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**PROJECT TITLE: LIBRARY MANAGEMENT SYSTEM FOR WAGBERI HIGH SCHOOL**

**DOCUMENT: TEST PLAN FOR A LIBRARY MANAGEMENT SYSTEM FOR WAGBERI HIGH SCHOOL**

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# INTRODUCTION

This document defines the methods, tools and procedures that will be used to test the Library management system. Testing is essential for any system in order to ascertain that it meets its objectives, requirements from the user and that it is functional. Testing also measures the level of fault tolerance of an website in abnormal conditions.

## Goals and objectives

This document aims to explore how the website in question performs as expected:

1. The system test should help identify errors, faults, bugs and failures in the system so that it can be described as a successful test.
2. It should help to establish test cases for the system and also test data to enable an efficient and effective system test.
3. It should help to establish resources for performing the test in the test plan. These resources include money required for manpower.
4. The test schedule is also developed for performing the tests which allocates the time required for each part of testing and the procedures to be followed.
5. The system should also ensure consistency in the software that has been developed ensuring there are no deviations from the specifications.

## Scope

The testing procedure of this website targets all aspects of the website’s performance. The primary purpose for testing is to detect software failures so that defects may be uncovered and corrected as early as possible during the development stage. This is a non-trivial pursuit.

Fundamental areas to be tested in the system include inputs, outputs, functional requirements and non-functional dimensions of quality (how it is supposed to be versus what it is supposed to do). For example; usability, scalability, performance, compatibility, security, maintainability, reliability – can be highly subjective; something that constitutes sufficient value to one person may be intolerable to another.

## Major constraints

There are several hindering factors for the testing of this website including;

1. There is no enough data to test the website effectively.
2. Data used might be inefficient to correctly test the website.

# Test plan

This part of the document explores how the website testing will be actualized to reap maximum results in order to discover any website faults if any. The plan also aims on testing the website efficiently and effectively.

## Software to be tested

This testing plan/ document primarily focus on the Library management system. The test will focus on these websites functionalities.

## Testing strategy

This section outlines specific steps to be followed in order to get the desired results. The steps are discussed below:

### Unit testing

This test focuses on the individual functionalities of individual website components e.g. login screen, database, homepage etc. this test examines components to ascertain that they are correctly functioning. The table below shows a summary of the components, type of tests and the outcomes.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of test** | **Area being tested** | **Expected output** | **Actual outcome** | **Incorrect outcome.** |
| **Unit test** | **Inputs** |  |  |  |
|  | Password | It should not show password characters. |  |  |
|  | Username | Registered usernames can be used |  |  |
|  | User details | User should input their details as prompted by the register screen. |  |  |
|  | Input Books | An authorized user can post Books in the acceptable formats. |  |  |
| **Screen design and layout.** | **Layout** | Ease of use of interfaces. |  |  |
| **Output design components** | **Output** | Books are easily legible |  |  |
|  | **Push notification messages** | When Books are posted to the website a message also tags along to notify the user. |  |  |
| **Database** | **Storage** | The website is able to read, write user and Books data appropriately. |  |  |

Table 2.2.1

### Integration testing

Integration testing is accomplished incrementally by adding one module at a time to isolate errors. Integration testing is systematic technique for constructing the program structure while at the same time conducting test to uncover errors associated with interfacing. The objective is to take unit tested modules and build a program structure as directed by the design. The table below examines the integration of website components.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Type of test** | **area being tested** | **Expected outcome** | **Actual outcome** | **Incorrect outcome** |
| Integration test | Database | The website is linked with its appropriate database. The website’s data is easily stored and extracted from its database. |  |  |
| Relationships | The website should correctly link students to their respective courses. To enable specific Books. |  |  |

Table 2.2.2

### Validation testing

This test gives two possible outcomes: the function or performance characteristics conforms to specifications and are accepted and a deviation from the specification is uncovered and a deficiency list is uncovered. The table below shows the test results:

|  |  |  |  |
| --- | --- | --- | --- |
| **type of testing** | **Area being tested** | **Expected outcome** | **Actual outcome** |
| **Validation testing** |  |  |  |
|  | Log in | A registered user should log in when the details match(username and password) |  |
|  | Register | A new user should be registered once they fill in the required details to register as a user. |  |
|  | Homepage | Existing Books on the library management system should appear on the home screen in order of urgency and timeliness. |  |
|  | Post books | A user authorized to post Books is able to post books to the library management system website. |  |
|  | Books | Target audiences of specific books are able to view the Books of their choice i.e. select a Books to view more details. |  |
|  | Modify Books | Posters of Books should have the ability to, delete, and edit books they posted. |  |

Table 2.2.3

### High order testing

This involves carrying out a test after the different components for the entire system have been integrated. This process is aimed at finding errors that may arise as the different components interact with each other. It also ensures that the whole system meets its functional requirements and non-functional requirements. The table below summarizes the high order test.

|  |  |  |
| --- | --- | --- |
| **Test component** | **Outcome (pass/fail)** | **recommendation** |
| Login page |  |  |
| Register page |  |  |
| Homepage |  |  |
| Create Books |  |  |
| Books |  |  |
| Modify/ edit Books |  |  |

Table 2.2.4

## Recovery testing

Recovery testing is the activity of testing how well the website is able to recover from crashes, hardware failures and other similar problems.

Recovery testing is the forced failure of the system in a variety of ways to verify that recovery is properly performed.

Some of the recovery testing that will be used includes:

1. Switching off server when the website is loading data after that checking the validity of websites data integrity.
2. Sudden restarting the computer while the system is running and after that checking the validity of websites data integrity.
3. Switching off data when the website is running and observe what happens.
4. Testing whether authentication forms can be bypassed by the user session.

## Security testing

This is the process to determine that the system protects data and maintains its functionality as intended.

Concepts covered in security testing are: confidentiality, integrity, authentication, authorization, availability and non-repudiation.

1. Confidentiality – a security measure which protects against the disclosure of information to parties other than the intended recipient.
2. Integrity – a measure intended to allow the receiver to determine that the information which it receives has not been altered in transit or by other than the originator of the information.
3. Authorization – process of determining that the requester is allowed to receive a service or perform an operation. This will ensure access control to the system.
4. Availability – this entails assuring information and services will be ready for use when expected. It will also ensure that information is kept available to authorized persons when they need it.

Security testing will evident when the beta version is deployed to the named sample above. The test results will be examined to ascertain the website meets security requirements.

## Performance testing

Performance testing is testing performed from one perspective, to determine how fast some aspect of the system performs under a particular workload. It will also serve to validate and verify other quality attributes of the system such as scalability, reliability and resource usage.

Performance testing is used to determine if the website meets the performance criteria. It can compare two systems to find which performs better. It can measure what parts of the system or workloads that cause the system to perform badly. In the diagnostic case, software engineers use tools such as profilers to measure what parts of a device or software contribute most to poor performance or to establish throughput levels for maintained acceptable response time.

The latter a performance defect is detected, the higher the cost of remediation.

**Purposes**

1. Demonstrate that the system meets performance criteria.
2. Compare two systems to find which performs better.
3. Measure what parts of the system or workload cause the system to perform badly.

## Stress testing

This is an activity that aims to subject the website to conditions that exert pressure on the system to see how the system reacts. This is particularly important for websites that are expected to handle lots of data at times or all the time. For the library management system, this is important since it serves a huge number of users mostly students, it is therefore necessary to stress the website to find out if the website can actually handle the weight of the users.

This can be done by flooding the website with;

1. New users- this is meant to measure how the website can accommodate a lot of users.
2. Books-books for different audiences can be sent in bulk to examine the practicability of the system under high pressure.
3. Books access requests- the website should handle the pressure of having a lot of people accessing Books. This will be telling of how the website can handle the pressure.

## Alpha/Beta testing

1. Alpha testing; this is the testing conducted by the developer. The developer has perfect knowledge of the website and will therefore know how best to test the website specifically the back-end and technical aspects.
2. Beta testing; this testing is conducted by the actual system users, they have their expectations of the system and therefore are able to critique and comment on the websites performance and usability.

## Testing resources and staffing.

This website does not require a lot of resources; the website can be deployed to a random sample of users in Wagberi high school which has computer labs (Beta testers). The device owners will then be trained on how to use the website and a study will be conducted to determine how the users interact with the website and how well the website responds to the user needs. The users identified should be from all organization levels i.e. students, lecturers, administration, departments.

## Test work products.

The expected products of the whole testing process are failures detected integration errors etc.

## Test plan record keeping

All results of the test study will be recorded in tables assigned to that particular test e.g. validation test results will be stored in the validation table. The results will be compared against their test metrics.

## Test metrics

The testing process will use the following metrics to measure performance and detect errors/ failures. This test will use a variety of test metrics, depending on the type of test being conducted. Test metrics will include;

Pass/fail metric – used with functional requirement tests. Functional requirements have to be met for the website to be valid. Therefore, there is no in between for the functional requirement test it either fails or passes.

Good/satisfactory/bad – this metric is used for non-functional requirements. The website testers rate the website in scores 1 – 10. 1-3 is for bad, 4-7 is for satisfactory and 8-10 for good.

## Testing tools and environment

The test procedure for this website is straightforward. Therefore, there is no need for complex tools and or environments e.g. simulation. The plan is to deploy the website to a random number of the target users as beta testers and obtain observations from them. Tools needed are mostly debugging tools.

## Test schedule

The test schedule is straight forward; validation testing is done first to ensure all the individual website components are correctly functioning. Integration testing is then carried out incrementally to ensure that the individual components when interface together successfully. High order testing is then carried out to ensure that the individual components when combined together work seamlessly.

## Test record keeping and test log

These are Mechanisms for storing and evaluating test results are specified. The test log is used to maintain a chronological record of all tests and their results. The primary method I will use is storing the testing data in designated tables e.g. validation results will be stored in the validation table.