**VALIDATION, VERIFICATION, AND TESTING PLAN**

*Railway Portal*

**Revision Sheet**

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| **Release No.** | **Date** | **Revision Description** |
| Rev. 0 | 5/30/00 | Validation, Verification, and Testing Plan Template and Checklist |
| Rev. 1 | 4/12/02 | Conversion to WORD 2000 format |
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**VALIDATION, VERIFICATION AND TESTING PLAN**

**TABLE OF CONTENTS**

Page #

1.0 GENERAL INFORMATION 1-1

1.1 Purpose 1-1

1.2 Scope 1-1

1.3 System Overview 1-1

1.4 Project References 1-1

1.5 Acronyms and Abbreviations 1-1

2.0 TEST EVALUATION 2-2

2.1 Requirements Traceability Matrix 2-2

2.2 Test Evaluation Criteria 2-2

2.3 User System Acceptance Criteria 2-2

3.0 TESTING CHARACTERISTICS 3-1

3.1 Testing Conditions 3-1

3.2 Extent of Testing 3-1

3.3 Data Recording 3-1

3.4 Testing Constraints 3-1

3.5 Test Progression 3-1

3.6 Test Evaluation 3-1

3.6.1 Test Data Criteria 3-1

3.6.1.1 Tolerance 3-1

3.6.1.2 System Breaks 3-1

3.6.2 Test Data Reduction 3-2

4.0 TEST DESCRIPTION 4-3

5.x [Test Identifier] 4-3

5.x.1 System Functions 4-3

5.x.2 Test/Function Relationships 4-3

5.x.3 Means of Control 4-3

5.x.4 Test Data 4-3

5.x.4.1 Input Data 4-3

5.x.4.2 Input Commands 4-3

5.x.4.3 Output Data 4-4

5.x.4.4 Output Notification 4-4

5.x.5 Test Procedures 4-4

5.x.5.1 Procedures 4-4

5.x.5.2 Setup 4-4

5.x.5.3 Initialization 4-4

5.x.5.4 Preparation 4-4

5.x.5.5 Termination 4-5

# GENERAL INFORMATION

## 1.1 Purpose

This document outlines the Validation, Verification, and Testing Plan for the Railway Portal project. The primary purpose is to establish a structured approach to testing, ensuring the reliability, security, and performance of the Railway Portal.

## 1.2 Scope

The plan covers the testing activities related to the Railway Portal project, defining the purpose, scope, and overview. It encompasses functional and non-functional testing, including user acceptance criteria.

## 1.3 System Overview

Provide a brief system overview description as a point of reference for the remainder of the document. In addition, include the following:

1. Responsible organization: TU Sofia, FDIBA
2. System name or title: Railway Portal
3. System code: https://github.com/Aleksey12SV/RailwayTicketingPortal
4. System category
5. *Major application*: performs clearly defined functions for which there is a readily identifiable security consideration and need
6. Operational status
7. Under development
8. System environment and special conditions

## 1.4 Project References

## 1.5 Acronyms and Abbreviations

# TEST EVALUATION

## 2.1 Requirements Traceability Matrix

## A matrix mapping all application functions to corresponding tests is included in https://github.com/Aleksey12SV/RailwayTicketingPortal/blob/master/labs/Lab6%20RTM.xlsx. This ensures that each system requirement is appropriately tested, providing comprehensive coverage.

## 2.2 Test Evaluation Criteria

Detailed criteria for evaluating each segment of the system/subsystem are outlined in https://github.com/Aleksey12SV/RailwayTicketingPortal/blob/master/labs/Lab1.pdf. This includes functional and performance criteria, aligning with user expectations.

## 2.3 User System Acceptance Criteria

Minimum function and performance criteria required for user acceptance are specified in https://github.com/Aleksey12SV/RailwayTicketingPortal/blob/master/labs/Lab2.pdf. These criteria serve as benchmarks for determining whether the system is fit for use.

# TESTING CHARACTERISTICS

## 3.1 Testing Conditions

Testing for the Railway Portal will utilize the normal input and database, replicating real-world scenarios to simulate user interactions authentically. The system will be subjected to conditions that closely resemble those encountered during actual usage, ensuring the robustness of the testing process.

## 3.2 Extent of Testing

Testing will be extensive, covering all critical functionalities of the Railway Portal. Limited testing will not be adopted to guarantee thorough validation, and the expected coverage of the tests is set at 95%. This high coverage ensures a comprehensive examination of the system's capabilities and functionalities.

## 3.3 Data Recording

During testing, the system will record various types of data, including:

User Interactions: Record user actions such as login attempts, ticket searches, booking processes, and payment transactions.

System Responses: Log the responses generated by the system for different inputs, including success messages, error messages, and warnings.

Unexpected Events: Capture and log any unexpected events or errors that might occur during testing, helping in identifying and resolving potential issues..

## 3.4 Testing Constraints

Indicate the anticipated limitations imposed on the testing because of system or test conditions (timing, interfaces, equipment, personnel).

## 3.5 Test Progression

In progressive or cumulative tests, include an explanation concerning the manner in which progression is made from one test to another so that the cycle or activity for each test is completely performed.

## 3.6 Test Evaluation

### 3.6.1 Test Data Criteria

Describe the rules by which test results will be evaluated.

#### 3.6.1.1 Tolerance

Discuss the range over which a data output value or a system performance parameter can vary and still be considered acceptable.

#### 3.6.1.2 System Breaks

The maximum number of interrupts, halts, or other system breaks which may occur because of non-test conditions.

### 3.6.2 Test Data Reduction

Describe the technique to be used for manipulation of the raw test data into a form suitable for evaluation, if applicable. *The available techniques may include:*

1. *Manual collection and collation of system test output into test sequence order, followed by verification of the results.*
2. *Automatic inspection of test results as obtained by data recording means using a test data reduction program followed by manual inspection of selected test results which do not lend themselves to complete reduction by automatic means.*
3. *Automatic inspection of test results specifically recorded for manipulation by the test data reduction program. Test results as recorded, include all items of test significance. The test data reduction program contains an image of correct data output for an item by item comparison of data, and provides a summary of an evaluated test as output.*

# TEST DESCRIPTION

This section provides a description of the tests. Each test should be under a separate section header, 4.1 - 4.x.

## 4.x [Test Identifier]

Provide a test name and identifier here for reference in the remainder of the section. Describe the test to be performed.

### 4.x.1 System Functions

Provide a detailed list of the system and communications functions to be tested.

### 4.x.2 Test/Function Relationships

Provide a list of the tests that constitute the overall test activity. Include a test/function matrix summarizing the overall allocation of the system tests to the functions.

### 4.x.3 Means of Control

Indicate whether the test is to be controlled by manual, semiautomatic, or automatic means.

### 4.x.4 Test Data

Identify any security considerations in each of the following subsections.

#### 4.x.4.1 Input Data

Describe the manner in which input data are controlled in order to test the system with a minimum number of data types and values, exercise the system with a range of bona fide data types and values that test for overload, saturation, and other “worst case” effects, and exercise the system with bogus data and values that test for rejection of irregular input.

#### 4.x.4.2 Input Commands

Describe steps used to control initialization of the test; to halt or interrupt the test; to repeat unsuccessful or incomplete tests; to alternate modes of operation as required by the test; and to terminate the test. Include graphic representation if appropriate.

#### 4.x.4.3 Output Data

Identify the media and location of the data produced by the tests. Describe the manner in which the output data are analyzed in order to: detect whether an output is produced; evaluate output as a basis for continuation of the test sequence; and evaluate the test output against the anticipated output to assess system performance.

#### 4.x.4.4 Output Notification

Describe the manner in which output notifications (messages output by the system concerning status or limitations on internal performance) are controlled in order to:

1. Indicate readiness for the test
2. Provide indications of irregularities in input test data or test database because of normal or erroneous test procedures
3. Provide indications of irregularities in internal operations on test data because of normal or erroneous test procedures
4. Provide indications on the control, status, and results of the test as available from any auxiliary test software

### 4.x.5 Test Procedures

#### 4.x.5.1 Procedures

Describe the step-by-step procedures to perform each test.

#### 4.x.5.2 Setup

Describe or refer to standard operating procedures that describe the activities associated with setup of the computer facilities to conduct the test, including all routine machine activities.

#### 4.x.5.3 Initialization

Itemize, in test sequence order, the activities associated with establishing the testing conditions, starting with the equipment in the setup condition. Initialization may include functions such as:

1. Readout of control function locations and critical data from indicators and storage locations for reference purposes
2. Queuing of data input values for the test
3. Queuing of test support software
4. Coordination of personnel actions associated with the test

#### 4.x.5.4 Preparation

Describe, in sequence, any special operations such as:

1. Inspection of test conditions
2. Data dumps
3. Instructions for data recording
4. Modifications of the data base
5. Interim evaluation of test results

#### 4.x.5.5 Termination

Itemize, in test sequence order, the activities associated with termination of the test, such as:

1. Recording readouts and critical data from indicators for reference purposes
2. Termination of operation of time-sensitive test support software and test apparatus
3. Collection of system and operator records of test results