Passport Automation System

Task 1: Problem Statement

Passport Automation System is used in the effective dispatch of passport to all the eligible applicants after several rounds of processing and verification. The core of the system is to get the online registration form (with details such as name, address etc.,) filled by the applicant whose testament is verified for its genuineness by the Passport Automation System with respect to the already existing information in the database. After that, the information is in turn forwarded to the regional administrator's Ministry of External Affairs office, where the application is processed manually. The system forwards the necessary details to the police for its separate verification whose report is then presented to the administrator. After all the necessary criteria have been met, the original information is added to the database and the passport is sent to the applicant. The entire process of 'Issue of Passport' if done in a manual manner, takes long time, so an Automated System becomes essential to meet the demand.

Task 2: SOFTWARE REQUIREMENT SPECIFICATION (SRS) Document

USER CHARACTERISTICS:
Applicant: These are the person who desires to obtain the passport and submit the information to the database.
Administrator: He has the certain privileges to add the passport status and to approve the issue of passport. He may contain a group of persons under him to verify the documents and give suggestion whether or not to approve the dispatch of passport.
Police: He is the person who upon receiving intimation, perform a personal verification of the applicant and see if he has any criminal case against him before or at present. He has the power to decline an application if he finds any discrepancy with the applicant.

Functional Requirements:
These describe the specific functions or services the system must provide.

- **User registration and login:** Users can register an account and log in to access the system.
- **Application submission:** Applicants can fill out and submit the online passport application form with supporting documents.
- **Data verification:** The system facilitates the verification of applicant information by internal staff and external agencies like police.
- **Fee payment:** The system must process payments for the application through integrated payment gateways.
- **Status tracking and notification:** Applicants can track their application status and receive real-time updates via the system.
- **Report generation:** Administrators can generate reports on applications and user data.
- **Communication platform:** The system acts as a communication channel between the applicant and the passport authority.

Non-Functional Requirements:

- **Performance:** The system must handle a high volume of users with minimal wait times and maintain performance under peak load.
- **Security:** The system must protect sensitive user data with features like encryption, access controls, and intrusion detection, while complying with data privacy regulations.
- **Usability:** The user interface should be user-friendly, with clear instructions and a layout that is easy for applicants of all technical abilities to navigate.
- **Reliability:** The system should be consistently available and have measures to prevent data loss and ensure business continuity.
- **Scalability:** The system architecture should be able to scale to accommodate increasing passenger traffic and future growth, possibly using cloud-based infrastructure.
- **Maintainability:** Administrators should be able to easily maintain and update applicant information in the database.

SOFTWARE INTERFACE

• Front End Client - The applicant and Administrator online interface is built using JSP and HTML. The Administrator's local interface is built using Java.

•Web Server - Glassfish application server (Oracle Corporation).

•Back End - Oracle database.

HARDWARE INTERFACE

The server is directly connected to the client systems. The client systems have access to the database in the server.

Task 3: Software Configuration Management document

Software Requirements:
Operating sytem : windows 7/10
Front end : J2EE
Back end : My SQL Server
IDE used : Netbeans

Hardware Requirements:
Processor :i3 or higher
RAM : 4 GB
Hard Disk drive: 500 GB

Task 4: Study and usage of any Design phase CASE tool

Features of Star UML:

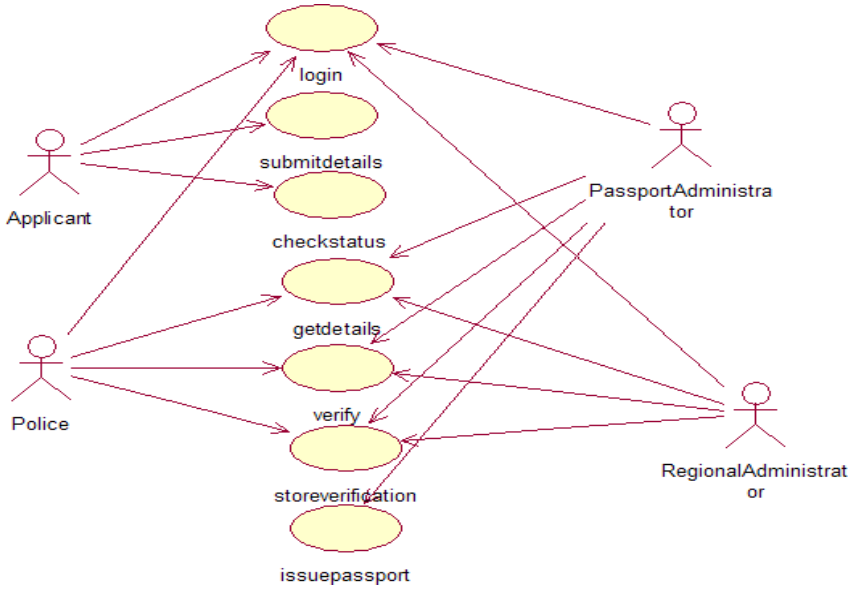
1. It supports multi-platform such as macOS, Windows, and Linux.
2. It involves UML 2.x. standard compliant.
3. Includes Entity-Relationship diagram, Data-flow diagram and Flowchart diagram.
4. It creates multiple windows.
5. It has modern UX and dark and light themes.
6. Featured with retina (High-DPI) display support.
7. Includes model-driven development.
8. It has open APIs.
9. Supports various third-party extensions.
10. Asynchronous model validation.
11. It can export to HTML docs.

Task 5: Performing the Design by using any Design phase CASE tools

USE CASE DIAGRAM:

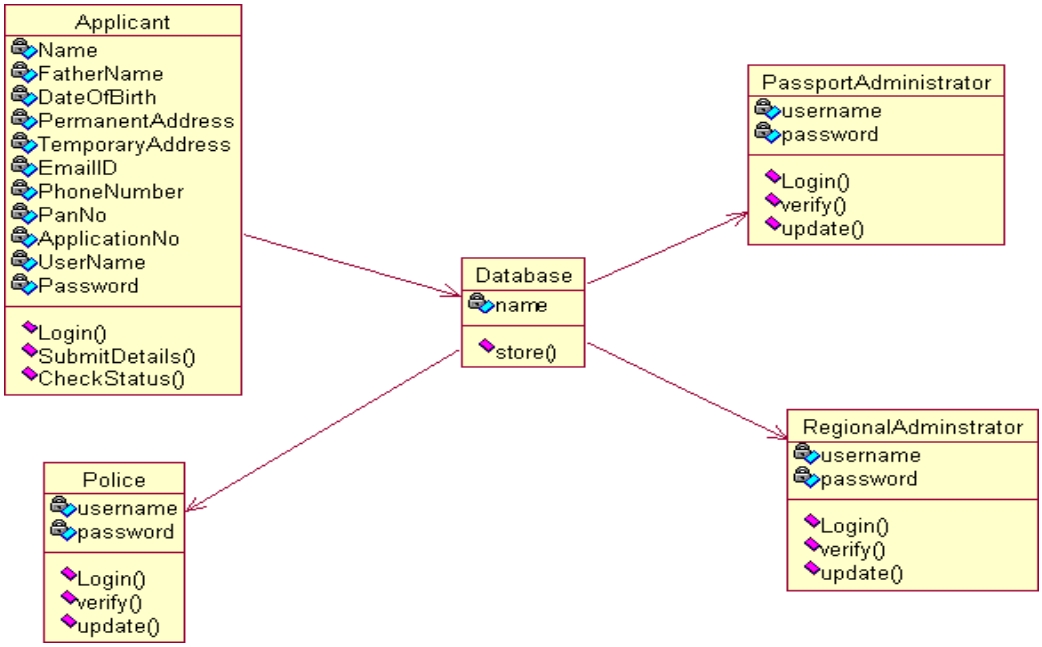
The actors in use case diagram are Applicant, regional administrator, database, passport Administrator, Police.

The **login use case** checks the username and password for applicant, regional administrator, passport administrator and police.
The **submit details use case** is used by the applicant for submitting his details
The **check status use case** is used by the applicant for checking the status of the application process.
The **get_details use case** is used for getting the details form the database for verification.
The **verify use case** is used for verifying the details by comparing the data in the database.
The **store_verification use case** is to update the data in the database.
The **issue_passport use case** is used by the passport administrator for issuing passport who's application verified successfully by all the actor.



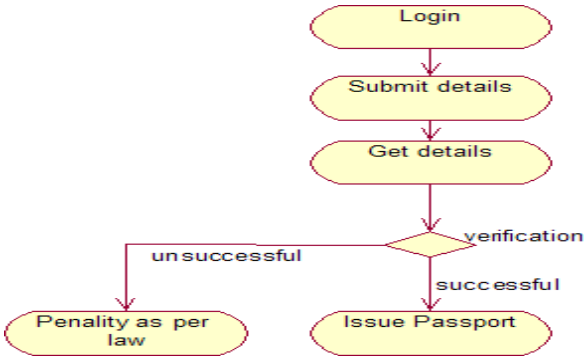
CLASS DIAGRAM:

APPLICANT-The applicant has attribute such as name and password and operations are Login, SubmitDetails and CheckStatus.
THE DATABASE- The database has attribute such as name and operation is store.
REGIONAL ADMINISTRATOR- The regional administrator has attribute such as name and operations are Login, verify and update.
PASSPORT ADMINISTRATOR- The passport administrator has attribute such as name and operations are Login, verify and update.
THE POLICE- The police have attribute such as name and operations are Login, verify and update.



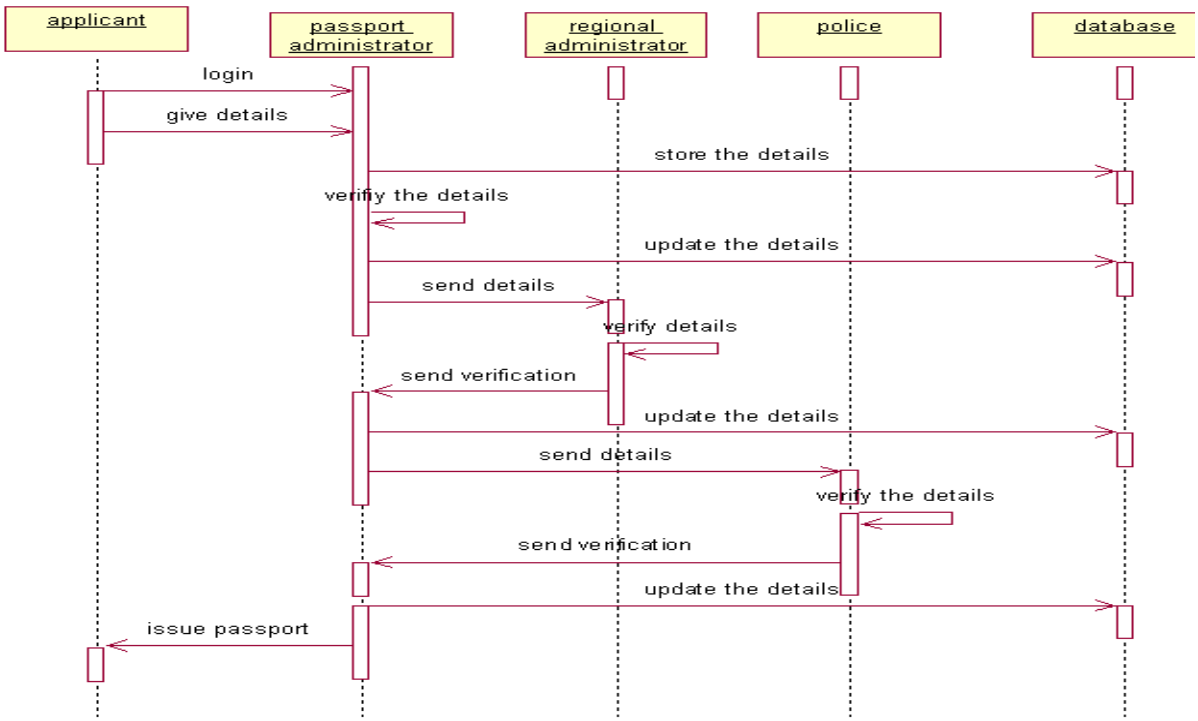
ACTIVITY DIAGRAM:

The activities in the passport automation system are login, submit details, get details, issue passport and penalty and verification. In the login activity applicant give username and password and then login into the passport automation system after then fill the details that are required for application. After the verification procedure completed successfully the passport is issued to the applicant.



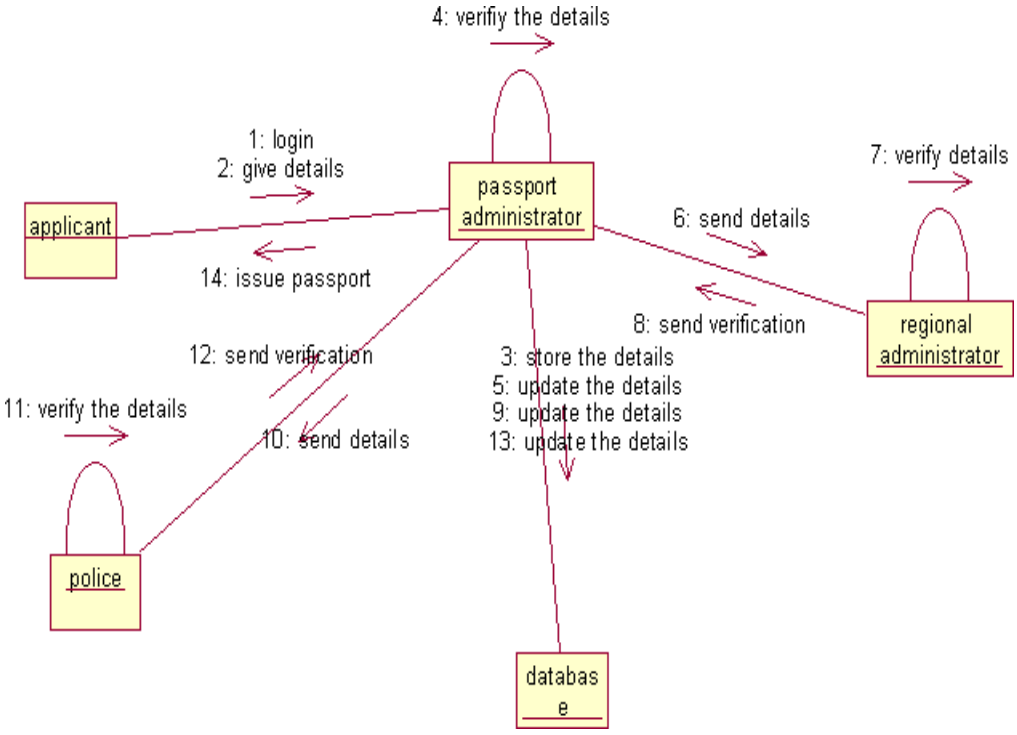
SEQUENCE DIAGRAM:

The applicant login the database and give his details and database store the details. The passport administrator get the details from the database and do verification and then forward to regional administrator. The regional administrator get details from passport administrator and perform verification and send report to passport administrator. The police get the details form passport administrator and perform verification and send report to passport administrator.



COLLABORATION DIAGRAM:

The applicant, passport administrator, regional administrator, police and database functions are show in sequence number. The applicant first login the passport automation system and submit his details the passport administrator, regional administrator and police verification are denoted.



Task 6: Develop test cases for unit testing and integration testing.

Unit Testing Test Cases:

Test Case: Verify Applicant Information Validation
Description: Ensure that the system properly validates and sanitizes applicant information.
Input: Applicant's name, address, date of birth, etc.
Expected Outcome: Valid inputs are accepted, and invalid inputs are rejected with appropriate error messages.

Test Case: Test Document Verification Logic
Description: Test the logic that verifies submitted documents against predefined criteria.
Input: Sample set of valid and invalid documents.
Expected Outcome: Valid documents pass verification, while invalid ones fail with corresponding error messages.

Test Case: Test Passport Issuance Process
Description: Verify the process of issuing a passport once all requirements are met.
Input: Approved applicant details and verified documents.
Expected Outcome: A new passport is generated and associated with the applicant.

Integration Testing Test Cases:

Test Case: Verify Applicant Application Flow
Description: Test the integration of various application components for a seamless user experience.
Steps:
Applicant submits an application.
Documents are verified.
Passport is issued upon successful verification.
Expected Outcome: Each step integrates smoothly, ensuring a complete application process.

Test Case: Test Data Exchange Between Modules
Description: Verify that data is correctly passed between different system modules.
Steps:
Applicant details are shared from the application module to the verification module.
Verification results are passed back to the application module.
Expected Outcome: Data is accurately exchanged between modules without loss or corruption.

Task 7: Develop test cases for various white box and black box testing techniques.

White box testing is a software testing technique that tests a system's internal design, source code structure, data structures used, and working details. Its primary objective is to improve the software's design, input-output flow, usability, and security.

White Box Testing Techniques:

1. Statement Coverage:
Test Case: Ensure that each line of code is executed at least once during the application process.
Steps:
Submit a passport application with valid details.
Verify the documents.
Check the status of the application.
Expected Outcome: All code lines related to application submission, document verification, and status tracking are executed.

2. Branch Coverage:
Test Case: Verify that all possible branches within decision points are taken during testing.
Steps:
Submit an application with valid details and valid documents.
Submit an application with valid details but invalid documents.
Submit an application with missing details.
Expected Outcome: All possible execution paths through decision points (like document validation) are tested.

3. Path Coverage:
Test Case: Ensure that all possible paths through the system are tested.
Steps:
Submit an application with valid details and documents.
Verify documents successfully.
Issue a passport.
Expected Outcome: The entire path from application submission to passport issuance is tested.

Black Box Testing Techniques:

Black box testing is a technique of software testing which examines the functionality of software without peering into its internal structure or coding. The primary source of black box testing is a specification of requirements that is stated by the customer. In this method, tester selects a function and gives input value to examine its functionality, and checks whether the function is giving expected output or not. If the function produces correct output, then it is passed in testing, otherwise failed.

1. Equivalence Partitioning:
Test Case: Validate input validation by partitioning input domains.
Steps:
Submit an application with valid details.
Submit an application with invalid characters in the name field.
Submit an application with an age above the valid range.
Expected Outcome: Input partitions are tested, including valid inputs and common invalid inputs.

2. Boundary Value Analysis:
Test Case: Test values at the boundaries of valid and invalid ranges.
Steps:
Submit an application with the minimum required age.
Submit an application with an age one unit below the minimum.
Submit an application with the maximum allowed age.
Expected Outcome: System handles boundary values correctly and doesn't break at extreme inputs.

3. Decision Table Testing:
Test Case: Test combinations of conditions and actions in decision tables.
Steps:
Submit an application with valid details and valid documents.
Submit an application with valid details but invalid documents.
Submit an application with missing details.
Expected Outcome: Different combinations of conditions and actions are tested.

4. Scenario-based Testing:
Test Case: Test end-to-end scenarios based on user stories.
Steps:
Submit a passport application, verify documents, and issue a passport.
Submit an application with incomplete details and verify the response.
Expected Outcome: User stories are tested to ensure the system meets user requirements.