OLPC and sugarlabs

Invite You To Come Play With Us!

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OLPC and Sugar Labs Volunteer
SCaLE 9X
Los Angeles, California
February 26, 2011

play (plā)

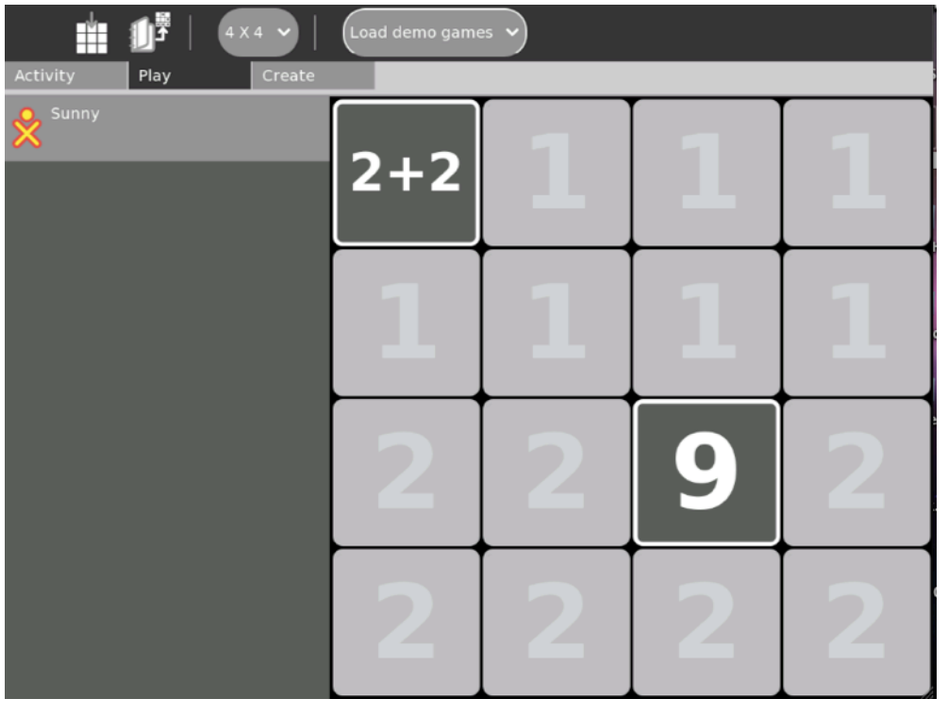
v. played, play·ing, plays

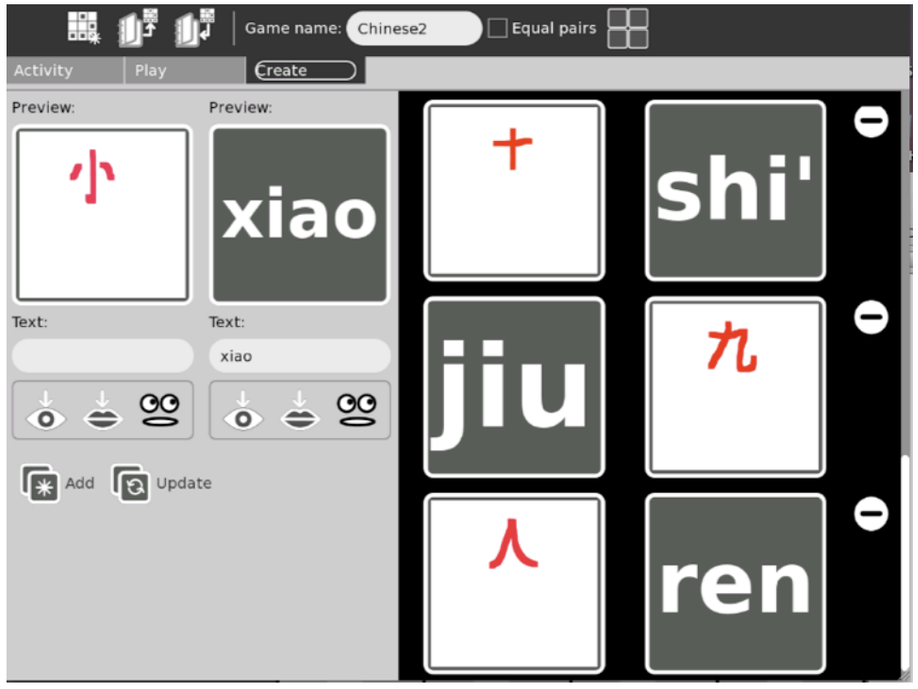
v.intr.

1. To occupy oneself in amusement, sport, or other recreation.

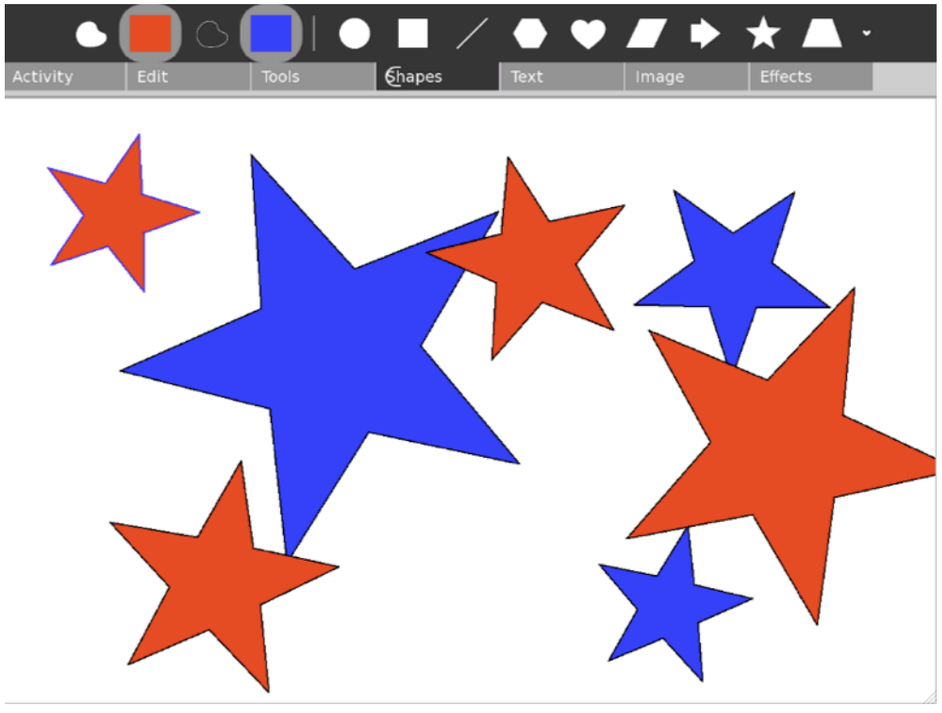
Sugar Turns Learning Into Play And Play Into Learning

In Memorize You Can Make Your Own Games



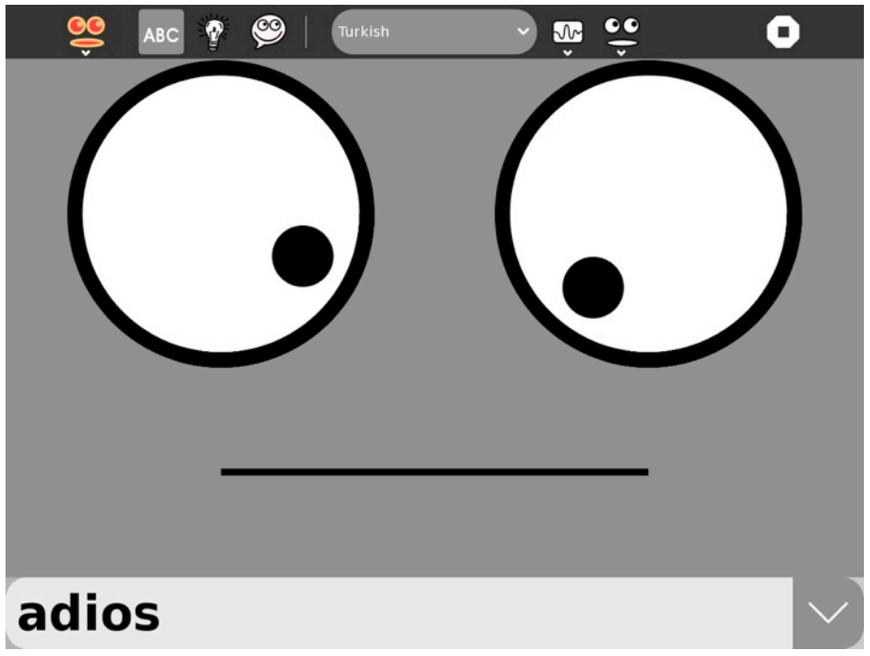


Create Art With Paint

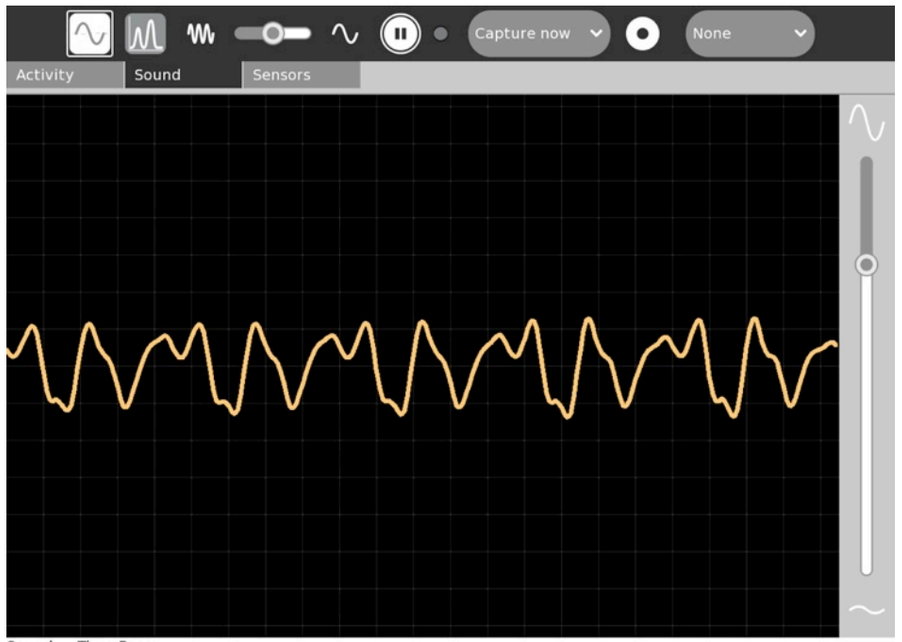


Make Your Own Story In Write

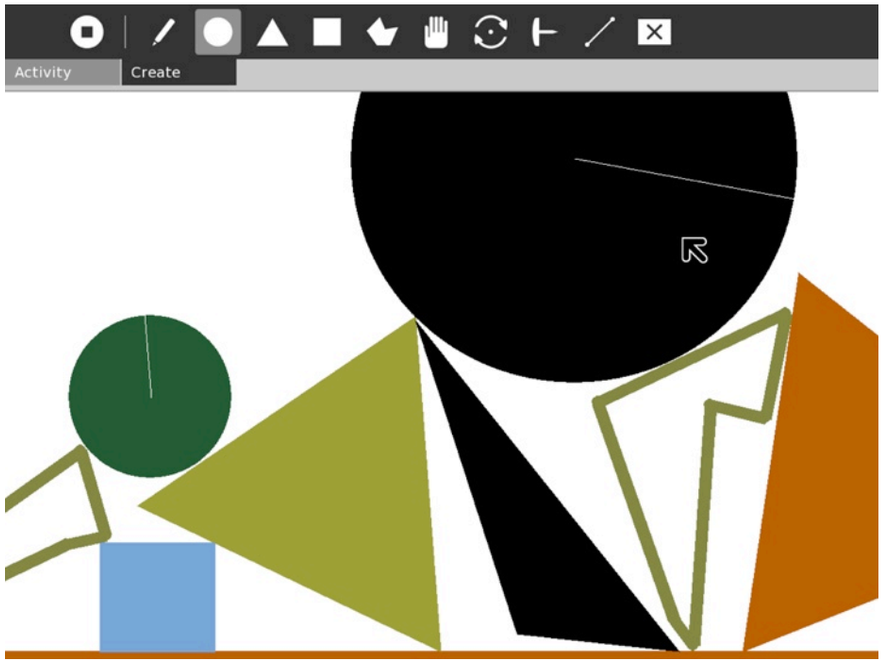
Make Your Computer Speak 30+ Languages!



Experiment With Sound In Measure

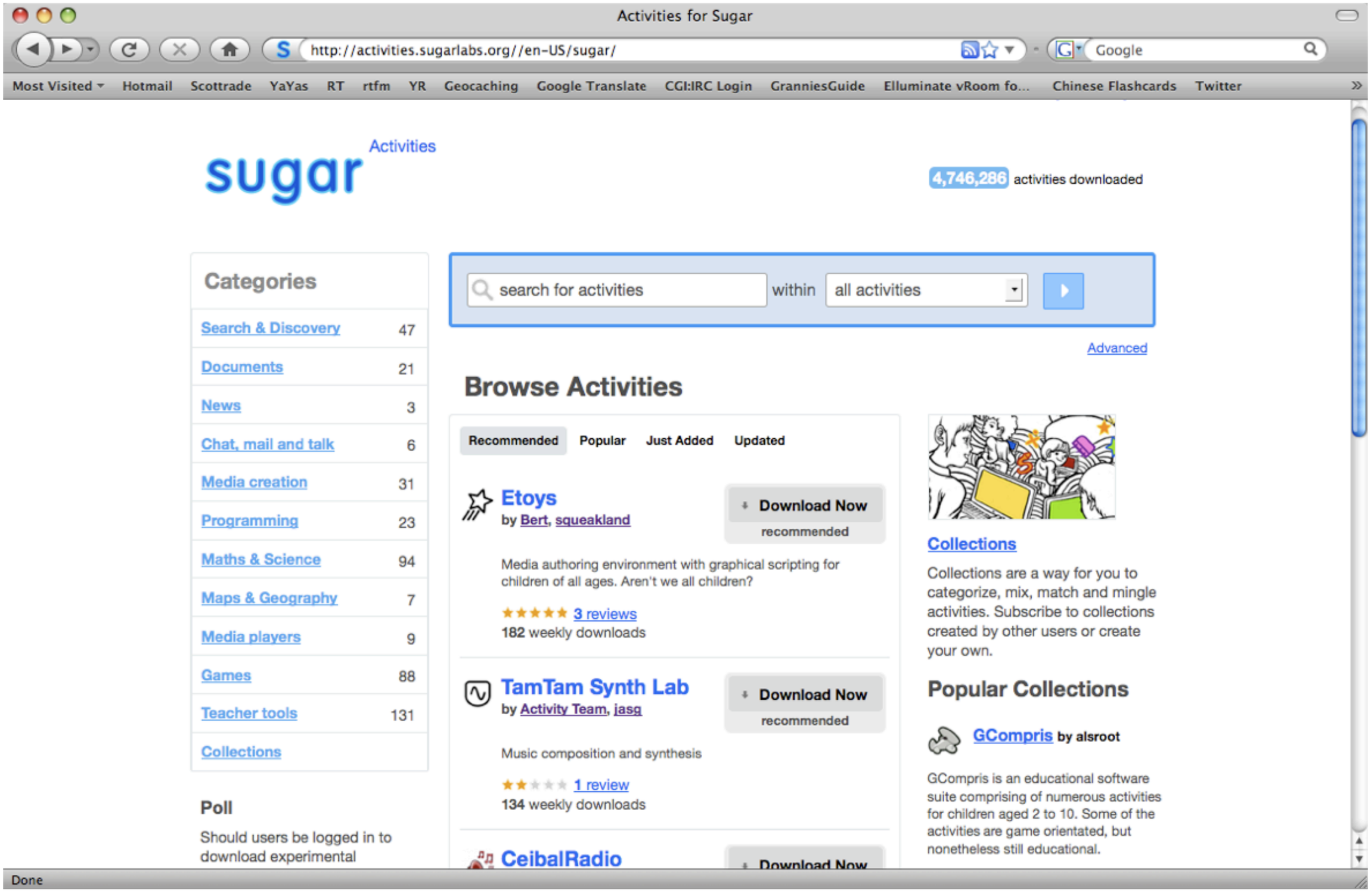


Experiment With Shapes in Physics

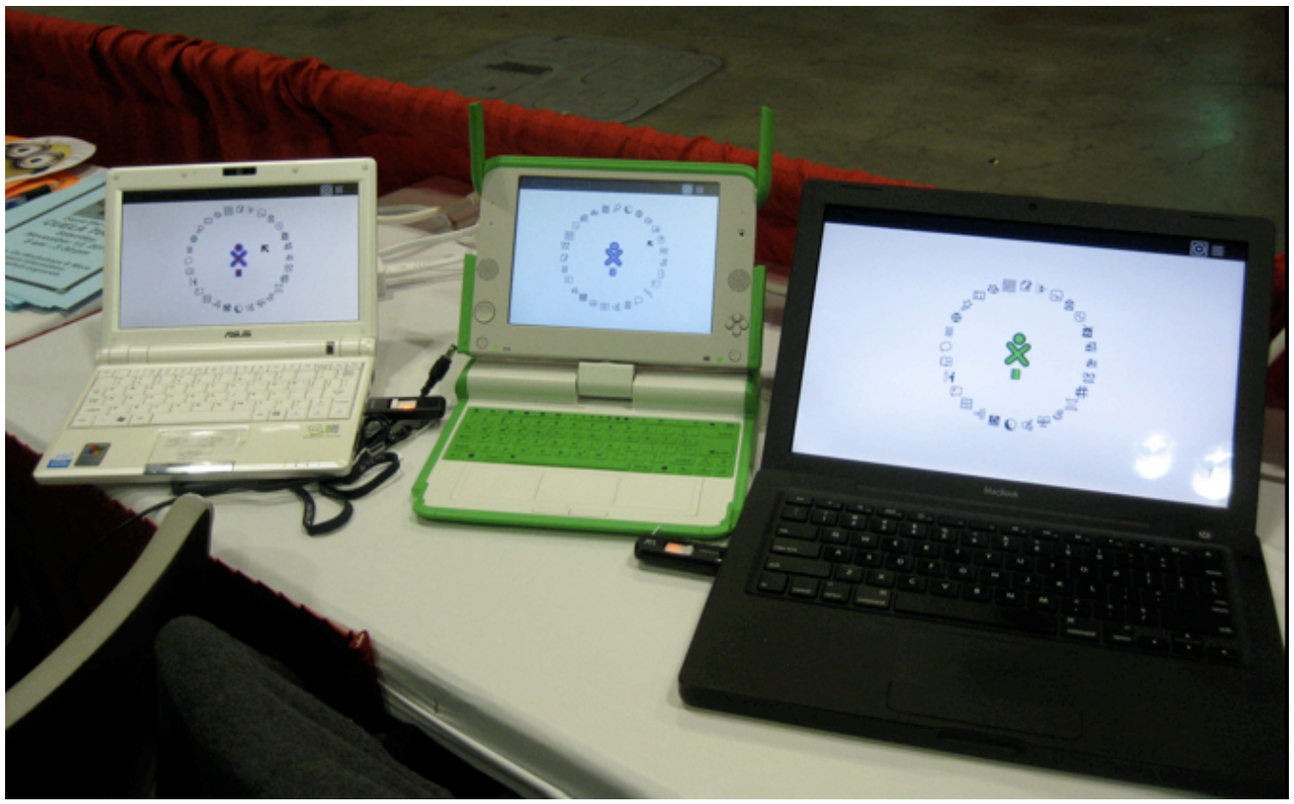


Play Music With TamTam

460 Activities, 4,750,000 Downloads

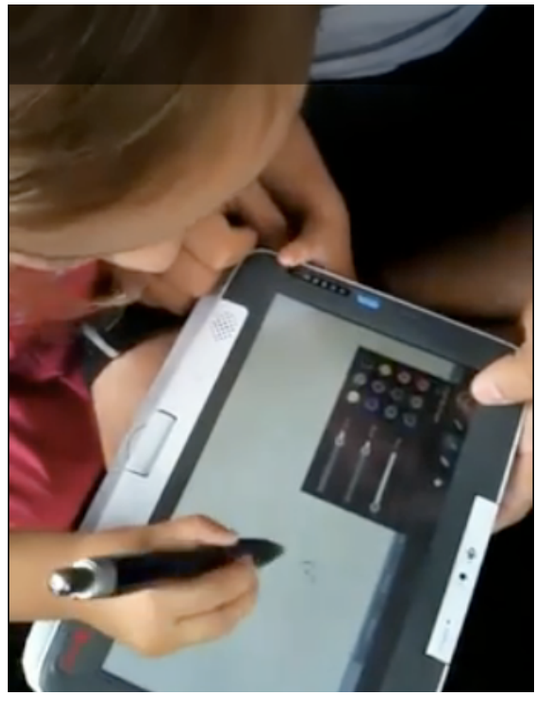


Sugar On Your PC



Run Sugar On Computers You Already Have!

Linux, Windows, Mac OSX
Desktop, Laptop, Netbook,
even a Classmate touch!



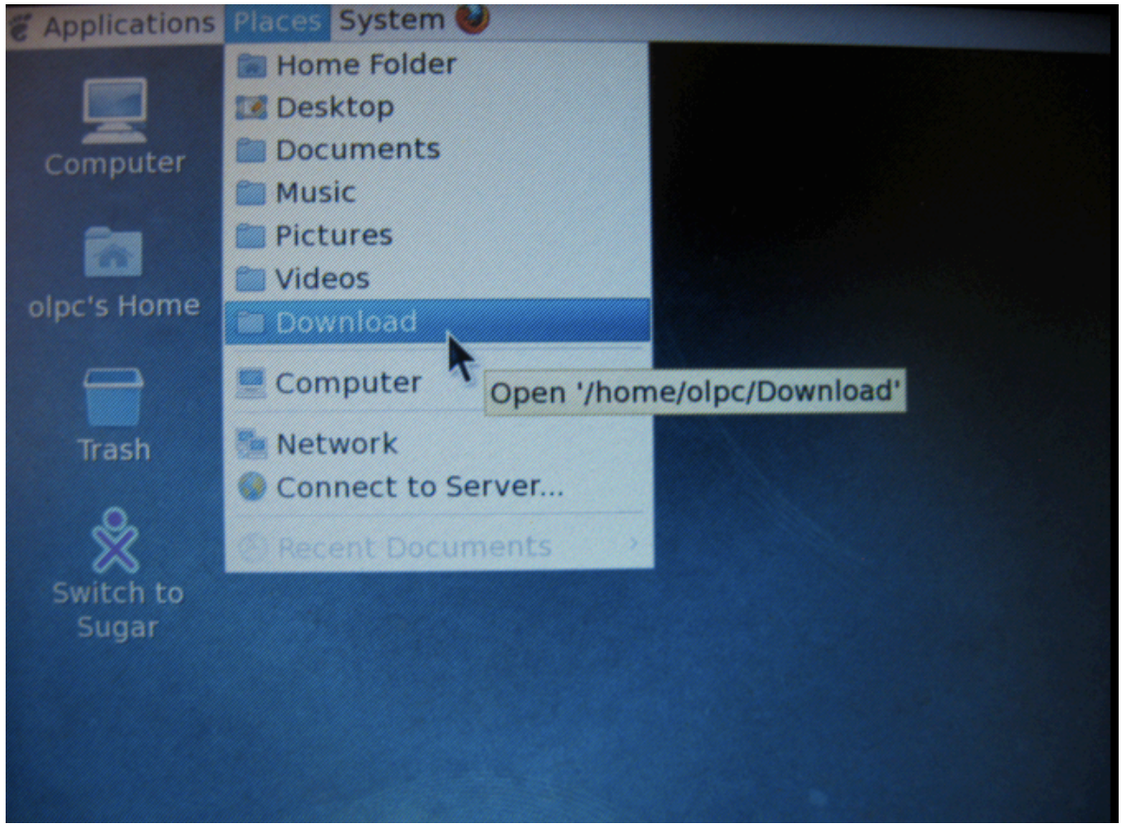
"SoaS": Sugar On A Stick Comes In Many "Flavors

* Strawberry
* Blueberry
* Mirabelle
* Mango Lassi
* Frequent updates
  in new "fruit flavors"

Live CD

Mac's Need Virtual Box
Or A Boot Helper Disk

Sugar On The XO



Sugar

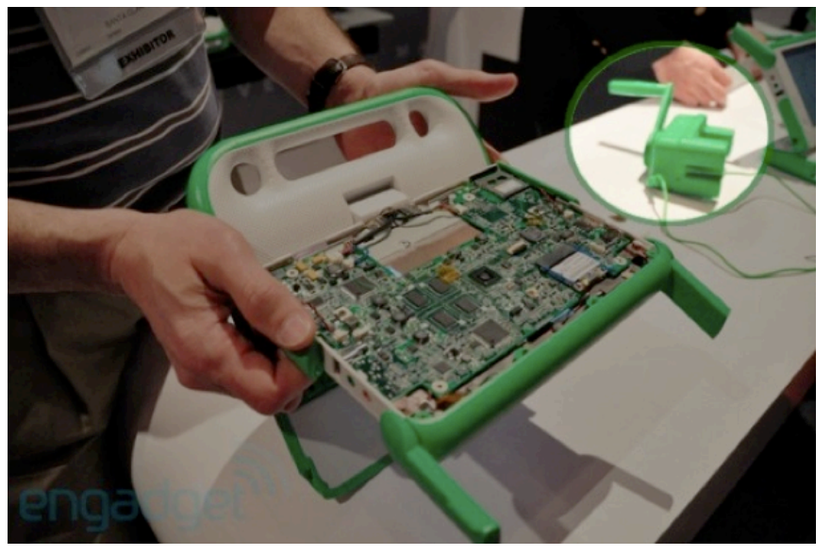
Gnome

Dual Boot Available on XO-1 and XO-1.5

Hardware Update

XO-1 and XO-1.5

XO-1.5HS



New XO-1.75 Supports Hand-Crank
ARM processor uses less power

XO-3 Prototype

XO laptop directions overview

one laptop per child

Today's machine

XO-1

11/2005 Announcement

A · B1 · B2 · B3 · B4 · C1 · C2 · CL1A

2006 · 2007 · 2008 · 2009

AMD Geode, 400 Mhz, 256Mo RAM, 1Go Flash, Dual mode screen WiFi mesh

XO-1.5

4/2009 Announcement

A1 · A2 · B1 · B2

1/2010 Production ?

2010 · 2011

VIA C7-M, 1 Ghz, 1Go RAM, 4Go Flash, Dual mode screen WiFi

4/2009 · 9/2009

Visions

XO-1.75

10/2009 Announcement

11/2010 Prototype ?

2010 · 2011

ARM processor

XO-2

5/2008 Announcement · 1/2009 Mock-up · 10/2009 Stopped

2009

Double multi-touch screen

XO-3

10/2009 Announcement

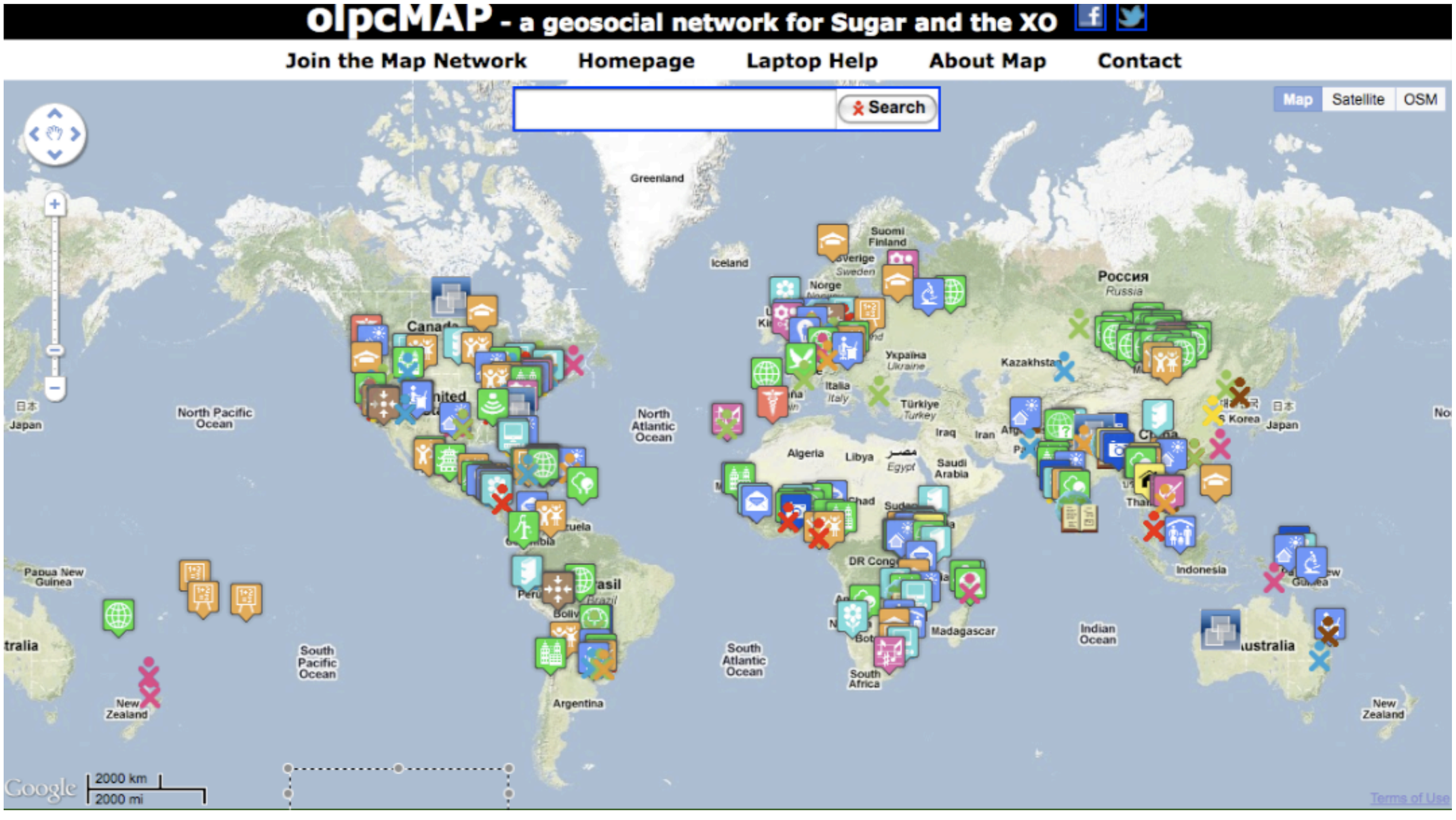
1/2012 Prototype ?

2009 · 2010 · 2011 · 2012

Single sheet

Over 1.8 Million XOs Deployed Worldwide

XO and Sugar Deployments and Projects Now Circle the Globe



This new map is “under construction.”
Consider adding your name and project!

Start A Club or School Chapter

Clubs and Chapters Do Projects & Meet Regularly With XOs and Sugar

Olin College

Harvard University

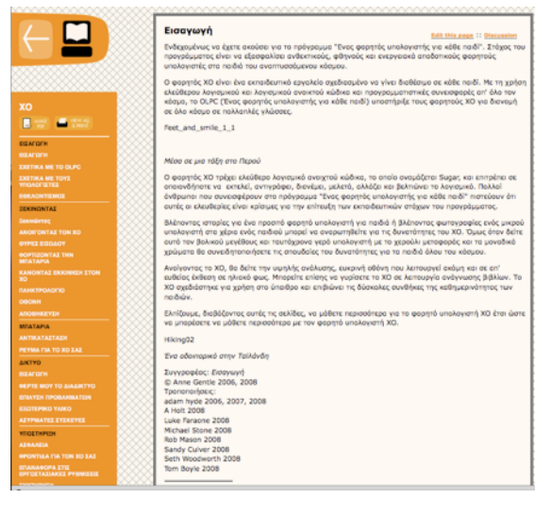
Start A Repair Center

Collaborate To Write And Translate eBooks

English

Spanish

Arabic

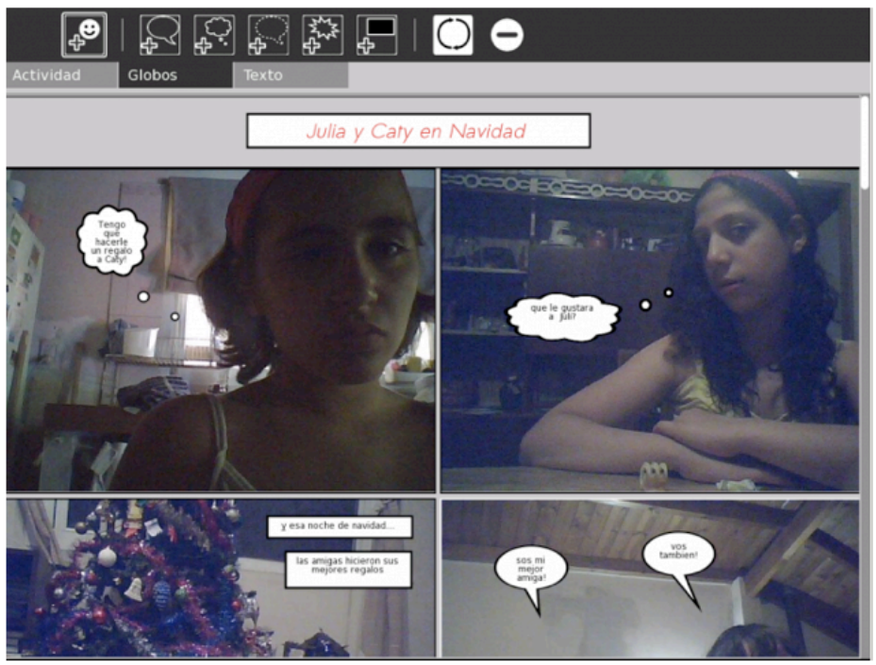


Greek

Do Community Outreach

Help People Learn to Use the XO & Sugar Software

Write And Test New Activities and Sugar On A Stick

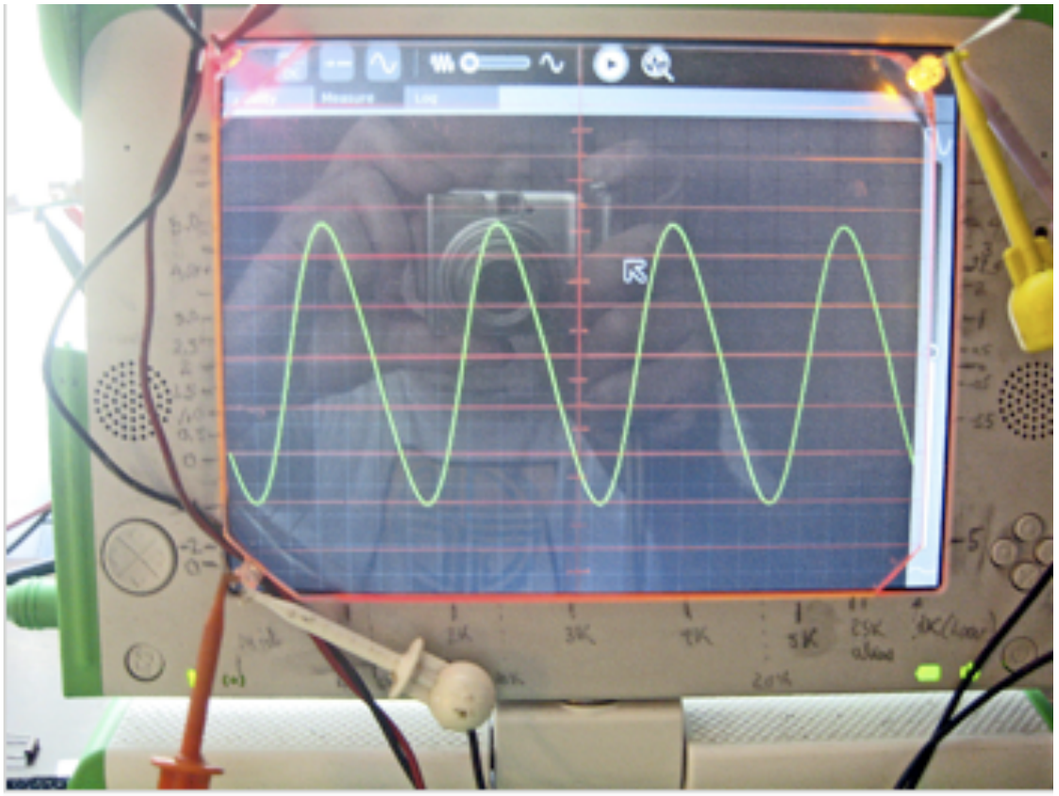


FotoToon

START A PROJECT THAT WILL CHANGE KIDS' LIVES WORLDWIDE!

http://wiki.laptop.org/go/Contributors_program

Try Your Priceless Idea With a Hardware Project
Share Your Results With The OLPC/Sugar Community



Electronic Tuning "Fork"

Temperature Sensor

Hardware Project In Southern California

Wind Shear Detection with 802.11s Wireless Mesh Networking

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Abstract-*A partial mesh array of wireless environmental sensors using IEEE 802.11s draft standard communications was developed for the detection of wind shear around airports. The system described here is self organizing, redundant and highly fault tolerant. It has no single point of failure and can continue operation even after a significant number of node failures. The objective of this system is to provide small and improvised airfields a system for detecting wind hazards as effective as those currently available only at much higher cost at the largest airports.*

The project is implemented with as much off-the-shelf hardware and software as possible. The goal was to rapidly develop a system with existing low cost components, avoiding significant development cost.

This Redundant Array of Inexpensive Sensors (RAIS) [1] system uses XO computers developed by the One Laptop per Child (OLPC) Foundation as a hardware platform. A fully operating system was developed and tested. The results derived from testing are encouraging and clearly shows the viability of deploying such a system in the field.

Keywords: 802.11s, mesh network, wind shear, wireless sensor network, XO computer

1. Introduction

Wind shear is a natural phenomenon that has caused numerous aviation disasters. Wind shear in the lowest layers of the atmosphere constitutes perhaps the most severe and frequent source of hazard for aviation operations [2]. In fact, wind shear accidents have led to regulations regarding the mandatory use of wind shear alert systems in air transport operations [3].

The largest airports have installed sophisticated RAdio Detection and Ranging (RADAR), SOnic Detection and Ranging (SODAR) and Light Detection and Ranging (LIDAR) arrays and some jet liners are equipped with backscatter LIDAR systems to detect wind shear. One example of such a system is discussed in reference [4] which details the wind shear and turbulence detection system for the Hong Kong airport. In the United States the Federal Aviation Authority (FAA) has designed the Low Level Windshear Alert system (LLWAS), the Terminal Doppler Weather Radar (TDWR) and the third-generation Low Level Windshear Alert System (LLWAS 3). These systems are highly sophisticated and the cost of these systems runs in the millions of US dollars. Consequently, these systems are not viable for small and medium sized airports. There are over 4,000 public use airports in the USA, most not catering to any scheduled airline services. Only 47 wind shear radar detection systems have been deployed to protect the nation's busiest airports [5]. This leaves the vast majority of pilots and airports with no wind shear detection capability whatsoever.

The present system developed is envisioned to fill this gap. The current system relies on inexpensive components and commercial off the shelf technologies thus providing a lower cost alternative to these expensive systems. Because it is highly portable and nodes will self-organize into a mesh network when deployed, it is eminently suitable for use on improvised airfields for military and disaster response purposes.

2. Architecture of the RAIS system

The system was designed using off the shelf components. This reduced cost of development and the development time. Use of pre-built components ensures that prototypes can be built using available anemometers, single-board computers, consumer GPS systems and other readily available components. By avoiding building any custom integrated circuits or circuit boards, a demonstration project with a modest budget was able to be in the field in a matter of months rather than years.

The network that gathers and distributes the wind shear data needs to be arranged in a partial mesh topology which ensures a fault tolerant and redundant configuration. The primary advantage of such a system is the absence of any single point of failure. Since this system has been implemented with low cost components, equipment failure is a risk. However, the redundant nature of the system ensures that single node failures do not bring down the operation of the whole system. Damage to individual nodes only degrades system performance.

Published Research Paper

CSUN researchers Use XOs to develop inexpensive wind shear detection system for small airports

What's on the computers?

Terminal Activity

Activity Edit

```
bash-3.2#
bash-3.2#
bash-3.2#
bash-3.2#
bash-3.2# python multiCastSender.py &
[1] 2810
bash-3.2# 000 10 ZEPH01 150550.000 0000.0000 N 00000.0000 E 0.0 67.50 0.0 90.00
000 11 ZEPH01 150604.000 0000.0000 N 00000.0000 E 0.0 67.50 0.0 90.00
000 12 ZEPH01 150611.000 0000.0000 N 00000.0000 E 0.0 67.50 0.0 90.00
000 13 ZEPH01 150619.000 0000.0000 N 00000.0000 E 0.0 67.50 0.0 90.00
000 14 ZEPH01 150627.000 0000.0000 N 00000.0000 E 0.0 67.50 0.0 90.00
000 15 ZEPH01 150634.000 0000.0000 N 00000.0000 E 0.0 67.50 0.0 90.00
```

Setup

Terminal Activity

Activity Edit

```
****************************************
03:15:30 UTC: HZ WShear Detected between ZEPH27 and ZEPH22, Distance 3.21km|Value 51.63m/s
****************************************
****************************************
03:15:30 UTC: HZ WShear Detected between ZEPH27 and ZEPH21, Distance 1.66km|Value 31.65m/s
****************************************
****************************************
03:15:30 UTC: VT WShear Detected between ZEPH27 and ZEPH21, Distance 1.66km|Value 5088.0fp
m
****************************************
No wind shear Between ZEPH27 and ZEPH20.
Server Received:
000 29 ZEPH25 031532.100 3423.7439 N 11838.504 W 21.9 203.0 1065.9 11.7
Current Working NodeSet is set(['ZEPH03', 'ZEPH02', 'ZEPH16', 'ZEPH17', 'ZEPH14', 'ZEPH15'
, 'ZEPH12', 'ZEPH13', 'ZEPH10', 'ZEPH11', 'ZEPH18', 'ZEPH19', 'ZEPH23', 'ZEPH08', 'ZEPH05'
, 'ZEPH04', 'ZEPH07', 'ZEPH06', 'ZEPH01', 'ZEPH00', 'ZEPH29', 'ZEPH28', 'ZEPH27', 'ZEPH26'
, 'ZEPH24', 'ZEPH09', 'ZEPH22', 'ZEPH21', 'ZEPH20'])
No wind shear Between ZEPH25 and ZEPH03.
****************************************
03:15:32 UTC: HZ WShear Detected between ZEPH25 and ZEPH02, Distance 1.34km|Value 42.17m/s
****************************************
****************************************
03:15:32 UTC: VT WShear Detected between ZEPH25 and ZEPH02, Distance 1.34km|Value 2233.1fp
m
****************************************
```

Output

Try Your Priceless Learning Idea With a Small Deployment

Share Your Results With The OLPC/Sugar Community

Honduras

Vietnam

A New PenPal Project in the Making

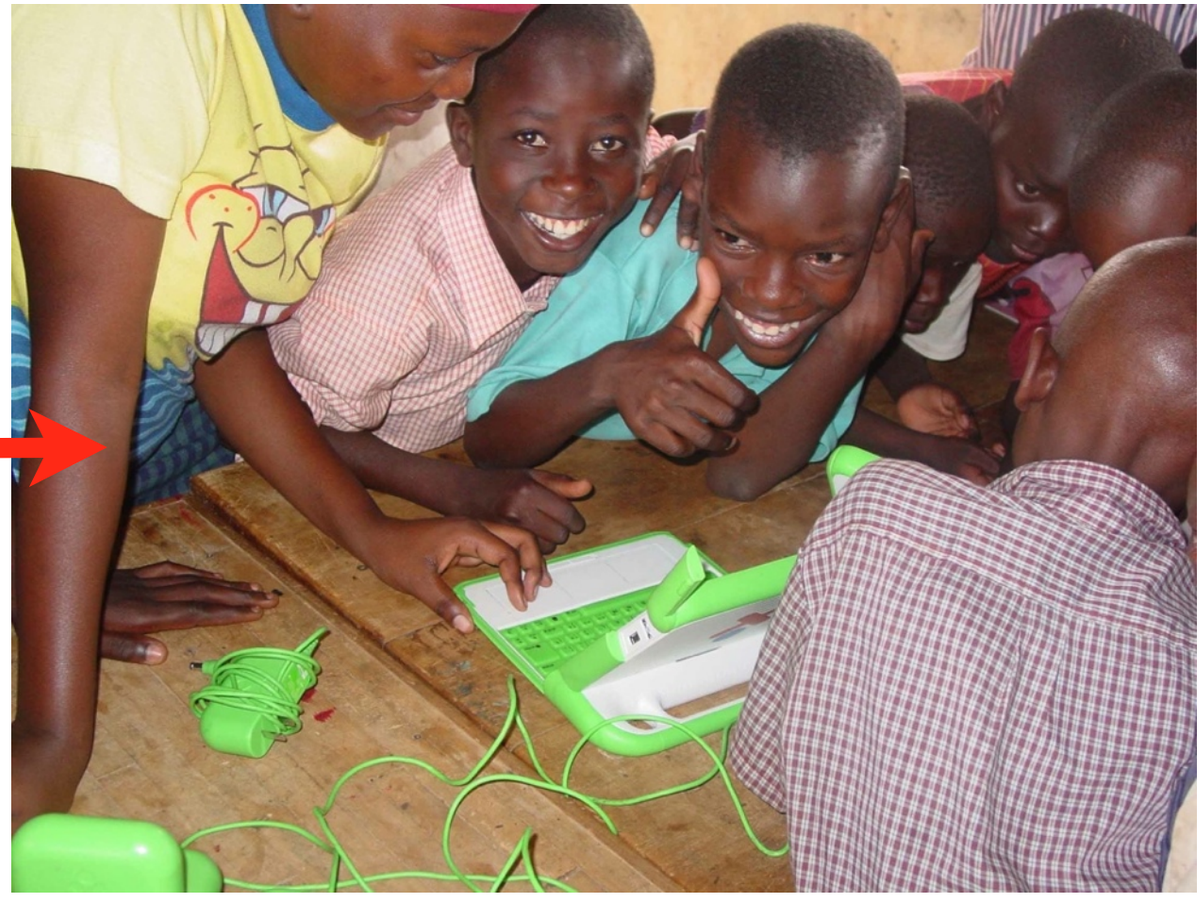
FAMLI After School Program Contributors Project At Audubon MS

AGYA/USC Contributors Project in Kampala, Uganda

Got Game? Web Version

A service learning project between students at New Tech High in Coppell Texas and students in Ghana at a center for former child slaves. They are using XO laptops as a communication tool to create relationships and educational math tools.

UCSB Contributors Project Pairs Kellogg School in Goleta With John Osogo School in Kenya



Here's Your "Take-Away"

Useful Links

help@laptop.org
http://wiki.laptop.org/go/Contributors_Program
http://wiki.sugarlabs.org/go/Sugar_on_a_Stick/Strawberry
http://wiki.sugarlabs.org/go/Sugar_on_a_Stick/Blueberry
http://wiki.laptop.org/go/Participate
http://wiki.laptop.org/go/University_program
http://wiki.laptop.org/go/Community mailing lists
http://blog.laptop.org/
http://www.sugarlabs.org/
http://www.flickr.com/photos/olpc