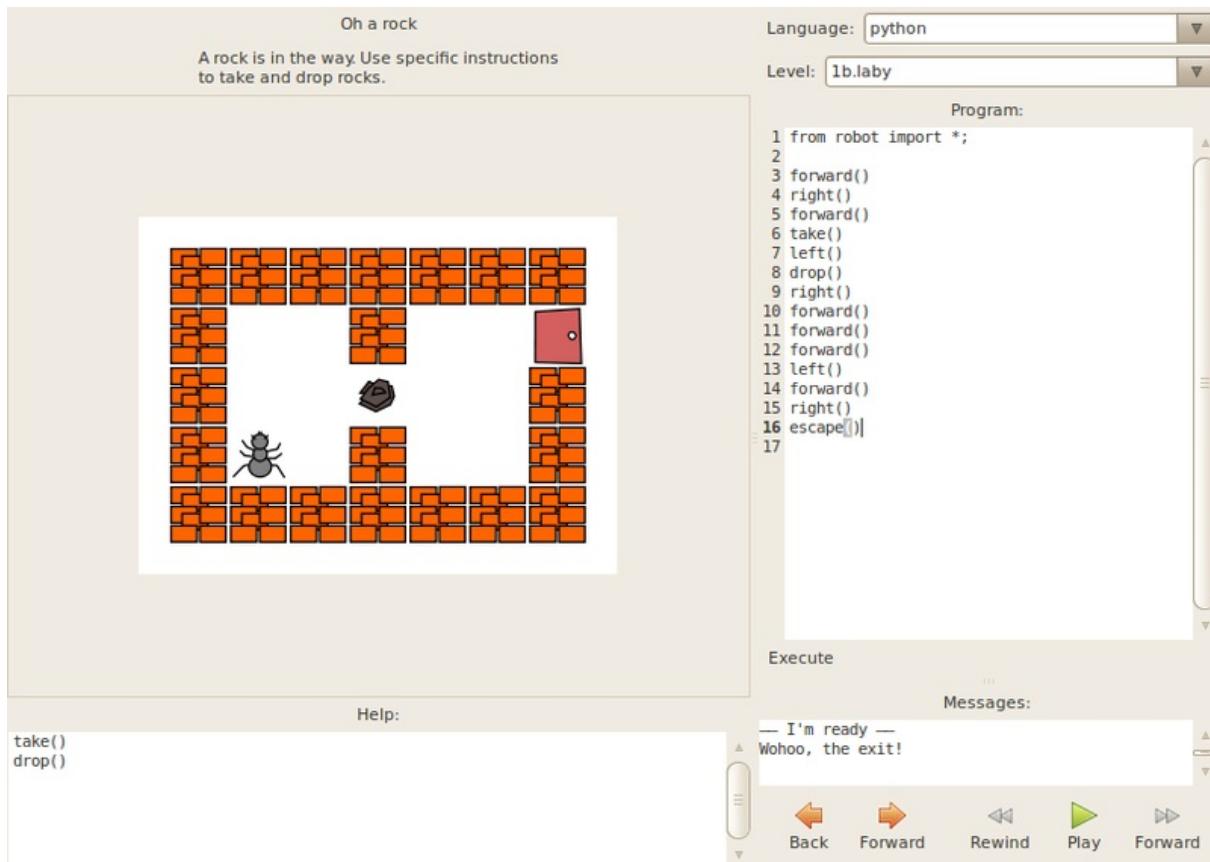
- [kgeography](#) - geography learning aid for KDE



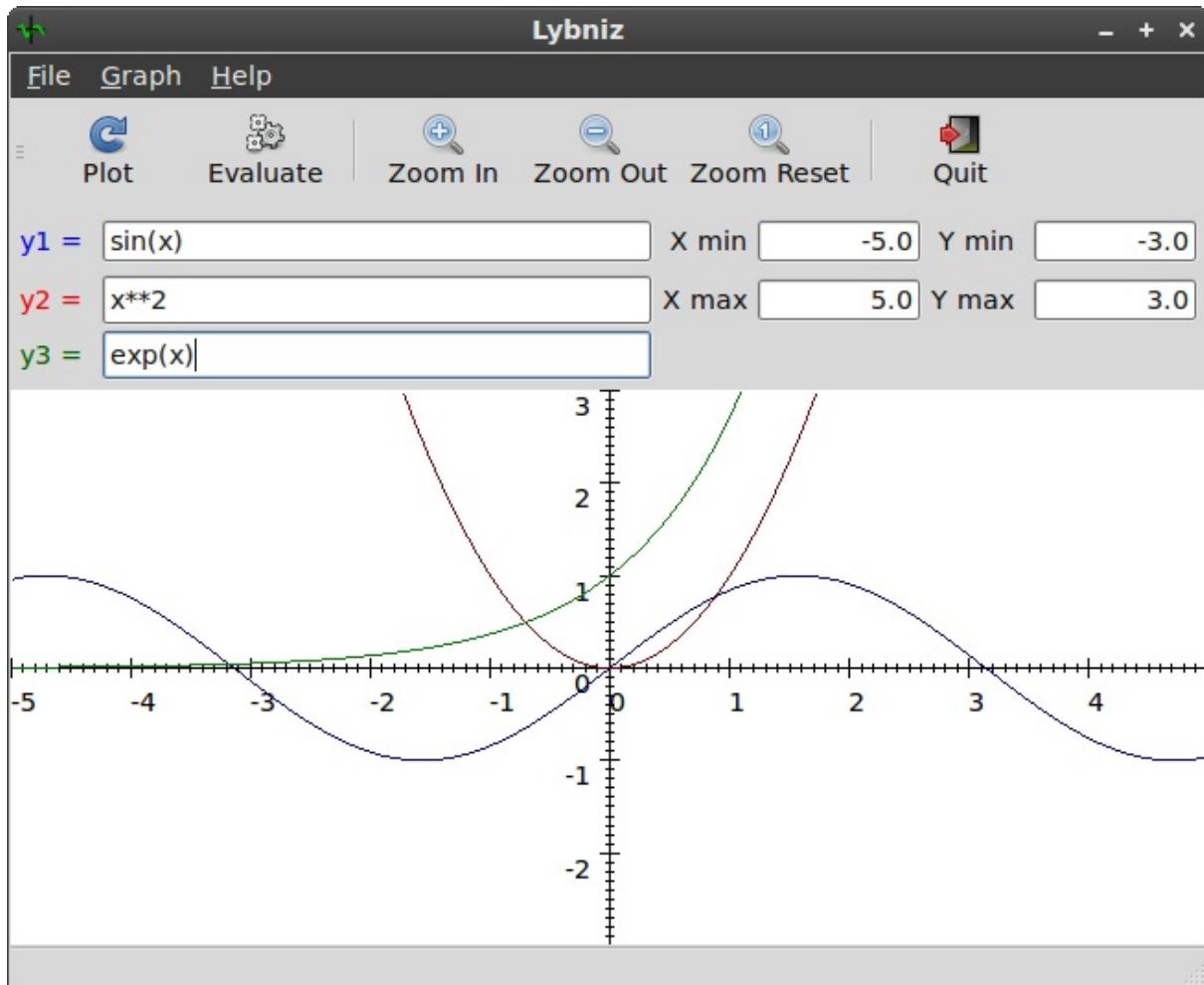
- [kstars](#) - desktop planetarium for KDE



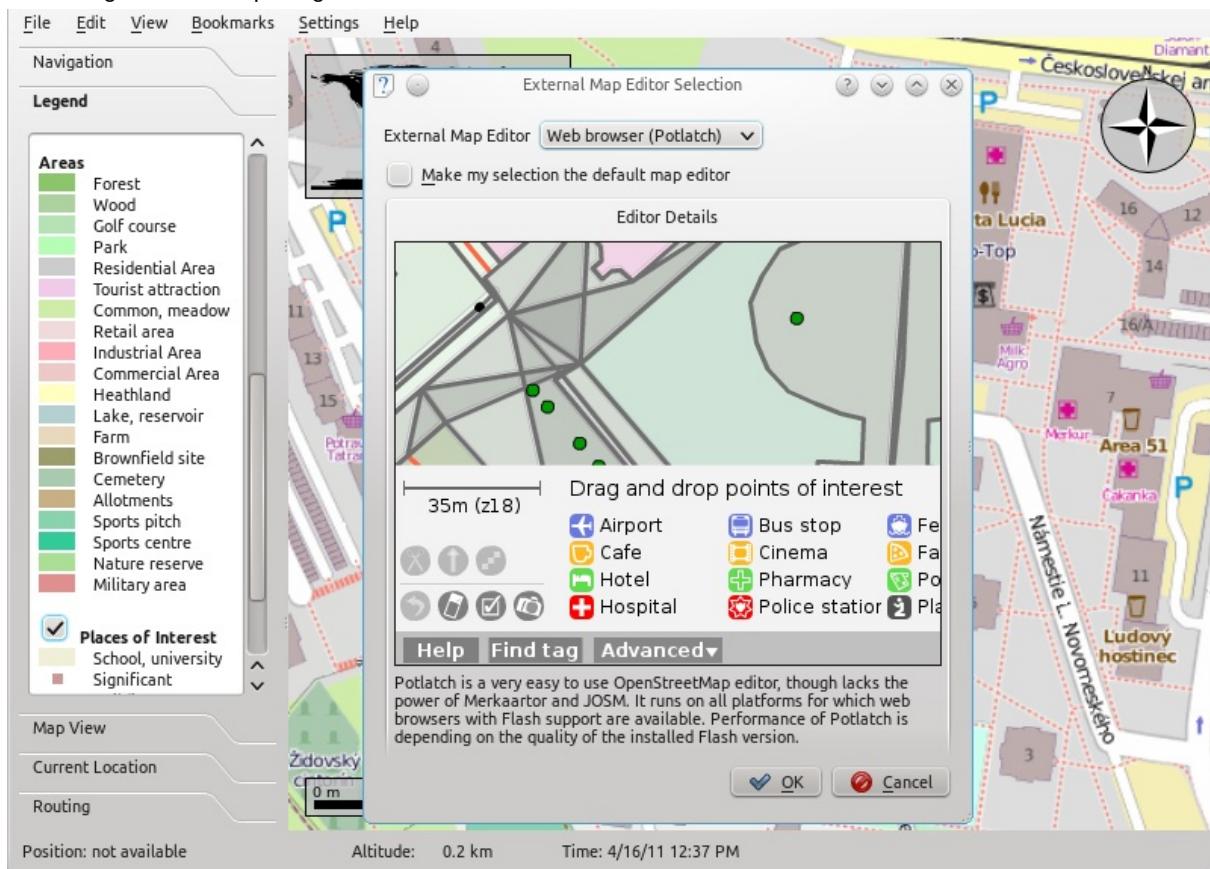
- [laby](#) - Learn how to program with ants and spider webs



- [lybniz](#) - mathematical function graph plotter



- [marble](#) - globe and map widget



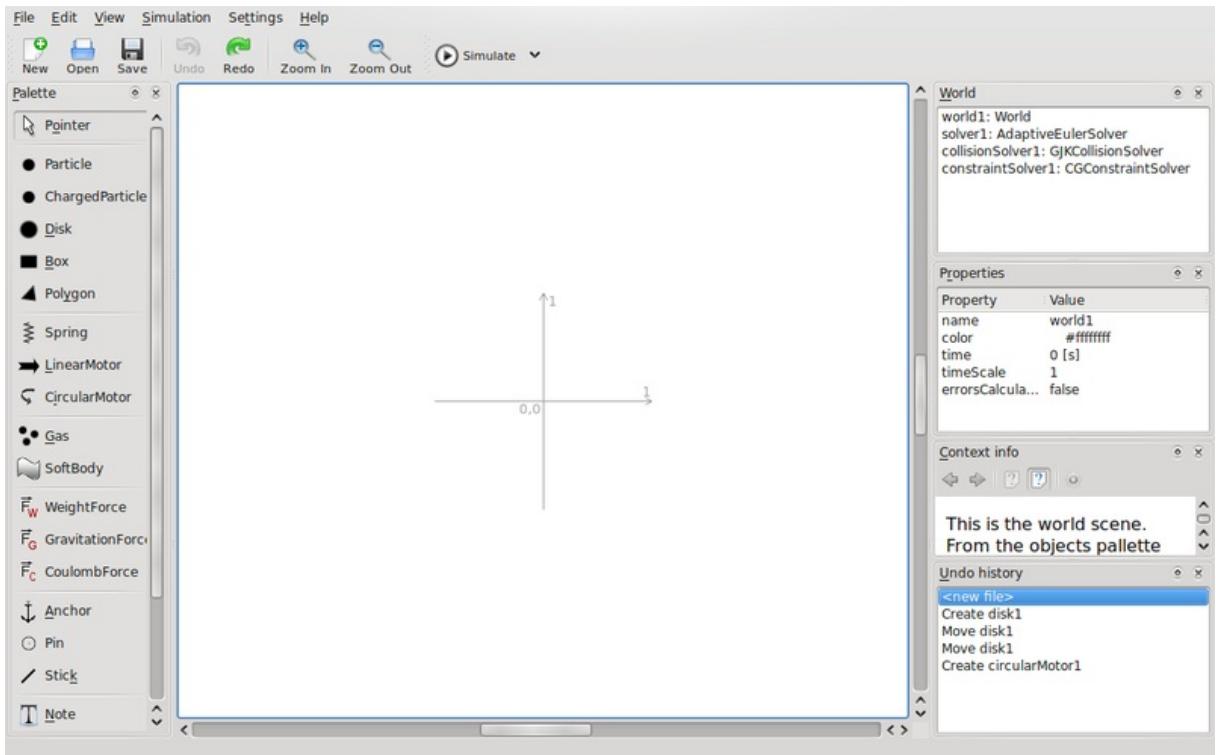
- [parley](#) - vocabulary trainer

The screenshot shows the Parley application interface. The title bar says "Parley". The menu bar includes File, View, Settings, Help, Full Screen, and Stop Practice. The main area displays a lesson titled "Lesson: misc jobs". Inside the lesson box, the English word "work, job, effort" is listed above its Spanish translation "el trabajo". To the right of the lesson box is a decorative graphic featuring a large question mark and several smaller bubbles. At the bottom of the lesson box are two buttons: "Answer Later" and "Hint". Below the lesson box are two buttons: "I did not know it" and "I knew it". The bottom of the screen features a progress bar with a red indicator and the text "2/1135".

- [ri-li](#) - a toy train simulation game



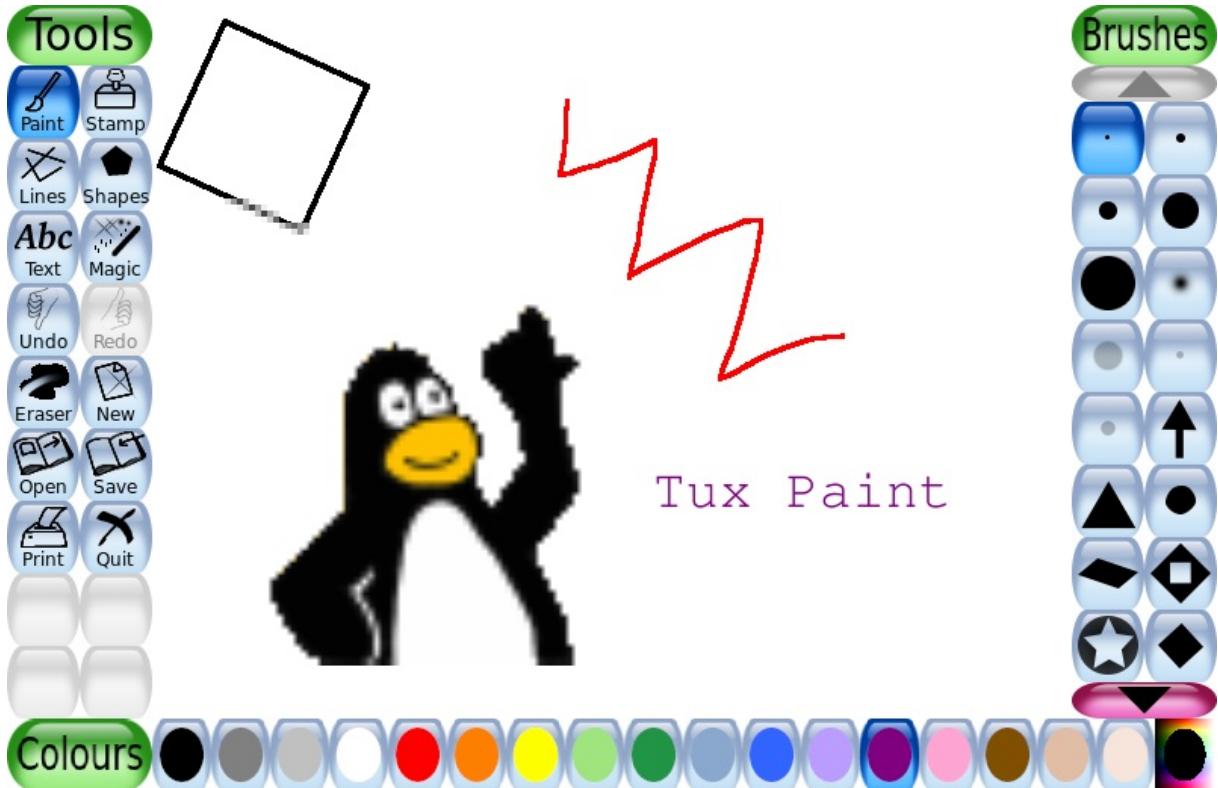
- [step](#) - interactive physical simulator for KDE



- [tuxmath](#) - math game for kids with Tux



- [tuxpaint](#) - A paint program for young children



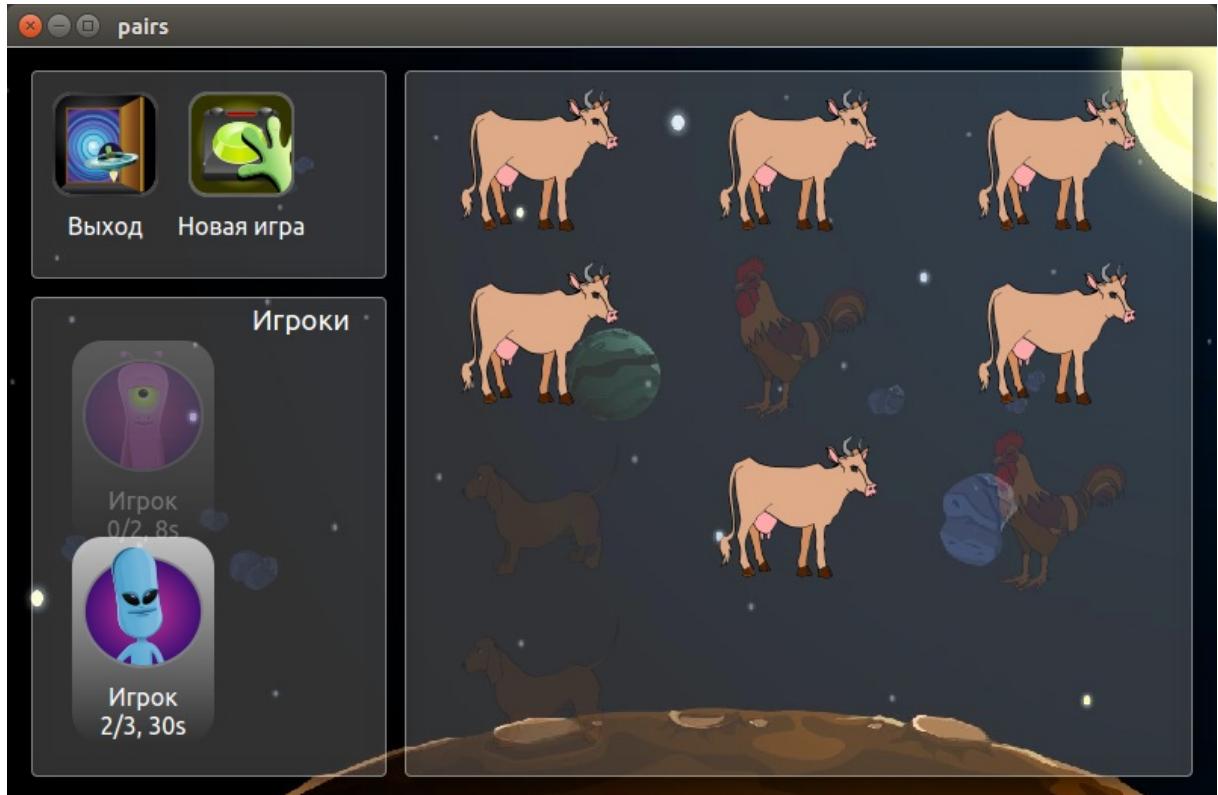
Pick a colour and a brush shape to draw with.



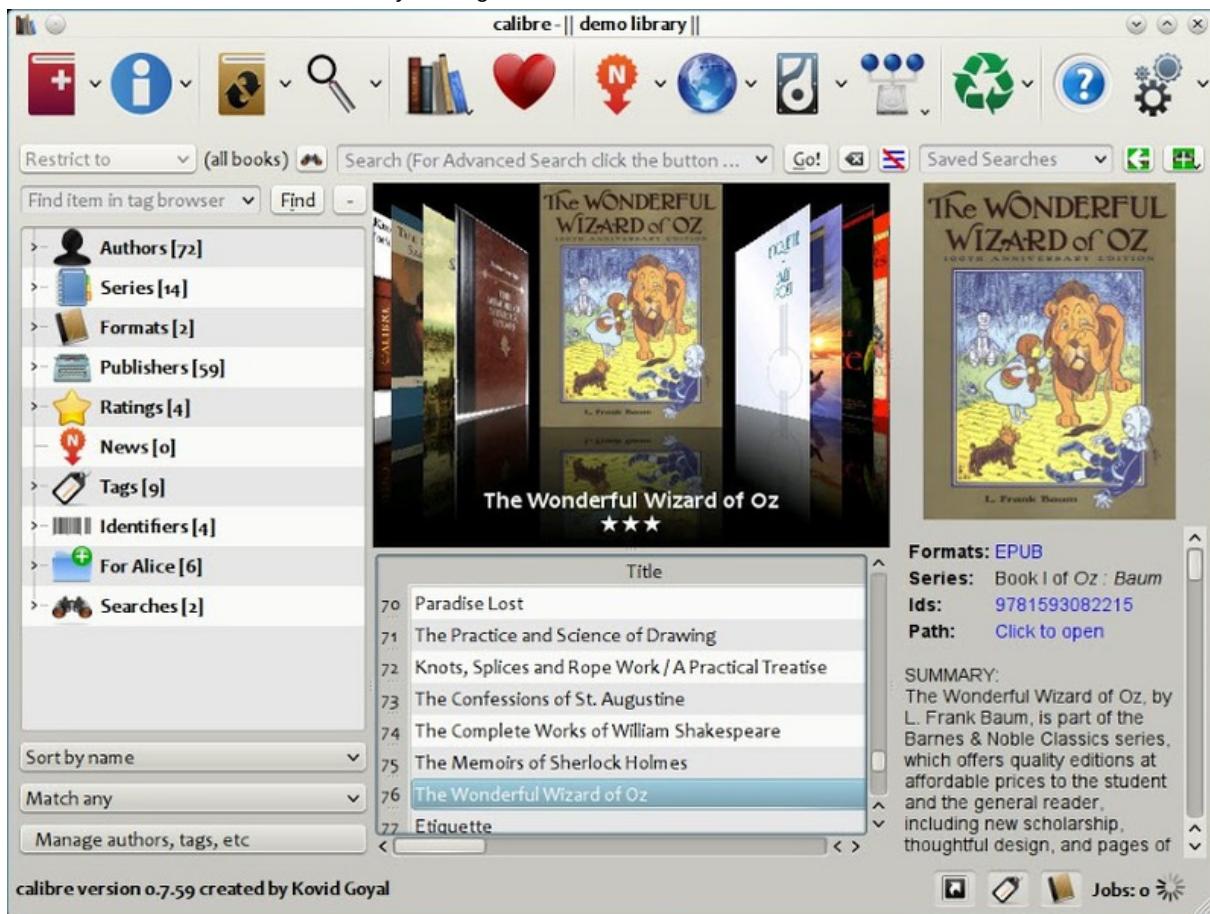
- [tuxtype](#) - Educational Typing Tutor Game Starring Tux



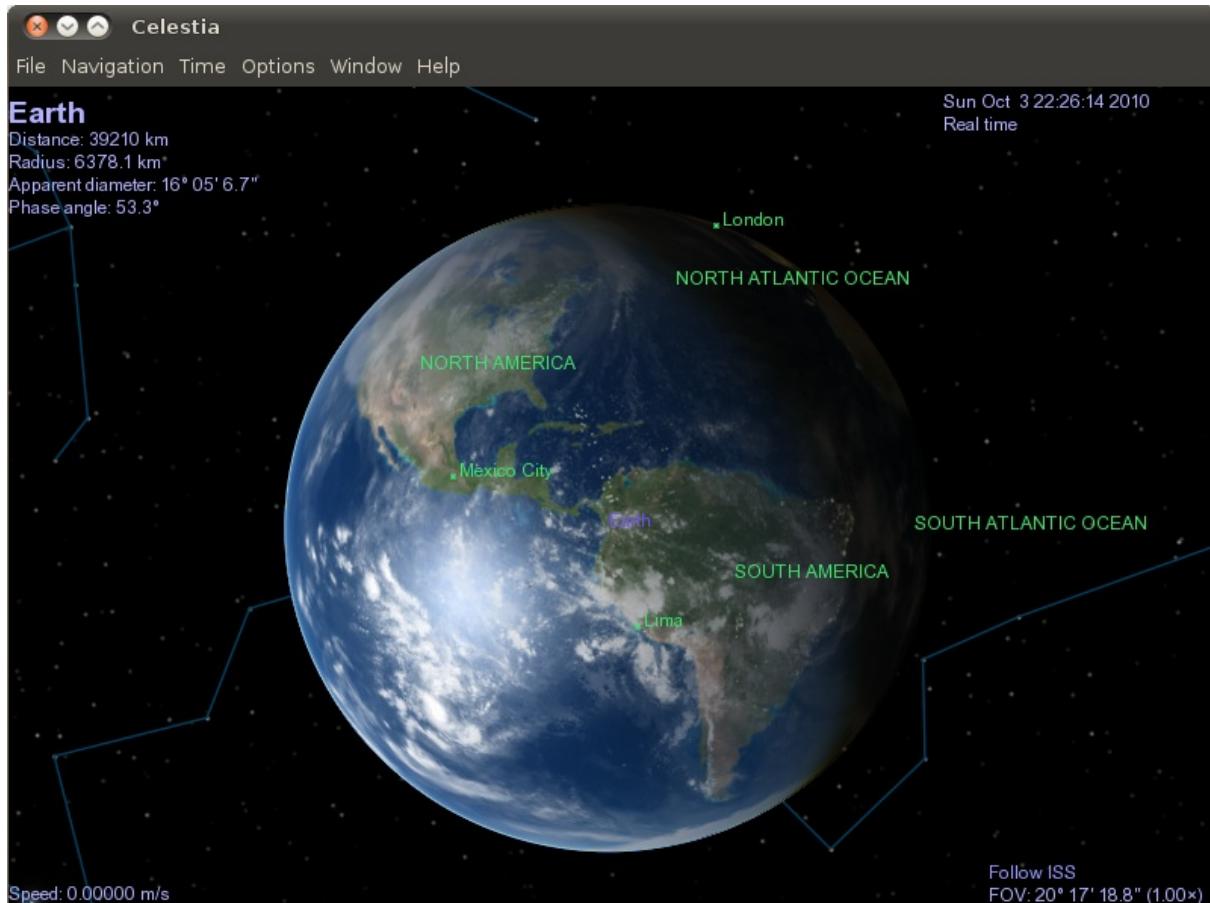
- [pairs](#) - memory and pairs game



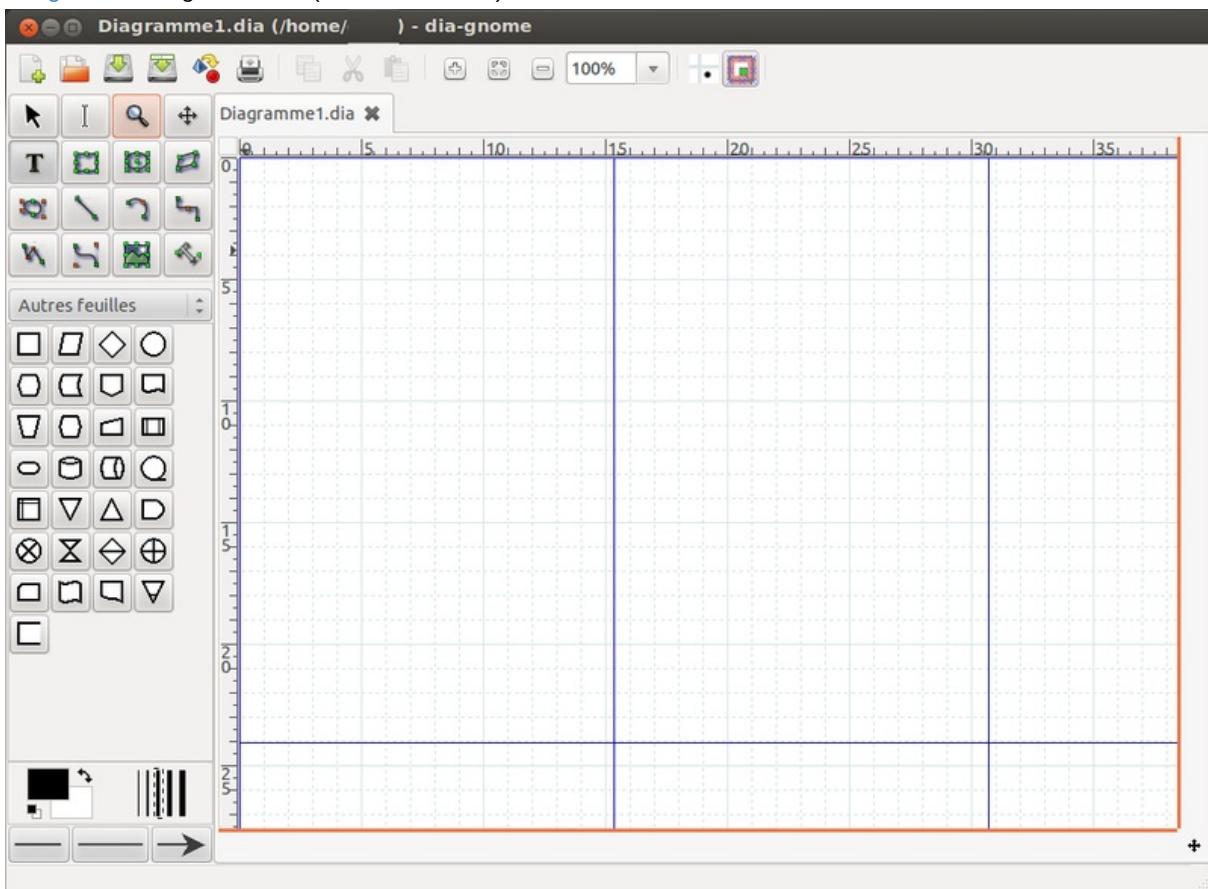
- [calibre](#) - e-book converter and library management



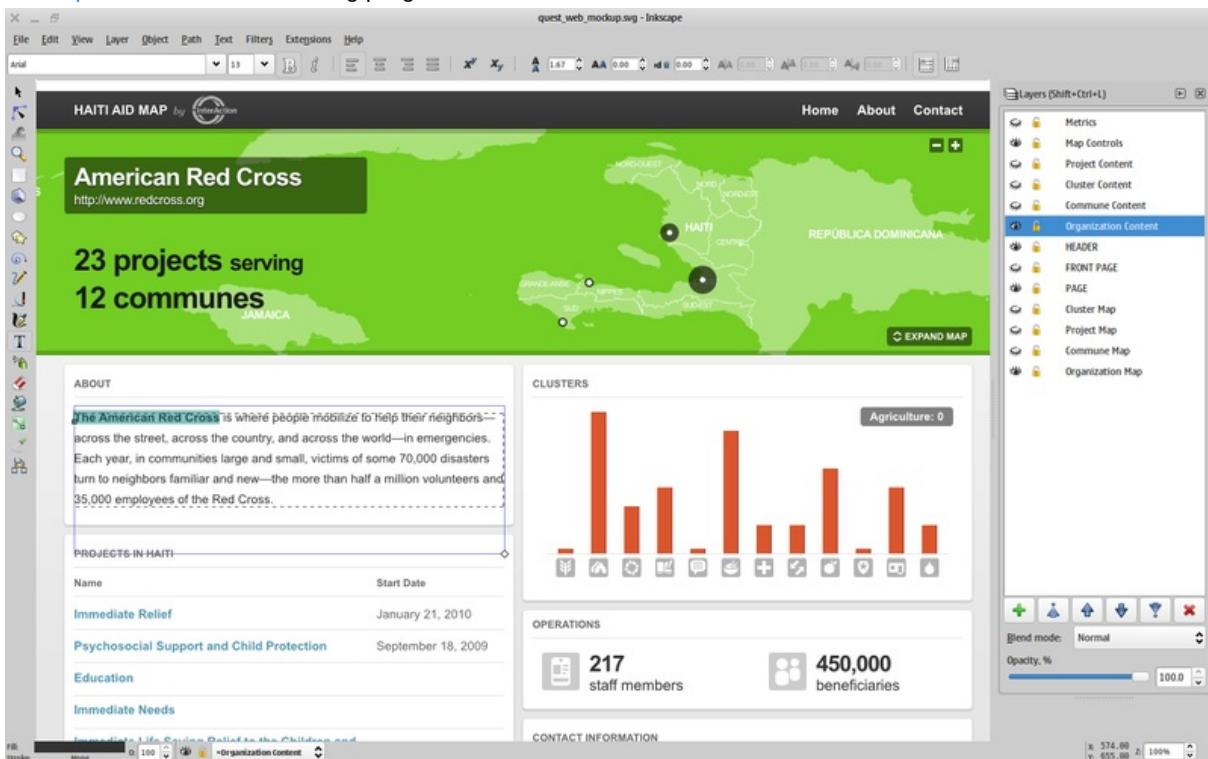
- [celestia-gnome](#) - real-time visual space simulation (GNOME frontend)



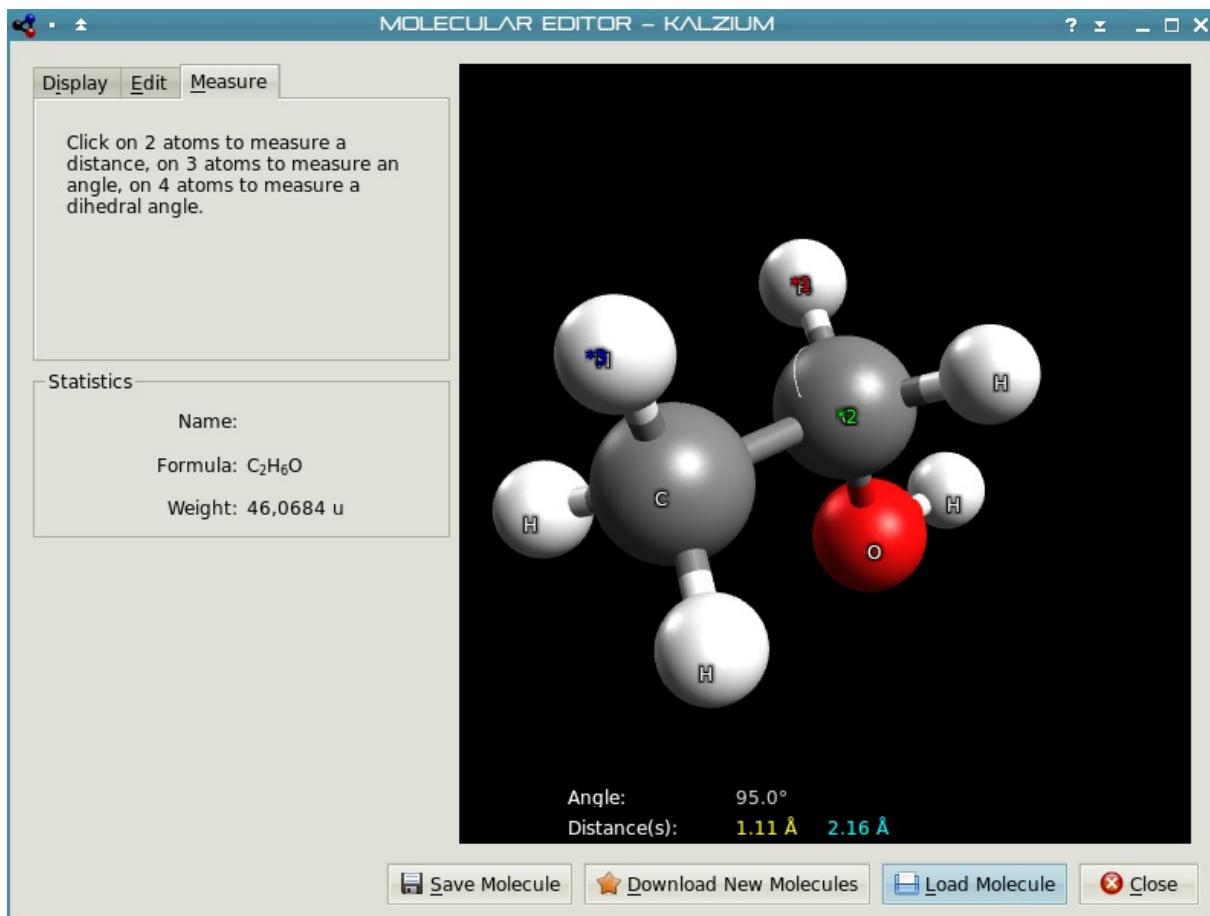
- dia-gnome - Diagram editor (GNOME version)



- inkscape - vector-based drawing program



- kalzium - periodic table and chemistry tools



- kbruch - fraction learning aid for KDE

File Settings Help

New Back  $\frac{2}{3} + \frac{1}{6} = \frac{5}{6}$   $\frac{3}{4} > \frac{1}{2}$   $0.\bar{3} = \frac{1}{3}$   $21 = 3 \cdot 7$  10% of 30 = 3

Arithmetic Comparison Conversion Factorization Percentage

**Options:**

Question:  
Mixed number:   
Number of terms: 2  
Maximum denominator: 10

Answer:  
Mixed number:   
Reduced form:

Solution:  
Mixed number:

Operations:  
Addition:   
Subtraction:   
Multiplication:   
Division:

**Arithmetic**

$1 - \frac{1}{4} =$

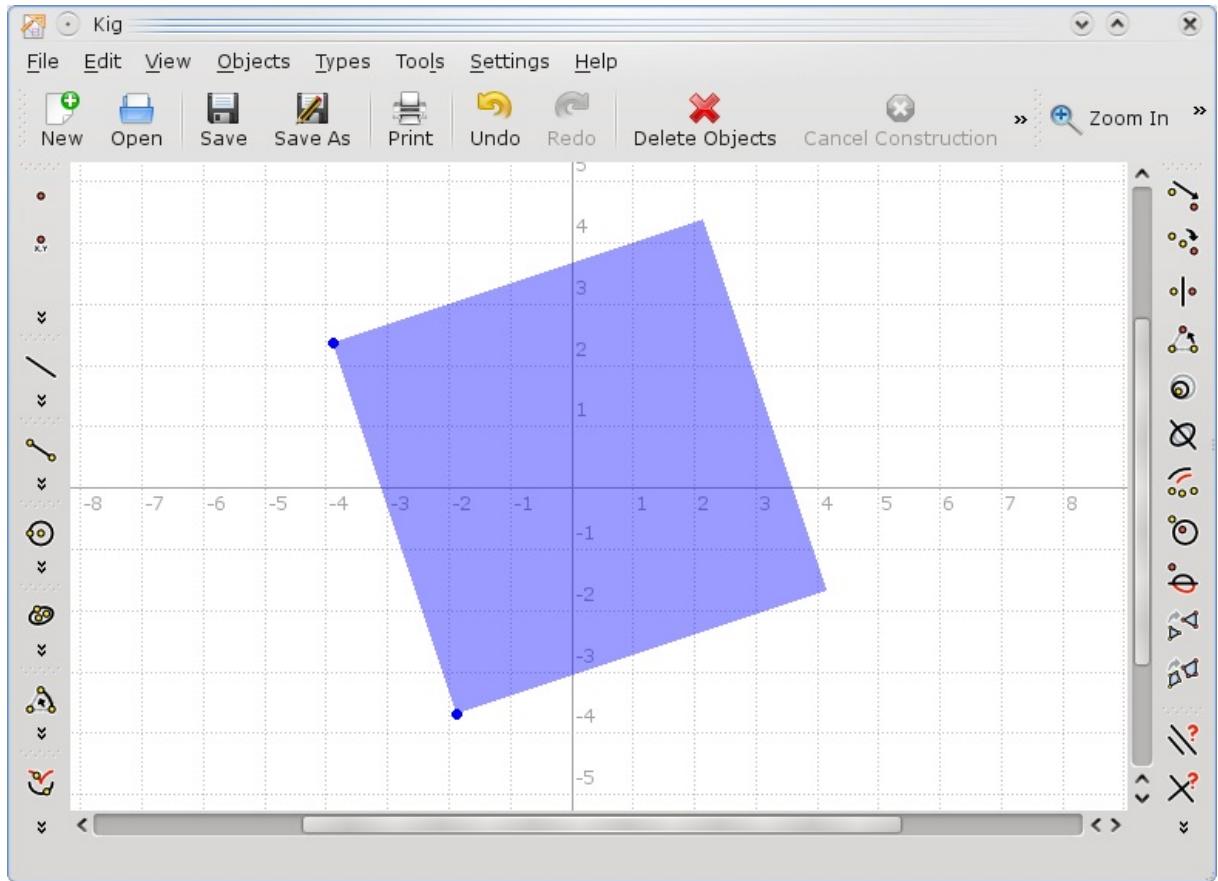
**Correct!**

Next Skip

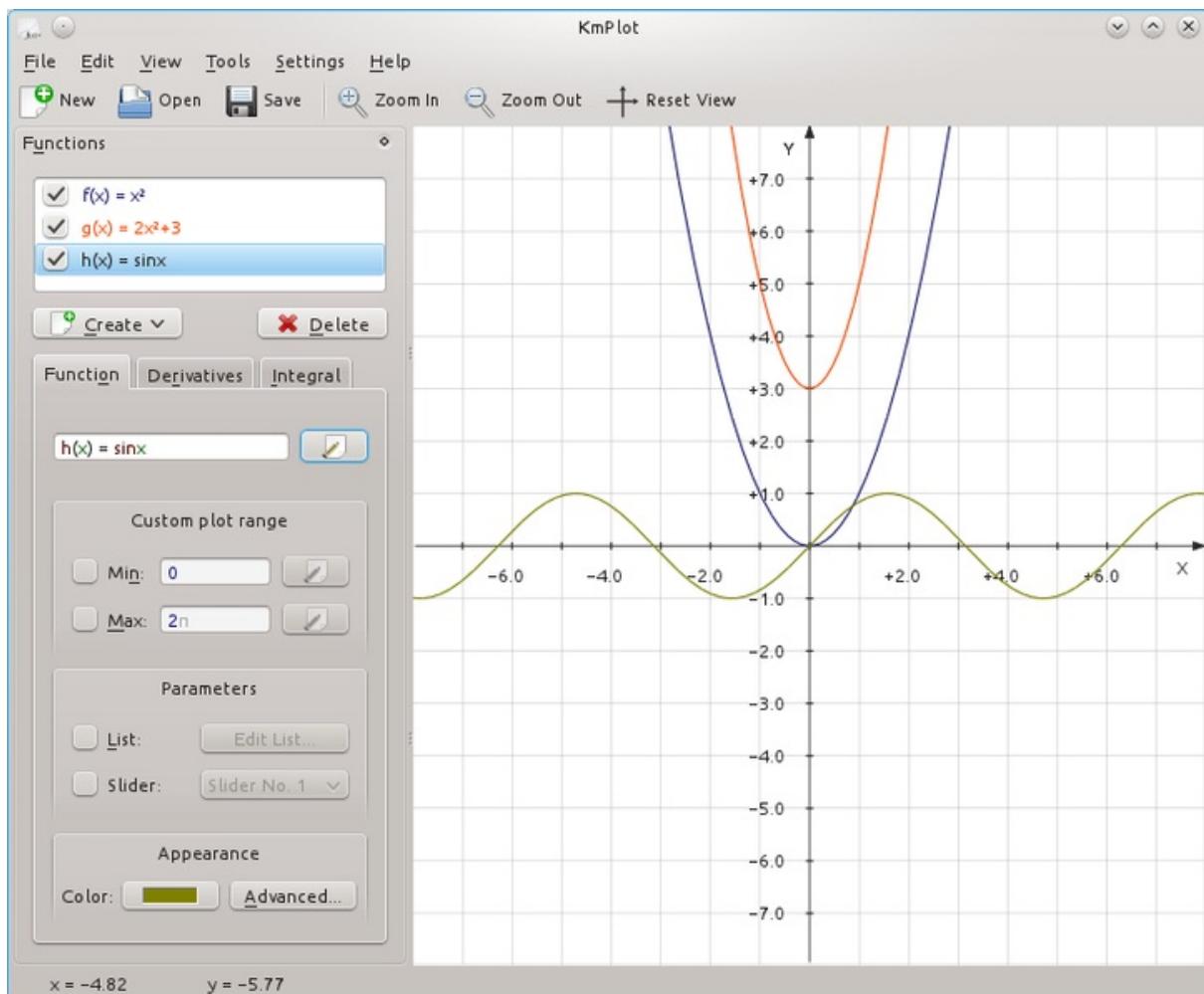
Questions: Correct: 21 70%  
Incorrect: 4 13%  
Skipped: 5 16%

**30**

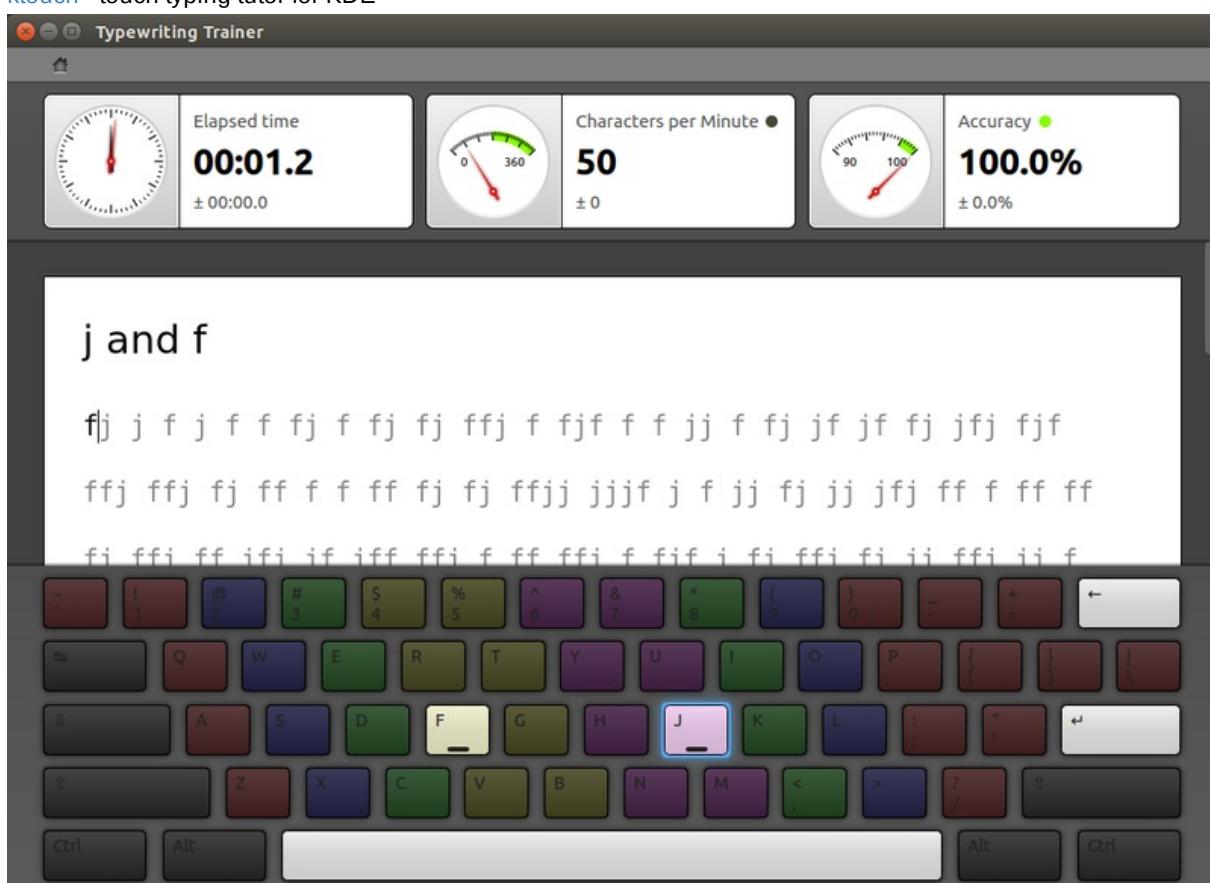
- [kig](#) - interactive geometry tool for KDE



- [kmplot](#) - mathematical function plotter for KDE



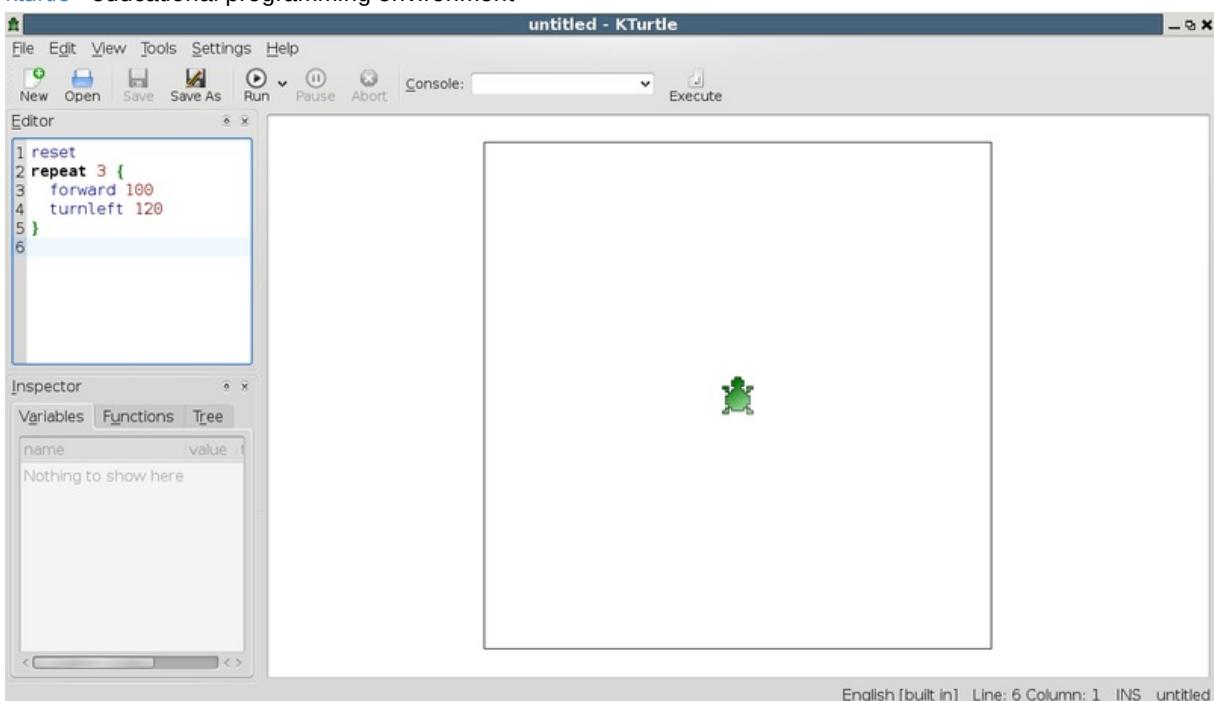
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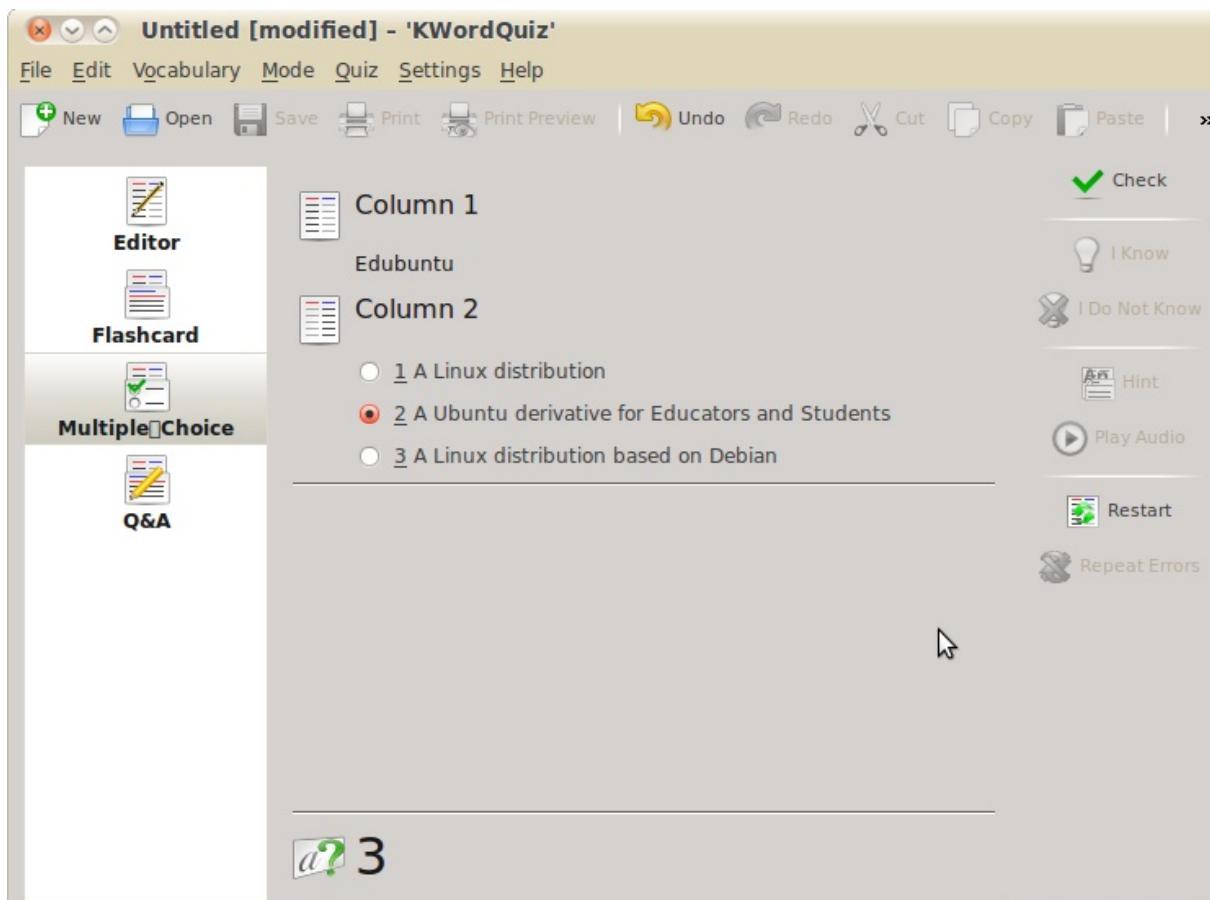
- [ktuberling](#) - stamp drawing toy



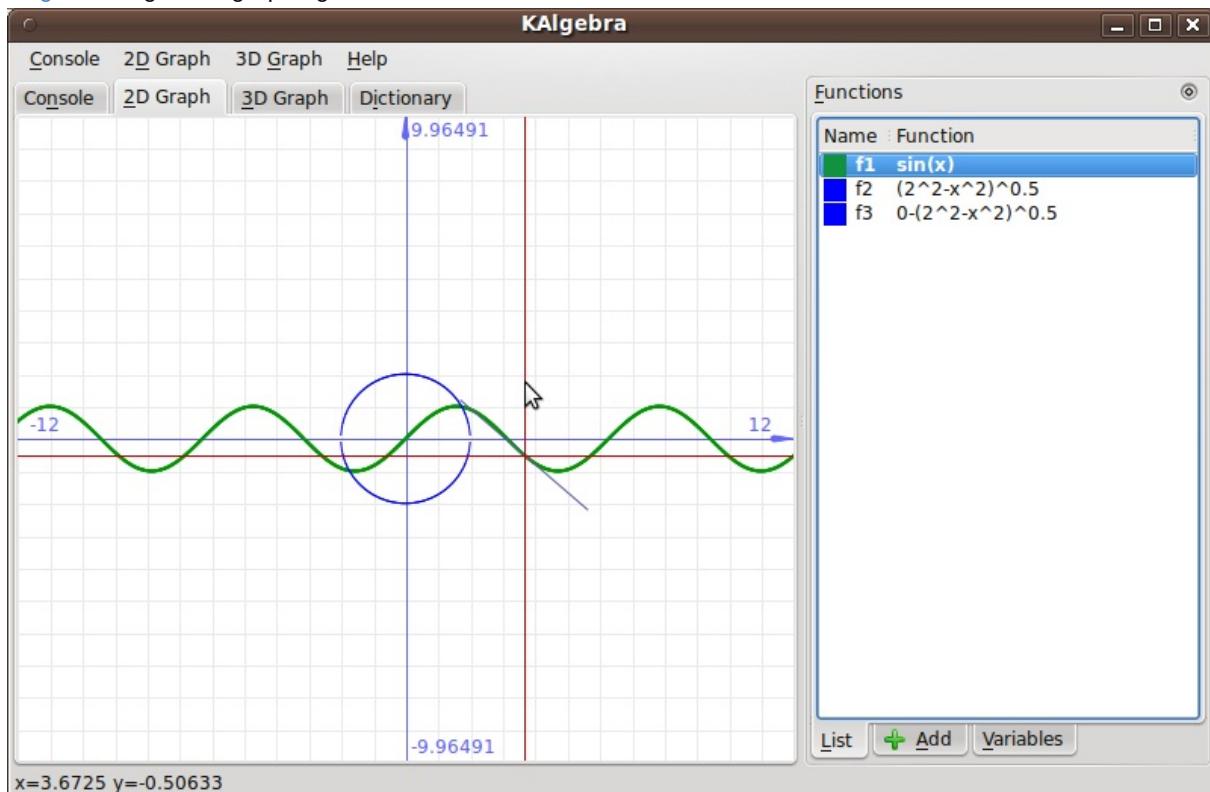
- [kturtle](#) - educational programming environment



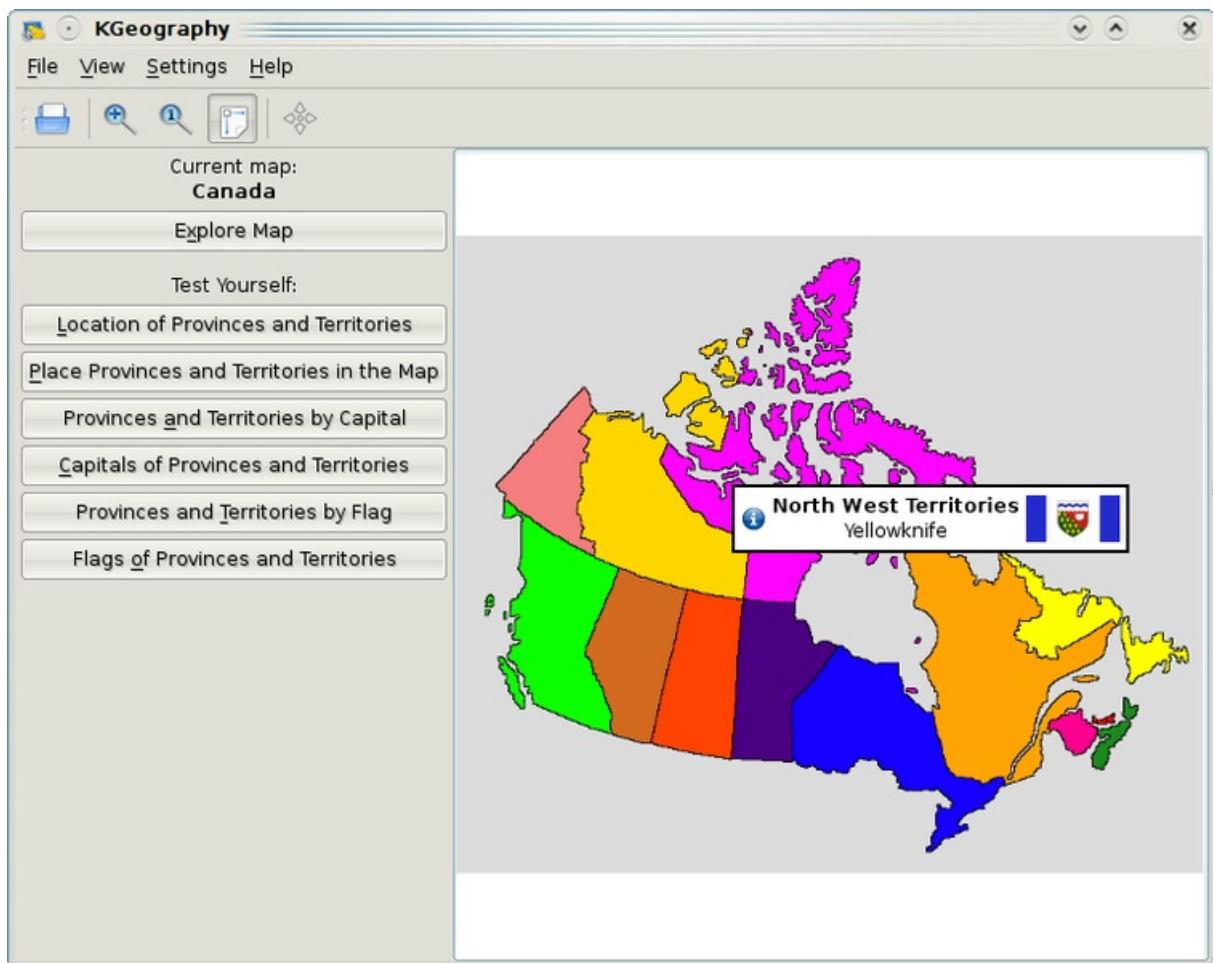
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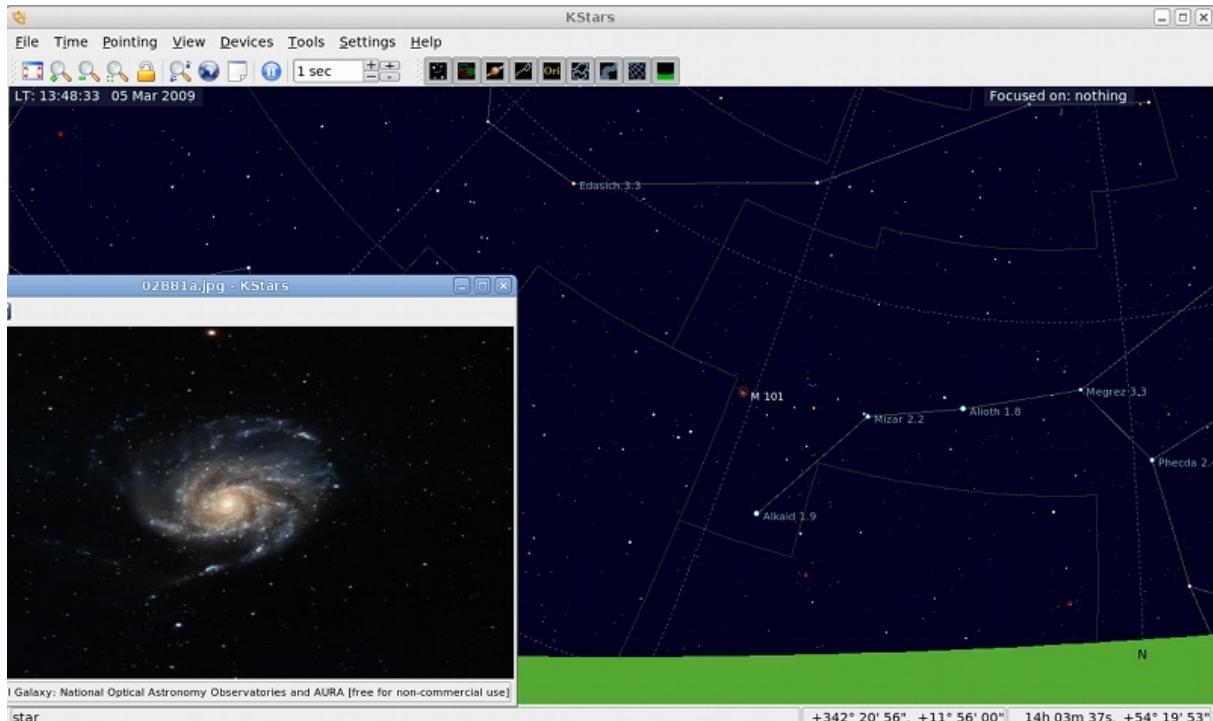
- [kalgebra](#) - algebraic graphing calculator



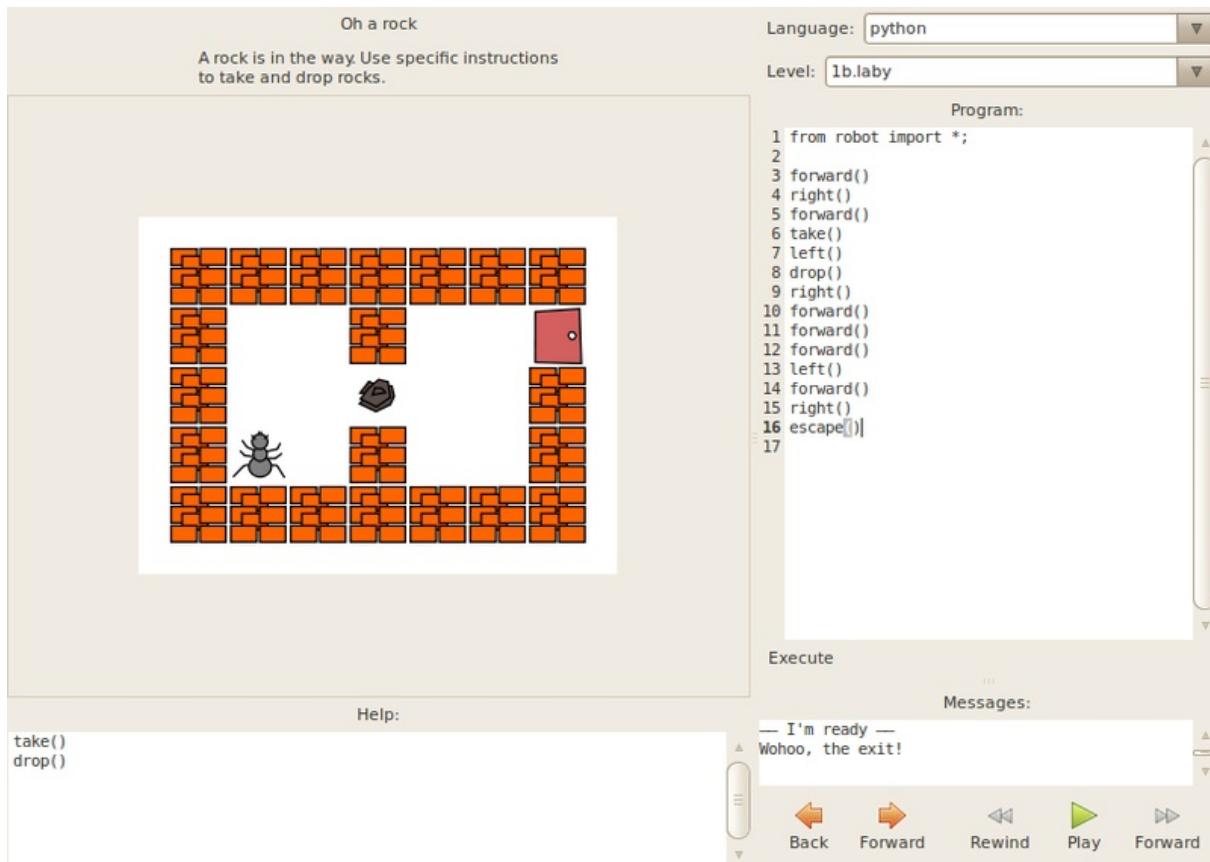
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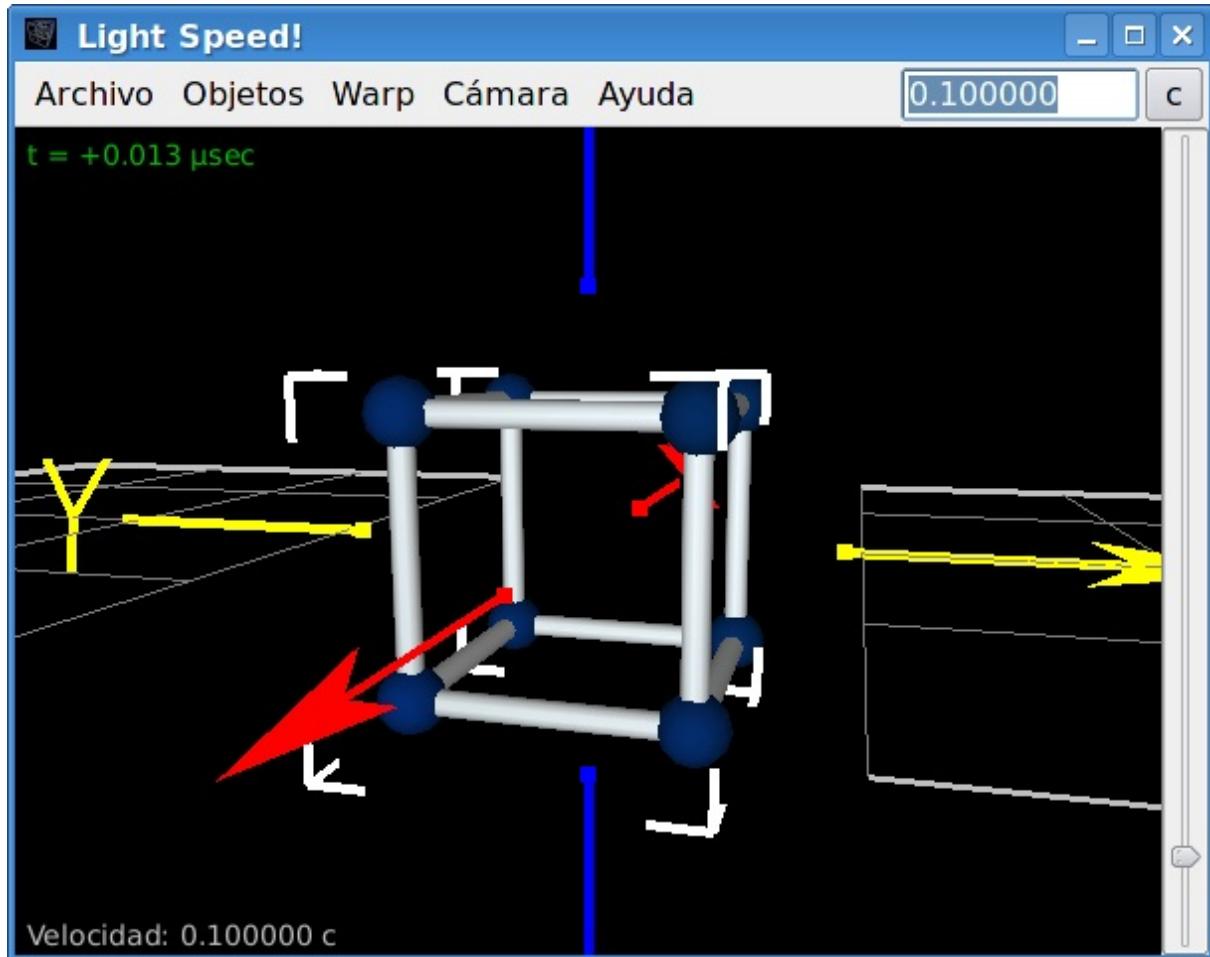
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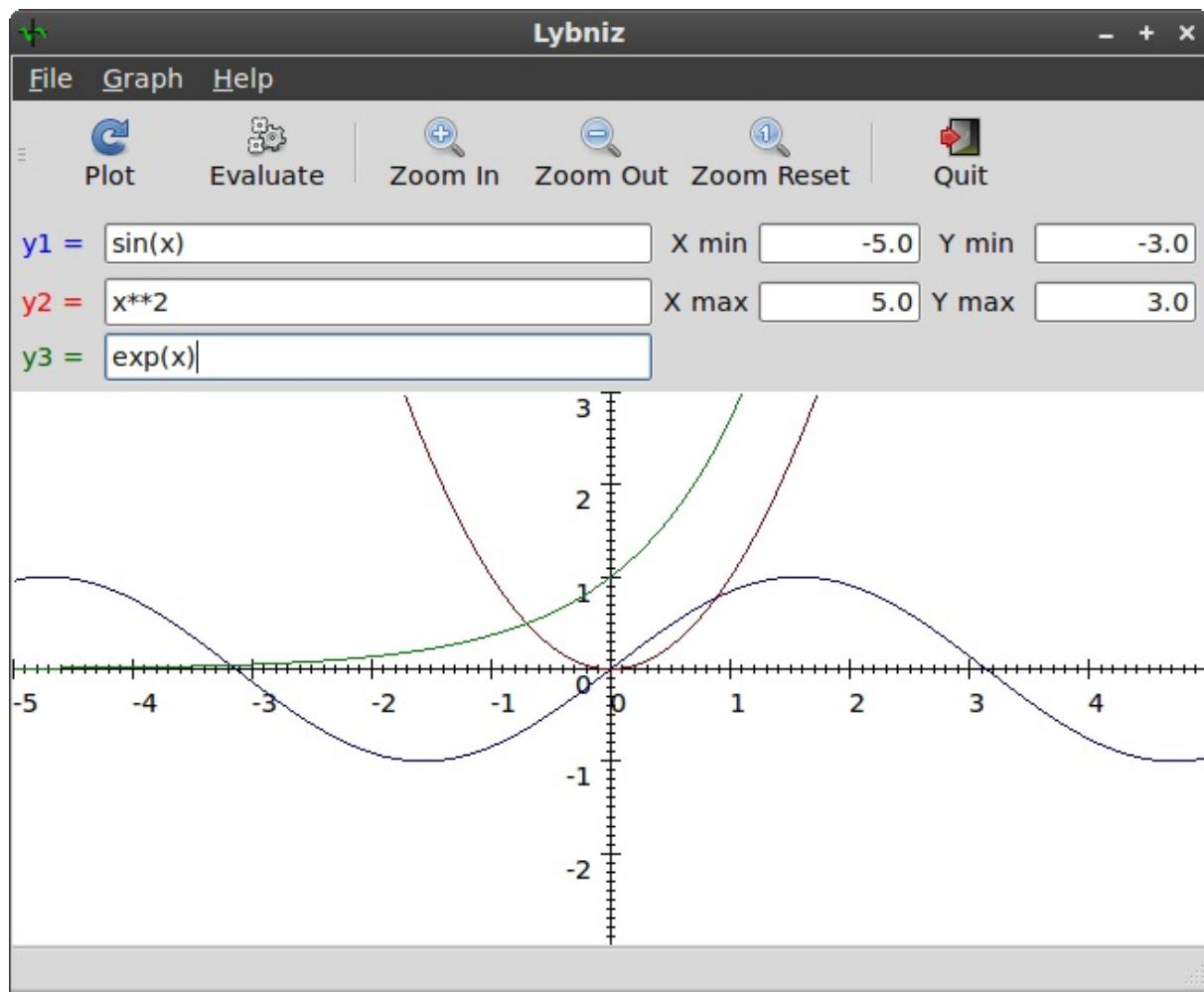
- [laby](#) - Learn how to program with ants and spider webs



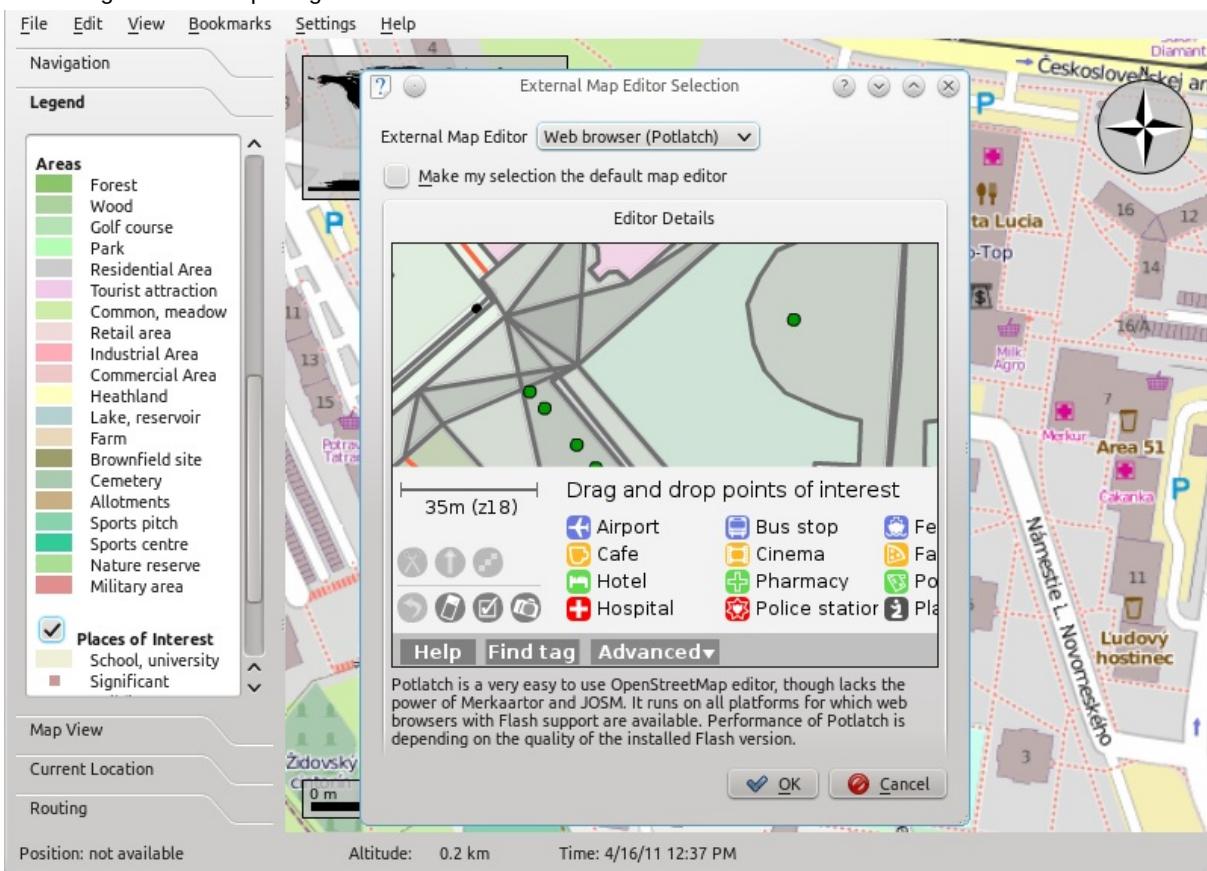
- lightspeed - Shows how objects moving at relativistic speeds look like



- lybniz - mathematical function graph plotter



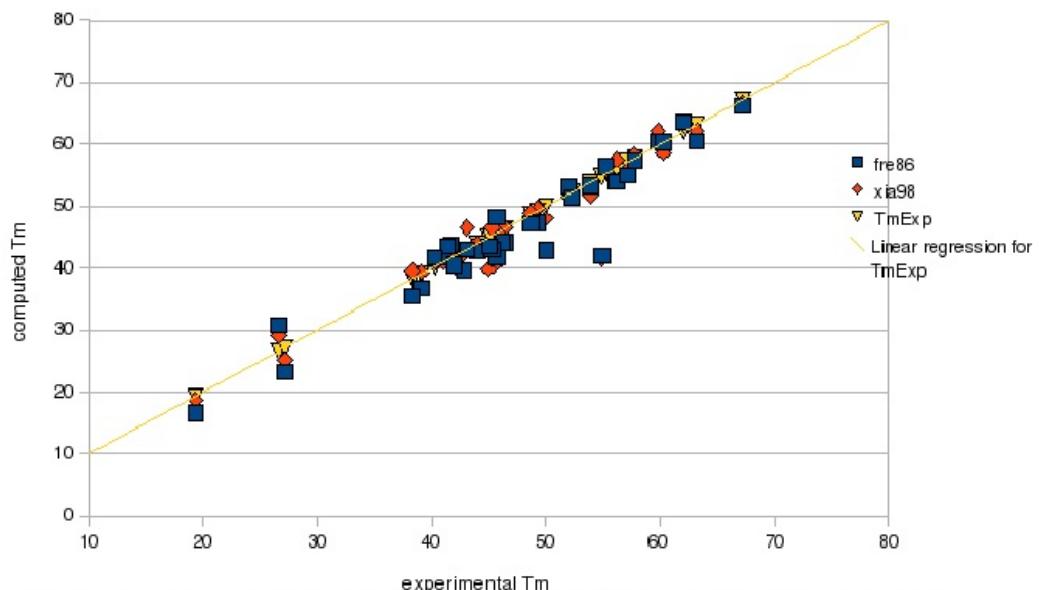
- marble - globe and map widget



- [melting](#) - compute the melting temperature of nucleic acid duplex

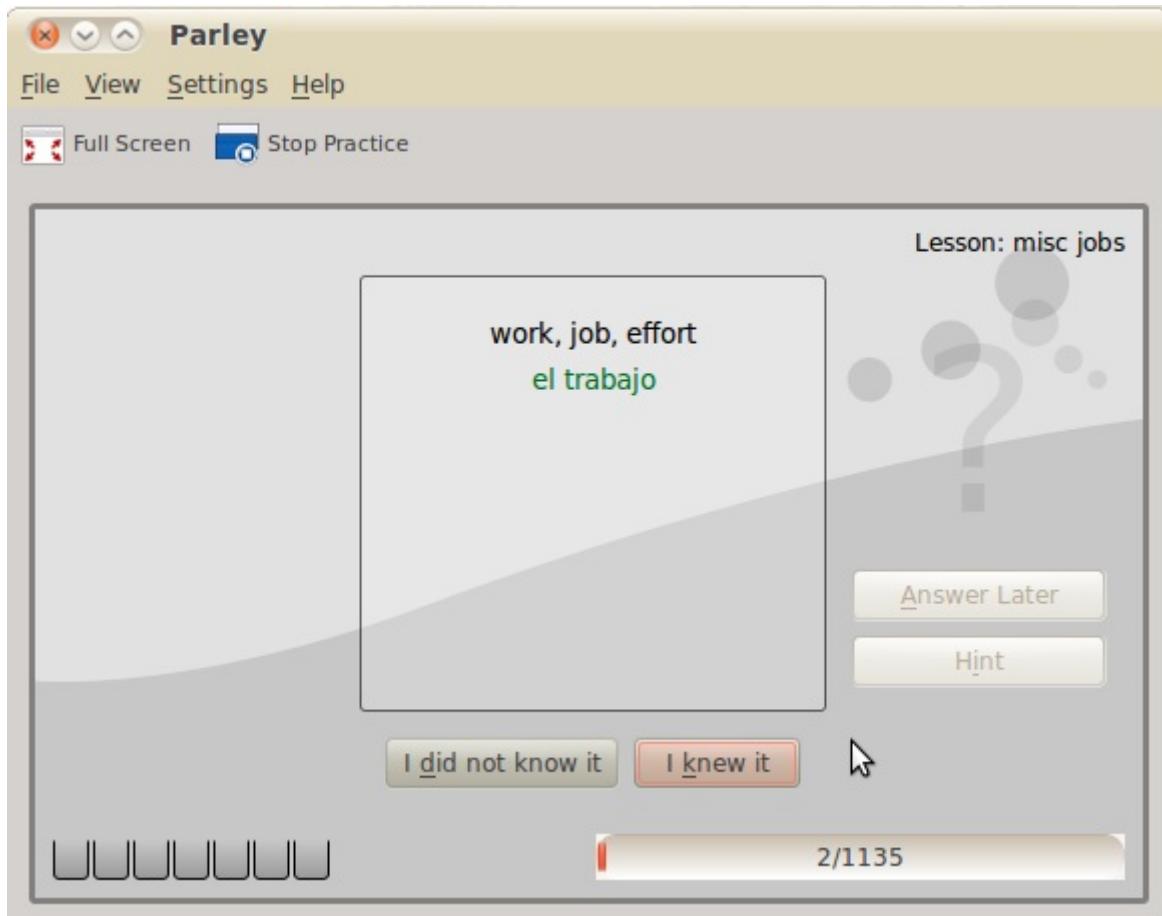
Perfectly matching RNA sequences

Self complementarity

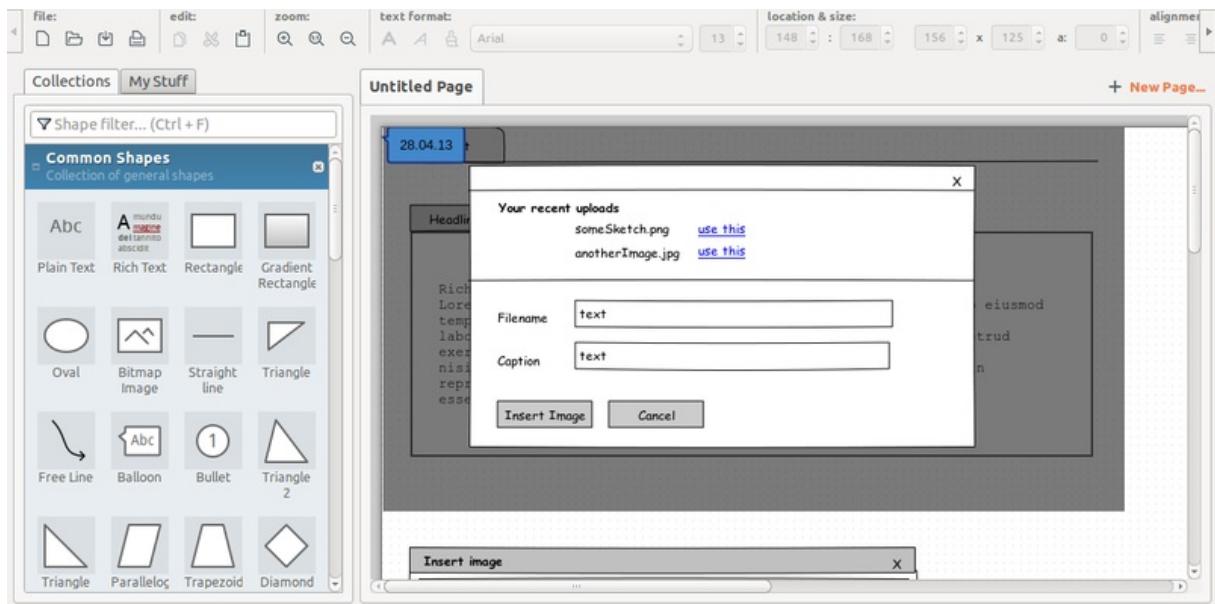


**Figure:** Comparison of experimental and computed Tm for various sets of RNA self complementary sequences.  $[Na^+] = 1 M$ ,  $[nucleic\ acid] = 1 \cdot 10^{-4} M$

- [parley](#) - vocabulary trainer



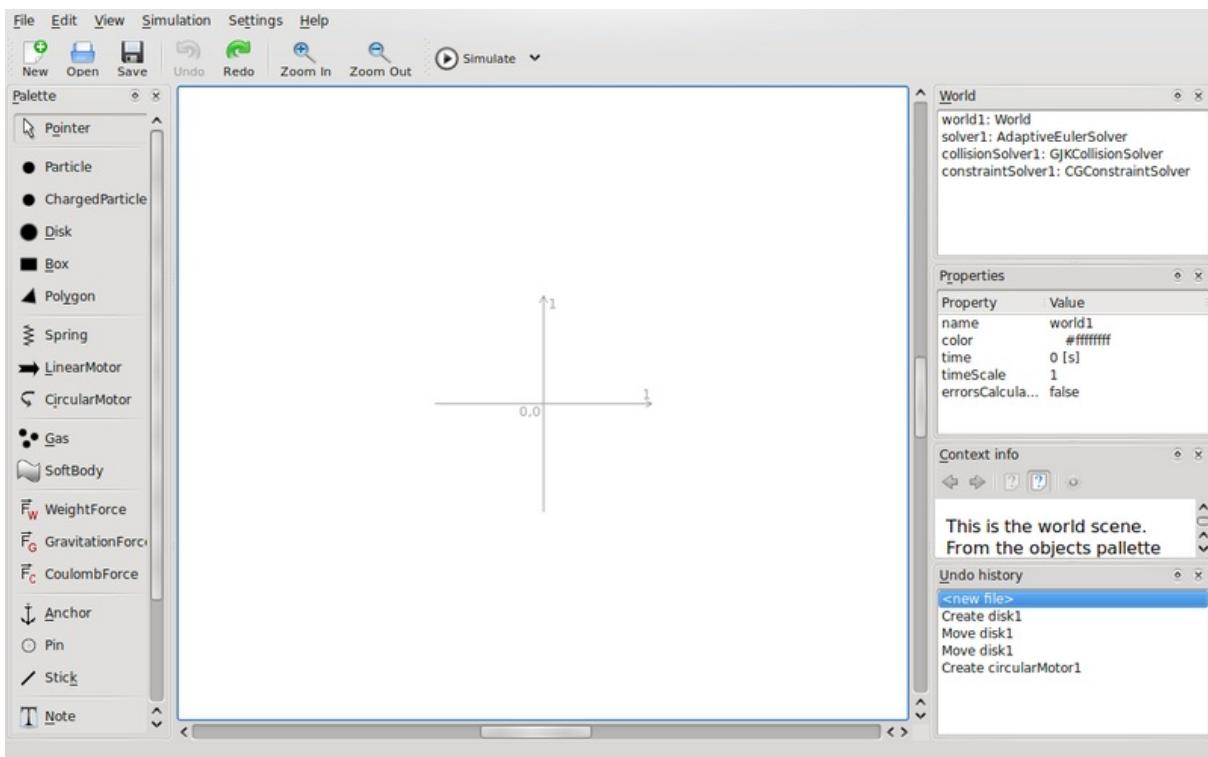
- [pencil](#) - animation/drawing software



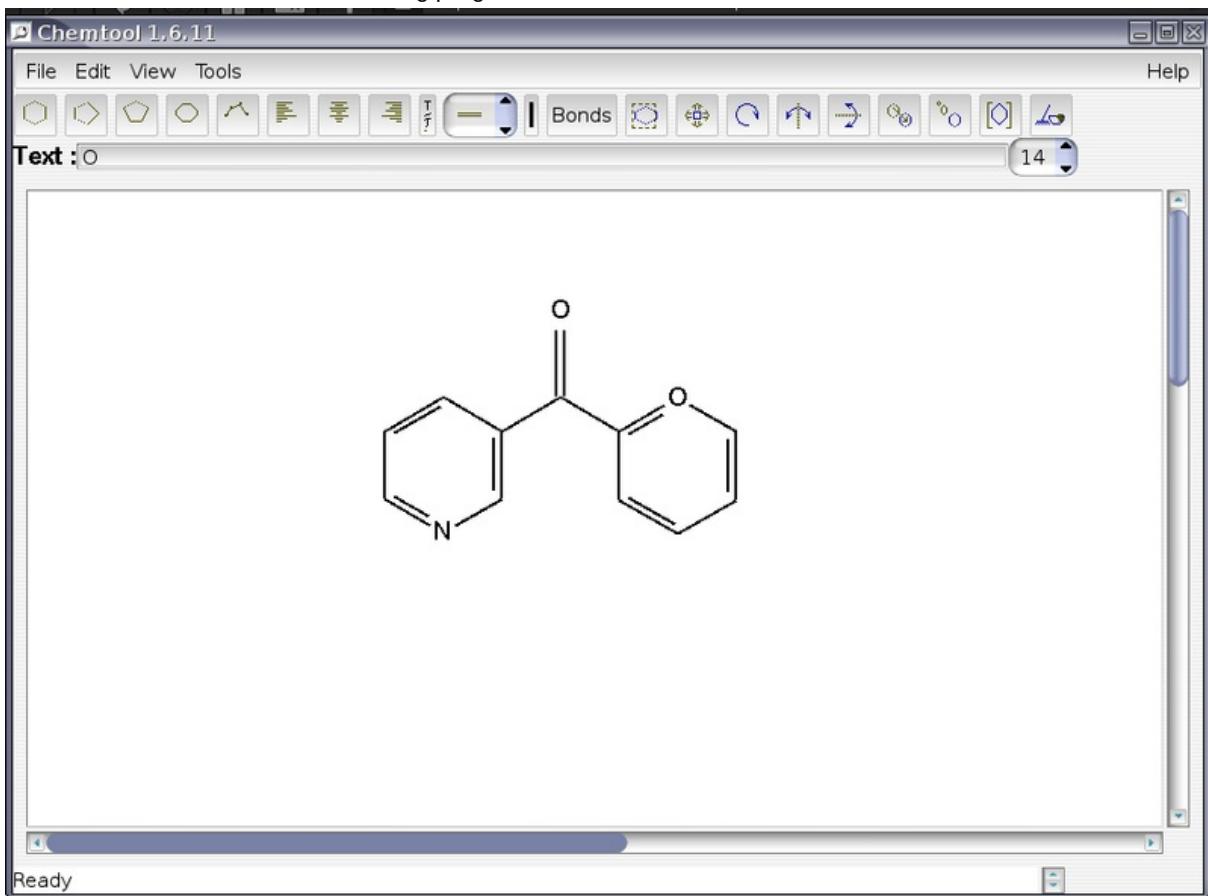
- [ri-li](#) - a toy train simulation game



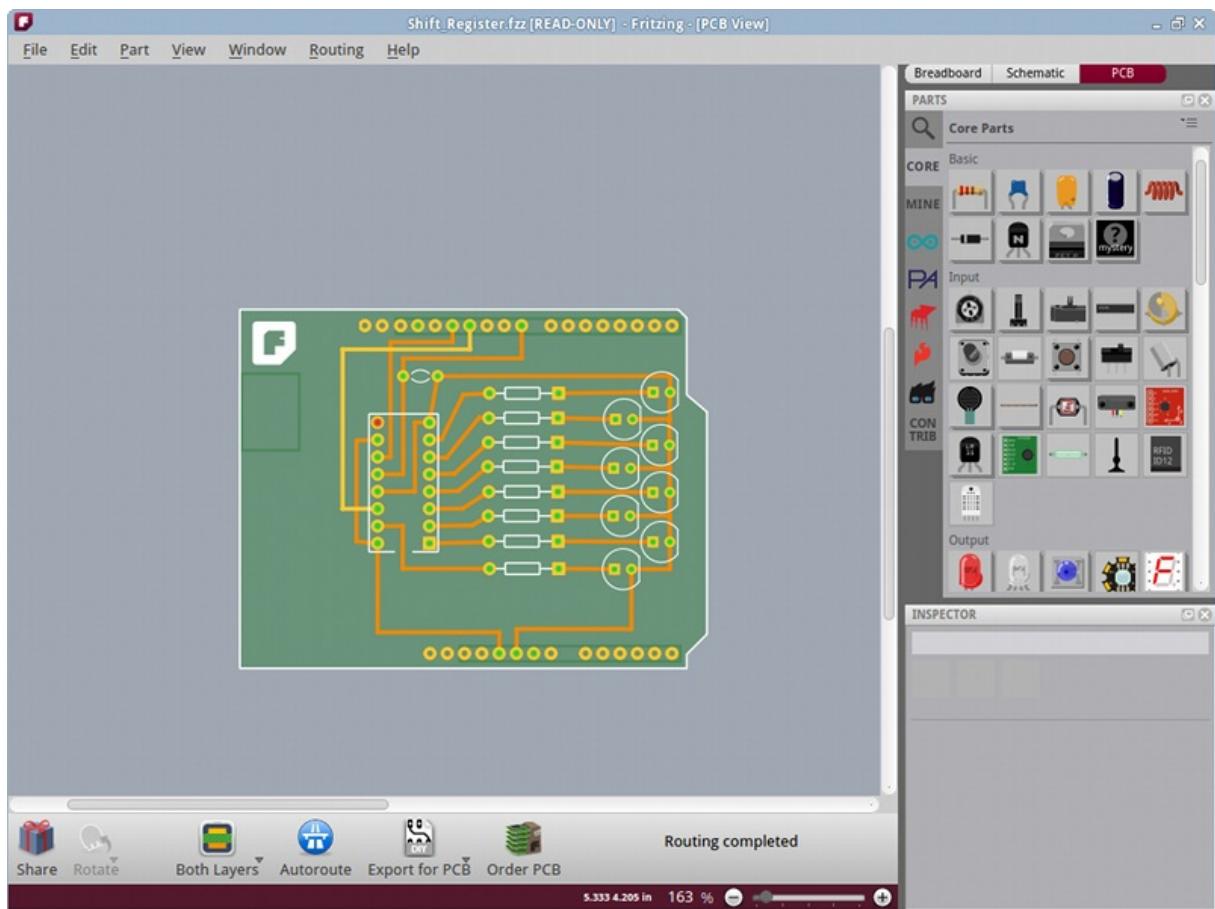
- [step](#) - interactive physical simulator for KDE



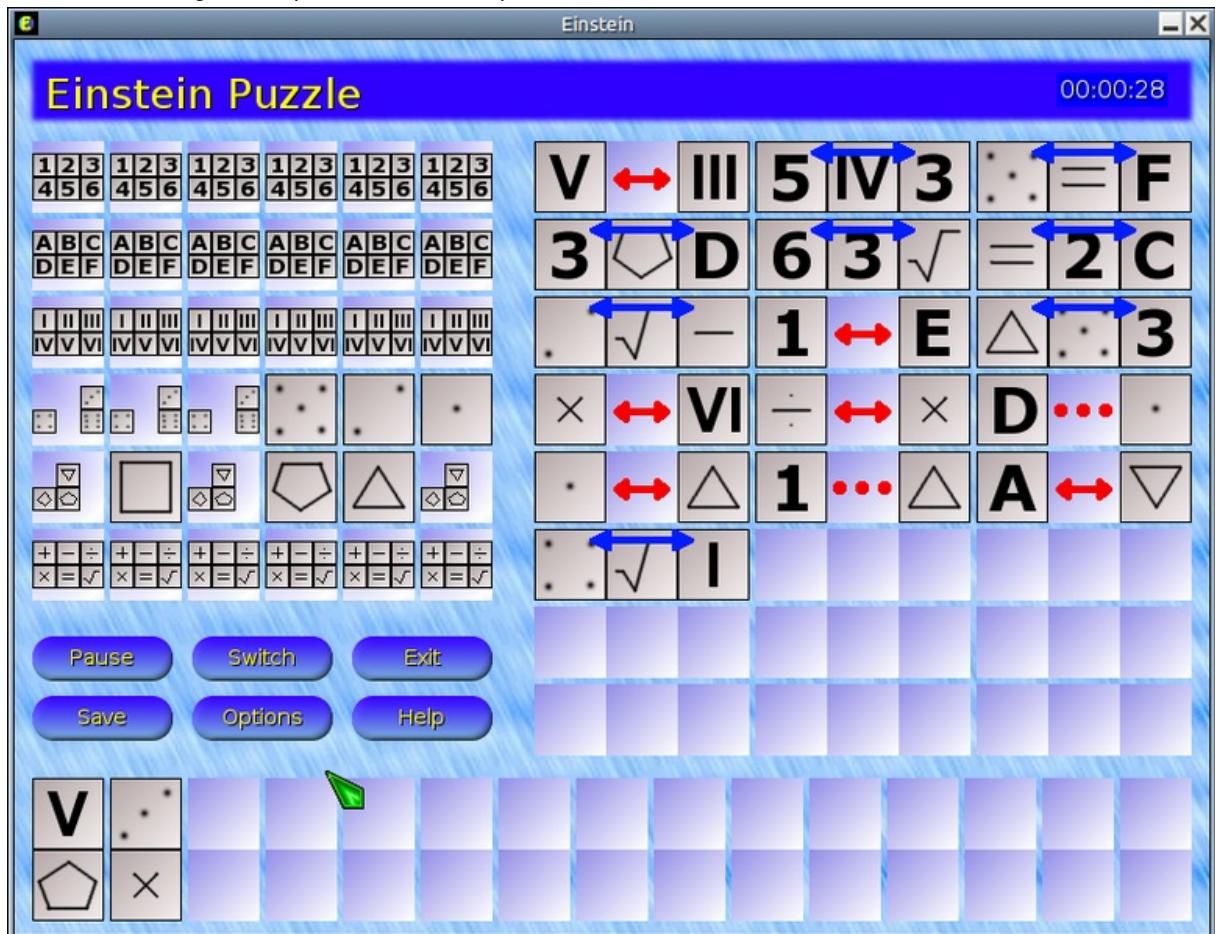
- **chemtool** - chemical structures drawing program



- **fritzing** - Easy-to-use electronic design software

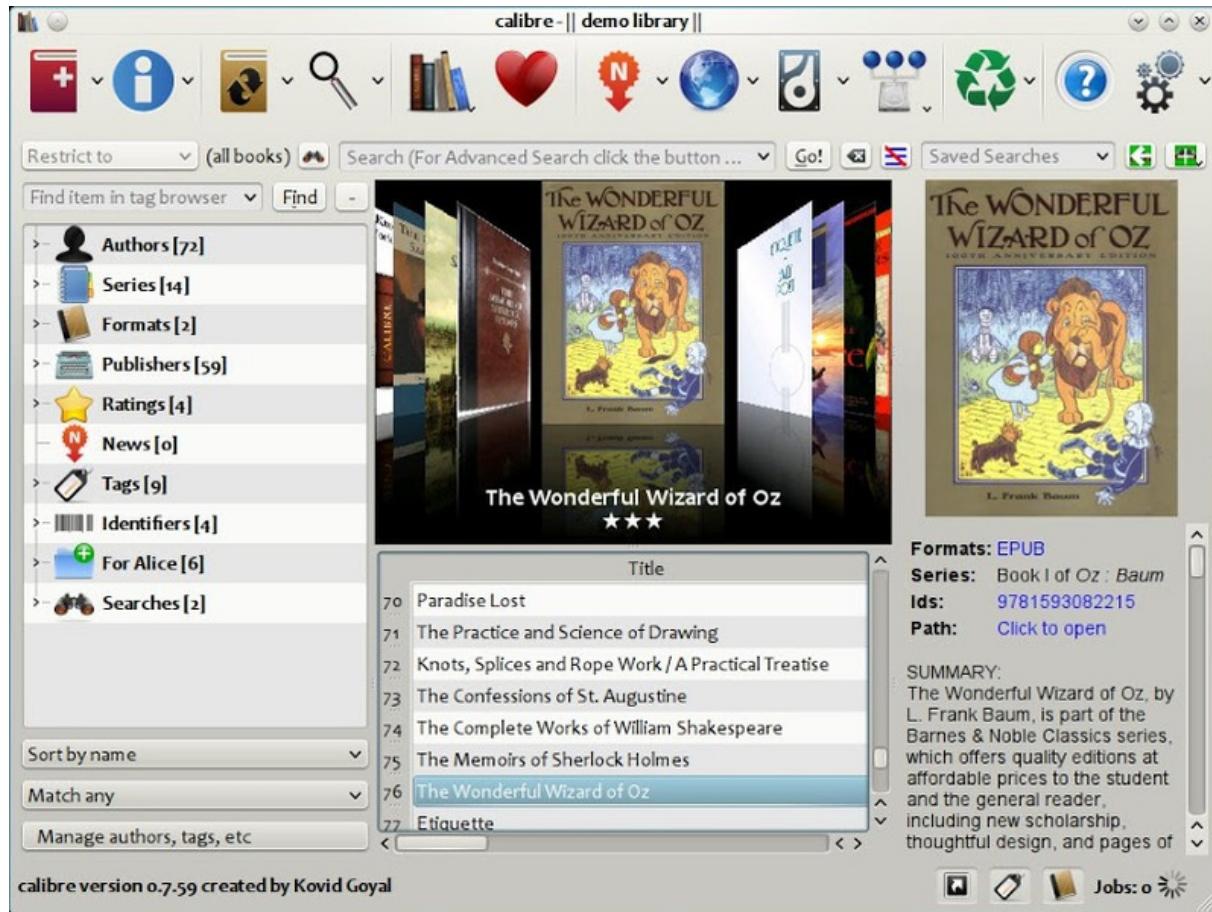


- [einstein](#) - Puzzle game inspired on Einstein's puzzle

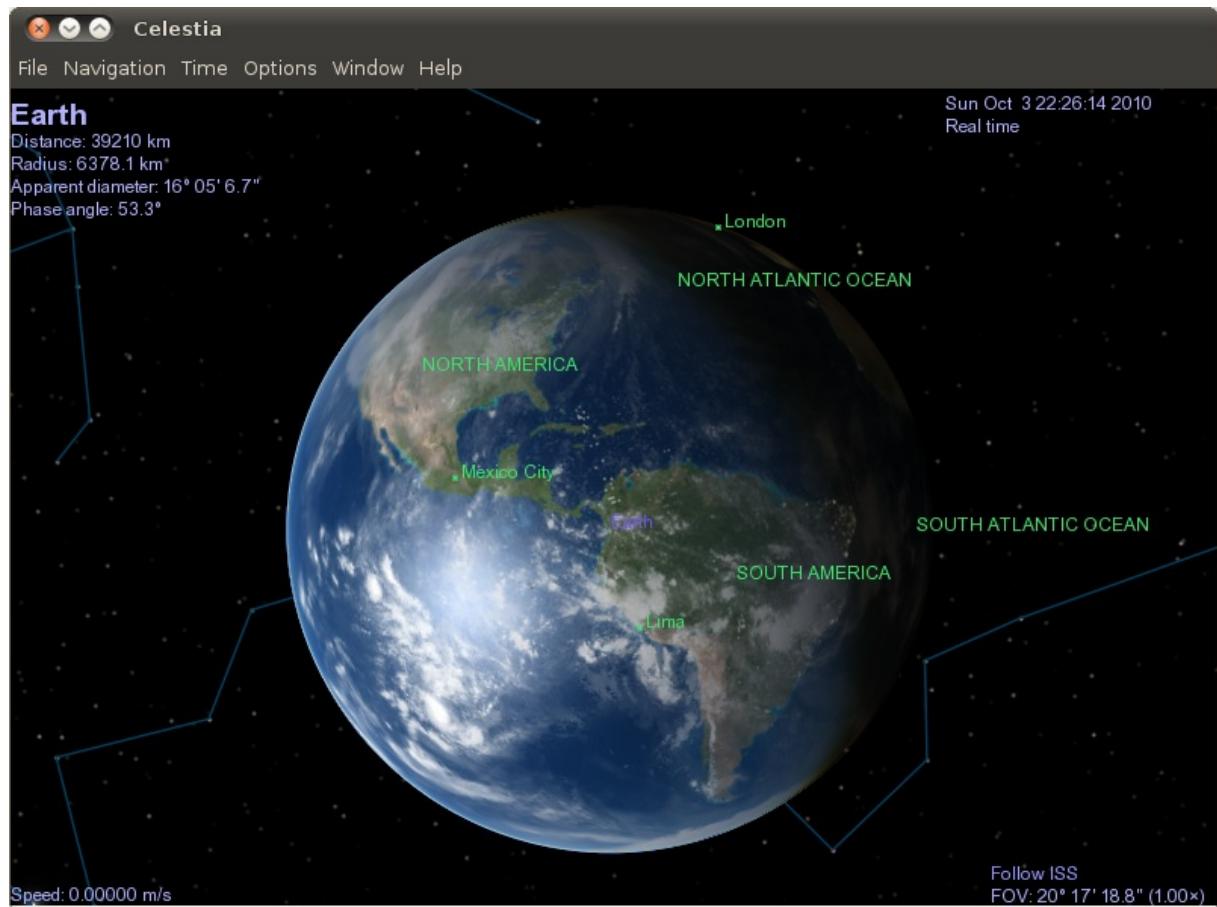


# ubuntu-edu-tertiary

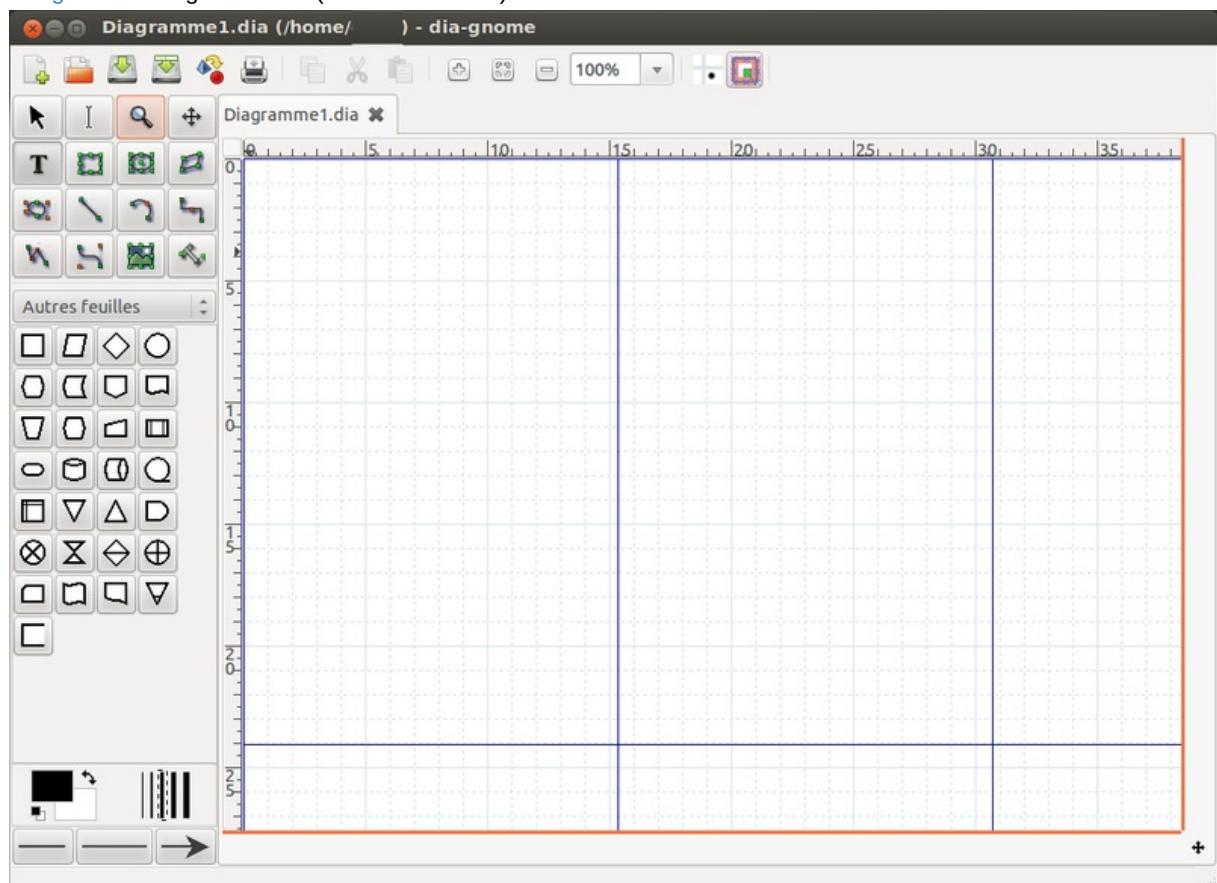
- [calibre](#) - e-book converter and library management



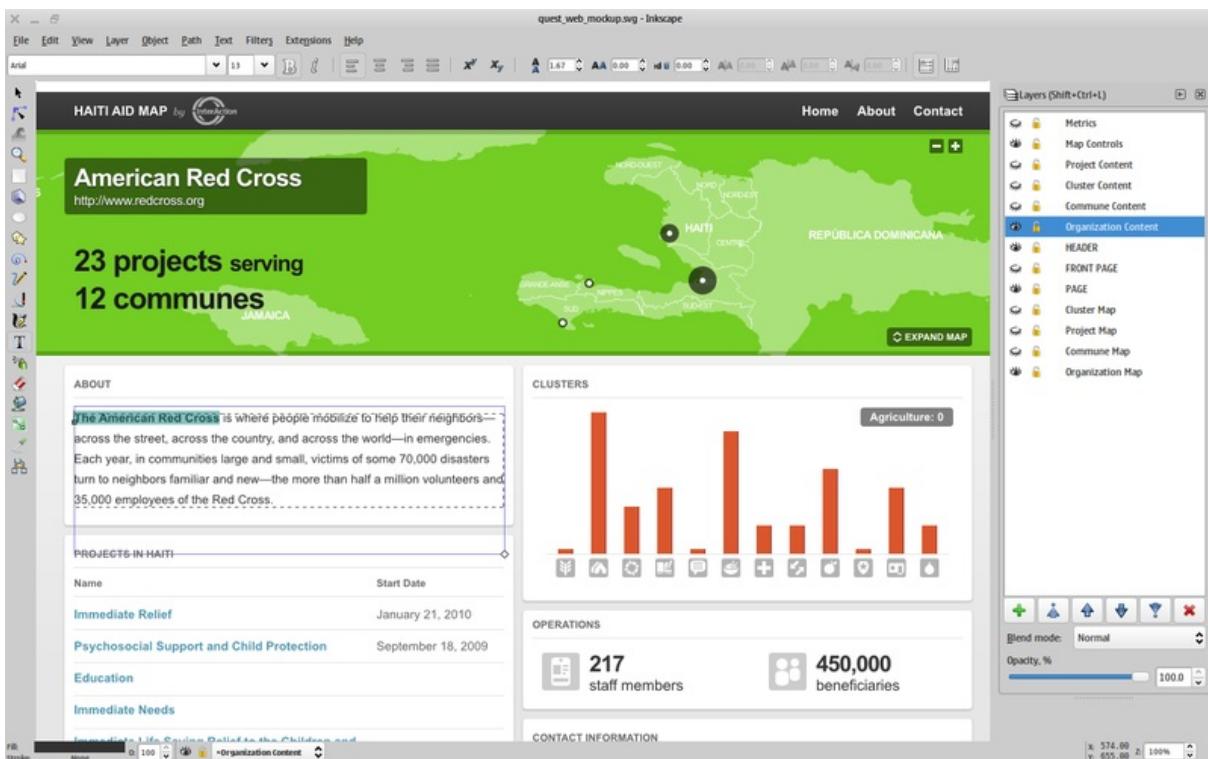
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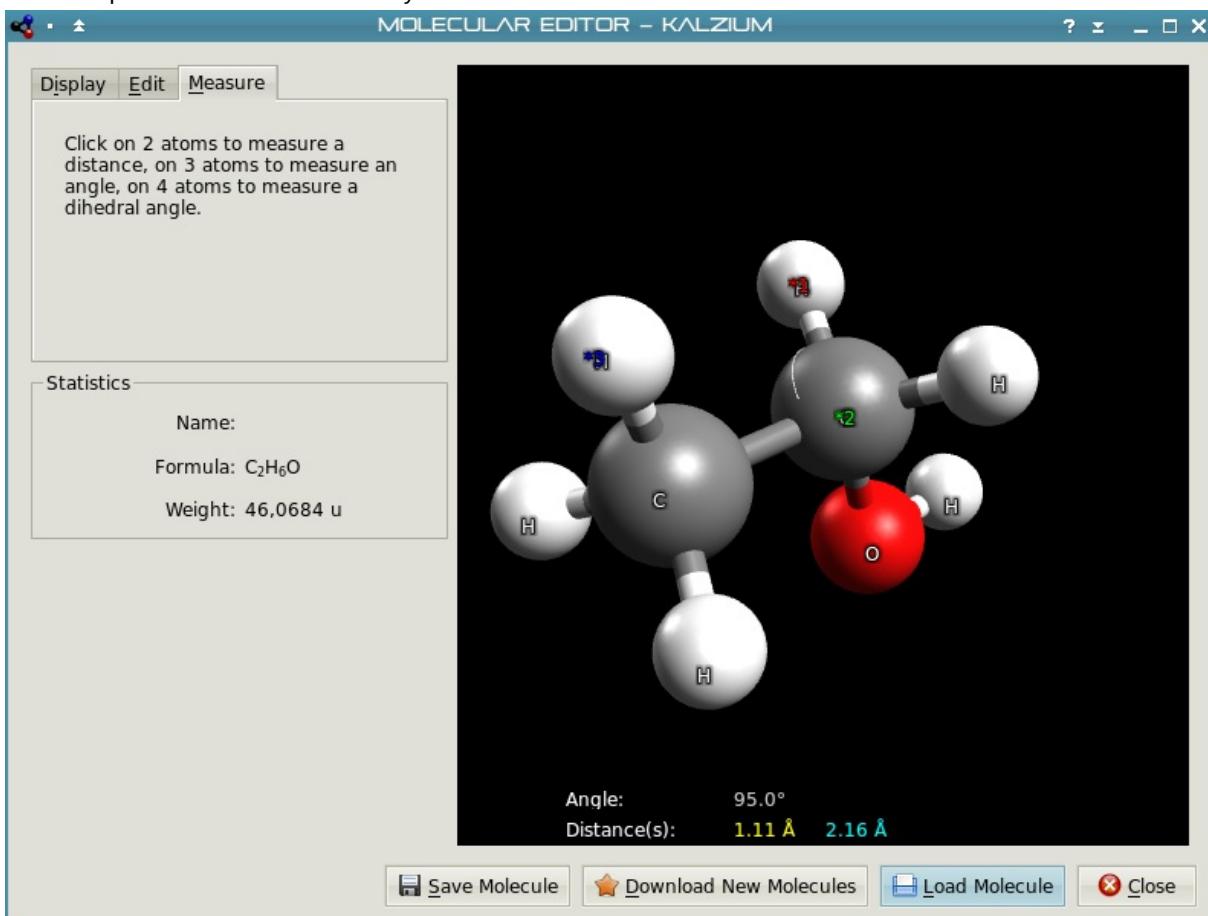
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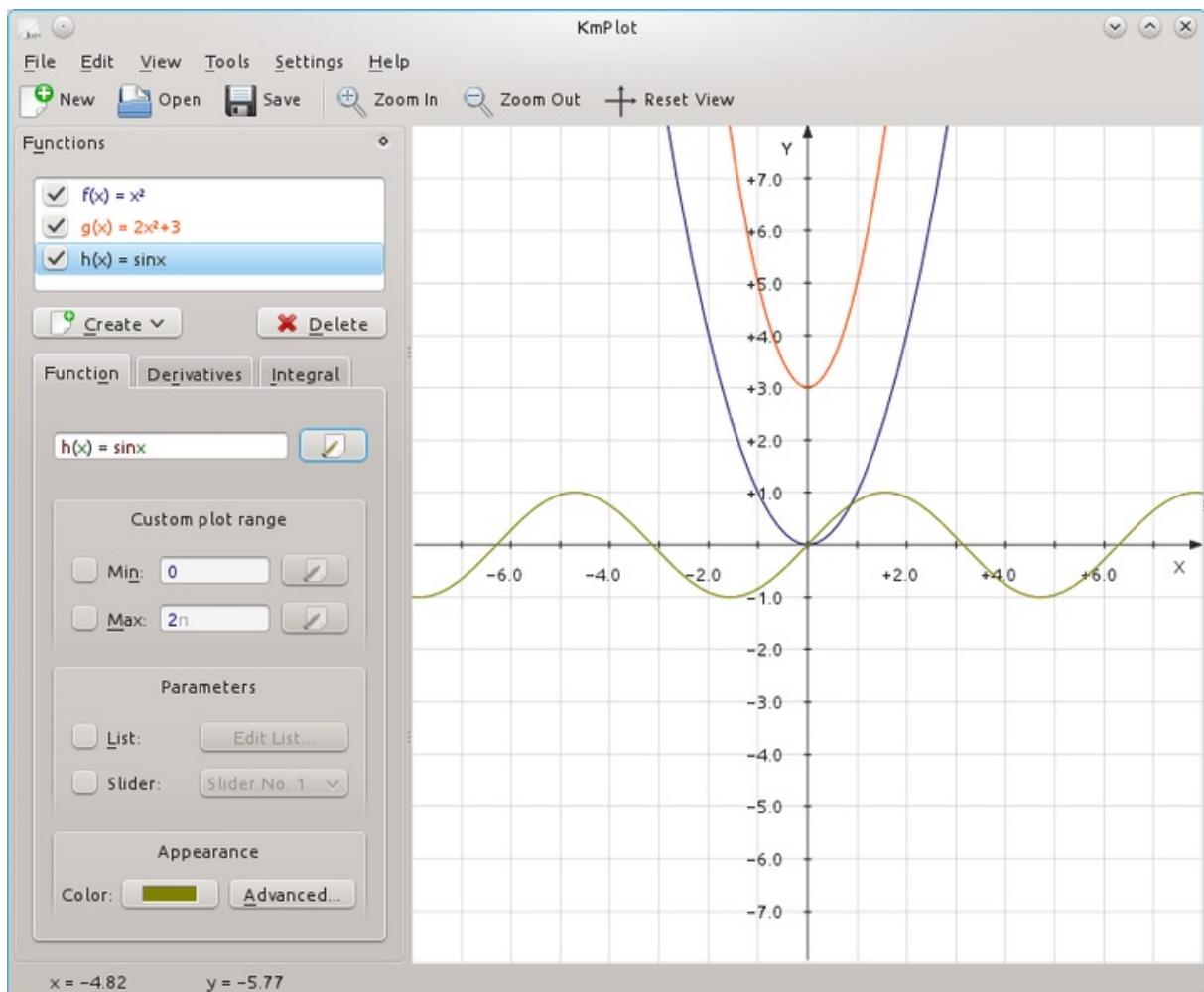
- inkscape - vector-based drawing program



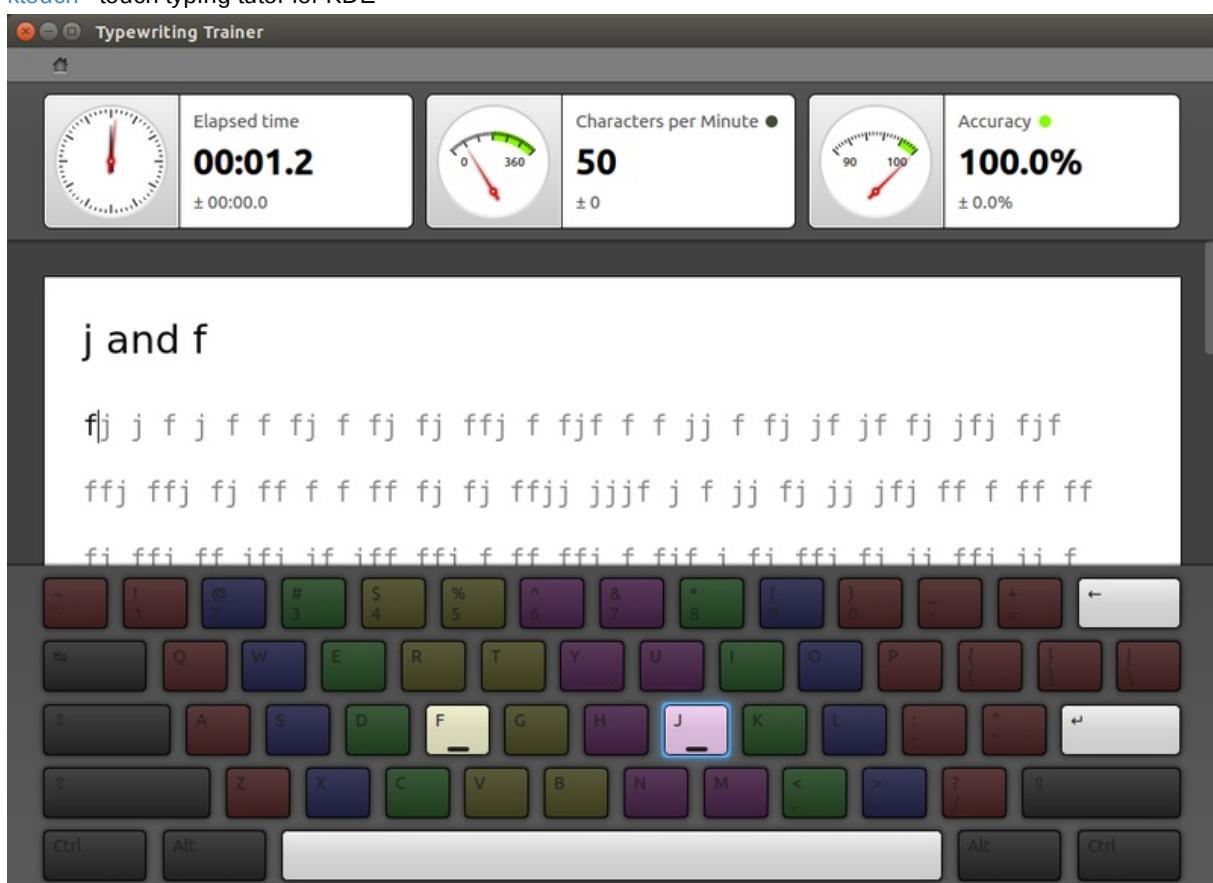
- [kalzium](#) - periodic table and chemistry tools



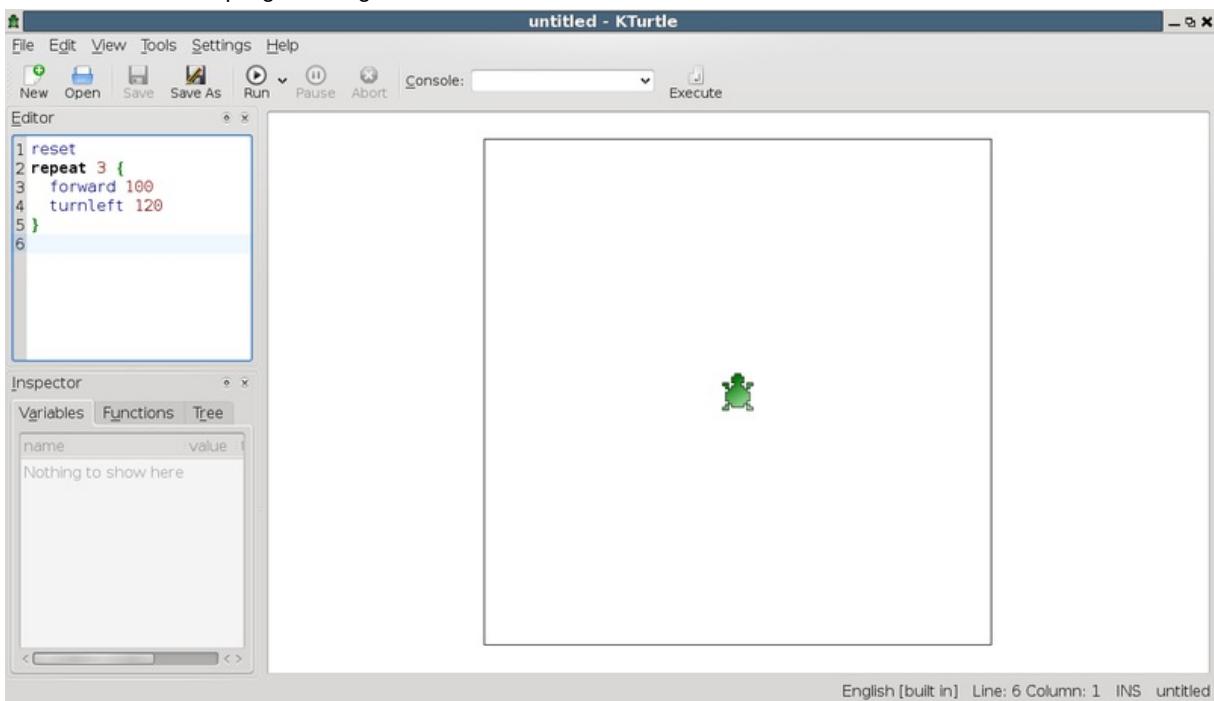
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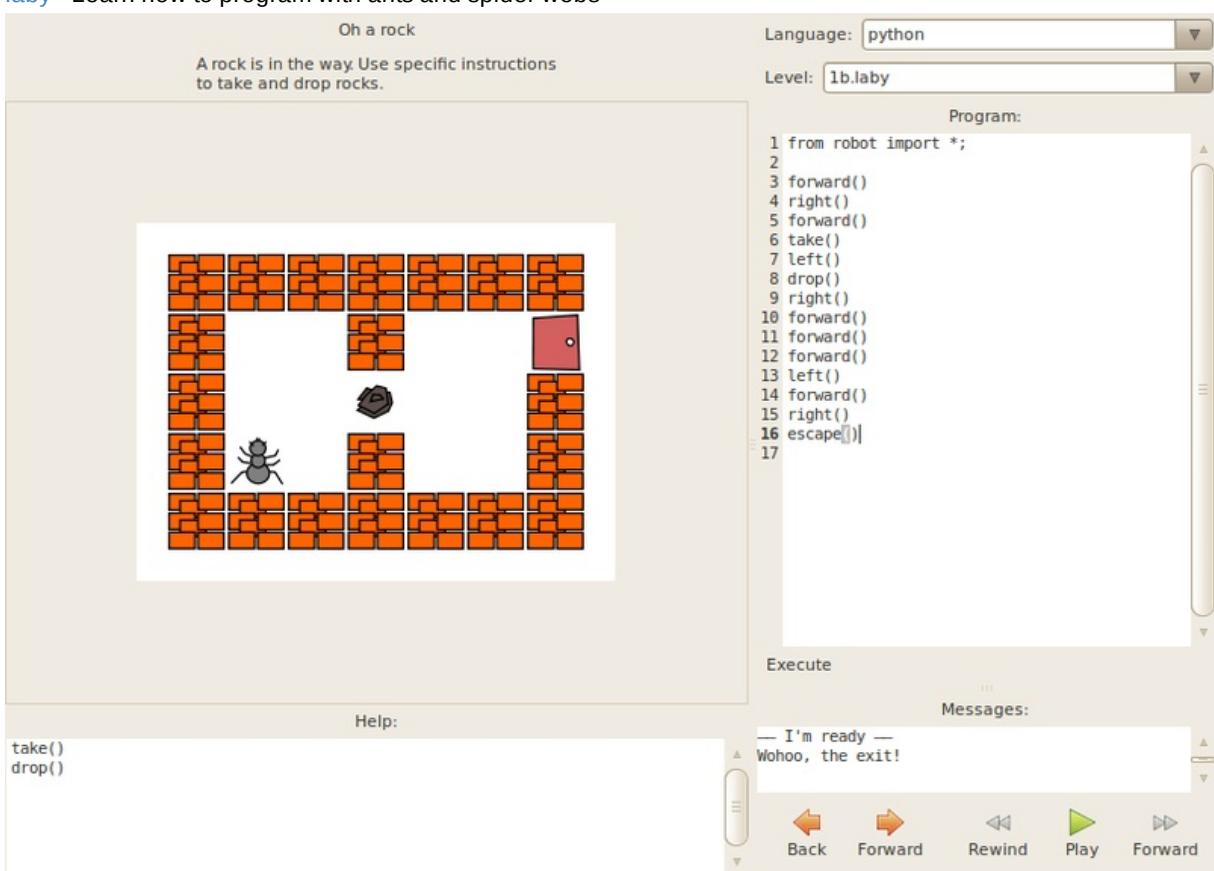
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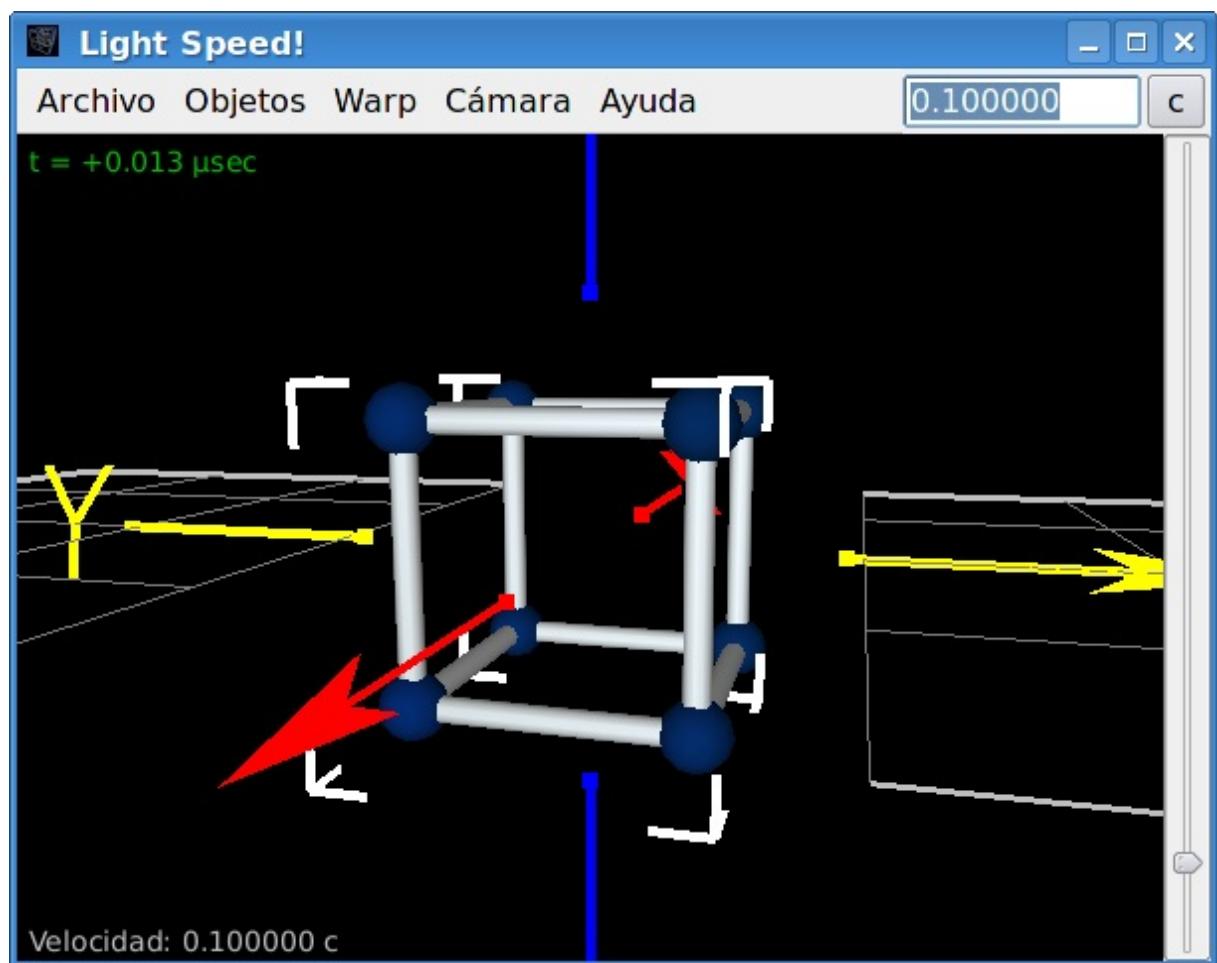
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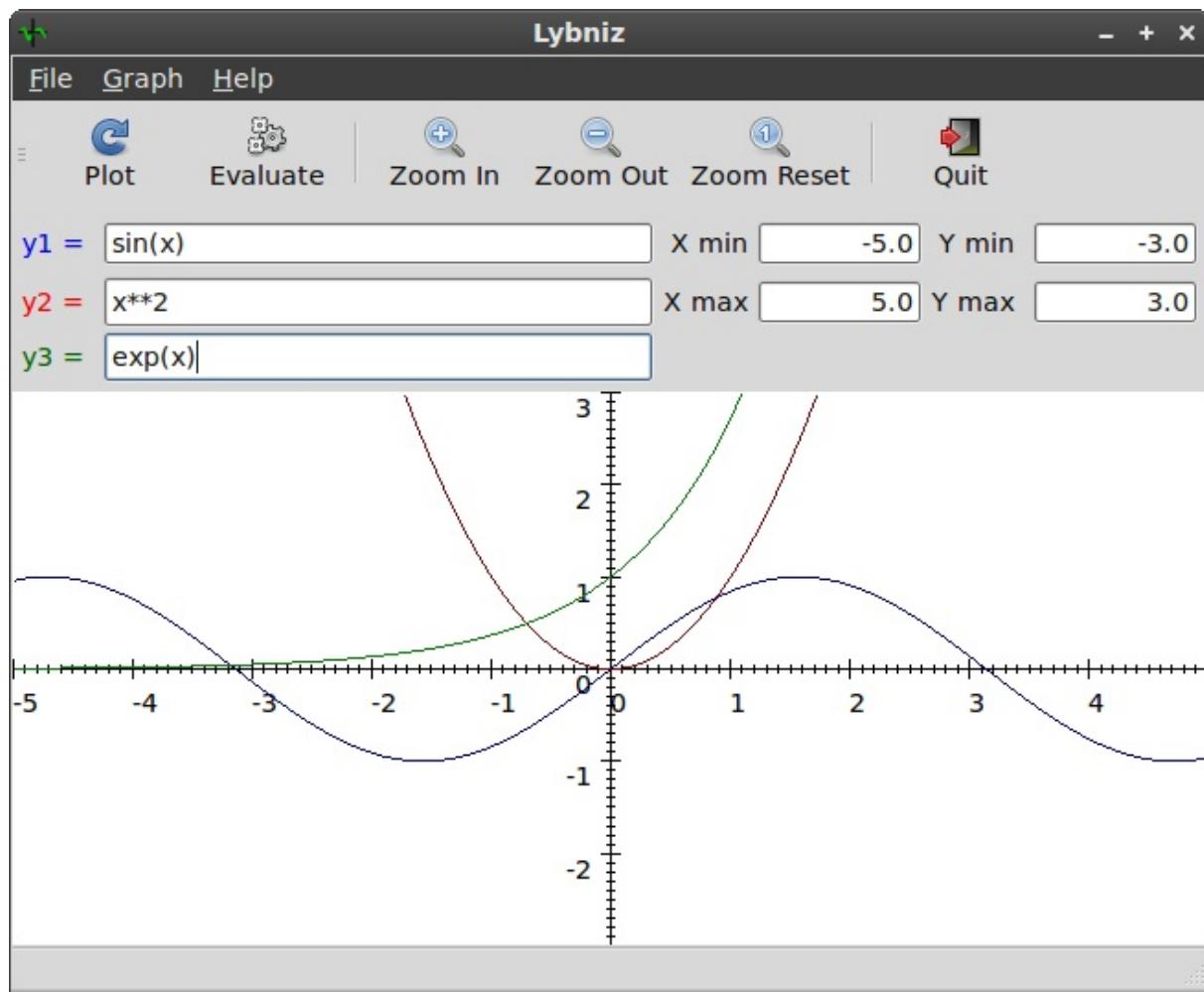
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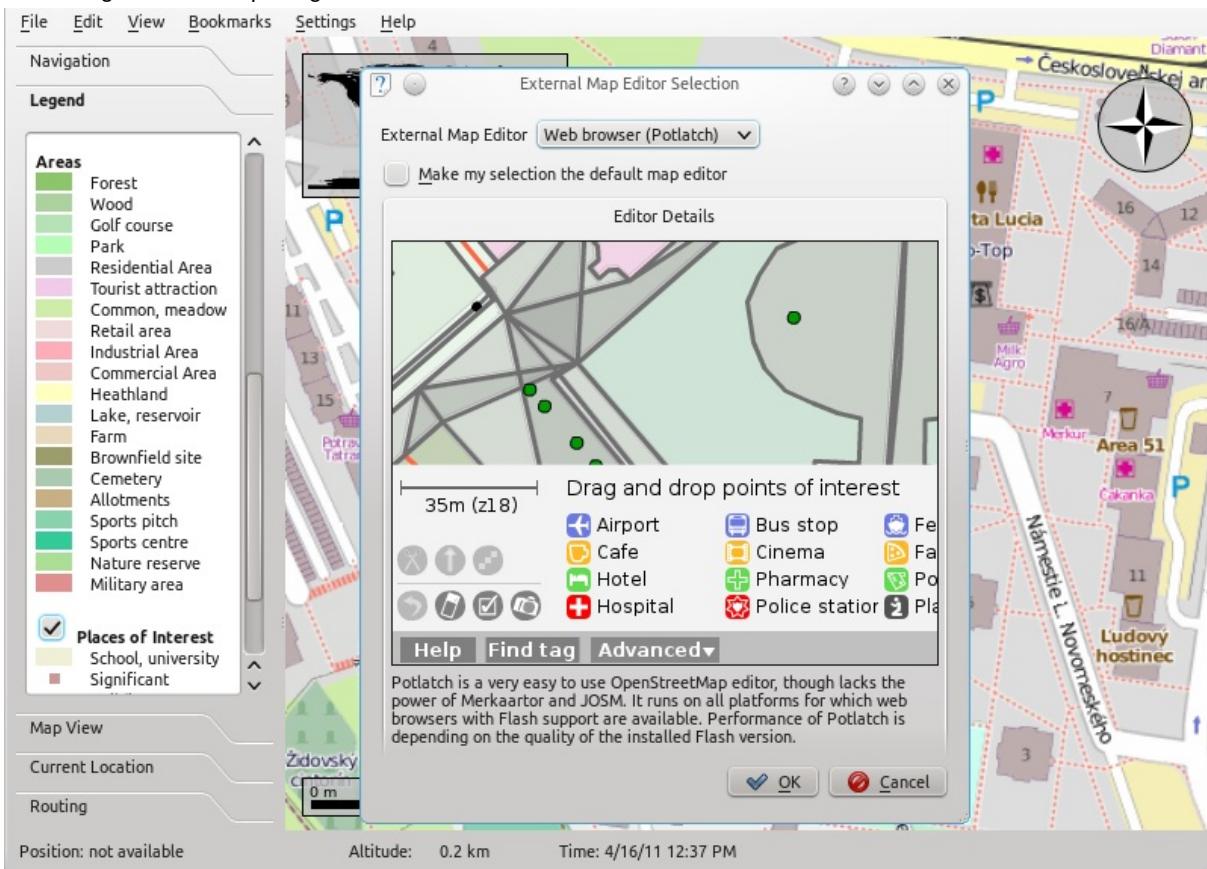
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- [lybniz](#) - mathematical function graph plotter



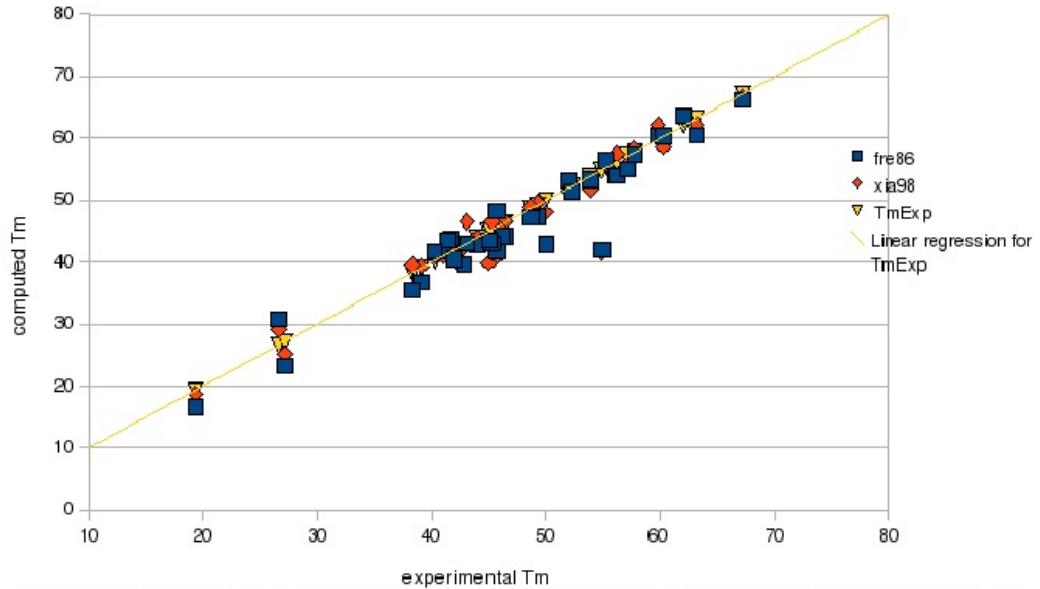
- marble - globe and map widget



- [melting](#) - compute the melting temperature of nucleic acid duplex

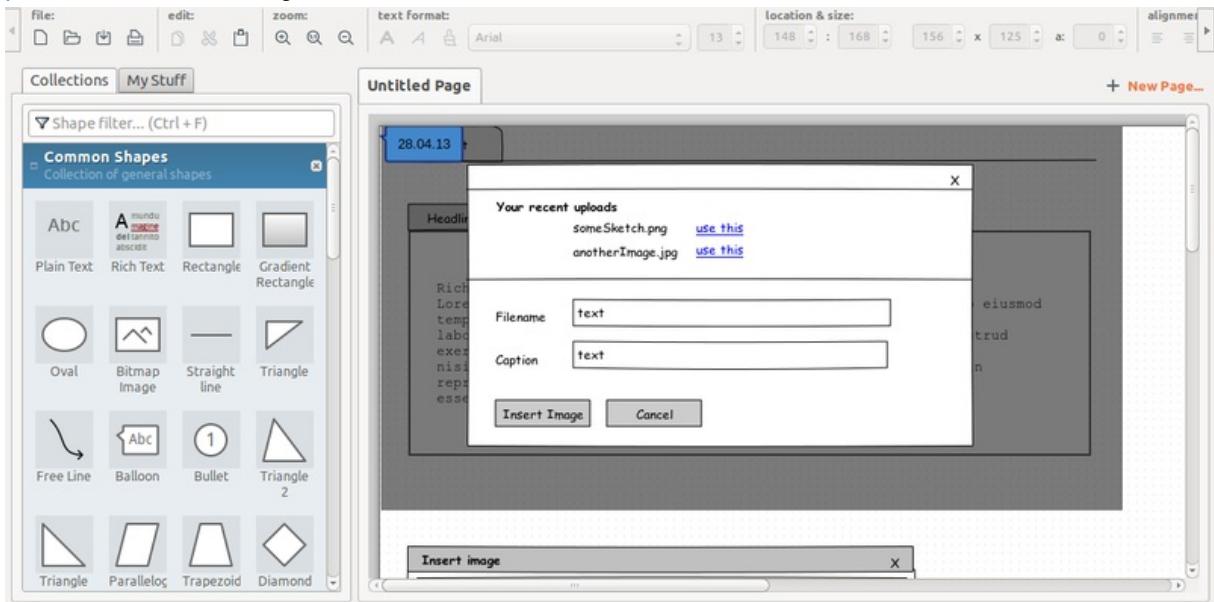
Perfectly matching RNA sequences

Self complementarity

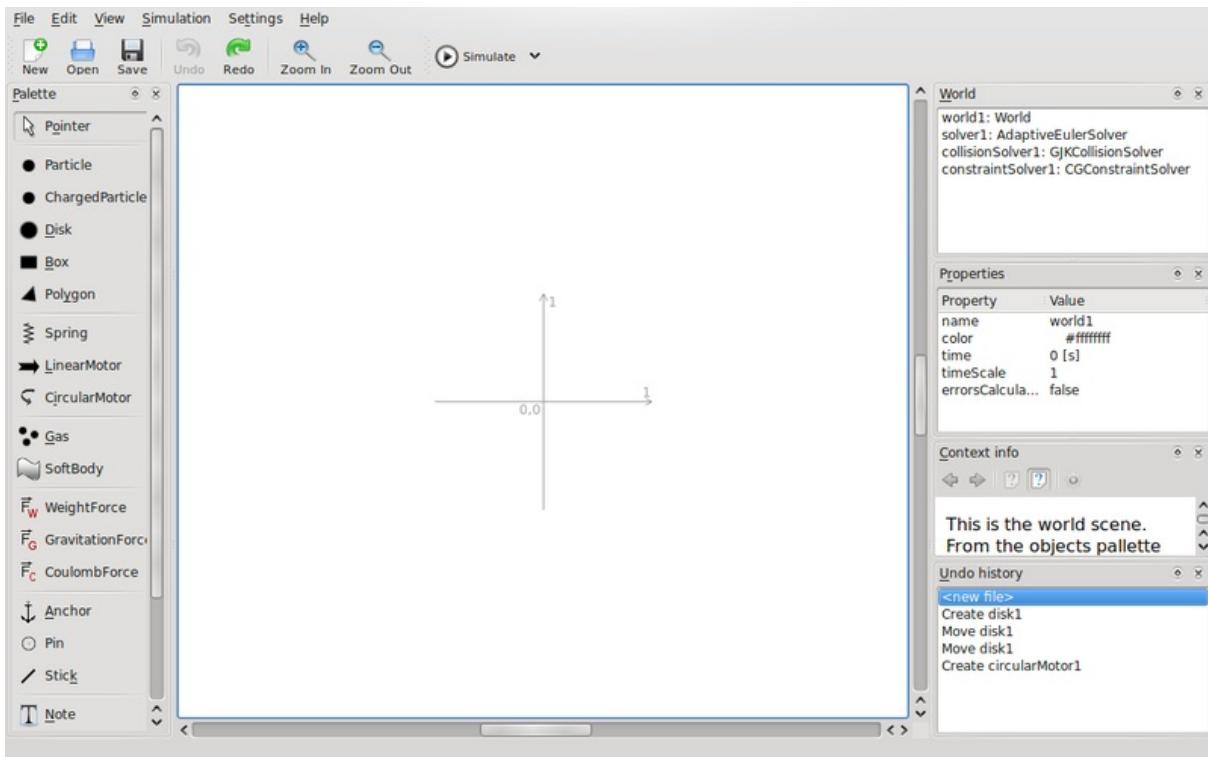


**Figure:** Comparison of experimental and computed Tm for various sets of RNA self complementary sequences.  $[Na^+] = 1 M$ ,  $[nucleic\ acid] = 1 \cdot 10^{-4} M$

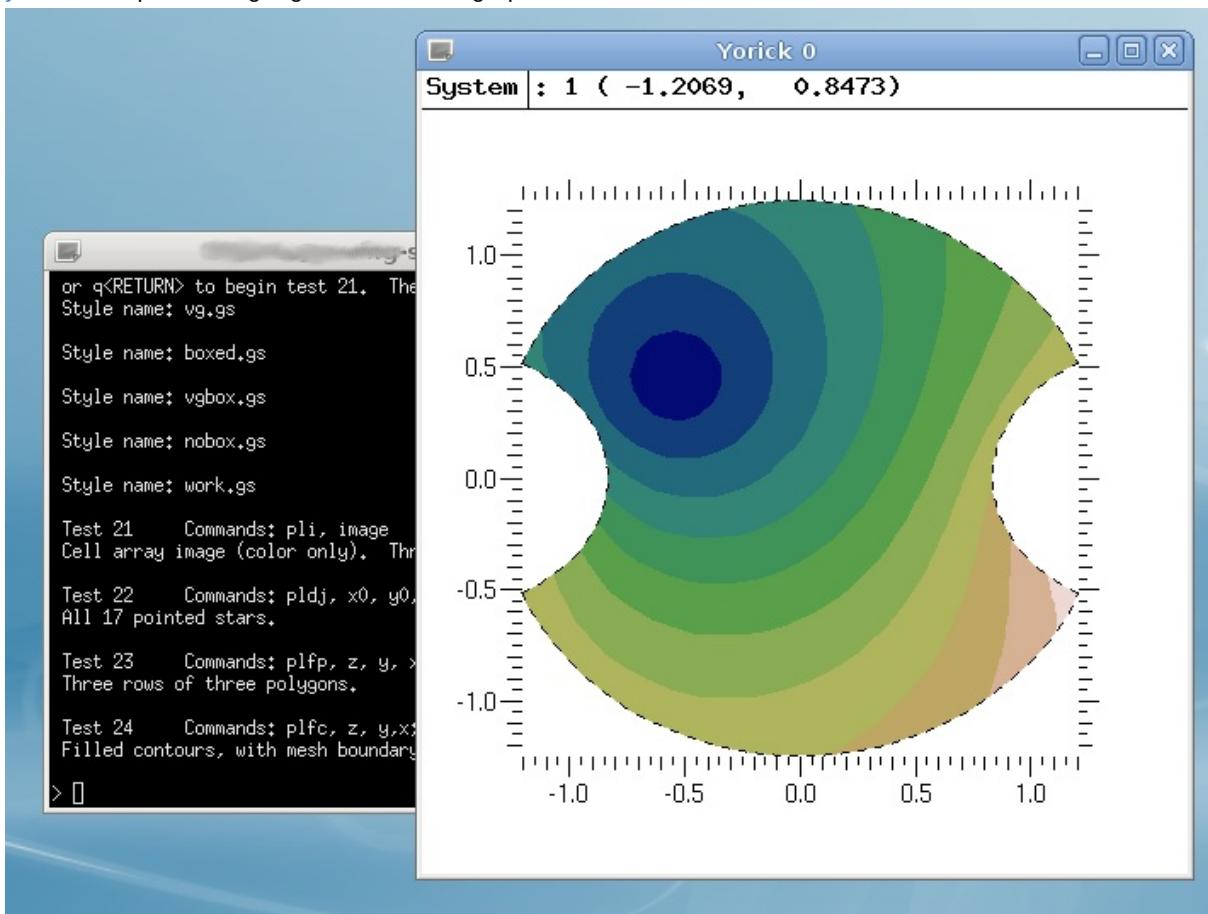
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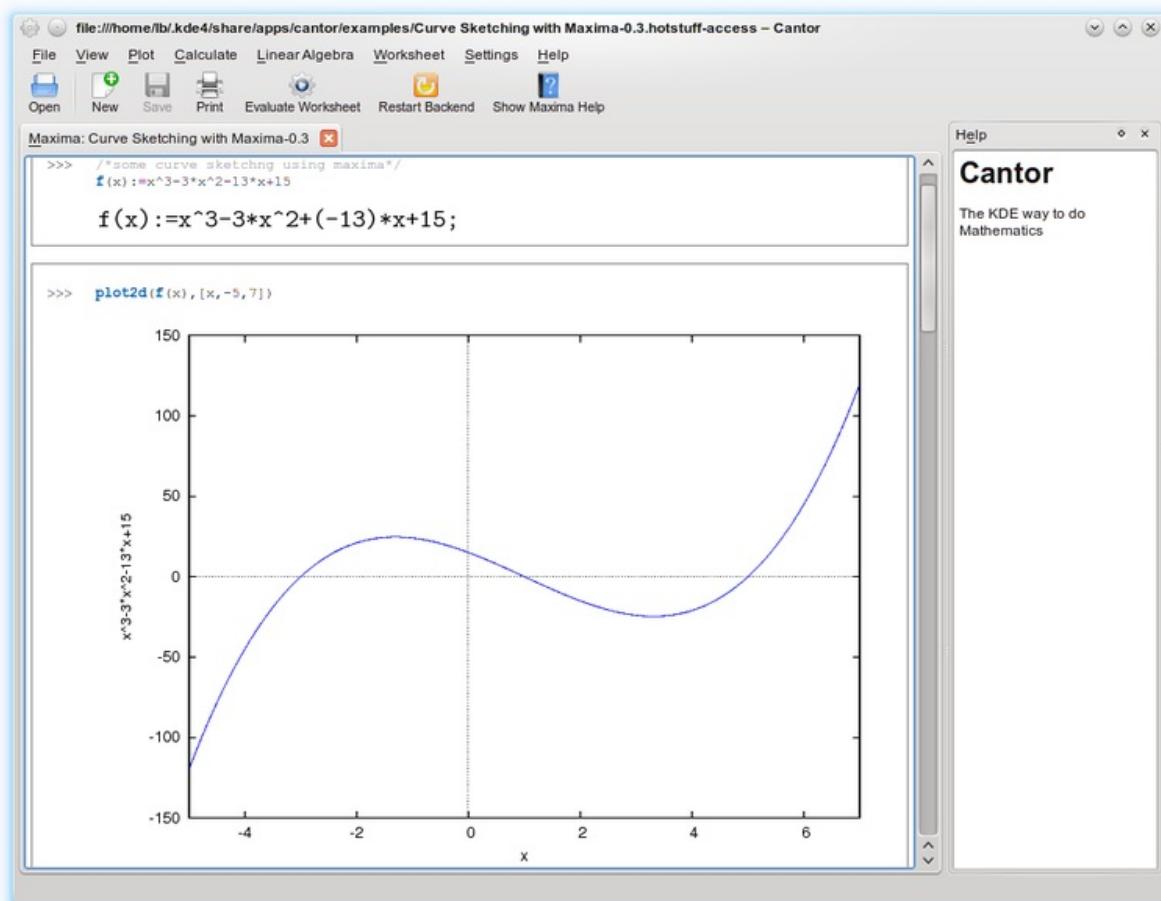
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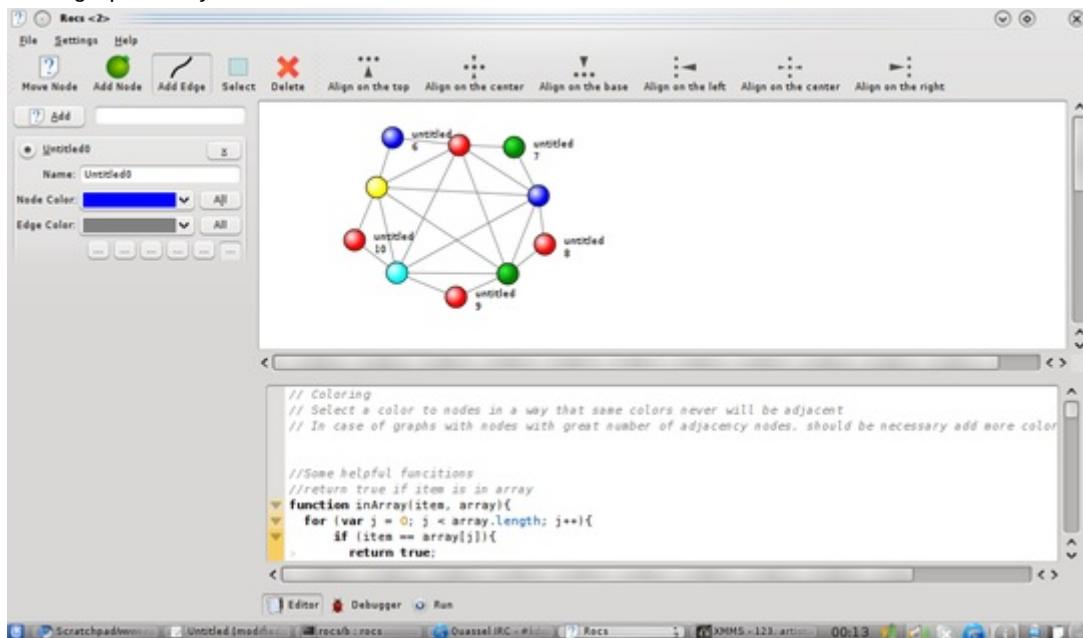
- [yorick](#) - interpreted language and scientific graphics



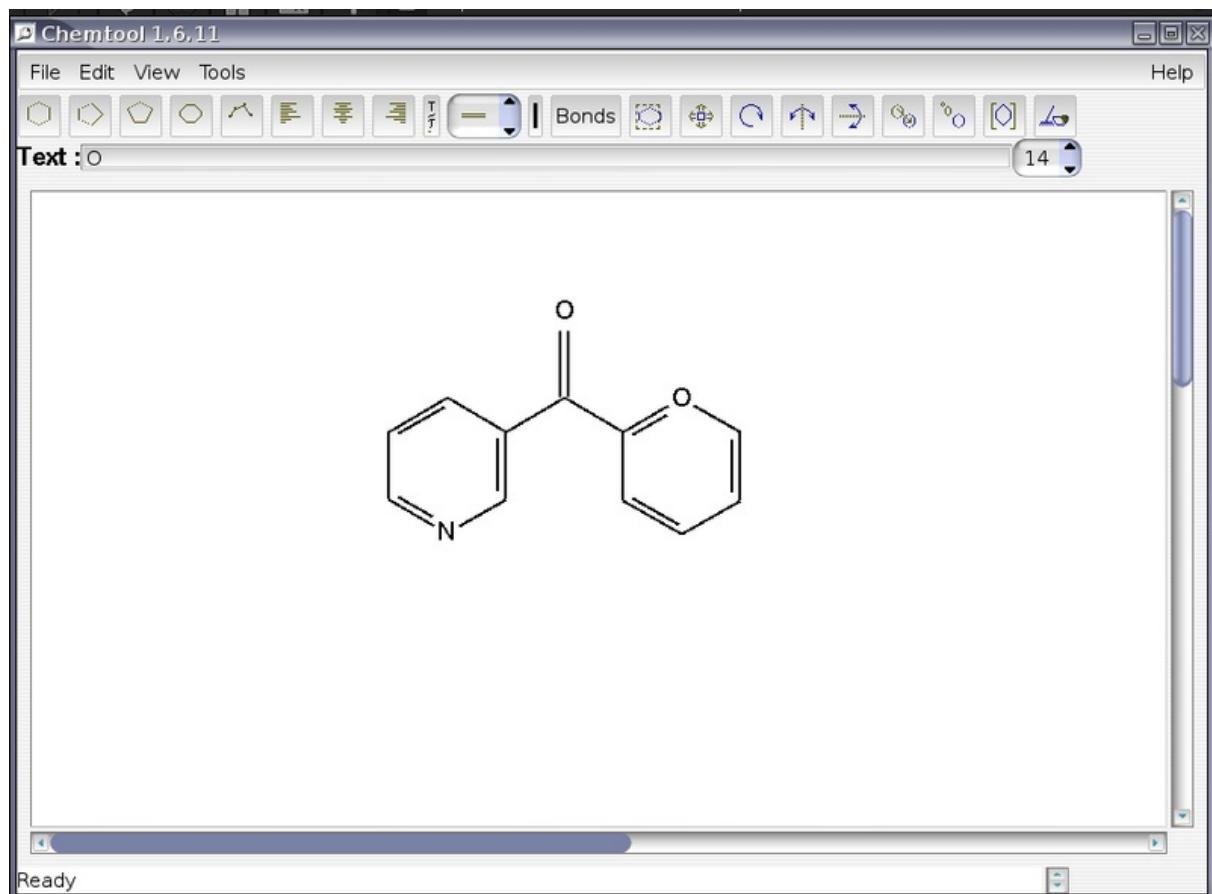
- [cantor](#) - interface for mathematical applications



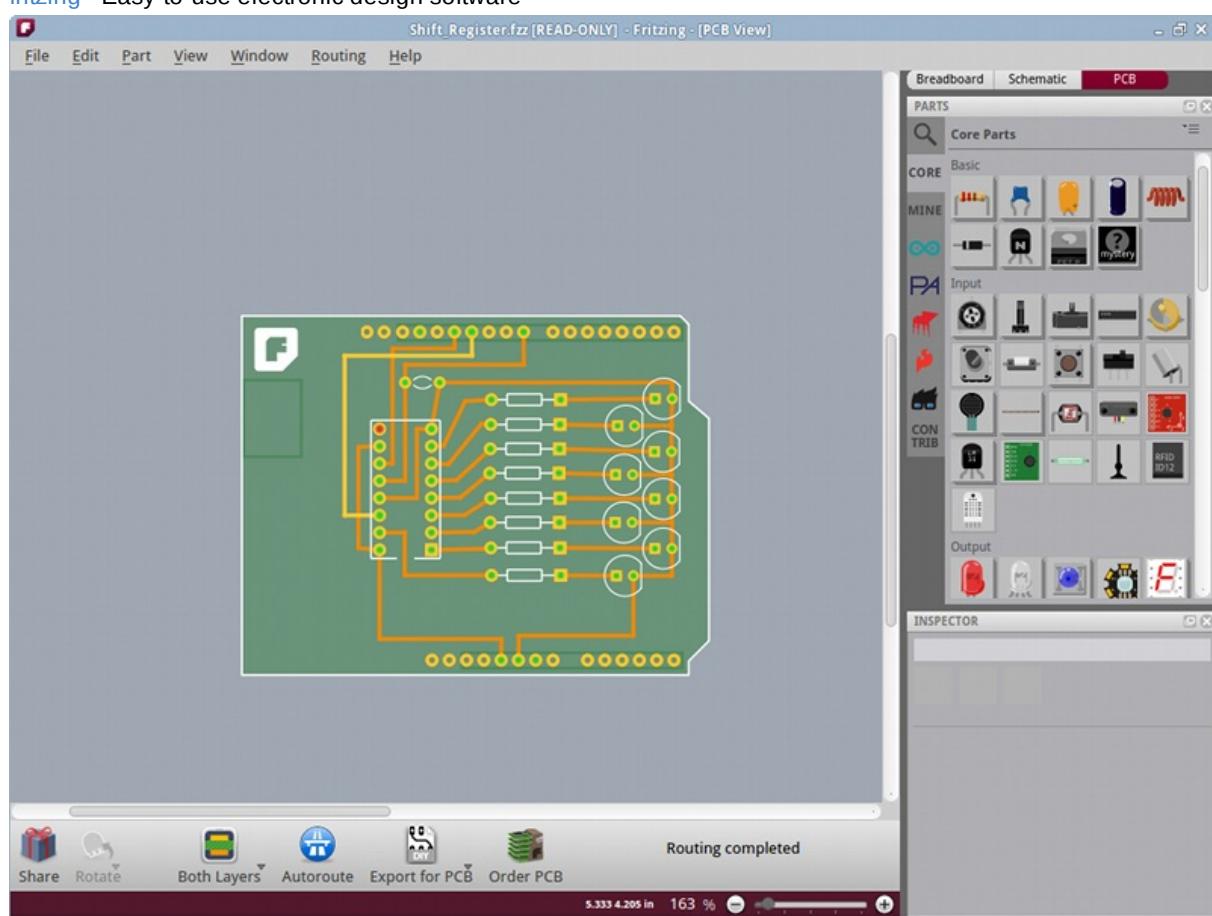
- [rocs](#) - graph theory IDE



- [chemtool](#) - chemical structures drawing program



- **fritzing** - Easy-to-use electronic design software



Edubuntu application list created with a slightly modified version of this [script](#)

# Contributors

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Below is a list of the contributors who have helped to create this guide. For detailed contribution statistics, see <https://github.com/hellohubs/documentation/graphs/contributors>

- [Roland Wells](#)
- [Judith Mueller](#)
- [Katrin Macmillan](#)
- [Caleb Flynn](#)
- [Sundar Raman](#)

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