

# Simplest Sweaved Article

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This is a testament to the improvement in LyX during the past 10 years.  
I'm on LyX 2.0.8 with Ubuntu Linux and the built-in TexLive.

In Lyx, I choose

File -> New

It creates the simplest, unadorned article possible. I make sure there is nothing in the preamble, no unusual settings. I've moved my home folder lyx configuration out of the way, started LyX from scratch. There is absolutely no reason why any other person should have difficulty opening this document in LyX and running it.

## Make a Very Minor Document Setup Change

After getting the new, blank document, I only make one itty bitty change in the document setup.

Document -> Modules. Find Sweave, hit Add

## Now write some code worth Sweaving

Come back to the document, hit Control-l, put in the code chunks. I think this is the most pleasant way, but some people think it is nicer to use the LyX code chunk environment

### One

```
<< one >>=
set.seed(234234)
x <- rnorm(1000)
mean(x)
sd(x)
@

> set.seed(234234)
> x <- rnorm(1000)
> mean(x)
```

```
[1] 0.01746376
```

```
> sd(x)
```

```
[1] 1.007385
```

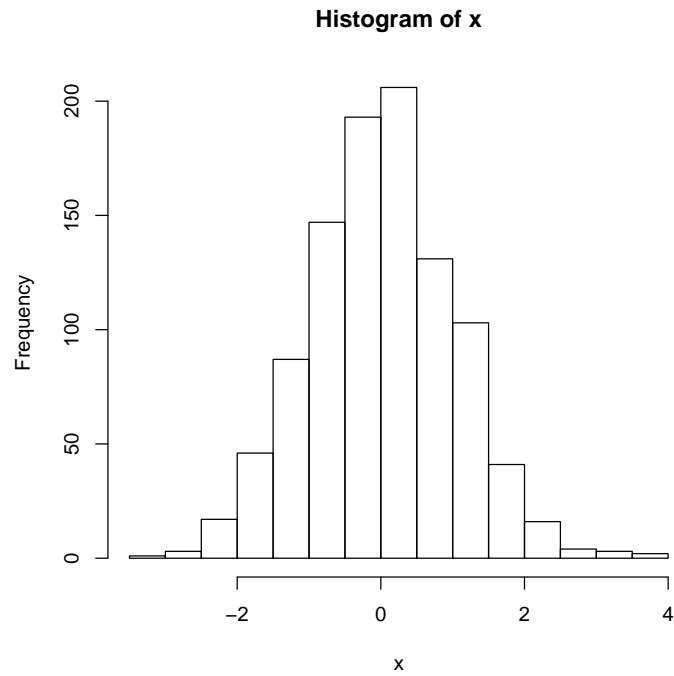
## Two

```
<< two, fig=T >>=
```

```
hist(x)
```

```
@
```

```
> hist(x)
```



## Three

```
<< three, results=tex >>=
```

```
dat <- data.frame(x1 = rnorm(1000), x2 = rnorm(1000))
b0 <- 0.5; b1 <- 0.7; b2 <- 0.15; se <- 10
dat$y <- b0 + b1*dat$x1 + b2*dat$x2 + se*rnorm(1000)
m0 <- lm(y ~ x1, data = dat)
m1 <- lm(y ~ x1 + x2, data = dat)
require(rockchalk)
```

```

outreg(list("Model of Student Behavior" = m0, "A More Elaborate Model"
= m1), varLabels = c("x1" = "Studying", "x2" = "Math Lessons"))
@  

> dat <- data.frame(x1 = rnorm(1000), x2 = rnorm(1000))
> b0 <- 0.5; b1 <- 0.7; b2 <- 0.15; se <- 10
> dat$y <- b0 + b1*dat$x1 + b2*dat$x2 + se*rnorm(1000)
> m0 <- lm(y ~ x1, data = dat)
> m1 <- lm(y ~ x1 + x2, data = dat)
> require(rockchalk)
> outreg(list("Model of Student Behavior" = m0, "A More Elaborate Model" = m1), varLabels =

```

	Model of Student Behavior	A More Elaborate Model
	Estimate	Estimate
	(S.E.)	(S.E.)
(Intercept)	0.065 (0.311)	0.073 (0.311)
Studying	0.937** (0.313)	0.940** (0.313)
Math Lessons	.	0.560 (0.308)
N	1000	1000
RMSE	9.841	9.830
R <sup>2</sup>	0.009	0.012
adj R <sup>2</sup>	0.008	0.010

\* $p \leq 0.05$  \*\* $p \leq 0.01$  \*\*\* $p \leq 0.001$

## Try to understand the different types of files that are generated.

This is that bare-minimum amount of Sweave.

But you should still understand it is a LyX file, that gets converted to Rnw, which gets converted to LATEX, which gets converted to PDF. The process can fail at any step, sometimes in difficult-to-understand ways.

You can ask for individual files out of this sequence, however. Here is one way to ask for them explicitly.

1. File -> Export -> PDF (pdflatex) will export the PDF document, the result you want.
2. File -> Export -> Sweave will create the Rnw document that R will turn into T<sub>E</sub>X.
3. File -> Export -> More Formats -> R/S code will run the “tangle” process to extract the R code from the Rnw document.

4. File -> Export -> Latex (pdflatex) will create the LATEX file that we would turn into a PDF.
- I would like an automated process to achieve steps 1-3, but don't have a good way.
  - I usually don't need the tex file from step 4, unless there is a failure to compile in the last phase. In cases like that, sometimes the only thing you can do is get the LATEX file and inspect it.

Another thing worth remembering is that while it is running, LyX is using a temporary directory to keep track of all of its individual files. That directory can be configured in

Tools -> Preferences -> Paths -> Temporary Directory. On my system, I have that set as “/home/pauljohn/tmp/lyxtmp”. When I get errors, I often go look in there to see what's going wrong.

## If your PDF Fonts Look Horrible, Do This

On my system, the default LATEX fonts are horrible when converted to PDF. The quick fix for that in Lyx is

Document -> Fonts

and change to Latin Modern fonts. Choose Latin Modern for the “Roman”, “SanSerif” and “Typewriter” font selections. I think many other fonts will work as well, but I've always been happy with Latin Modern.

Another reason to do this is that it reduces the danger of “invisible” characters due to the absence of a symbol from a character set.

## If you are Happy with that output, Use it!

1. I usually want more attractive presentation of the code chunks. For that, I use “Sweavel.sty”, which will be discussed in article-2.
2. I also make other configuration changes. The end result is a template document. If you want to learn more about how you can make your own template, I suggest you start by reviewing my essay on making a LyX Template. In this area of my web page, <http://pj.freecollege.org/guides/Computing-HOWTO/LatexAndLyx> you should see a folder LyX-article-template. In there, I show step-by-step the changes I usually make when beginning with a “blank” LyX article document.
3. All of the compiling work R does is off in the temporary directory, so I don't have copies of the files it creates while doing this work. I ALMOST ALWAYS wish I had the separate pieces of LATEX markup and the graphs in separate files, so I might use them in other presentations or documents. If you want to see how that's done, move on to article-2.

4. I really wish there were a “one button” solution to export
  - (a) The PDF for the Sweaved document
  - (b) The Rnw file
  - (c) The R code that is extracted (tangled) from the Rnw document

At one point, I had a LyX script that did it, but after LyX updated, that script fails and I've not figured how to make it work. Frustrating. That means I sometimes forget to export the Rnw file and the R files when I export the PDF.