

# **The (Failed) Creation of a Language Change Simulator**

The goal of this project is to create a software that simulates language change. Below is a list of steps I have to take towards completing the project. Of course, I was wayyyy too overly optimistic when I first envisioned the project...

## **Describing the language**

In order to simulate language change, we must first describe the current state of the language. Therefore, our software needs to be able to read in and store the grammar of the language. The user should be able to input descriptions of an existing language, or they could use the software to create their own!

### **1 Phonemic inventory**

The most basic component of a (spoken) language is a phoneme – the smallest unit of sound. Every language has a phonemic inventory, which is a collection of sounds that a speaker of that language perceives as distinctive. Each phoneme can be described using a feature matrix – a set of minimally necessary binary features that distinguishes it from all other phonemes in the language.

Thus, our software must be able to (1) store a phonemic inventory, (2) associate each phoneme to its set of features, and (3) allow the user to access phonemes via feature matrixes, and vice versa. As a bonus, we could also incorporate an algorithm that outputs a feature matrix given a list of feature values, and a system that allows the user to describe or create a phonetic-based writing system and associate each phoneme to an orthographical element.

### **2 Phonology**

Every language has phonological rules that govern how phonemes are realized in speech. These rules are encoded using the same feature matrixes described above.

Thus, our software must be able to (1) allow the user to input and store phonological rules, and (2) correctly apply these rules to phonemic representations and yield the appropriate phonetic forms.

## **Time out...**

So by then I realized that even getting that far is a bit of a stretch... And I was right...

## **An account of my unfortunate struggles**

### **1 Creating a user interface**

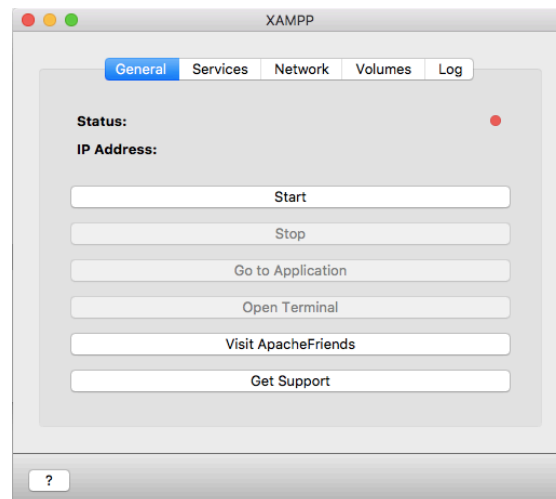
When I first started the project, I decided that the first thing I needed to do was to create a user interface. I found the *Qt5 C++ GUI Programming Cookbook* (URL:

[https://culturalengineerassociation.weebly.com/uploads/8/6/7/7/86776910/qt5\\_c\\_\\_gui\\_programming\\_cookbook.pdf](https://culturalengineerassociation.weebly.com/uploads/8/6/7/7/86776910/qt5_c__gui_programming_cookbook.pdf)) and followed instructions. I learned to use stylesheets, layout options, spacers, and various clicking reactions.

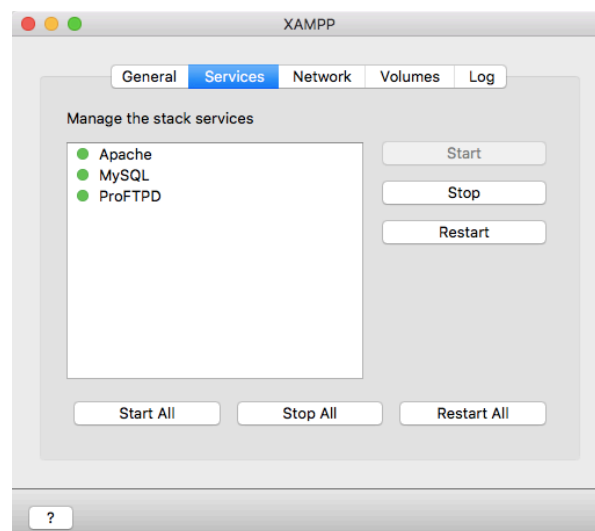
## 2 Setting up a database

Following the Qt Cookbook, I attempted to create and connect to a database. I downloaded XAMPP, which is a package that includes Apache and MySQL, which I need in order to create a database. Since the version of XAMPP that I downloaded has a very different user interface than the one described in the cookbook, I had to figure out how to make it work. Below is a list of steps (with screenshots!) that I took to set up a simple database for any unfortunate soul to follow:

- (1) Launch XAMPP and click “Start”



- (2) Click on “Services”. If the circles next to Apache and MySQL are red, click on each and click on start. If they are both green, you’re good to go!



- (3) Go back to “General” and click on “Go to Application”. It should take a page that looks like this:



## Welcome to XAMPP for 7.2.5-0

You have successfully installed XAMPP on this system! Now you can start using Apache, MariaDB, PHP and other components. You can find more info in the [FAQs](#) section or check the [HOW-TO Guides](#) for getting started with PHP applications.

XAMPP is meant only for development purposes. It has certain configuration settings that make it easy to develop locally but that are insecure if you want to have your installation accessible to others. If you want have your XAMPP accessible from the internet, make sure you understand the implications and you checked the [FAQs](#) to learn how to protect your site. Alternatively you can use [WAMP](#), [MAMP](#) or [LAMP](#) which are similar packages which are more suitable for production.

Start the XAMPP Control Panel to check the server status.

### Community

XAMPP has been around for more than 10 years – there is a huge community behind it. You can get involved by joining our [Forums](#), adding yourself to the [Mailing List](#), and liking us on [Facebook](#), following our exploits on [Twitter](#), or adding us to your [Google+](#) circles.

Contribute to XAMPP translation at [translate.apachefriends.org](https://translate.apachefriends.org).

Can you help translate XAMPP for other community members? We need your help to translate XAMPP into different languages. We have set up a site, [translate.apachefriends.org](https://translate.apachefriends.org), where users can contribute translations.

- (4) Click “phpMyAdmin” at the top right corner of the page. You will most likely see this error message:

## Access forbidden!

### New XAMPP security concept:

Access to the requested directory is only available from the local network.

This setting can be configured in the file "httpd-xampp.conf".

If you think this is a server error, please contact the [webmaster](#).

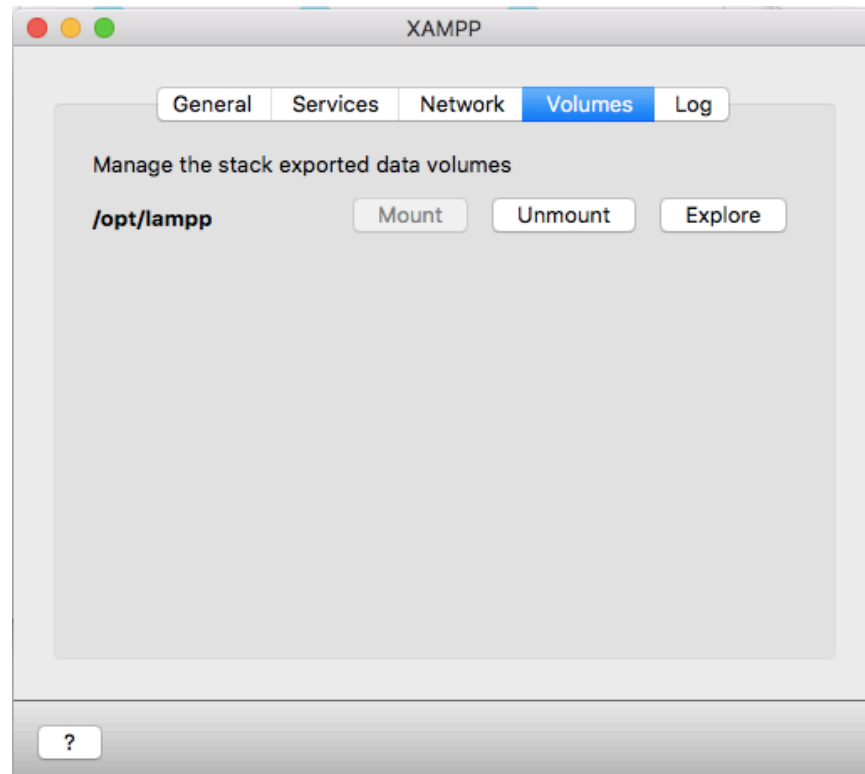
### Error 403

[192.168.64.3](#)

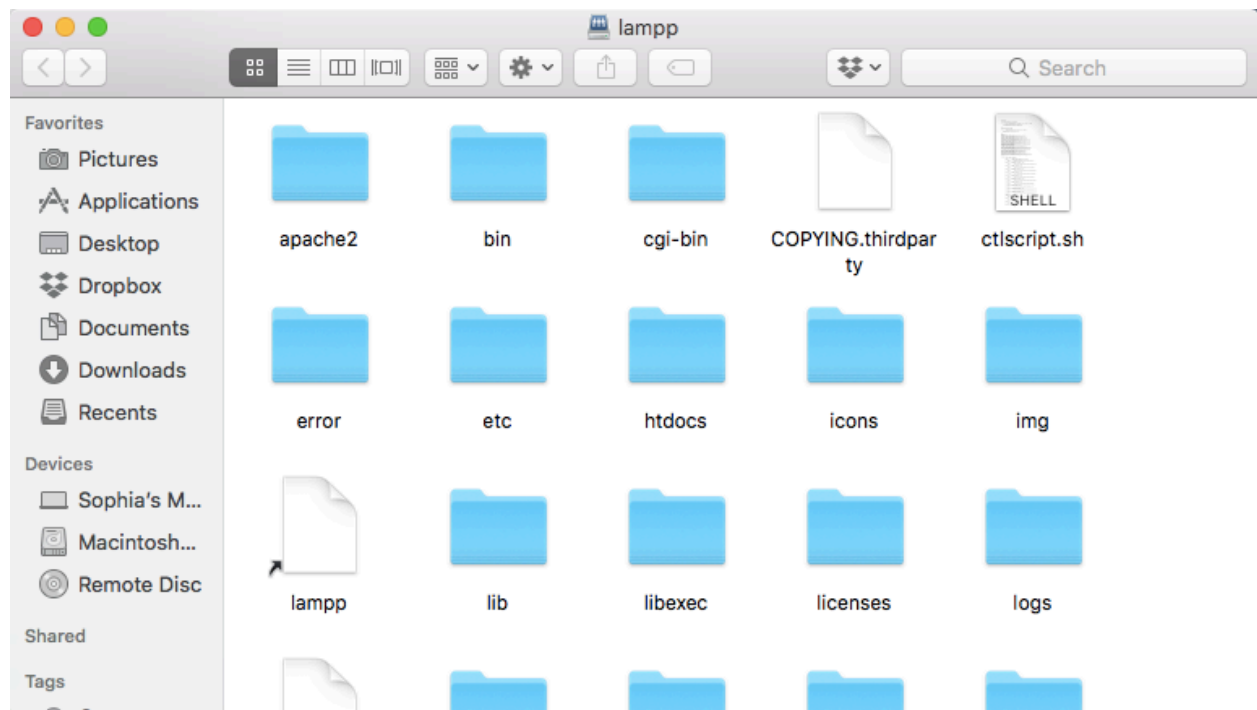
Apache/2.4.33 (Unix) OpenSSL/1.0.2o PHP/7.2.6 mod\_perl/2.0.8-dev Perl/v5.16.3

Note: It took me foreeeever to figure out how to fix this. You’re welcome!

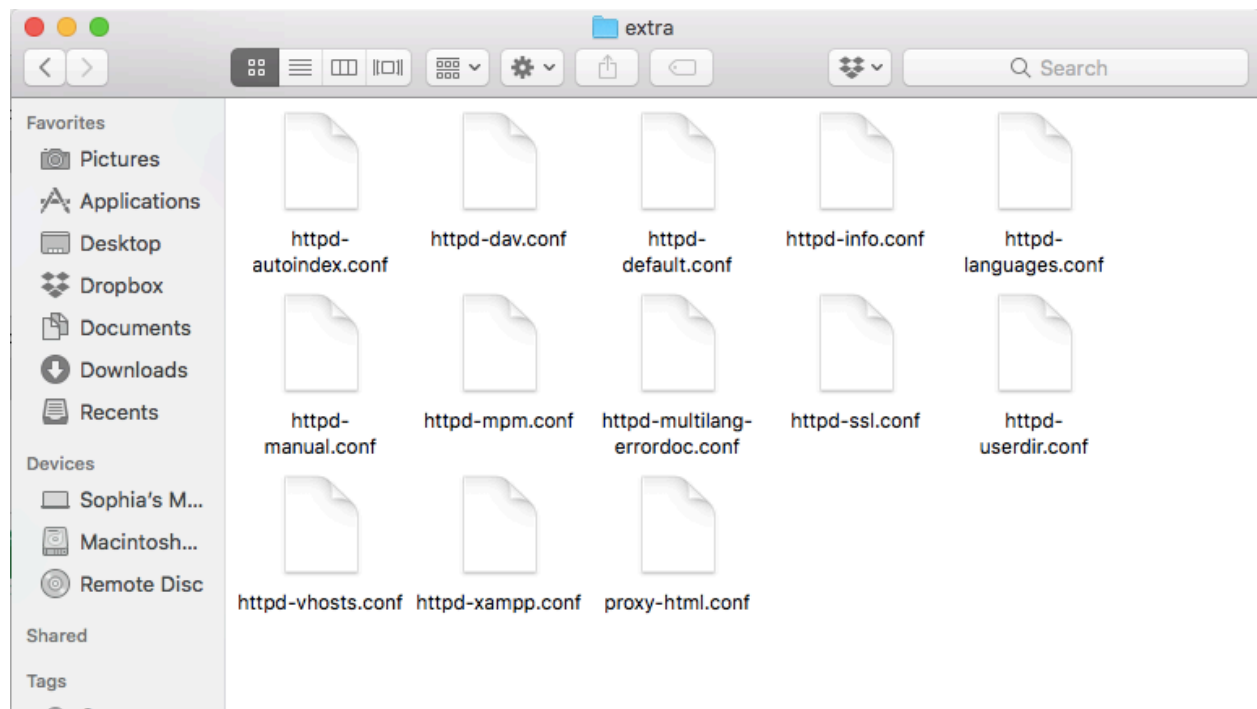
- (5) Go back to the XAMPP interface and click on “Volumes”. Then, click on “Mount”.



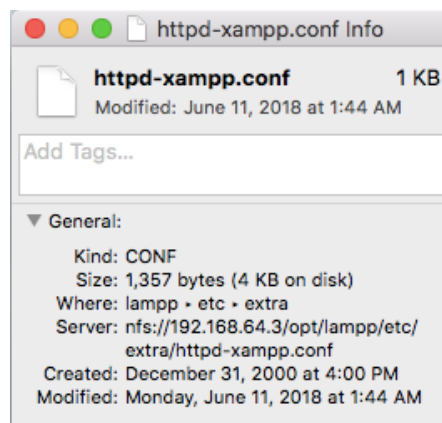
- (6) Click on “Explore”, and you’ll be taken to a Finder window that looks like this:



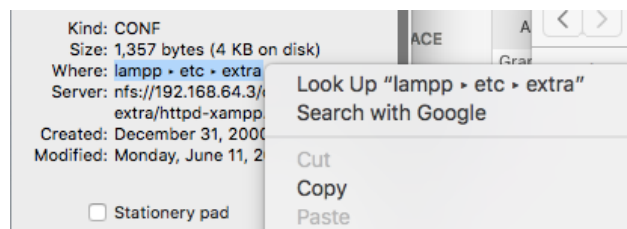
- (7) Click into the folder “etc”, then into another folder “extra”, where you’ll see a file named “httpd-xampp.conf” (second one in last row). We need to modify this file in order to fix the Access Forbidden error.



- (8) Right click on the file and select “Get Info”. A window like this will pop up:



- (9) Select the information after “Where” and copy it.



- (10) Open Terminal, type in **cd**, space, and paste the address you just copied. Hit enter. Your Terminal should look something like this:

```
[Sophias-MacBook-Air:~ sophialuo$ cd /Users/sophialuo/.bitnami/stackman/machines/]
xampp/volumes/root/etc/extra
Sophias-MacBook-Air:extra sophialuo$ █
```

- (11) Type **vim httpd-xampp.conf** and hit enter. You will see something like this:

```
##<IfDefine PHP4>
#LoadModule php4_module          modules/libphp4.so
#</IfDefine>
#<IfDefine PHP7>
#LoadModule php7_module          modules/libphp7.so
#</IfDefine>

# We will enable it by default
#<IfDefine PHP>
    LoadModule php7_module          modules/libphp7.so
#</IfDefine>

LoadModule perl_module          modules/mod_perl.so

Alias /phpmyadmin "/opt/lampp/phpmyadmin"

# since XAMPP 1.4.3
<Directory "/opt/lampp/phpmyadmin">
    AllowOverride AuthConfig Limit
    Require local
    ErrorDocument 403 /error/XAMPP_FORBIDDEN.html.var
</Directory>

"httpd-xampp.conf" 51L, 1357C
```

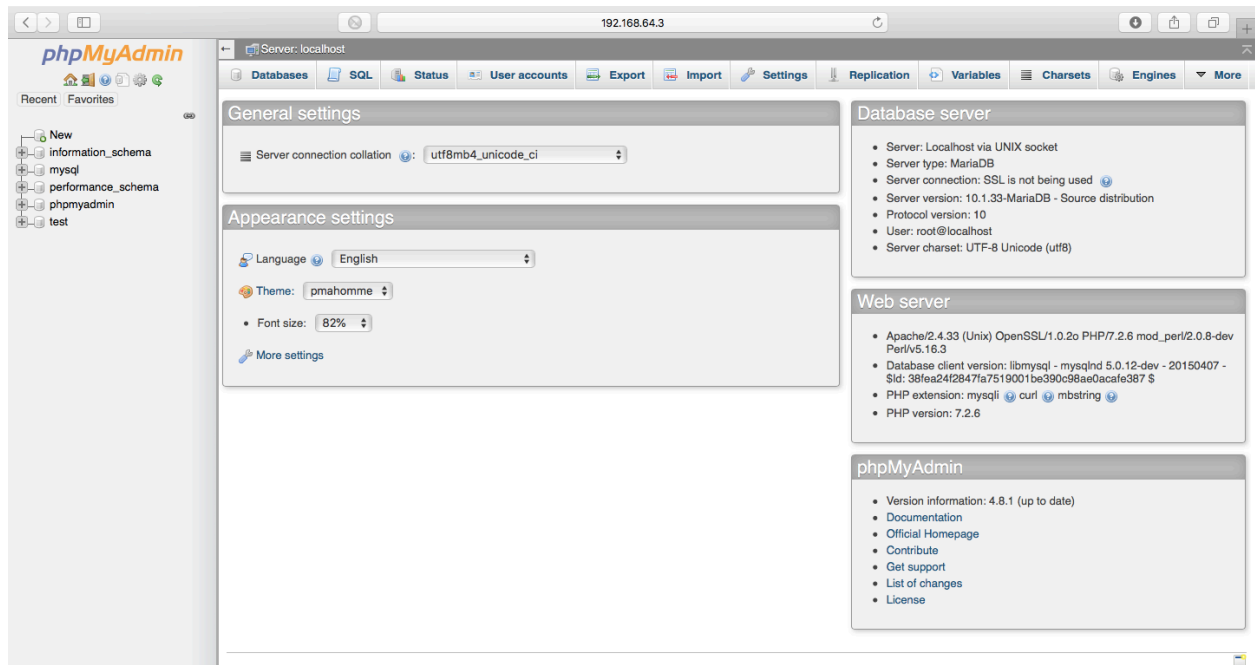
- (12) Hit **i** (stands for “insert”) so we can modify the file. Find the following section:

```
## since XAMPP 1.4.3
<Directory "/opt/lampp/phpmyadmin">
    AllowOverride AuthConfig Limit
    Require local
    ErrorDocument 403 /error/XAMPP_FORBIDDEN.html.var
</Directory>
```

- (13) Modify this section as follows:

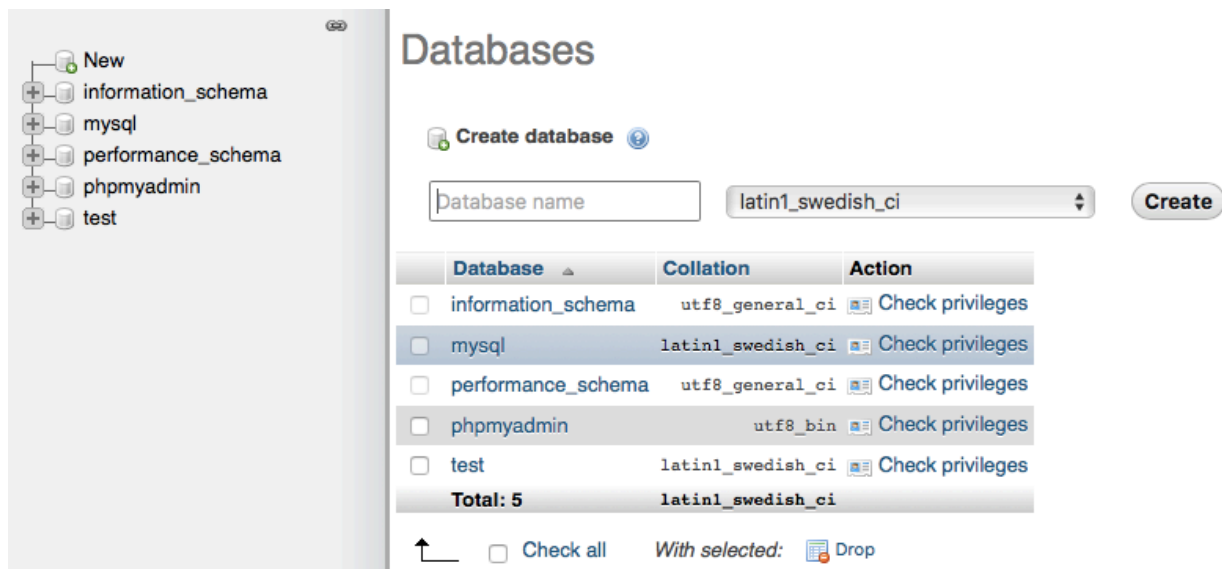
```
# since XAMPP 1.4.3
<Directory "/opt/lampp/phpmyadmin">
    AllowOverride AuthConfig Limit
    Order allow,deny
    Allow from all
    Require all granted█
</Directory>
```

- (14) Hit **esc**, type **wq**, then hit enter to save and quit. Now, restart XAMPP following steps (1) to (4). This time, you should be taken to an interface like this:

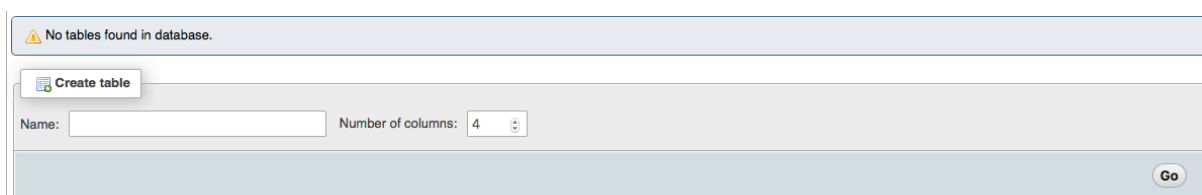


We're finally ready to start creating a database!

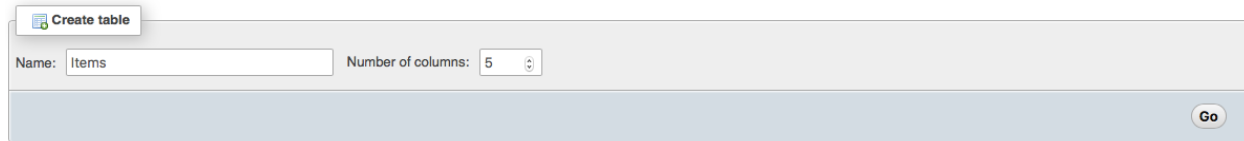
(15) Click on “New” at the top of the left side bar, and you will see something like this:



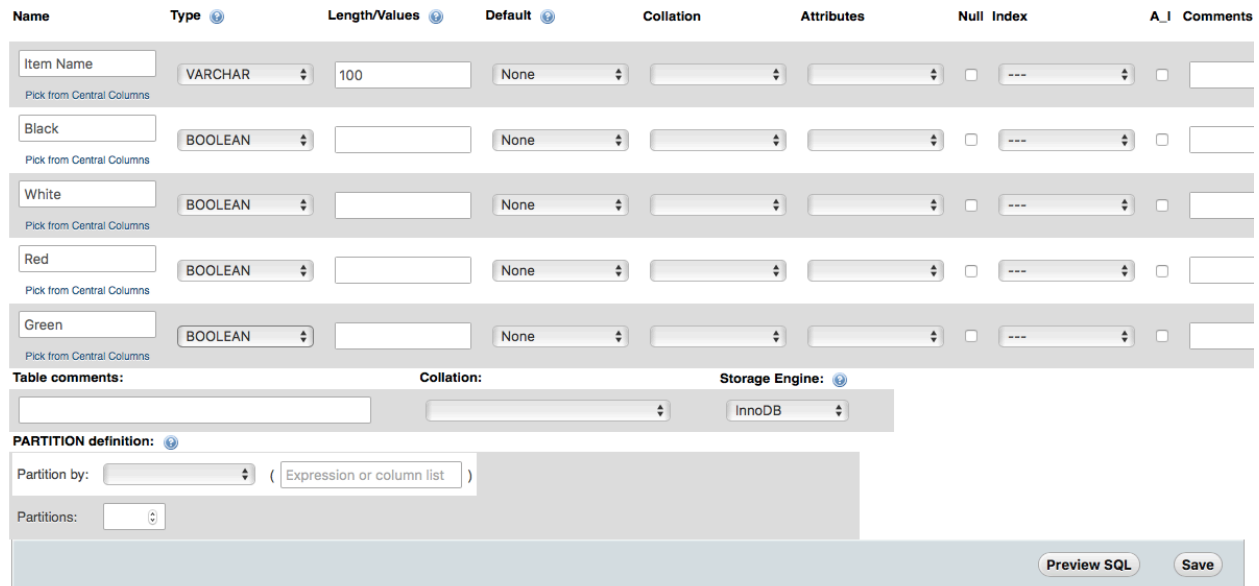
(16) Type in a database name of your choosing (I will use “Tutorial”) and click on “Create”. You will then see this:



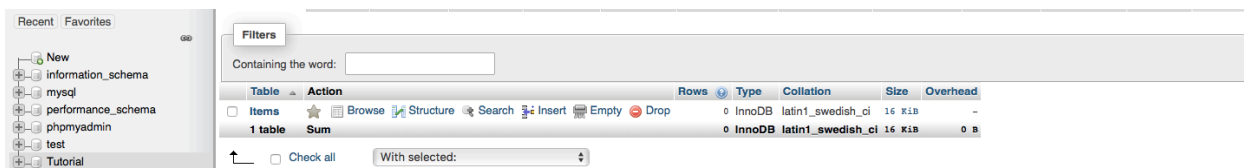
- (17) Now, suppose that, in our database, we want to store some items and their colors – whether they are black, white, red, green, or some of the above, or all of the above. For this purpose, I will create a table named “Items”, and give it five columns. You create any table of your choosing. Once you have entered the name and the number of columns you want, click on “Go”.



- (18) Now, you will have the chance to set up your table. When you’re ready, click on “Save”. Here is how I set up mine:



- (19) In order to add entries into our database, click on the database name in the left sidebar (mine is “Tutorial”), and click on “Insert” under “Action” at the center of the page.



- (20) Add each item to the form, and click “Go” at the bottom of the page when you’re done. Here is an example:



Column	Type	Function	Null	Value
Item Name	varchar(100)			<input type="text" value="Lady bug"/>
Black	tinyint(1)			<input type="text" value="1"/>
White	tinyint(1)			<input type="text" value="0"/>
Red	tinyint(1)			<input type="text" value="1"/>
Green	tinyint(1)			<input type="text" value="0"/>

[Go](#)

☐ Ignore

Column	Type	Function	Null	Value
Item Name	varchar(100)			<input type="text" value="Polar bear"/>
Black	tinyint(1)			<input type="text" value="0"/>
White	tinyint(1)			<input type="text" value="1"/>
Red	tinyint(1)			<input type="text" value="0"/>
Green	tinyint(1)			<input type="text" value="0"/>

[Go](#)

and then

(21) Now, click on “Items” in the left sidebar, and you should see a table with items we entered:

Tutorial

- New
- Items
- Columns

☐ Show all | Number of rows:  | Filter rows:

+ Options

Item Name	Black	White	Red	Green
Polar bear	0	1	0	0
Lady bug	1	0	1	0
Penguin	1	1	0	0

We did it! Hooray!!!

### 3 Connecting Qt to a database

So God knows how many hours I have spent looking at tutorials and forums trying to figure this out, but it just *would not work*.

The code that various tutorials and forums said to put in **main.cpp** are pretty much all the same, and look something like this:

```
// creating a database connection

QSqlDatabase db = QSqlDatabase::addDatabase("QMYSQL");
db.setHostName("localhost");
db.setUserName("root"); // default mysql username for xampp is 'root'
db.setPassword(""); // xampp mysql has no password in default
db.setDatabaseName("qtdatabase");

// lets test the connection
if(db.open()){
    cout << "Database connected" << endl;
}
else{
    cout << "Database connect failed" << endl;
}
```

It never works.

Following tutorials and forums, I have tried to

- (1) Copy and paste the folder “sqldrivers” in .../Qt/5.11.0/clang\_64/plugins into the debug location of my Qt project. It didn’t work.
- (2) Download MySQL Connector/C++ (download link here: <https://dev.mysql.com/downloads/connector/cpp/>) and add the library files in my Qt project. Since all the tutorials I could find were done on Windows OS, the library files are slightly different. Nonetheless, I tried including, one, some combination, or all of the library files in my project, and it DOES NOT WORK.

Moral of the story: Maybe I should try Python instead...

### Things I learned

- (1) Git: staging, committing, branching, merging, cherry-picking... it’s so useful!
- (2) Terminal: I’ve always thought that programmers are really cool when they are typing

away in that little black window. At the start of the course I knew absolutely nothing about Terminal, but, throughout the class and the project, I learned a lot of common commands and how to use them. Now maybe the person sitting next to me at the library will also think I'm super cool? ;)

- (3) Qt: Following the Qt Cookbook, I looked in detail at stylesheets, layouts options, spacers, and different widgets. The interface (for making an interface lol) can be a little hard to maneuver, but it is very versatile and has a lot of potential!
- (4) Database: I successfully set one up. Yay!
- (5) Researching programming on the Internet: It is *extremely* frustrating. Everyone has their own styles and preferences, and make different assumptions about your previous knowledge. People also use different operating systems and different versions of a software. All of this makes it *very* difficult to find a simple and reliable answer to a question on the Internet, so **if you are trying to program something that you don't have full knowledge of, expect to spend *way* more time looking for resources and trying them out (and most often failing) than coding...**