

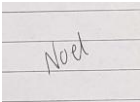


Module Code: ITS63304 (Jan 2025)

Module Name: Object Oriented Programming

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Submission Date	Week 12: 12/03/2025
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Declaration: Certify that this assignment is entirely my own work, except where I have given fully documented references to the work of others, and that the material contained in this assignment has not previously been

submitted for assessment in any other formal course of study.

Marks/Grade:	Evaluated by:
<i>Evaluator's Comments:</i>	

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1. Abstract:

License Management System is a Java application whose purpose is to make it easier to manage user registrations and track the request for licenses as well as their renewals later. The application supports two different user categories:

Normal Users – Normal users can register, apply for licenses, check application status, and renew licenses.

Admins – Administrators have the ability to approve or reject applications, generate reports, and manage the license renewal process.

The program utilizes several validation processes, including checking the conformity of email addresses to a specified pattern, determining the uniqueness of citizenship numbers, and checking for age validity. In addition, it uses ANSI escape codes to print colored text in the command line interface, enhancing the user experience. The system also presents a systematic and effective process for the management of licenses, with the verification being made in accordance with the specified rules.

2. Introduction

The License Management System aims to improve the effectiveness of license management by applying a structured methodology that supports:

User registration and verification with electronic mail confirmation and age verification. The procedure for obtaining the license depends on fulfilling specified qualification conditions. Administrative oversight for reviewing applications, renewing licenses, and generating reports.

The platform features a command-line interface (CLI) which uses ANSI escape codes, thus improving the user experience by providing the ability to display colored messages. The platform is particularly beneficial for organizations since it can efficiently administer user licenses while at the same time maintaining compliance requirements.

Its structured approach ensures data integrity, role-based access, and an organized workflow for managing licenses.

3. Application Description

License Management System consists of several basic classes, with each having a particular responsibility.

User management

User Registration: User Registration checks valid email format, unique email and citizenship number, and age verification (18+).

User Authentication: User Authentication verifies user credentials like email, password and allows the user the respective dashboard (Standard User/Administrator).

License Administration License Class: License Administration Licence Class stores license details, issue dates and expiry dates.

Renewal Process: Normal Users can apply for license renewals when their existing licenses expire.

Overseeing Applications

Application Class: Manages application details and status (Pending, Approved, Rejected).

The ApplicationManager class: manages application submission, approval, and rejection processes.

User classes

NormalUser Class: Allows users to apply for licenses, check the status of their applications and renew licenses.

Administrator Class: Allows administrators to monitor the application process, create reports and oversee the renewal of licenses.

4. User Roles and responsibilities:

1. Kritak Aryal	As a team leader, Contributed in the main function of class LicenseManagementSystem.java and also contributed on some suggestions to License.java. For Report, he did Testing and implication, getting the screen shots and testing the whole application function.
2. Noel Maharjan	Highly helpful during the structuring of Application.java class and made a major contribution to ApplicationManagement.java. For Report he finished the Abstract covering the important part of the application functionalities.
3. Samyak Bajracharya	Majority of UserManagement.java was possible because of him an the smooth user management was made possible. He also made contribution to User.java For Report he contributed in complition of Introduction and Conclusion.
4. Rijan Panthi	With his contribution of designing and coding Admin.java and User.java we were able to get a robust admin class and dashboard. He also contributed in UserManagement.java and For Report he looked over the Limitations of the application.
5. Iris Maharjan	Did his research on Nepal's license system, contribution to License.java and major contribution to main class LicenceManagementSystem.java. HE also put some efforts on Application.java and for Report he finished Description of the application.

5. Application Features:

User Interface LicenseManagementSystem is the primary application user interface and comes with a command-line interface (CLI) with colored output for added user convenience. Application Features and Usefulness User Enrollment and Authentication.

✓ The system checks the email addresses for their format and ensures their uniqueness. It checks whether the people marked as applicants are at least 18 years old. The system differentiates between Administrators and ordinary users clearly. The process for getting licenses is governed by specified standards, which the applicants must meet. The submissions with substandard quality get automatically approved.

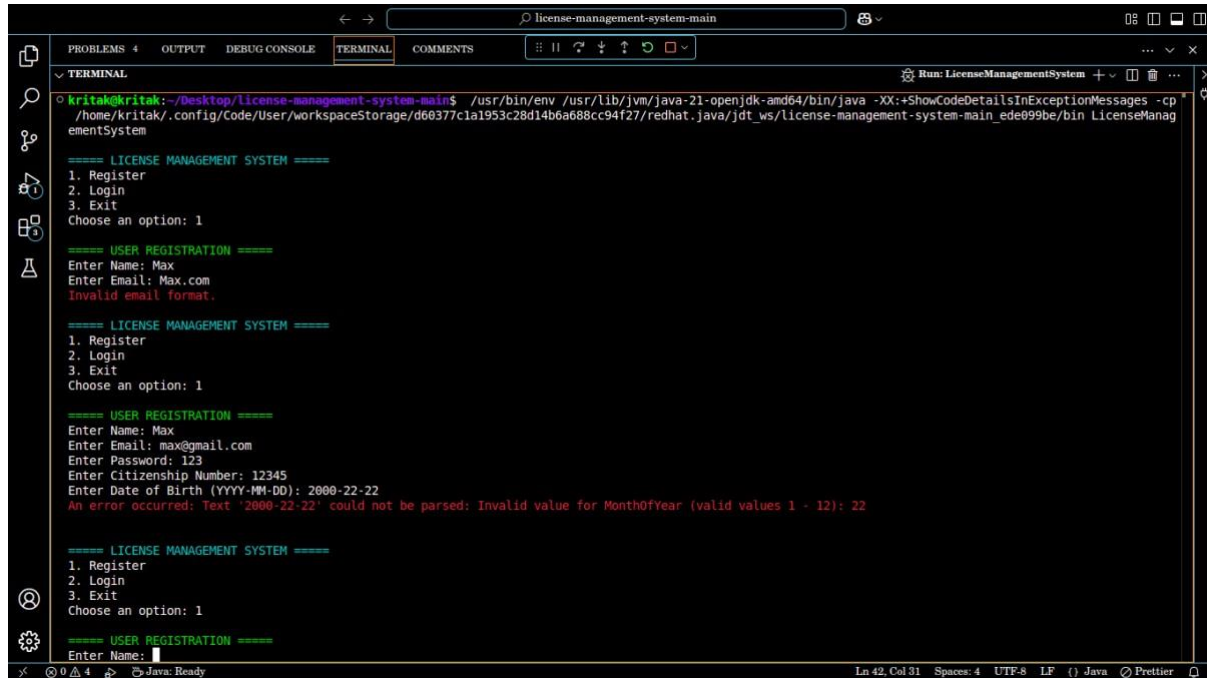
✓ The users have the ability to check the status of their applications in addition to the renewal of expired licenses.

✓ Administrators can check the status of pending applications and act accordingly. Administrators can also generate reports with the purpose of improving the management practices.

✓ Administrators manage the renewal process for the licenses. User Interface The application uses a command-line interface (CLI) with colored output.

✓ It offers independent dashboards for Administrators as well as for Standard Users. The design is based on a systematic approach towards application administration.

6. Testing Plan and Implementation



```
license-management-system-main
PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL COMMENTS
Run: LicenseManagementSystem

kritak@kritak:~/Desktop/license-management-system-main$ /usr/bin/env /usr/lib/jvm/java-21-openjdk-amd64/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp
/home/kritak/.config/Code/User/workspaceStorage/d60377c1a1953c28d14b6a688cc94f27/redhat.java/jdt_ws/license-management-system-main_ed0999be/bin LicenseManag
ementSystem

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 1

===== USER REGISTRATION =====
Enter Name: Max
Enter Email: Max.com
Invalid email format.

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 1

===== USER REGISTRATION =====
Enter Name: Max
Enter Email: max@gmail.com
Enter Password: 123
Enter Citizenship Number: 12345
Enter Date of Birth (YYYY-MM-DD): 2000-22-22
An error occurred: Text '2000-22-22' could not be parsed: Invalid value for MonthOfYear (valid values 1 - 12): 22

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 1

===== USER REGISTRATION =====
Enter Name: 
```



```
license-management-system-main
PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL COMMENTS
Run: LicenseManagementSystem

/java-21-openjdk-amd64/bin/java -XX:+ShowCodeDetailsInExceptionMessages -cp /home/kritak/.config/Code/User/workspaceStorage/d60377c1a1953c28d14b6a688cc94f27/
redhat.java/jdt_ws/license-management-system-main_ed0999be/bin LicenseManagementSystem

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 1

===== USER REGISTRATION =====
Enter Name: Max
Enter Email: max@gmail.com
Enter Password: 123
Enter Citizenship Number: 12345
Enter Date of Birth (YYYY-MM-DD): 2000-10-10
Select Role (1: Normal User, 2: Admin): 1
User registered successfully! User ID: U1

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 2

===== USER LOGIN =====
Enter Email: max@gmail.com
Enter Password: 1234
Invalid email or password.
Returning to main menu...

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 2

===== USER LOGIN =====
Enter Email: 
```

```
license-management-system-main

PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL COMMENTS
Run: LicenseManagementSystem

Login successful! Welcome, Max

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 1
Applying for a license...
Enter requested category (A,B,C,D,E,F): A
Application submitted successfully! Your Application ID: AP1

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 1
Applying for a license...
Enter requested category (A,B,C,D,E,F): c
Application submitted successfully! Your Application ID: AP2

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 2
Checking application status...
ApplicationID: AP1, UserID: U1, Category: A, Status: Pending
ApplicationID: AP2, UserID: U1, Category: C, Status: Pending

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 
```

```
license-management-system-main

PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL COMMENTS
Run: LicenseManagementSystem

Enter Citizenship Number: 123
Enter Date of Birth (YYYY-MM-DD): 1
An error occurred: Text '1' could not be parsed at index 0

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 1

===== USER REGISTRATION =====
Enter Name: mike
Enter Email: mike@gmail.com
Enter Password: 123
Enter Citizenship Number: 12345
Citizenship number already registered.

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 1

===== USER REGISTRATION =====
Enter Name: mike
Enter Email: mike@gmail.com
Enter Password: 123
Enter Citizenship Number: 54322
Enter Date of Birth (YYYY-MM-DD): 2000-12-12
Select Role (1: Normal User, 2: Admin): 2
User registered successfully! User ID: U2

===== LICENSE MANAGEMENT SYSTEM =====
1. Register
2. Login
3. Exit
Choose an option: 
```

```
license-management-system-main

PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL COMMENTS
Run: LicenseManagementSystem

2. Login
3. Exit
Choose an option: 2

===== USER LOGIN =====
Enter Email: mike@gmail.com
Enter Password: 123
Login successful! Welcome, mike

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 2
Enter application ID to approve(a,A)/reject(r,R):
Approve or Reject (A/R):
Invalid decision. Please enter 'A' to approve or 'R' to reject.

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 1
Viewing pending applications...
ApplicationID: AP1, UserID: U1, Category: A, Status: Pending
ApplicationID: AP2, UserID: U1, Category: C, Status: Pending

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 
```

```
license-management-system-main

PROBLEMS 4 OUTPUT DEBUG CONSOLE TERMINAL COMMENTS
Run: LicenseManagementSystem

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 3
Generating reports...
Total Applications: 2
Total Licenses Issued: null

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 1
Viewing pending applications...
ApplicationID: AP1, UserID: U1, Category: A, Status: Pending
ApplicationID: AP2, UserID: U1, Category: C, Status: Pending

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 2
Enter application ID to approve(a,A)/reject(r,R): AP2
Approve or Reject (A/R): a
Application approved. License issued: LicenseID: L0, Category: C, Issue Date: 2025-03-11, Expiry Date: 2030-03-11

===== ADMIN DASHBOARD =====
1. View Pending Applications
2. Approve/Reject Application
3. Generate Reports
4. Renew License
5. Logout
Choose an option: 
```

```
license-management-system-main
Enter Password: 123
Login successful! Welcome, max

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 2
Checking application status...
ApplicationID: AP1, UserID: U1, Category: C, Status: Approved
ApplicationID: AP2, UserID: U1, Category: A, Status: Rejected

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 1
Applying for a license...
Enter requested category (A,B,C,D,E,F): d
Application submitted successfully! Your Application ID: AP1
Application approved. License issued: LicenseID: L1, Category: D, Issue Date: 2025-03-11, Expiry Date: 2030-03-11

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
3. Renew License
4. Logout
Choose an option: 2
Checking application status...
ApplicationID: AP1, UserID: U1, Category: C, Status: Approved
ApplicationID: AP2, UserID: U1, Category: A, Status: Rejected
ApplicationID: AP1, UserID: U1, Category: D, Status: Approved

===== USER DASHBOARD =====
1. Apply for License
2. Check Application Status
```

Test Cases for User Management

Register with fake email = System rejects registration.
Register with duplicate email = System rejects registration.
Login with incorrect password = System denies access.

License Management Test Cases

Submit application in incorrect category = System refuses to accept application.
Renew lapsed license = System processes renewal successfully.

Test Cases for Admin Actions

Approve pending application = Update System status to "Approved."
Reject pending application = Update System status to "Rejected."
Generate reports = System generates reports successfully.

All the test cases were run successfully, & it was made sure that the system works.

7. Limitations

Single User Interface: The application uses a command-line interface (CLI), which is not necessarily so user-friendly as a graphical user interface (GUI).

Inadequate Role Management: The system only supports two roles at present: Normal User and Admin. A more revealing role hierarchy can improve usability.

Lack of Persistent Storage: No database in the application. Data is discarded when the system is powered down.

Lack of Suitable Security Features: Despite email verification and age validation, other stronger security features (example: encryption) may be added

8. Conclusions

License Management System offers a seamless method of license application and renewal management. It accommodates validations, role-based access, and clearly defined workflows for admins as well as users.

Key Strengths:

Organized user roles (Normal User/Admin).
Accurate validation for user registration and applications.
ANSI escape codes for better user experience in CLI.

Improvement in the Future:

Implements a graphical user interface (GUI) for better user experience.
Implements persistent storage (database integration).
Extended role management to save more roles (example: Super Admin, Inspectors).

Even though having some limitations in the system, it is a good foundation to expand further in license management.

9. References

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