3.14 Test Procedures and Implementation

Testing Procedures:

Testing is the exposure of system to trial input to see whether it produces correct output. Testing assumes requirements that are already validated. Testing cannot guarantee correctness, no method can guarantee correctness. Testing can only increase our confidence that the system will usually perform without failure (and "usually" may not really be that often). Testing is the process of detecting presence of faults. Debugging is the process of locating and correcting faults.

Once source code has been generated, software must be tested to uncover as many errors as possible before delivering to your customer. Our goal is to design a series of test cases that have a high likelihood of finding errors. That's where software testing technique enters into picture.

Test Plan:

The design of test for software and other engineered products can be as challenging as the initial design of product itself. Software

engineers often treat testing as an afterthought, developing test cases that may "feel right" but have little assurance of being complete. We must design tests that have the highest likelihood of finding the most errors with a minimum amount of time and effort.

Over the past two decades a rich variety of test case design methods have evolved for software. These methods provide the developer with a systematic approach to testing. More important, methods provide a mechanism that can help to ensure the completeness of tests and provide the highest likelihood for uncovering errors in software.

Unit Testing:

Unit testing concentrates verification on the smallest element of the program – the module. Using the detailed design description important control paths are tested to establish errors within the bounds of the module.

In this system each sub module is tested individually as per the unit testing such as Vin reading, Symptom Diagnosis, VDR operations etc are tested individually.

Integration Testing:

Once all the individual units have been tested there is a need to test how they were put together to ensure no data is lost across interface, one module does not have an adverse impact on another and a function is not performed correctly.

After unit testing each and every sub module is tested with integrating each other.

System testing for the current system:

In this level of testing we are testing the system as a whole after integrating all the main modules of the project. We are testing whether system is giving correct output or not. All the modules were integrated and the flow of information among different modules was checked. It was also checked that whether the flow of data is as per the requirements or not. It was also checked that whether any particular module is non-functioning or not i.e. once the integration is over each and every module is functioning in its entirety or not.

In this level of testing we tested the following: -

Whether all the modules are working properly

Whether all the forms are properly linked or not.

Whether data handling is properly done or not.

1) Test case for Technician Login

Test case ID: TC_Tech_login	Test Priority: High
Module Name: Technician Login	**Test Title:** Verification of Technician Login Page
Description: This test case will verify valid invalid data of technician login module of the application.	

Pre-Condition: Application should be launched on computer and technician should know username and password.

For Valid Data:

Steps	Test Steps	Test Data	Expected Result	Actual Result	Status
1 2 3	Enter Username Enter Password Click on Login Button	XXX XXX	Technician should be logged in and redirected to home page	Technician is logged in and is on home page	Pass

For Invalid Data:

Step s	Test Steps	Test Data	Expected Result	Actual Result	Status
1 2 3	Enter Username Enter Password Click on Login Button	XXXXX X XXXXX	Technici an should not be logged in.	Admin is redirected back to the login page	Pass

Post-Condition:

For valid data: Valid Technician is logged in and home form will be displayed.

For invalid data: Technician will be redirected again to the Login form.

2) Test case for VIN reading:

Test case ID: Vin_Read	**Test Priority:** High
Module Name: Diagnosis	**Test Title:** Verification of VIN reading
Description: This test case will verify valid VIN no. data of vehicle.	

Pre-Condition: Application should be launched on computer and technician should be on the Vin reading screen. The system should be connected to the vehicle VCI…

For Valid Data:

Steps	Test Steps	Test Data	Expected Result	Actual Result	Status
1	Check for auto retrieval	XXX	Vin number should be present in the text box value	VIN no is displayed on the screen	Pass
2	Enter VIN	XXX	Vin no should be properly entered	VIN no is displayed on the screen	Pass

For Invalid Data:

Step s	Test Steps	Test Data	Expecte d Result	Actual Result	Status
1	Fail to retrieve the VIN no.	XXXXX X	Technici an should not be directed further.	Technician is redirected back to the same form	Pass
2	Fail to enter the VIN manually	XXXXX	Technici an should not be directed further.	Technician is redirected back to the same form	Fail

For valid data: Technician is directed to next form

For invalid data: Technician will be redirected to the same form.

4.1 Flow Chart:

```
                    ┌──────────┐
                    │  Start   │
                    └────┬─────┘
                         │
                         ▼
               ┌───────────────────┐
               │ Initial Symptom   │
               │  Diagnosis by SA  │
               └─────────┬─────────┘
                         │
                         ▼
                      ╱╲            No
                    ╱    ╲ ──────────────┐
                   ╲Proceed╱             │
                    ╲    ╱               │
                      ╲╱                 │
                       │ Yes             │
                       ▼                 │
             ┌───────────────────┐       │
             │ Job Card Generated│       │
             └─────────┬─────────┘       │
                       │                 │
                       ▼                 │
             ┌───────────────────┐       │
             │Technician Receives│       │
             │   Job Card        │       │
             └─────────┬─────────┘       │
                       │                 │
                       ▼                 │
             ┌───────────────────┐       │
             │    Diagnosis      │       │
             └─────────┬─────────┘       │
                       │                 │
                       ▼                 │
             ┌───────────────────┐       │
             │  Update Job Card  │       │
             └─────────┬─────────┘       │
                       │                 │
                       ▼                 │
             ┌───────────────────┐       │
             │ SA receives Job   │       │
             │      Card         │       │
             └─────────┬─────────┘       │
                       │ ◄───────────────┘
                       ▼
                  ┌──────────┐
                  │   Stop   │
                  └──────────┘
```
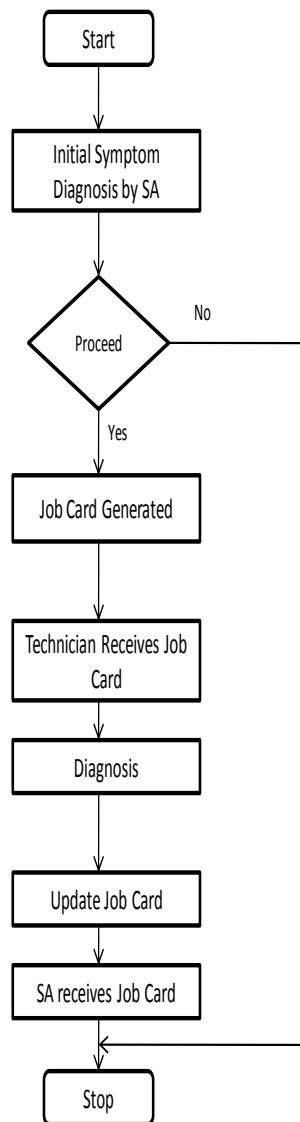
Drawbacks & Limitations

Drawbacks:

The drawback of current system is that it is partially connected to web. The system can be made available on internet rather than on intranet.

The system is lacking in the delivery of messaging to the respective concern person about the status of the process.

The current system is lagging in the adaptability to the other modules of the tools. It is an independent system.

Limitations:

The current system is dependent on a third party server (independent hardware) which in result cannot be available if server goes down.

The system in based on the intranet i.e if the main switch goes down , the entire system goes down

Proposed Enhancements

The proposed enhancements to the current system are :

1) The current system is generally operated completely on client side. Hence an live assistance can be implemented in the system wherein the customer can be assisted with a team of experts of the system who are available 24 x 7.

2) The system currently operates in Windows based platform and is restricted to it. It can further be modified to multi platform OS. This will help the tool to be operated on any platform.

Conclusion

Based on the proposed mitigations and measures and additional measures as mentioned in the details of the system above, I believe that the proposed system will make an impact to the workstations which are based on the automobile domains and carry out the Management process operations i.e day to day operations related to the vehicle and make the process fast, reliable, robust and secure to operate , maintain company as well as customer centric data in a proper way.

The system is developed with a view for future opeartion's that are to be performed and the availability of the system for future enhancements.

Thus, the system if properly implemented in proposed way can be of great commercial use to organizations and small scale business entities.