**1.0 Testing**

1.1 Scope: **Functional testing**(End users such as students, teachers, and administrators will test the system’s functionality to ensure it meets their specific needs and requirements.) **Performance testing**( Verifies that the system can handle the loads of high-performance use.) **Security testing**(Finds the flaws in the system that can be exploited and fix the flaws. Verify authentication and authorization features.) **User acceptance testing**(Final stage of testing to verify users can use the program.)

1.2 Functional, performance, security, and user acceptance test Scenarios:

1. Student Information Management
2. Report Generation
3. Classroom Scheduling
4. Messaging System

**1.3 Functional testing for students, teachers, admins**

**Student Information**

* Enrollment of the student
* Verify that the student is in the system and assigned a Student ID
* Check to see if the student details are correctly displayed

**Report generation**

* Customize the report
* Student ID, name, class is displayed
* Display attendance, grade, reports

**Classroom Scheduling**

* Schedule the daily, monthly, and yearly
* Scheduling time of the day

**Messaging System**

* Messaging between students and admins/teachers
* Secure Messaging

**1.4 Performance testing for students, teachers, and administrators**

Student information

* The large number of student records
* Number of users that are logging on

Report generation

* Generating large sets of data

Classroom scheduling

* Real-time modifications to the timetable
* Integration into other systems

Messaging system

* High Messasage volume
* Large file attachments
* Scalability

**1.5 Security testing for users**

Student Information

* Test weak passwords and reject
* Unauthorized access
* Network security

Report generation

* Password Strength
* Data encryption
* Secure report delivery

Classroom Scheduling

* Unauthorized access
* Secure time changes

**1.6 User Acceptance Testing**

Student Information

* Classes are correct
* Enter data without error
* Student ID is accurate

Report generation

* Report card
* Overall percentage
* Attendance

Classroom Scheduling

* Timetable is accurate
* Calander is updated
* Classroom allocation

Messaging system

* Sending and receiving messages
* Message history
* Timestamp on message

**2.0 Test steps**

**2.1 Student information Functional test**

### **Student Profile Update**

**Test Case:** Update an existing student's information.

**Test Steps:**

* + Log in as an authorized user.
  + Navigate to the "Student Information" section.
  + Search for the student to be updated.
  + Edit the necessary fields (e.g., address, phone number, emergency contacts).
  + Save the changes.
* **Expected Result:** The student's information is updated correctly.

**2.2 Report Generation Functional test**

**Test Case: Generate a report for a single student.**

**Test Steps:**

* **Log in as an authorized user.**
* **Navigate to the "Reports" section.**
* **Select "Student Report" option.**
* **Choose the desired student and report period.**
* **Click "Generate Report."**
* **Verify that the report displays:**
  + **Student's personal information (name, ID, class, etc.)**
  + **Subject-wise marks and grades**
  + **Overall percentage and grade**
  + **Attendance details**
  + **Any additional relevant information (e.g., behavioral reports,**
  + **extracurricular activities)**
* **Expected Result: A well-formatted report is generated with accurate information.**

**2.3 Classroom scheduling Functional test**

Test Case: Generate a timetable for a class.

Test Steps:

* Log in as an authorized user.
* Navigate to the "Timetable" section.
* Select the class for which to generate a timetable.
* Assign subjects to specific time slots and teachers.
* Generate the timetable.

Expected Result: A valid timetable is generated without any time conflicts or resource constraints.

**2.4 Messaging System Functional test**

### Message Sending and Receiving

* Test Case: Send a message to another user.
* Test Steps:
  + Log in to the system.
  + Navigate to the messaging section.
  + Select a recipient from the contact list.
  + Compose a message.
  + Click "Send."
  + Verify that the message is delivered to the recipient's inbox.
  + Log in as the recipient and check the received message.
* Expected Result: Messages are sent and received correctly without any errors.

**2.5 Student information Performance test**

### **Concurrent User Access**

* **Scenario:** Simulate multiple users accessing student information simultaneously.
* **Test Steps:**
  + Use a load-testing tool to simulate a large number of concurrent users.
  + Perform common operations like searching, editing, and deleting student records.
* **Performance Metrics:**
  + Response time for user actions.
  + System throughput (number of requests processed per second).
  + Error rates and system failures.

**2.6 Report generation Performance test**

### **Report Generation**

* **Scenario:** Generate complex reports for large datasets.
* **Test Steps:**
  + Generate reports for a large number of students or classes.
  + Export reports to different formats (PDF, Excel, etc.).
* **Performance Metrics:**
  + Report generation time.
  + System resource utilization during report generation.
  + Report accuracy and completeness.

**2.7 Classroom schedule Performance test**

### **Real-time Timetable Modification**

* **Scenario:** Simulate real-time modifications to the timetable.
  + **Test Steps:**
    - Log in as an administrator.
    - Make frequent changes to the timetable, such as adding, removing, or modifying classes and time slots.
    - Check the system's response time and accuracy in updating the timetable.
* **Performance Metrics:**
  + Time is taken to update the timetable.
  + System responsiveness to user actions.
  + Data consistency and integrity.

**2.8 Messaging system Performance test**

Scenario: Simulate a large number of messages being sent and received simultaneously.

Test Steps:

* Use a load-testing tool to generate a large number of messages.
* Send messages between different user groups (students, teachers, parents).
* Monitor the system's response time and ability to handle the load.

Performance Metrics:

* Message delivery time.
* System response time to user actions.
* Resource utilization (CPU, memory, database).

**2.9 Student information Security test**

Test Case: Test unauthorized access attempts.

* Test Steps:
  + Attempt to log in with incorrect credentials.
  + Verify that access is denied.

**2.10 Report generation Security test**

### **Data Privacy and Confidentiality**

* **Test Case:** Test data encryption.
  + **Test Steps:**
    - Verify that sensitive data (e.g., student personal information, grades) is encrypted both at rest and in transit.
* **Test Case:** Test data masking and anonymization.
  + **Test Steps:**
    - Verify that sensitive data is masked or anonymized in reports, especially when shared with external parties.

**2.11 Classroom Scheduling Security test**

### **Access Control**

* **Test Case:** Test role-based access control.
  + **Test Steps:**
    - Log in as a user with different roles (admin, teacher, parent).
    - Attempt to access and modify classroom schedules that are not authorized for the specific role.
    - Verify that access is denied.

**2.12 Messaging system Security test**

**Test Case:** Test weak password policies.

* **Test Steps:**
  + Attempt to log in with weak passwords (e.g., short passwords, common passwords).
  + Verify that the system enforces strong password policies.

**2.13 Student information User Acceptance test**

### Student Enrollment

* Test Steps:
  1. Create a new student account.
  2. Verify that the student's personal information is accurately recorded.
  3. Enroll the student in a specific class and section.
  4. Check if the student is added to the class roster.

**2.14 Report generation User Acceptance test**

Generate a report card for a specific student.

Verify that the report includes:

* Student's personal information (name, ID, class, etc.)
* Subject-wise marks and grades
* Overall percentage and grade
* Attendance details
* Any additional relevant information (e.g., behavioral reports, extracurricular activities)

**2.15 Classroom scheduling User acceptance test**

### **Timetable Generation**

* **Test Steps:**
  + Generate a timetable for a specific class.
  + Verify that the timetable:
    - Allocates classes to appropriate rooms.
    - Assigns teachers to their respective classes.
    - Avoids time conflicts and room clashes.
    - Adheres to school's academic calendar.
* **Acceptance Criteria:**
  + Timetable is generated accurately and efficiently.
  + The timetable is visually clear and easy to understand.
  + The system can handle changes and updates to the timetable.

**2.16 Messaging system User Acceptance test**

### **Message Sending and Receiving**

* **Test Steps:**
  + Send a message to another user.
  + Verify that the message is delivered correctly.
  + Reply to the received message.
  + Verify that the reply is received by the sender.
* **Acceptance Criteria:**
  + Messages are delivered and received promptly.
  + Messages are displayed correctly, with accurate timestamps.
  + Users can easily compose, send, and receive messages.