Documentation for Delib,
ITP II course project

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Introduction and Purpose

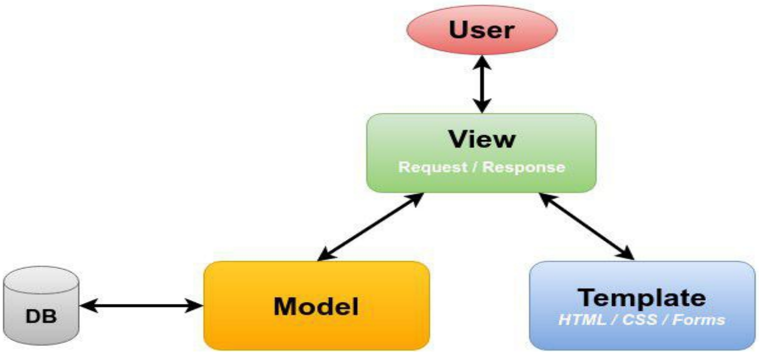
This document describes the architecture and design for the Delib project. Delib is a web site project for all users who are fond of reading books and magazines and would like to have access to the IU library. Everyone can register, see all the books our library can offer and check them out. If you are a registere user, you will get the response if the library has available copies of the document you need and if there is a book you are searching for.

The purpose of the document is to describe the project in a way that addresses the interests and concerns of both users and developers. The document will identify major system components and describe their static attributes and dynamic patterns of interaction.

Django framework was chosen to implement the project as a web site because it is suitable for projects like this and it met the developers needs.
Django is a high-level Python Web framework that encourages rapid development and clean, pragmatic design. Built by experienced developers, it takes care of much of the hassle of Web development, so you can focus on writing your app without needing to reinvent the wheel.
Among all the pros of Django the most important are as follows:

- It is free and open source.
- It was designed to help developers take applications from concept to completion as quickly as possible.
- It takes security seriously and helps developers avoid many common security mistakes.
- It is flexibly scalable.

System Design for Django projects



Django follows the MVT (Model – View – Template) concept. Here is what happens when a visitor lands on a Django page:

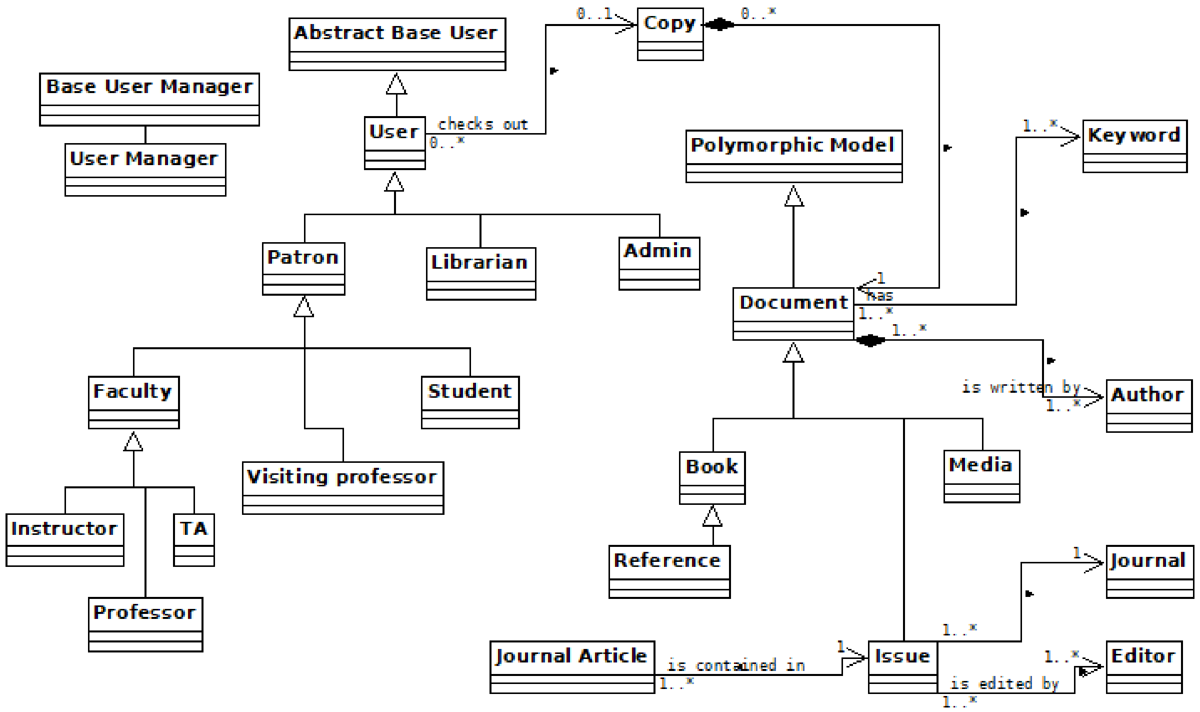
1. First, Django consults the various URL patterns created by a developer and uses the information to retrieve a view.

2. The view then processes the request, querying the database if necessary.

3. The view passes the requested information on to the template.

4. The template then renders the data in a layout a developer has created and displays the page.

High-Level Class Design (uml-diagram)



Components description

Users

There is a special class User, which contains the information that library needs to know about each person of the system (name, surname, address, etc) and methods and fields to enable authentication.

The class UserManager helps us to create a user.

There are three types of users in our implementation (they are inherited from class User):

Patron:

The methods of classes of documents (search for, check out, return documents) are available for objects and descendants of class Patron. There are three subtypes of patrons (users of these classes have different possibilities of using the library, e.g checking out period, number of times to renew the book, etc):

- Faculty, representing all the teaching body (e.g. professors, instructors, TAs).
- Students of the university. A student cannot be a faculty member.
- Visiting Professors. VPs are not part of the Faculty body.

Librarian:

The class contains methods that are available only for managing patrons by librarians. There are 3 subtypes of librarians, they have different privileges. Librarians with privilege equal to 1 can access and change the information about documents and patrons. Privilege 2 means the librarians have the same abilities as the privilege 1 librarians do but also they can add the documents and patrons to the library. Finally, librarians with privilege 3 can delete documents and patrons in addition to privilege 2. Librarians with privilege 2 should place an outstanding request for a document.

The methods of classes of documents, such as check overdue document, check out documents, add copy, remove copy can be used by users of class Librarian. All these actions are written in the log.

Admin:

Admin is a descendant of class User. He can run all the system by managing librarians. Admin can add, delete or modify librarians, as well as assign privileges to them. There can not be more than one admin in the library.

Documents

There is a special class Document, which contains information that library needs to know about each document of the system(title, authors, keywords, price) and methods for checking out, returning documents(for all users), adding/deleting/modifying document(for users of class Librarian). The methods of the class check the type of user (methods are available only for a certain type of user, meet the requirements of library system). All the actions like addition, deletion, modification, checking out, renewing and returning of documents are logged in the system. The logs contain information on what action was performed and by whom.

Class Author contains the author's name of the document.

Class Keyword contains document keywords.

The main asset of the library are documents. The application contains the following type of documents:

Book:

The class Book is inherited from Document. It also contains publisher, edition, year of publication and tells whether the book is a bestseller. A check out period is different for several types of users. There is a method that checks the type of user and makes it possible to take the book for a certain time for different users.

Journal Articles:

There is a class Journal that contains the publisher of the journal.

Class Editor contains the editor's name of the issue.

There is a class Issue which is inherited from class Document and contains the journal, editors and publication date. There is a method for determining the check out period.

There is a class Journal Article which contains the title of the journal, issue and the authors.

Media:

The class is a descendant of the class Document and contains a method that makes it possible to take the media for a certain time

Reference:

The objects of these class are not available for checking out.

Copies

A library may have several copies of each document. The class Copies contains a place where the copy is stored, user that checked it (if it is checked out) and loan status. There are methods that help check out copy, return copy, etc. In case of multiple requests for a document there is a queue of users, according to which they are served. The priority is as follows: Students, Instructors, TAs, Visiting Professors, Professors.

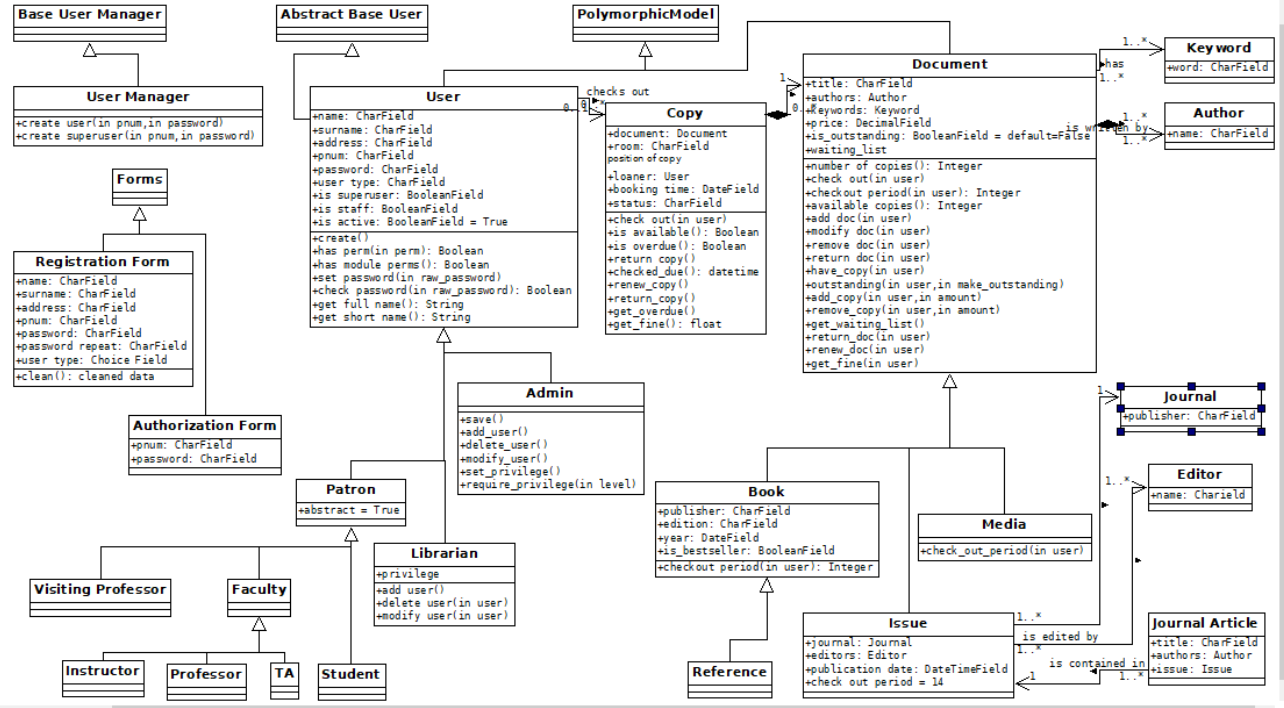
For users and customers

As a **patron** of the library management system, you can be registered to the system by a librarian with your phone number as a primary key, you can check out, renew or return a document after the registration. You can search for a particular document by author, title or keywords. For some documents there can be a queue so you will need to wait and be served according to your priority in the queue. Users are served in the following priority: Students, Instructors, TAs, Visiting Professors, Professors. When a document becomes available and you have been waiting for it, you get notified about its availability via email which you registered with. After this you have no more than one day to come and take the document, otherwise you will be deleted from the queue and the next patron after you will be invited to check out the document. The documents are checked out for different period of time depending on the type of the document and your status, try not to overdue the documents because in such a case you will be fined for returning the documents late.

As a **librarian**, you can be managed by an admin, the owner of the system. He can assign privileges, add, delete and modify librarians. You are in charge of the documents and patrons meaning, you can add or delete documents and patrons from the system and modify information about them.

As an **admin**, you possess the library management system and run the librarians. You can assign different privileges to librarians in order for them to be able to do different tasks like deletion or modification of documents.

Annex1


Base User Manager
Abstract Base User
PolymorphicModel
User Manager
+create user(in pnum,in password)
+create superuser(in pnum,in password)
User
+name: CharField
+surname: CharField
+address: CharField
+pnum: CharField
+password: CharField
+user type: CharField
+is superuser: BooleanField
+is staff: BooleanField
+is active: BooleanField = True
+create()
+has perm(in perm): Boolean
+has module perms(): Boolean
+set password(in raw_password)
+check password(in raw_password): Boolean
+get full name(): String
+get short name(): String
checks out
0..1
0..*
Copy
+document: Document
+room: CharField
position of copy
+loaner: User
+booking time: DateField
+status: CharField
+check out(in user)
+is available(): Boolean
+is overdue(): Boolean
+return copy()
+checked_due(): datetime
+renew_copy()
+return_copy()
+get_overdue()
+get_fine(): float
1
0..*
Document
+title: CharField
+authors: Author
+Keywords: Keyword
+price: DecimalField
+is_outstanding: BooleanField = default=False
+waiting_list
+number of copies(): Integer
+check out(in user)
+checkout period(in user): Integer
+available copies(): Integer
+add doc(in user)
+modify doc(in user)
+remove doc(in user)
+return doc(in user)
+have_copy(in user)
+outstanding(in user,in make_outstanding)
+add_copy(in user,in amount)
+remove_copy(in user,in amount)
+get_waiting_list()
+return_doc(in user)
+renew_doc(in user)
+get_fine(in user)
has
1..*
1..*
Keyword
+word: CharField
is written by
1..*
1..*
Author
+name: CharField
Forms
Registration Form
+name: CharField
+surname: CharField
+address: CharField
+pnum: CharField
+password: CharField
+password repeat: CharField
+user type: Choice Field
+clean(): cleaned data
Authorization Form
+pnum: CharField
+password: CharField
Admin
+save()
+add_user()
+delete_user()
+modify_user()
+set_privilege()
+require_privilege(in level)
Patron
+abstract = True
Librarian
+privilege
+add user()
+delete user(in user)
+modify user(in user)
Visiting Professor
Faculty
Instructor
Professor
TA
Student
Book
+publisher: CharField
+edition: CharField
+year: DateField
+is_bestseller: BooleanField
+checkout period(in user): Integer
Media
+check_out_period(in user)
Reference
1
Journal
+publisher: CharField
1..*
Editor
+name: Charield
Issue
+journal: Journal
+editors: Editor
+publication date: DateTimeField
+check out period = 14
1..*
is edited by
1..*
is contained in
1
1..*
Journal Article
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