ZENSE PROJECT

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IDEA

This project comprises of two simulations on Simple Harmonic Motion of Vertical and Horizontal Spring Mass System respectively. Also Project contains one wensite containg blogs, this is done using Django Framework.

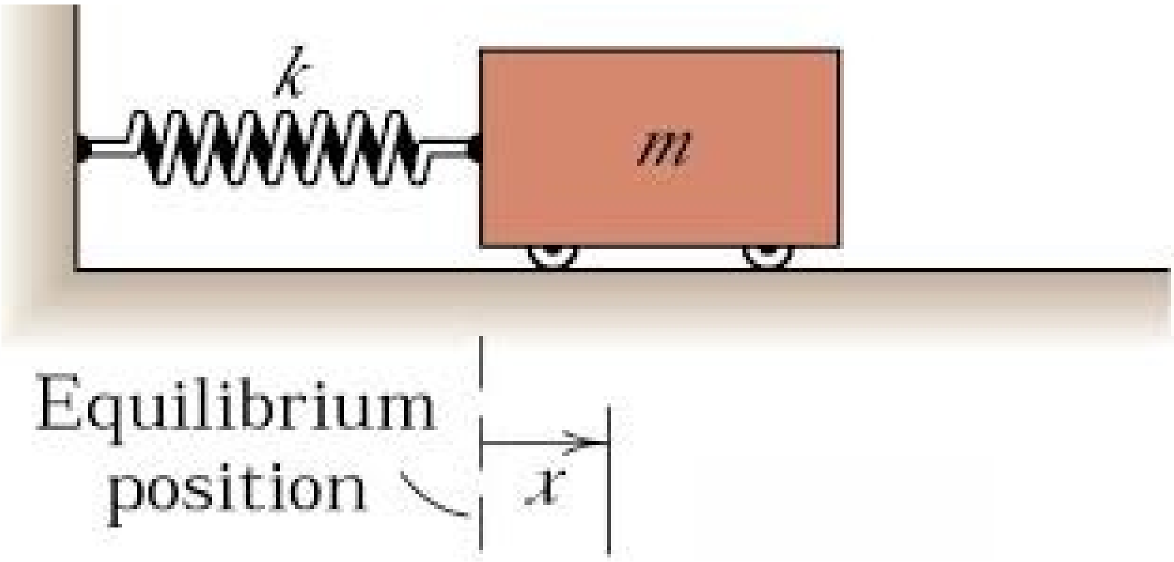
TECHNOLOGY USED AND IMPLEMENTATION DETAILS

The simulation part of the project is done using VPython. VPython is simple rendering tool for 3-D objects and graphs. This makes easy to create navigable 3D displays and animations. Thus using features of VPython and using concepts of Physics both the simulations of Vertical and Horizontal spring system are done.

VPython has option of choosing a 3D object such as cylinder, cone, ellipsoid, ring, sphere etc. And to work with these 3D objects we can adjust their colors, textures , animation speed,

vector operations and various other things on that 3-D object.
Such as for placing the object in particular position vector(x, y, z) is used.
For example, pos = vector(1, 2, 3)
Similarly for adjusting size also.

After setting the position of wall, spring and block, the SHM concept of physics is being used such that equlibrium position is defined and also following equations of motion in physics is applied.



From Second Law of Motion-

Force = Mass*Acceleration

Here , Mass = m, acceleration = a, Spring constant = k , position from equilibrium position = x, velocity = v and time = t.

$kx = ma$

$a = kx/m$

$v = v + at$

$x = x + vt$

Thus on the following principles, both horizontal and vertical spring system works.

Now, the name of website created using Django Framework is being named Local Library. For this first the skeleton of website is created using the following command

```
$ django-admin startproject locallibrary
```

Then to create catalog application in local library run the following command

```
$ python3 manage.py startapp catalog
```

Hence, this will create further structure of website.

For registering catalog application we have update settings.py in locallibrary.
Django uses an Object-Relational-Mapper to map model definitions to data structures. Thus everytime when we make changes and want structure of data to be stored we have run following commands.

```
$ python3 manage.py makemigrations
$ python3 manage.py migrate
```

Now in models.py after importing models, reverse, User and date classes are defined with necessary methods that has to performed by them. The classes which are defined are Genre, Book, BookInstance and Author.

Then we register this modules in admin.py. After registerin we can create a superuser which has full access to site. To create superuser and restart development server following commands are used:

```
$ python3 manage.py createsuperuser
$ python3 manage.py runserver
```

Thus after this we can add Authors, Books, Book Instances and Genres. Also as a superuser we can create new users and groups . Here in groups only one group has been created that is Library.

Then changes are made in view.py accordingly .A view is a function that processes an HTTP request, fetches the required data from the database, renders the data in an HTML page using an HTML template, and then returns the generated HTML in an HTTP response to display the page to the user. The index view follows this model — it fetches information about the number of Book, BookInstance, available BookInstance and Author records that we have in the database, and passes that information to a template for display.

Then templates folder is being created which contains various HTML templates for structure and layout of the file.

In views.py pagination is also inserted so as to maintain hundreds of records.

For keeping track state between client and particular browser sessions are being used. Thus sessions were already enabled while skeleton website ws created.

Then for user Authnetication, templates containg login.html, logged_out.html, password_reset_complete.html, password_reset_confirm.html, password_reset_done.html, password_reset_form.html are created.

To navigate to login page go to http://127.0.0.1:8000/accounts/login/

To navigate to logout URL go to http://127.0.0.1:8000/accounts/logout/

After login a user can view the list of borrowed books by going to My Borrowed link at the sie-bar.

Vrious features of HTML form and form fields are being used in this.

First, log in to the site with an account that has whatever permissions you decided are needed to access the author editing pages. Then navigate to the author create page: http://127.0.0.1:8000/catalog/author/create/.

Thus by this features , user interactive website is being created using Django framework.

LEARNING SOURCE

For Simulations part, I learnt VPython basic concepts through the following link http://www.glowscript.org/docs/VPythonDocs/index.html

And for Django I referred to the following tutorial https://developer.mozilla.org/en-US/docs/Learn/Server-side/Django

FUTURE SCOPE OF YOUR PROJECT

Horizontal and Vertical spring system o simulations differ by changing mass of boxor spring constant of spring. Thus, we can analyse SHM concepts by observing the change in motion by changing these quantities.

Local Library Website can be used by users to save the book and author name. It allows user to maintain record of books in systematic way by providing various options. Hence it is user interactive website which can help you to mange the data properly.

OVERALL EXPERIENCE

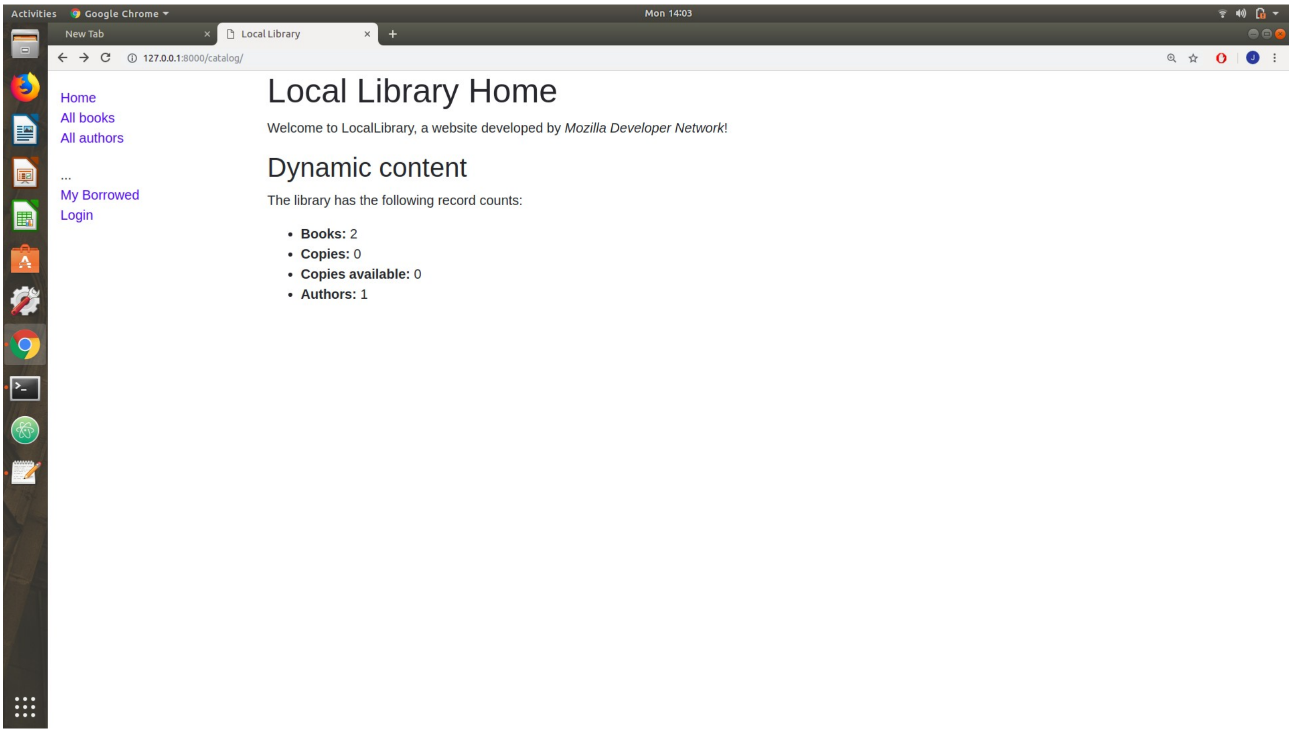
While creating this project I learnt many things and also gained experience on how should we start to learn a particular thing. I have not applied many changes apart from what was taught in tutorial. So that was the part which I thought could have been improved. While learning simulations I also came to know about other modules in python such as turtle, matplotlib etc.

IMAGES/SCREENSHOTS OR VIDEOS:

https://www.youtube.com/watch?v=SMoTDoiO4oo

https://www.youtube.com/watch?v=coUuMSdiQks

After running the development server this page is visible.



Local Library Home

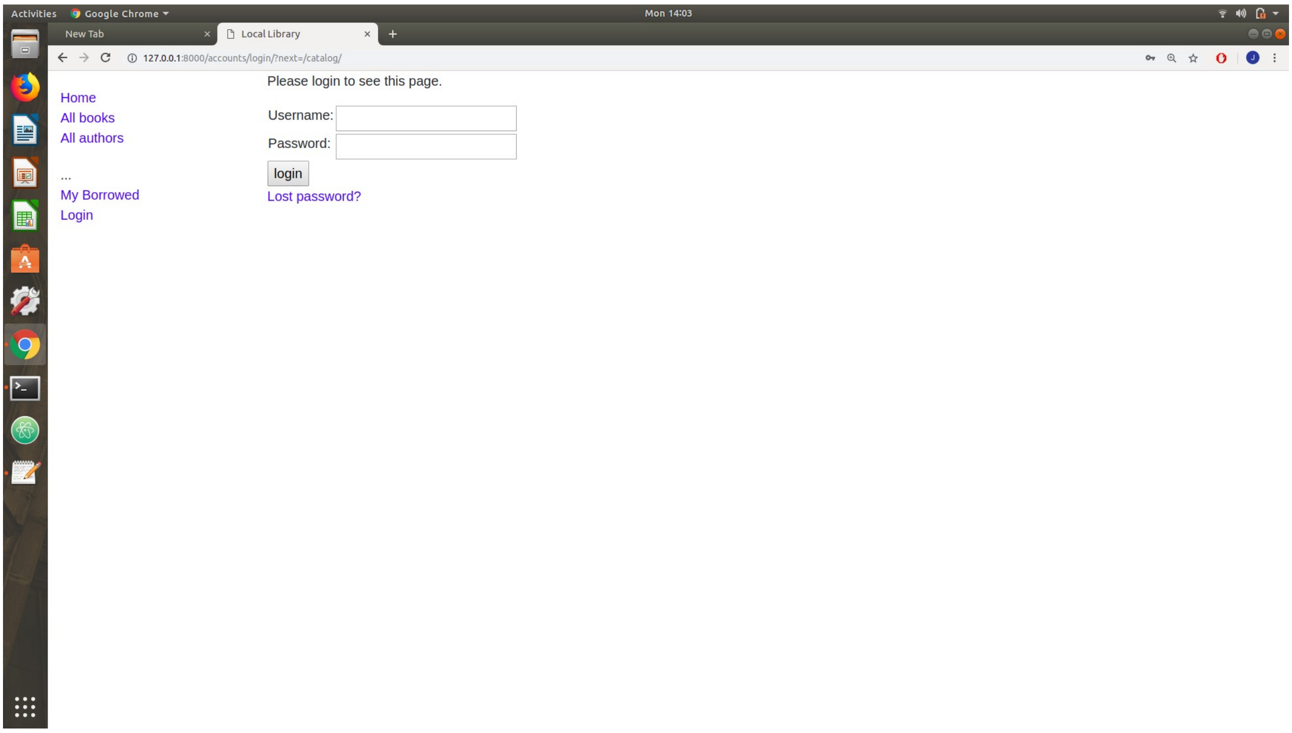
Welcome to LocalLibrary, a website developed by *Mozilla Developer Network*!

Dynamic content

The library has the following record counts:

- **Books:** 2
- **Copies:** 0
- **Copies available:** 0
- **Authors:** 1

This is user login page.



Home
All books
All authors
...
My Borrowed
Login

Please login to see this page.

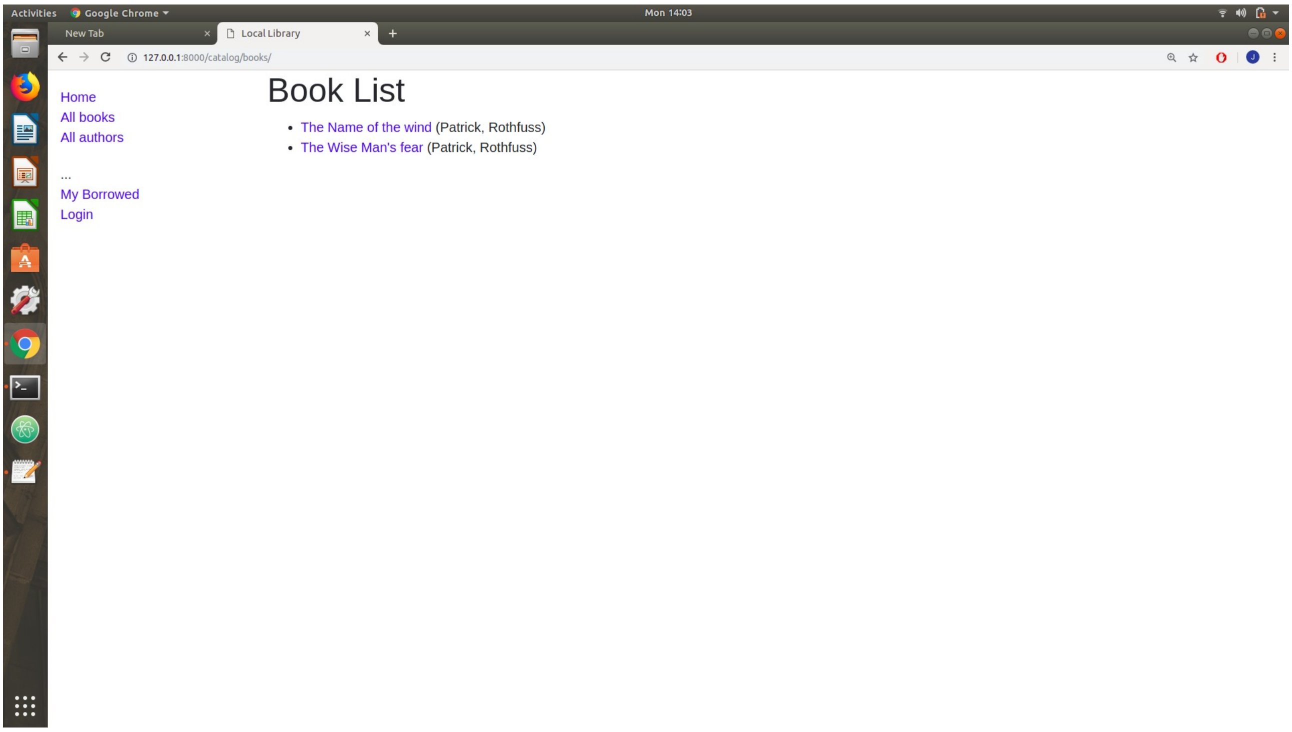
Username:

Password:

login

Lost password?

The All Books link on the side bar display this page.

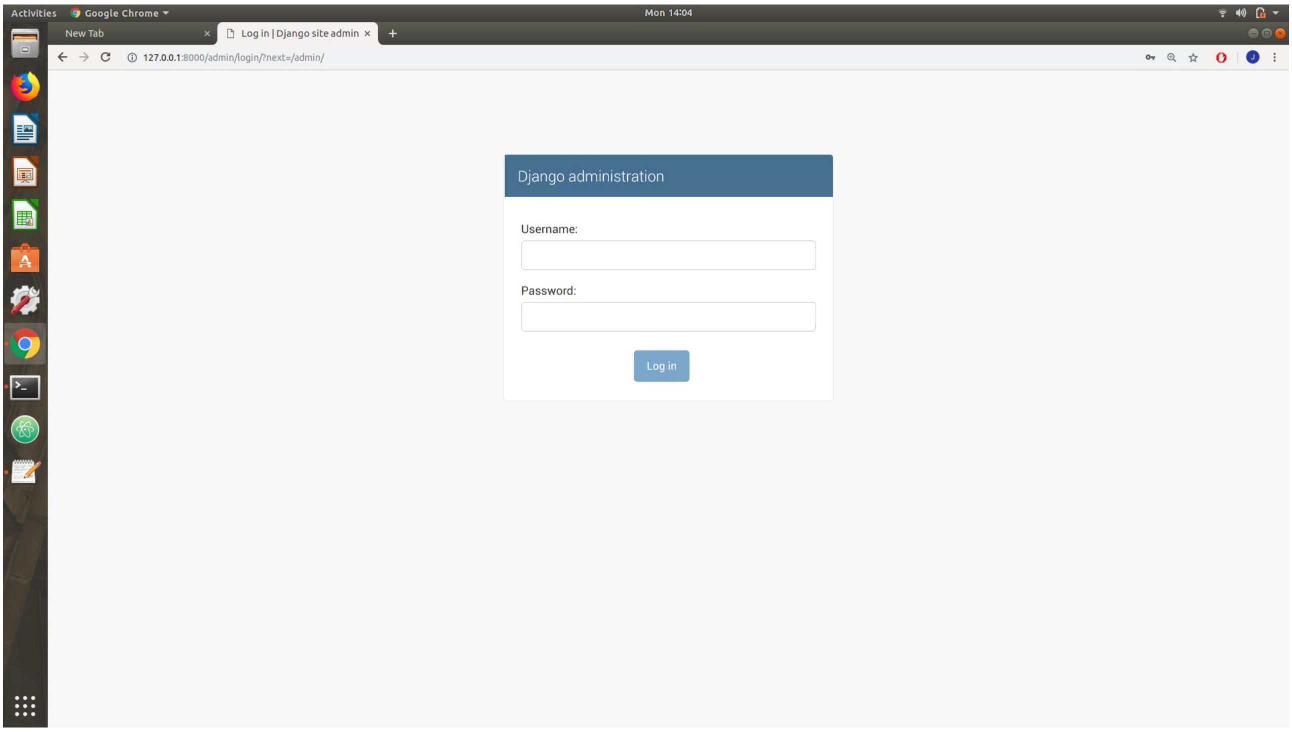


Home
All books
All authors
...
My Borrowed
Login

Book List

- The Name of the wind (Patrick, Rothfuss)
- The Wise Man's fear (Patrick, Rothfuss)

http://127.0.0.1:8000/admin/ opens this page, this allows login of superuser.


Activities
Google Chrome
Mon 14:04
New Tab
Log in | Django site admin
127.0.0.1:8000/admin/login/?next=/admin/

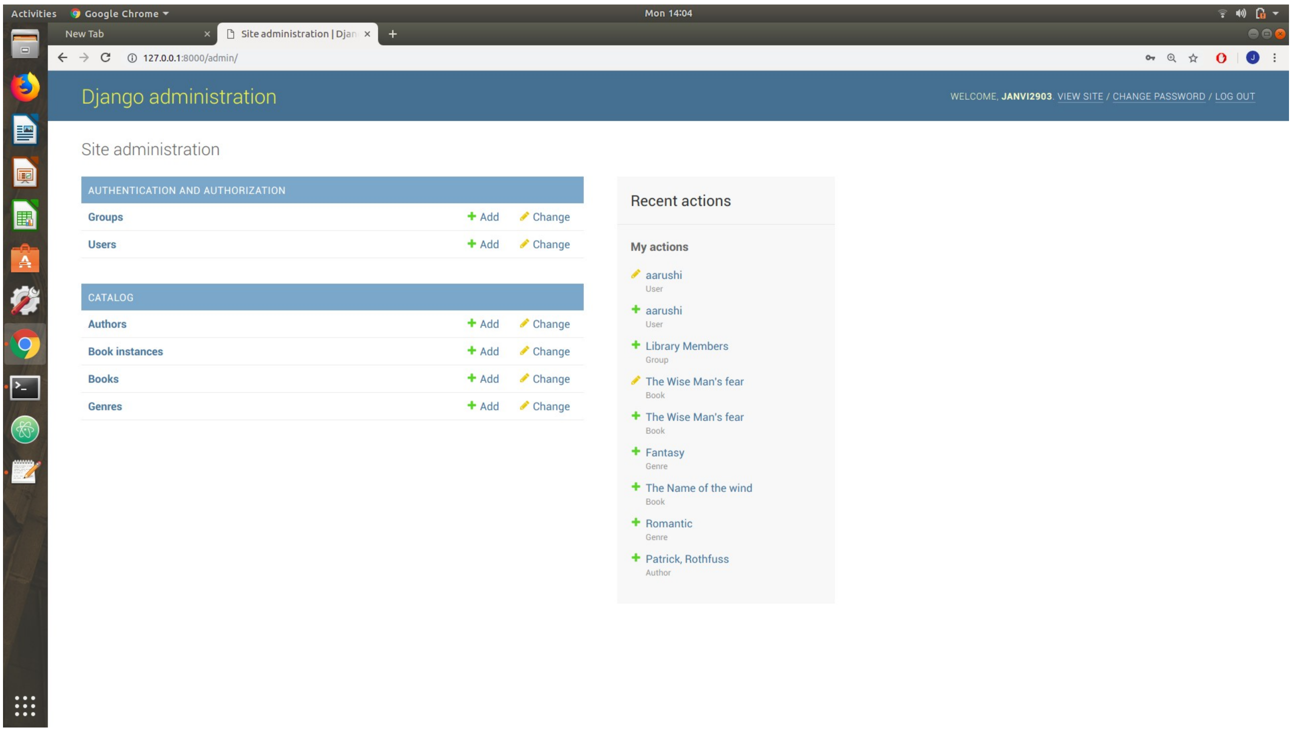
Django administration

Username:

Password:

Log in

The page which opens after login of superuser.



Django administration

WELCOME, JANVI2903. VIEW SITE / CHANGE PASSWORD / LOG OUT

Site administration

AUTHENTICATION AND AUTHORIZATION		
Groups	+ Add	Change
Users	+ Add	Change

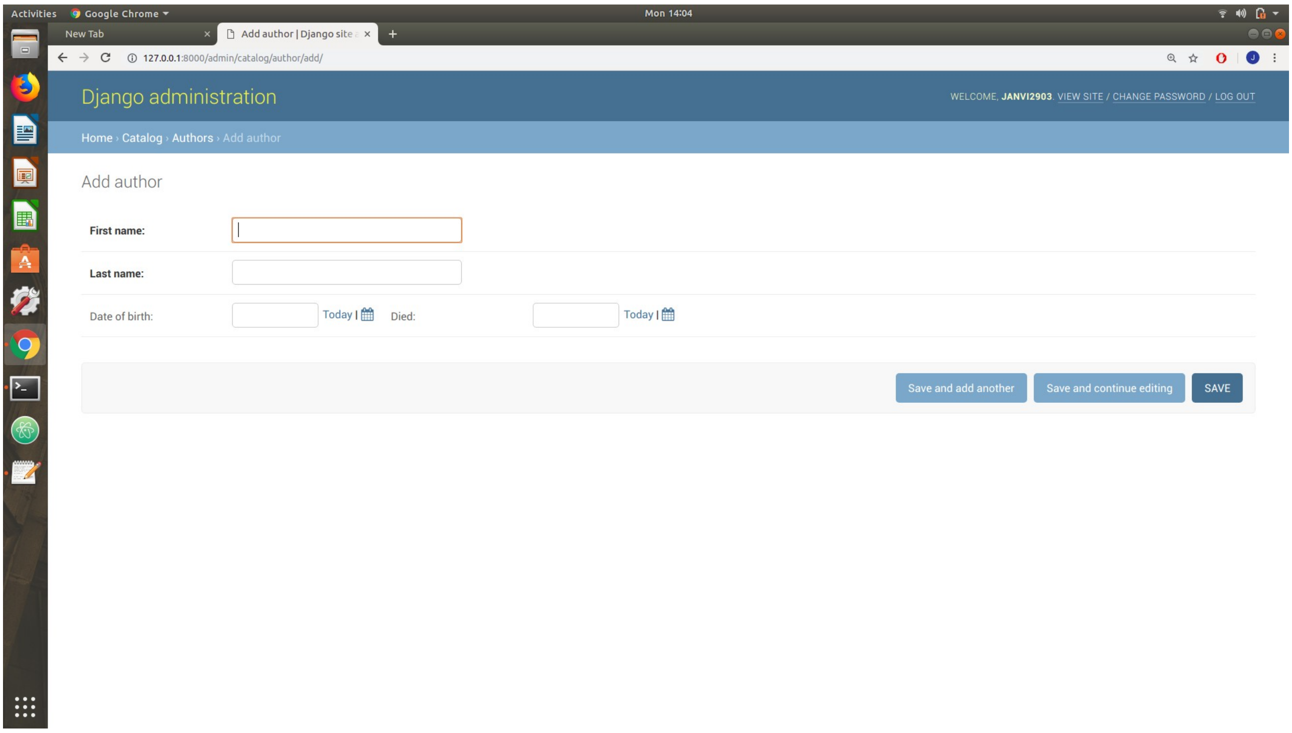
CATALOG		
Authors	+ Add	Change
Book instances	+ Add	Change
Books	+ Add	Change
Genres	+ Add	Change

Recent actions

My actions

- aarushi
  User
- + aarushi
  User
- + Library Members
  Group
- The Wise Man's fear
  Book
- + The Wise Man's fear
  Book
- + Fantasy
  Genre
- + The Name of the wind
  Book
- + Romantic
  Genre
- + Patrick, Rothfuss
  Author

This page opens when you want to add a new author.



Activities Google Chrome ▾ Mon 14:04

127.0.0.1:8000/admin/catalog/author/add/

Django administration

WELCOME, **JANVI2903**. VIEW SITE / CHANGE PASSWORD / LOG OUT

Home › Catalog › Authors › Add author

Add author

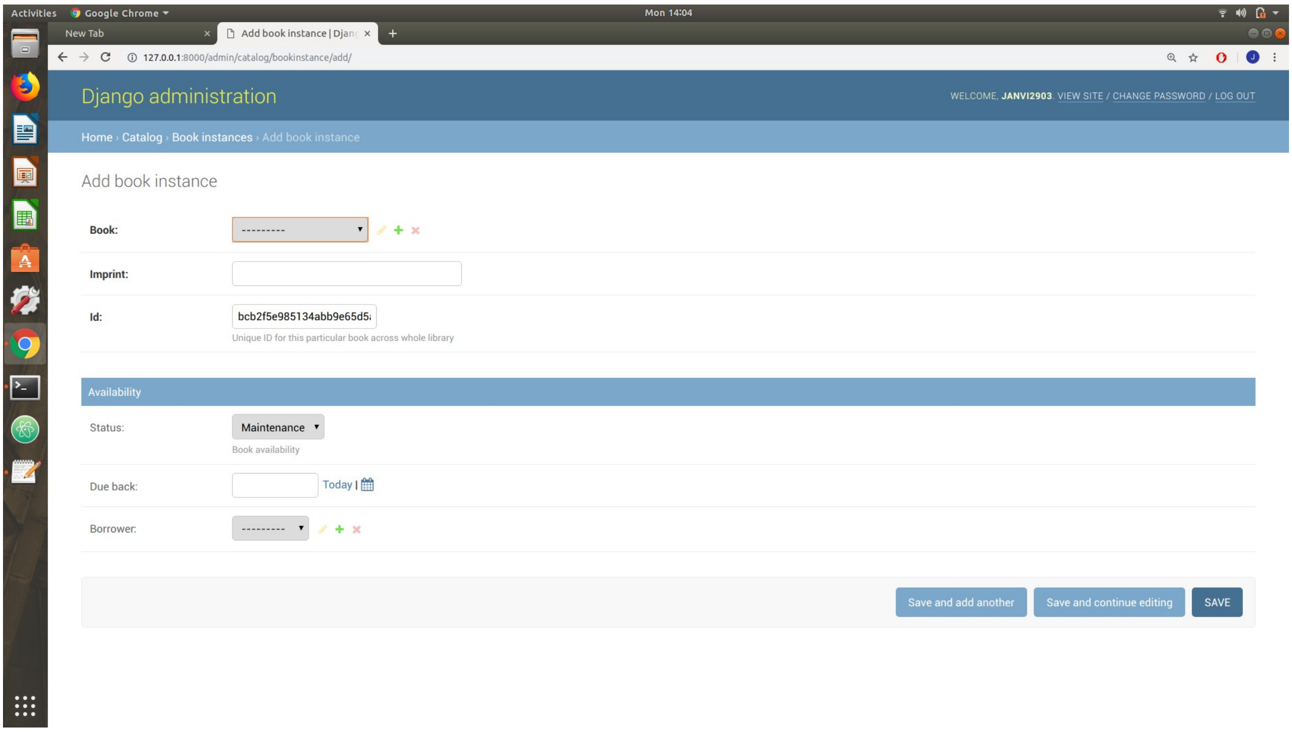
First name:

Last name:

Date of birth: Today | Died: Today |

Save and add another | Save and continue editing | SAVE

This page opens if you want to add book instance.



Activities Google Chrome ▾ Mon 14:04

127.0.0.1:8000/admin/catalog/bookinstance/add/

Django administration

WELCOME, **JANVI2903**. VIEW SITE / CHANGE PASSWORD / LOG OUT

Home › Catalog › Book instances › Add book instance

Add book instance

Book: ---------

Imprint:

Id: bcb2f5e985134abb9e65d5

Unique ID for this particular book across whole library

Availability

Status: Maintenance

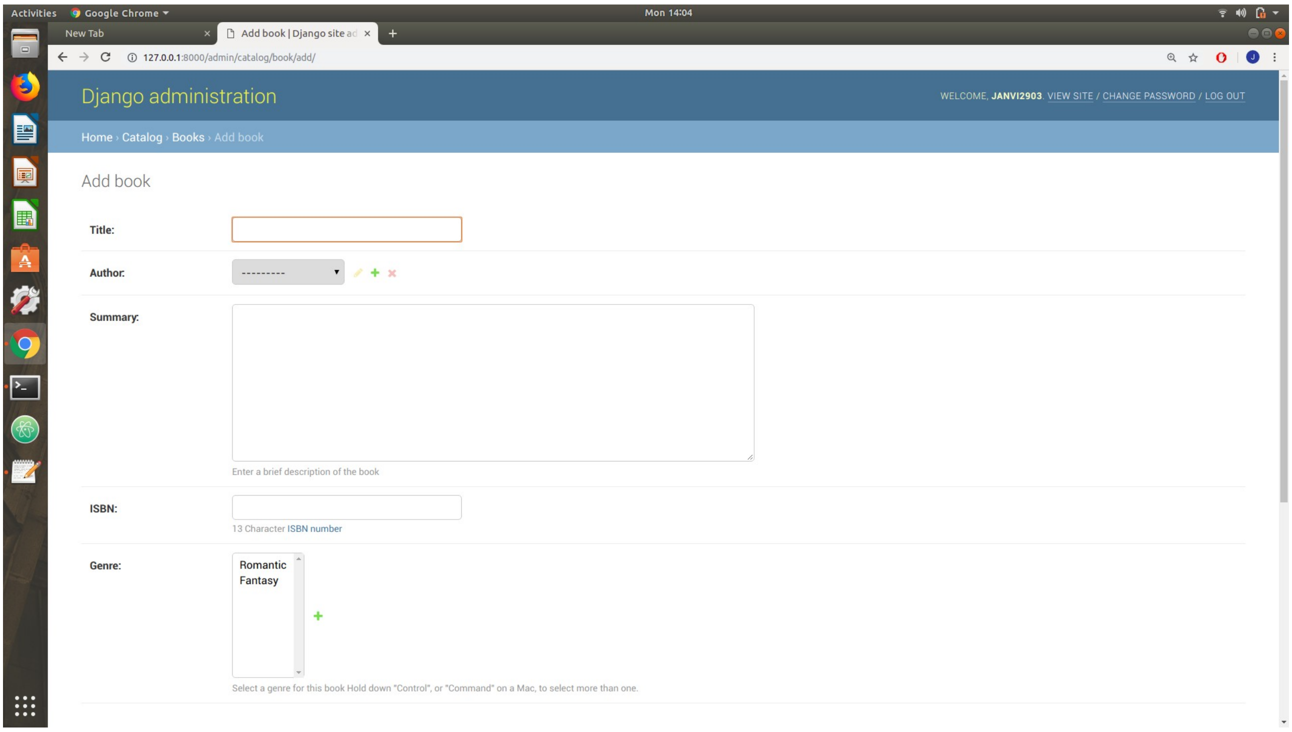
Book availability

Due back: Today |

Borrower: ---------

Save and add another | Save and continue editing | SAVE

This page opens when you want to add a book.


Activities
Google Chrome
Mon 14:04
New Tab
Add book | Django site ad
127.0.0.1:8000/admin/catalog/book/add/
Django administration
WELCOME, JANVI2903. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › Catalog › Books › Add book

Add book

Title:

Author: ---------

Summary:

Enter a brief description of the book

ISBN:

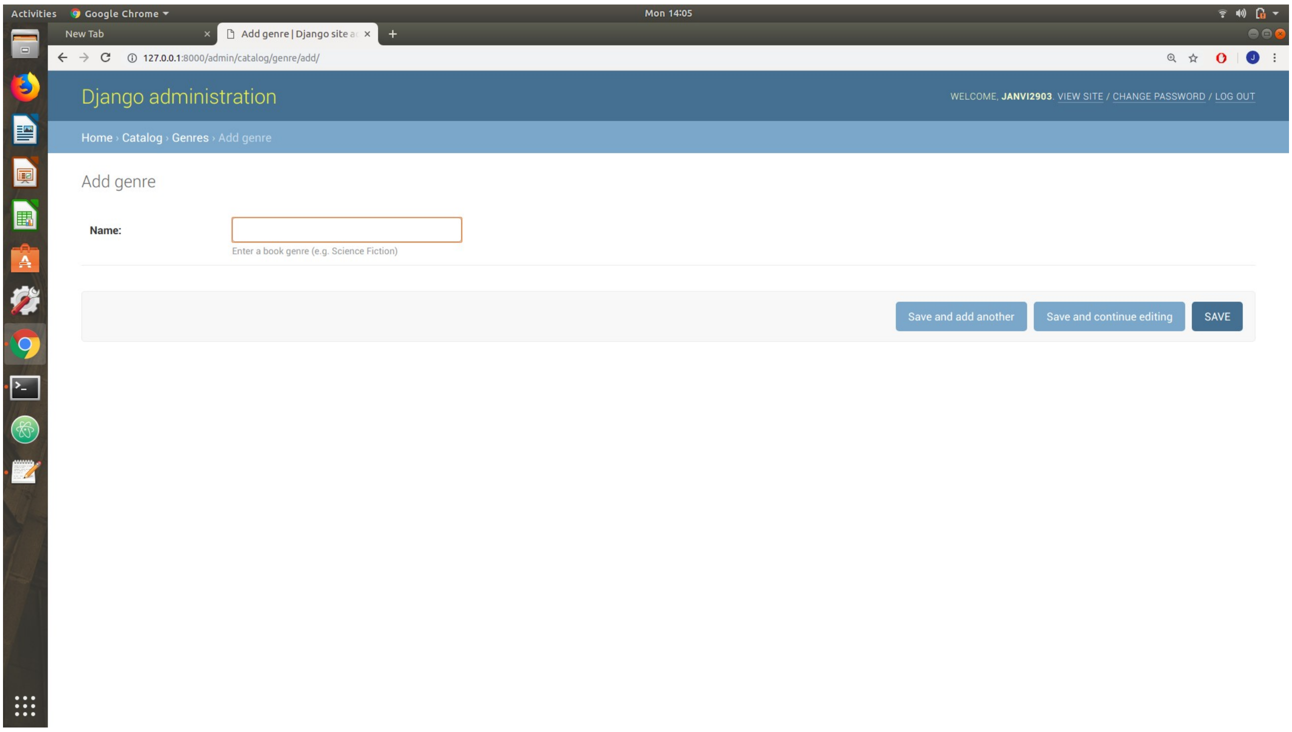
13 Character ISBN number

Genre:

Romantic
Fantasy

Select a genre for this book Hold down "Control", or "Command" on a Mac, to select more than one.

This page opens when you want to add a genre.

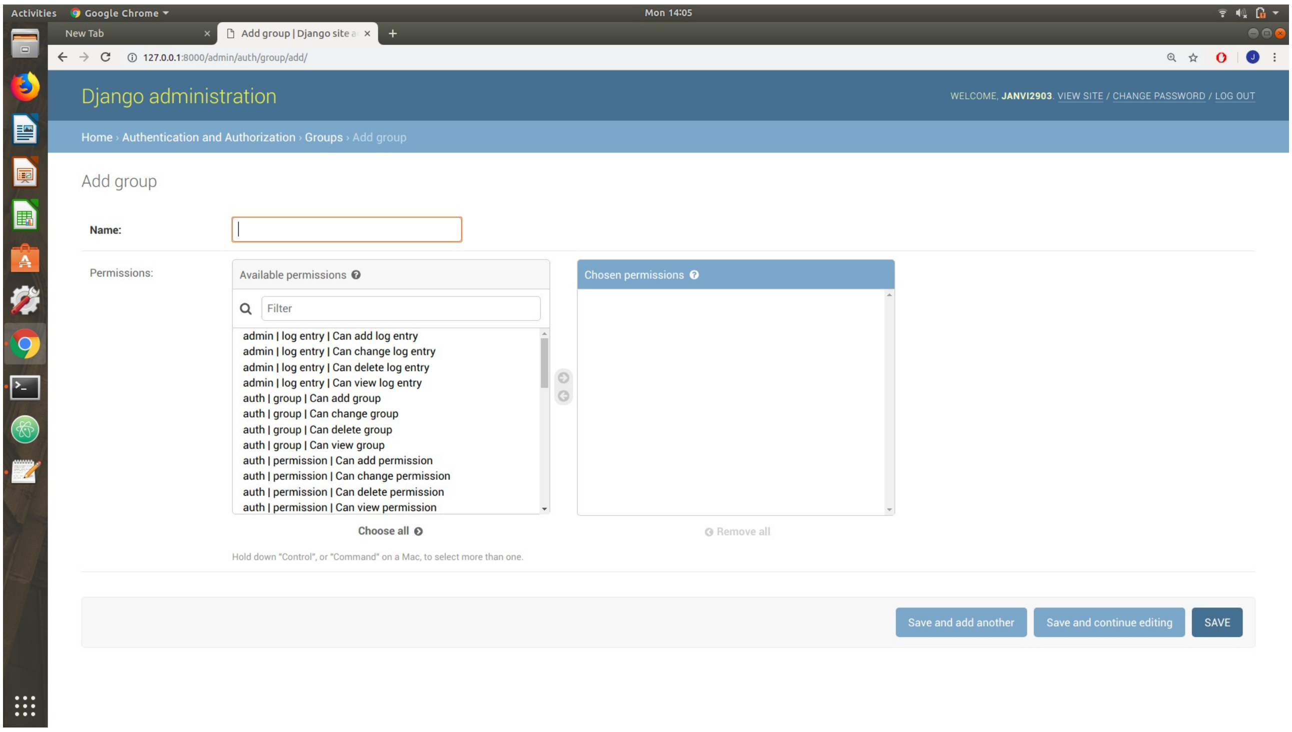

Activities
Google Chrome
Mon 14:05
New Tab
Add genre | Django site ad
127.0.0.1:8000/admin/catalog/genre/add/
Django administration
WELCOME, JANVI2903. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › Catalog › Genres › Add genre
Save and add another
Save and continue editing
SAVE

Add genre

Name:

Enter a book genre (e.g. Science Fiction)

This page opens when you are adding a group.


Activities
Google Chrome
Mon 14:05
New Tab
Add group | Django site a
127.0.0.1:8000/admin/auth/group/add/
Django administration
WELCOME, JANVI2903. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › Authentication and Authorization › Groups › Add group

Add group

Name:

Permissions:

Available permissions

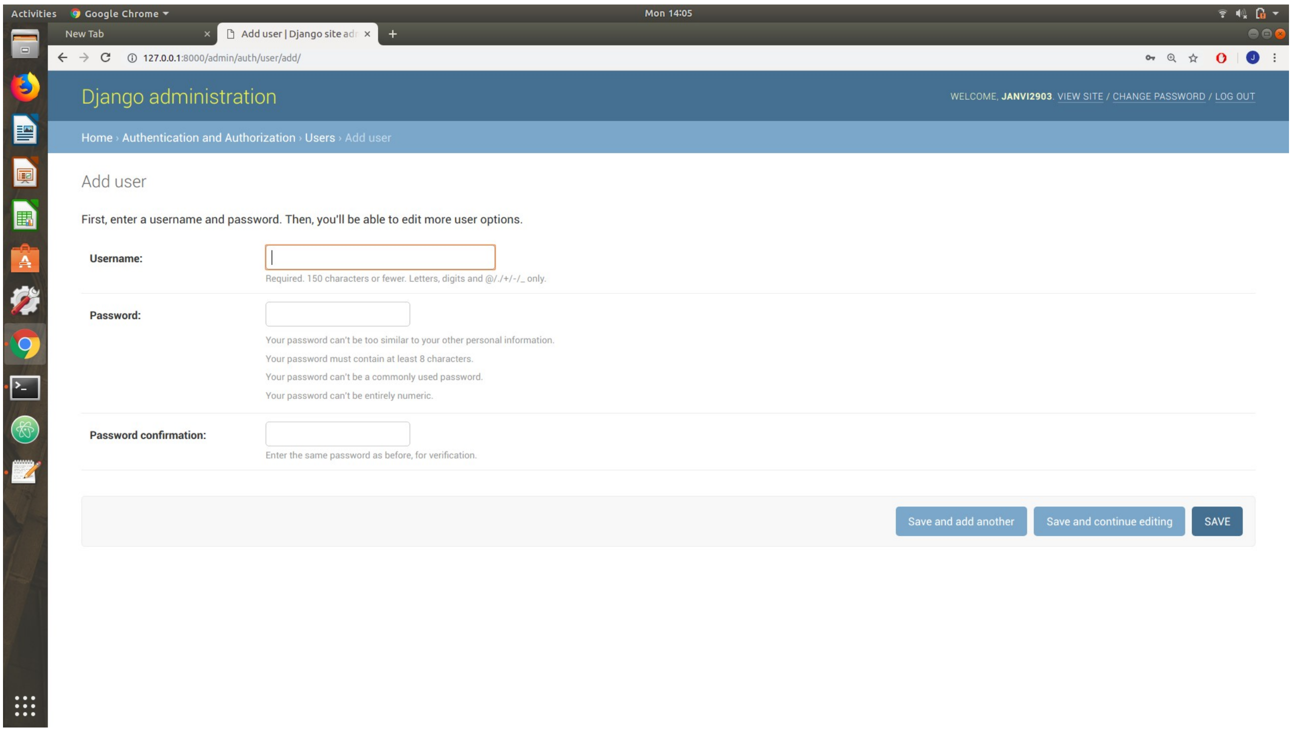
Filter

admin | log entry | Can add log entry
admin | log entry | Can change log entry
admin | log entry | Can delete log entry
admin | log entry | Can view log entry
auth | group | Can add group
auth | group | Can change group
auth | group | Can delete group
auth | group | Can view group
auth | permission | Can add permission
auth | permission | Can change permission
auth | permission | Can delete permission
auth | permission | Can view permission

Chosen permissions

Hold down "Control", or "Command" on a Mac, to select more than one.

This page opens when you are adding a new user.


Activities
Google Chrome
Mon 14:05
New Tab
Add user | Django site ad
127.0.0.1:8000/admin/auth/user/add/
Django administration
WELCOME, JANVI2903. VIEW SITE / CHANGE PASSWORD / LOG OUT
Home › Authentication and Authorization › Users › Add user

Add user

First, enter a username and password. Then, you'll be able to edit more user options.

Username:

Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.

Password:

Your password can't be too similar to your other personal information.
Your password must contain at least 8 characters.
Your password can't be a commonly used password.
Your password can't be entirely numeric.

Password confirmation:

Enter the same password as before, for verification.