

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

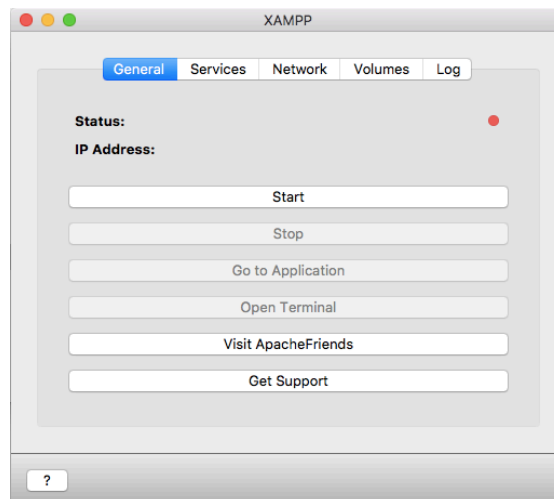
When I first started the project, I decided that the first thing I needed to do was to create a user interface. I found the *Qt5 C++ GUI Programming Cookbook* (URL:

https://culturalengineerassociation.weebly.com/uploads/8/6/7/7/86776910/qt5_c__gui_programming_cookbook.pdf) and followed instructions. I learned to use stylesheets, layout options, spacers, and various clicking reactions.

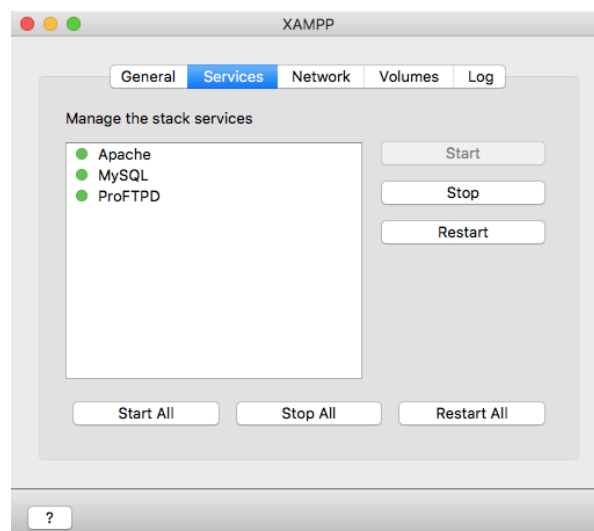
2 Setting up a database

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.

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, 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](#).

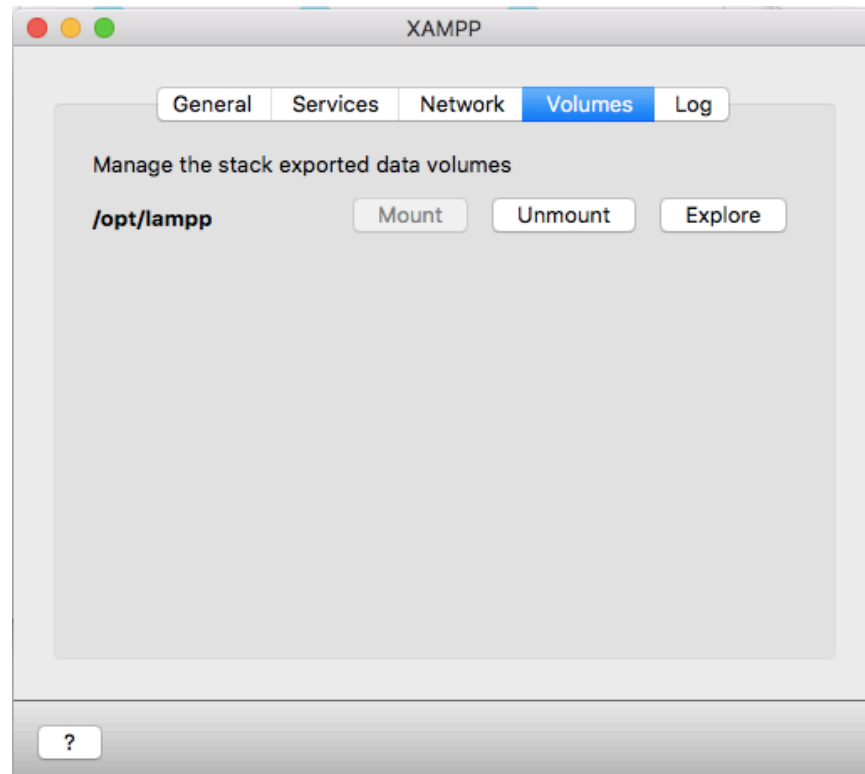
Error 403

[192.168.64.3](#)

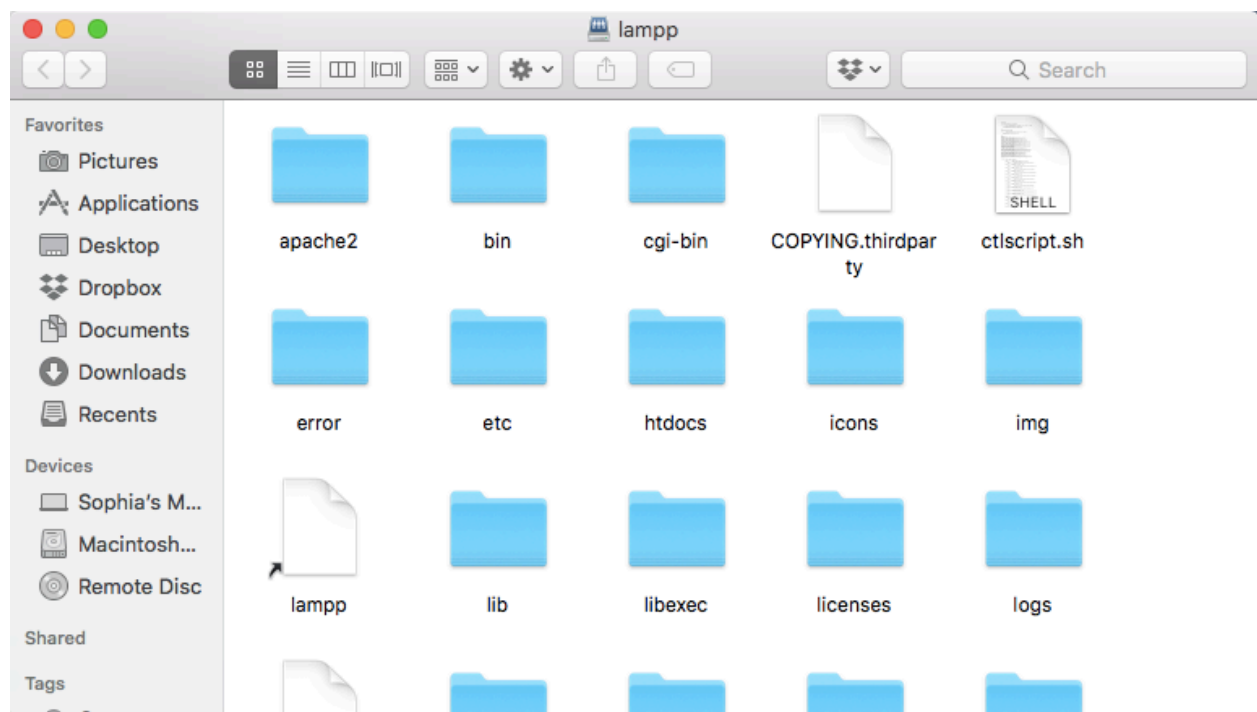
Apache/2.4.33 (Unix) OpenSSL/1.0.2o PHP/7.2.6 mod_perl/2.0.8-dev Perl/v5.16.3

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

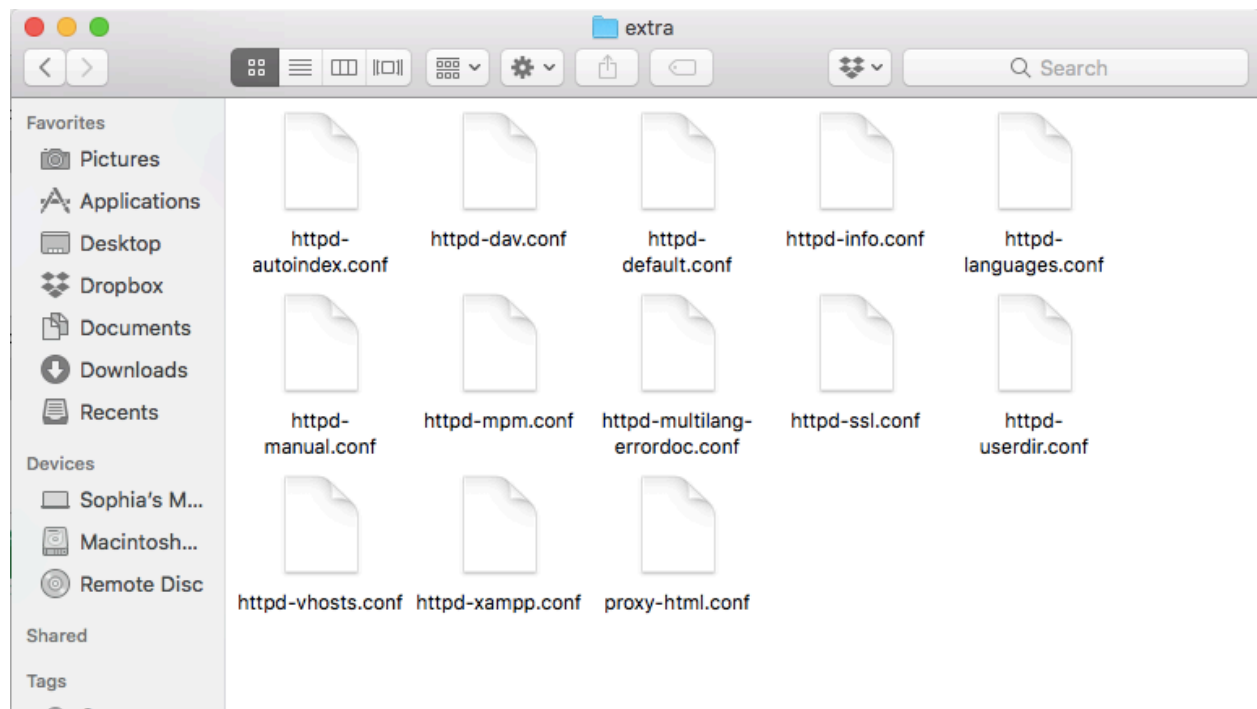
- (5) Go back to the XAMPP interface and click on “Volumes”. Then, click on “Mount”.



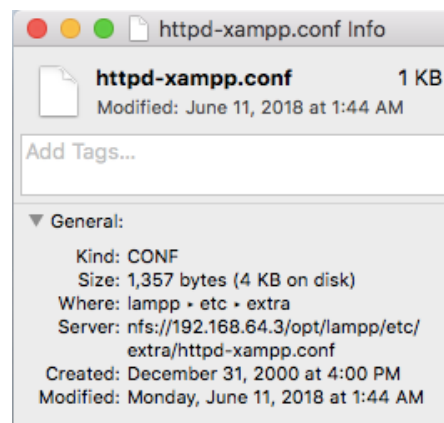
- (6) Click on “Explore”, and you’ll be taken to a Finder window that looks like this:



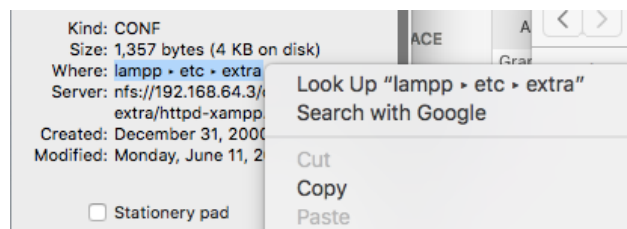
- (7) Click into the folder “etc”, then into another folder “extra”, where you’ll see a file named “httpd-xampp.conf” (second one in last row). We need to modify this file in order to fix the Access Forbidden error.



- (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
```

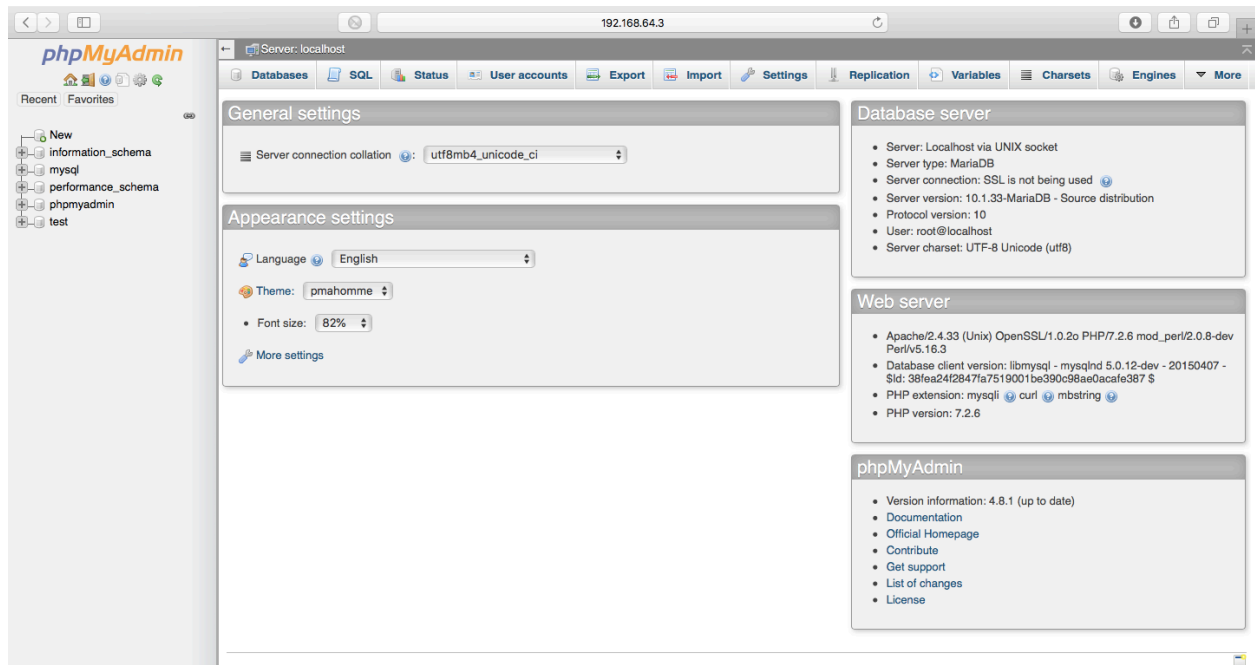
- (12) Hit **i** (stands for “insert”) so we can modify the file. Find the following section:

```
## 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:

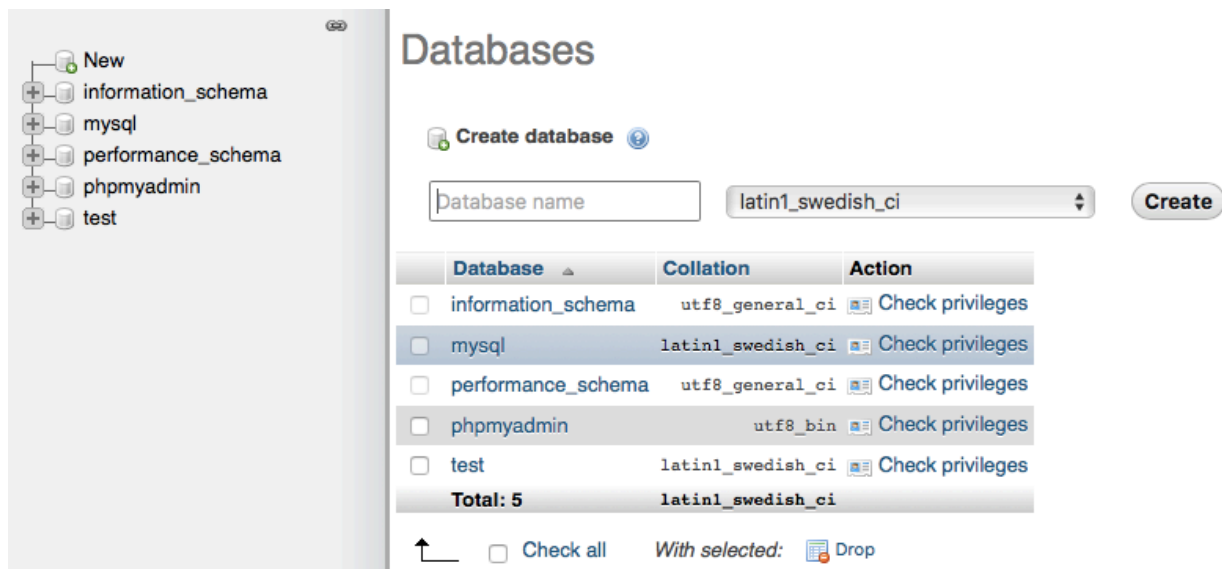
```
# since XAMPP 1.4.3  
<Directory "/opt/lampp/phpmyadmin">  
    AllowOverride AuthConfig Limit  
    Order allow,deny  
    Allow from all  
    Require all granted█  
</Directory>
```

- (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:

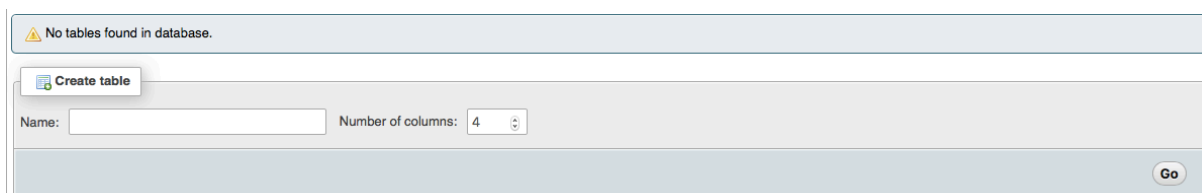


We're finally ready to start creating a database!

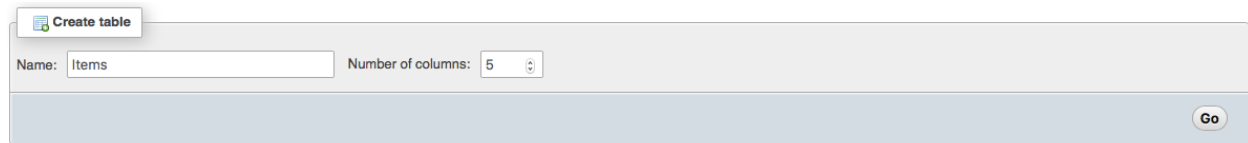
(15) Click on “New” at the top of the left side bar, and you will see something like this:



(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”.

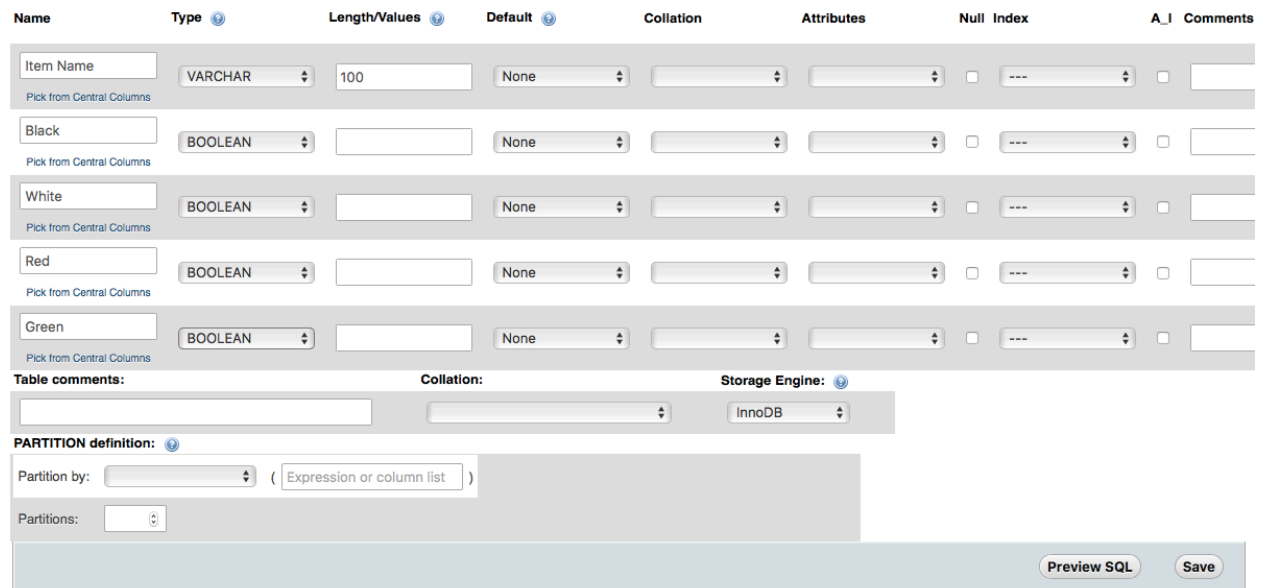


Create table

Name: Items Number of columns: 5

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:



Name	Type	Length/Values	Default	Collation	Attributes	Null	Index	A_I	Comments
Item Name	VARCHAR	100	None						
Black	BOOLEAN		None						
White	BOOLEAN		None						
Red	BOOLEAN		None						
Green	BOOLEAN		None						

Table comments: Collation: Storage Engine: InnoDB

PARTITION definition: Partition by: (Expression or column list) Partitions:

Preview SQL Save

- (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.



Recent Favorites

New

- information_schema
- mysql
- performance_schema
- phpmyadmin
- test
- Tutorial

Filters

Containing the word:

Table	Action	Rows	Type	Collation	Size	Overhead
Items	Browse Structure Search Insert Empty Drop	0	InnoDB	latin1_swedish_ci	16 K	16
1 table	Sum	0	InnoDB	latin1_swedish_ci	16 K	16

Check all With selected:

- (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)			Lady bug
Black	tinyint(1)			1
White	tinyint(1)			0
Red	tinyint(1)			1
Green	tinyint(1)			0

Go

☐ Ignore

Column	Type	Function	Null	Value
Item Name	varchar(100)			Polar bear
Black	tinyint(1)			0
White	tinyint(1)			1
Red	tinyint(1)			0
Green	tinyint(1)			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: 25 | 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!!!