

Why Free Software for Education?

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About the author

- Teacher in a French high school: physics, chemistry and computer science
- Free Software activist for twenty years. Got bored by Windows 97.
- Debian Developer for ten years. Has someone a free-libre package to upload?



Free Software



Richard Stallman

When I talk about Free Software, I often add the “libre” Latin word: I mean free as in freedom, not just free as a free beer. Software freedom requires four liberties:

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Examples: [LibreOffice](#), [Firefox](#), which you *may be* already using?
[SendMail](#), [Bind 9](#): if you access Internet, you *are* using them.



Open Source Software



Eric S. Raymond

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Example: in my school, the local area network (LAN) is ruled by the software [Kwartz](#), mostly written in Perl language. Kwartz features some services, authentication, IP address allocation, e-mail, file shares, *owncloud*, ... I can access the source files, because it is Open Source Software. However Kwartz' licence does not allow me to copy or redistribute it. I am allowed to use it only in my school.



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Closed Software

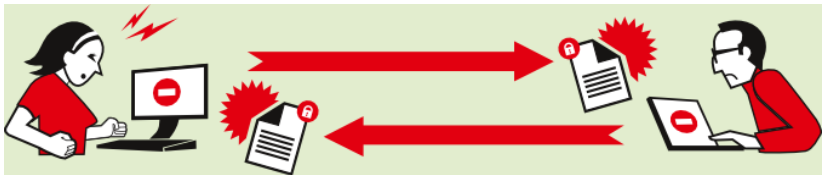
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My school uses some Closed Software tools, for example the software driving our colorimeters comes with no source, and I wish I could fix some of their damned bugs.



Free Formats



Every useful software deals with *data*; every developer may define her/his own standard to read and write those data. Fortunately, most developers are using standard formats, so data can be exchanged between various software pieces.



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- 3 be fully documented
- 4 be free of encumbering patents, copyrights or other restrictions



Which col-or makes the TV display nice?

Once upon the time, Black & White TV was invented. If you are old enough, you may remember that some humans walked on the moon in year 1969: their images were broadcast on monochrome TV screens.

Today, most people prefer watching colourful movies. This is possible thanks to TV screen featuring Trichromacy, i.e. able to generate three kinds of sub-pixels.

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- Is this progress due to the Blue Colour?



Fragile environments



Above you can see « Forêt des Landes », a nice forest grown in the South-West of France, since king Louis XIV ordered it. This forest is uniquely made of [Pinus pinaster](#), as king Louis XIV wanted pine wood, to build a fleet stronger than the English Navy.

The picture on the right was taken there in year 2009, after [Cyclone Klaus](#)



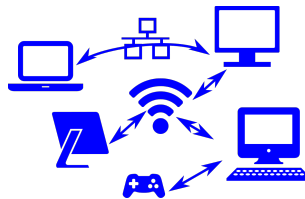
Fragile environments



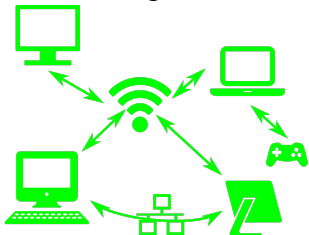
Let us learn from mistakes!



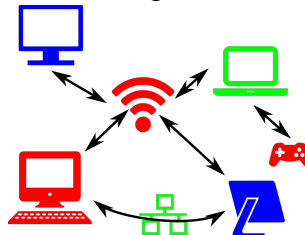
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NOT Fragile

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As in the TV screen metaphor, the interesting thing is not *one* colour, but the combination of all of them. Such a combination is feasible only if standards (the *black* arrows) are used to communicate:

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Even when secrecy is needed, standard protocols are the way to go. When you communicate with your bank over Internet, standard communication protocols are used. Secrecy stems from cryptography algorithms, which are also public standards.



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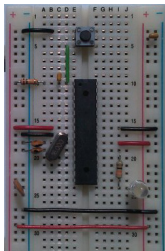
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- 10 Because free software permits diversity in our digital environment



A short story : first, bare components



Fifteen years

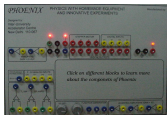
ago, French high schools used to have an optional course named “*Mesures Physiques et Informatique*”
Physic Measurements Computer Science.

Therefore, I was very interested by the emerging cheap solutions based on ATmega microcontrollers and eventually affordable for students.

A colleague from Université de Strasbourg, helped my school in year 2005 to purchase a few ATmega chips and upload them a microprogram, to sample analogical signals and send the records to a computer by serial link.



Discovering PHOENIX



My manager and I were

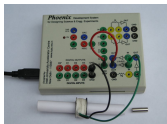
crazy enough to dare open this course as remote learning. Our purpose was to allow students in "*Sport-Études*" section (sports+studies) to remain at home one day longer in the week.

During the seven first weeks of the school year, they were taught three hours every Saturday morning in the school, then they were allowed to attend the course remotely from November to June, and send their homework by Internet.

Unfortunately, breadboards are too fragile for our students, and we had a lot of issues with them. Then, my colleague e-mailed me that [PHOENIX](#) was born in IUAC!



Discovering PHOENIX



The first PHOENIX

box was linked to computers by a parallel cable, and was bulky. When PHOENIX-M became available, we bought 30 boxes for the school and began to distribute them to the next students, with the same training schedule: 7 weeks on Saturdays in the school, and later remote learning.

Each PHOENIX-M box was enclosed in a plastic wallet, with a booklet summarising its features, a few external components for experiments, and a CD-ROM providing the distribution Freeduc. So, homework could be done by booting one student's computer with the CD-ROM, and working within exactly the same software environment as they were taught in the school.



In year 2010, the optional course MPI went out of the curriculum, and many physics teacher have missed it, because it yielded measurable consequences on students' knowledge and abilities, even when they were tested two year after the course, during the "*Baccalauréat*" exam.

Quite at the same time, ExpEyes was released and I passed the New Member Application of the organisation Debian. So, for ten years approximately, I keep maintaining the packages for ExpEyes which are part of Debian, Ubuntu, and satellite software distributions.



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Here is my opinion about it:

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- so far, few authors write about ExpEyes, few people publish tips and tricks doable with it



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