**UML Design Modeling**

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Within this paper, the various types of testing will be discussed. This includes component tests, integration tests, system tests, and acceptance tests. This paper will specifically discuss testing within the class enrollment system project that will take place at the end of this course.

The first wave of testing to be performed will be component tests. Component testing focuses on modules within isolation rather than interconnection. (*What Is Unit Testing? - Unit Testing Explained - AWS*, n.d.) Apache web servers, MariaDB databases, and SendGrid SMTP services are the components that will be individually tested here. For testing Apache, simply going to the school enrollment website and ensuring a page is loaded will be sufficient. Database testing comes next. The database will be tested in isolation by first initiating a connection, and then performing a variety of data storage, retrieval, and transformation queries. SendGrid will be tested by validating emails are received properly at test addresses.

Next, integration testing will be performed. This type of testing serves to confirm communication and correctness between different components. This ensures that interfaces all interfaces are properly functioning. (GeeksforGeeks, 2025) For testing interactions between the webserver and the database, a student account will be created. Once this is created, logins will be attempted. If this is functioning properly, then sign-in will only be accepted with the correct username and password combination. Otherwise, an error will be generated. Then, a password reset will be requested. This will test interaction between the webserver and SendGrid. This will also depend on previous integration tests being successful. This test will be marked as successful if the email is successfully generated and received.

Full system testing will be the next to last wave of testing performed. This process tests all integration across all components of the system, as well as system use cases to validate that the system meets the specified requirements. (Yasar & Black, 2023) During this process, a user will sign into their account and then attempt to enroll in a class. If the class is full, they will be placed on a wait list. Otherwise, it will enroll them successfully. Figure 2 below demonstrates how this process should behave. Figure 1 shows a basic class diagram of what the varying roles within the system are. To complete testing, next the ability to drop a class will be tested. If this succeeds as well, then all user requirements for the student role will be successful.

The final testing phase will be acceptance testing. During this final leg of testing, students, teachers, technical administrators, and other staff will test all use cases of the system. If it does not meet all requirements, it will go back for further rework. However if all is successful, then it will be released as a finished product. (Das, 2024)

A diagram of a user

AI-generated content may be incorrect.

Figure 1

A diagram of a student

AI-generated content may be incorrect.  
Figure 2

Resources

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