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Design and Implementaton of Database and Software with Testing and Quality Assurance for Online Business

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***Abstract*- The expertise of E-Commerce need to proper understand both technological and Business knowledge. E-commerce is mainly used as the platform as buying and selling numerous goods via the Internet service specially WWW (World Wide Web). The use of E-Commerce is increased progressively and its popularity is skyrocketed. People all over the world specially the young and busy person showing keen interest on E-Commerce because this platform very helpful to save their valuable time. Though Bangladesh is a developing country, its IT technology shows improvement very rapidly. The attachment of Business with IT technology added an authentic dimension. But the complexity of managing the demand of growing people and product diversity increased day by day. To cope with this challenge the businessman feel an urgent requirement of strong, efficient and flexible database for manage data and website for managing their activities. In this research work I design a database and a website for the demand of online business. The engagement of people with E-commerce growing rapidly and their test and demand are very diverse. So the data is increased a lot and the requirement of Database is must for online businessman because the only solution of managing these growing data is database management. The different types and qualities of product enhance speedily. The businessman needs to show each product on the user interface so that the user can attract with the product and can easily choose their required product. This essential task can do perfectly by using software. After design and implement software it is unavoidable desired to complete testing and quality assurance plan. In our research work we have done these tasks perfectly, effectively and successfully.**

Keywords- E-commerce, Online Business, MYSQL, Database, Website.

I. INTRODUCTION

E-commerce or Electronic commerce is a method through which various types of transactions like data or fund transfer taking place with the help [1] of electronic technology. In the initial state this techniques is used to transfer commercial document such as invoices and purchase orders. The electronic commerce included lots of transaction system for example debit card, credit card, ATM, Telephone banking, enterprise resource planning systems (ERP), data mining and data warehousing. E-commerce business formula has been developed an environment through which the commercial business spread all over the world within very short time. Bangladesh is a developing country and our country experienced a quick development of IT technology. By using these advanced technology people can communicate and transfer information, data, fund, ect. throughout the world instantly.

The people are growing very rapidly and their demand and test increases instantly. They attract the purchases [2] process which is time saving and convenient. Nowadays people are very busy with their work and they have no time to shopping their required good. As a result they are showing keen interest with online shopping which is much time saving process. The world is running with full speed in economical department. But suddenly the world experienced a disease Covid-19 which shut down the world economy and business sector. People can't move outside of their house even for buying their expected daily goods. As a result for fulfill their basic needs major portion of people around the world depends on the online shopping. If they need any kinds of product they can easily order the product through online. At the same time lots of people have started online business. They tried to attract more customer concentration to buy their product. Though numerous businessmen are engaged with online business, the competition is increased and its become difficult to exist in the business market. Its become must for them to develop themselves and need to decorate their business with lots of innovative ideas.

For existing in the competition and betterment of their business it becomes essential to engage their business with online. For managing their business properly and spread it throughout the world, they need an efficient database and software. The customer is [3] growing rapidly and the product types are rising very fast. So lots of data are available which need to manage the business manager without loss. This data managing process is very difficult. This problem can be solved very easily with the engagement of database. Through database a businessman can easily manage huge amount of data without any data loss. For extended their business nationally or internally they need to advertise their business which is very hard work. On the other hand, for obtaining public concentration the merchant need to display his product in a decorated and attractive manner which is very complex. This complex and hard task can be done very easily with the help of software. In this research work I design a flexible database and efficient website as the blessed of online business.

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II. PROPOSED SYSTEM

A. *System design*

User case diagram:

The functional diagram which is interacted between system and users and this diagram is known as user case diagram. This diagram is shown below.

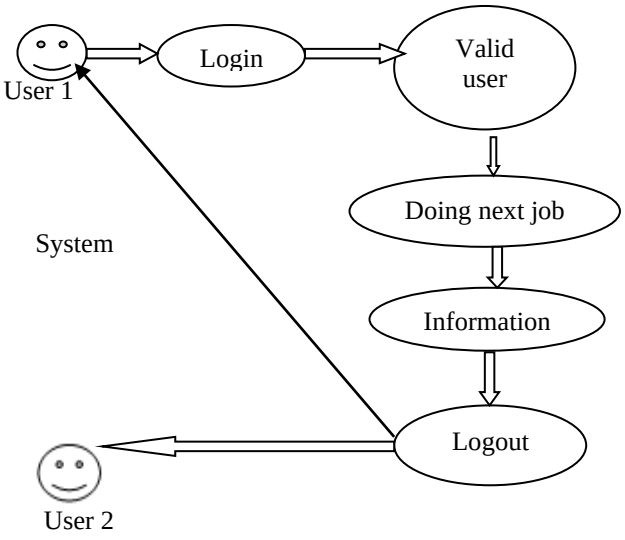

Fig. 2.1 User Case Diagram

B. *Data Flow Diagram:*

The graphical representation of the system necessity component for module design is known as data flow diagram. This diagram mainly focused on the logical flow rather than processed. As a result this is not showing any dependency on hardware, software, data structure or file organization. The data flow diagram mainly a flow chart using structured analysis and design tools. The data flow diagram mainly describes the system data flow and changes transform data.

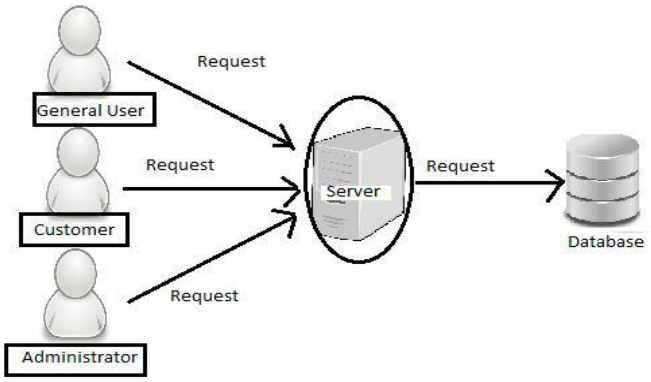

Fig.2.2 Data flow diagram

C. *Context analysis diagram*

The system mainly contains some content like Admin, Users, Shipping and Agent.

Fig. 2.3 Context analysis diagram

Data Flow Diagram Level 1: Through level 1 the user can login the system, add and removes items, register, make order and pay. Admin have lots of freedom like change, modify catalog and maintain user data.

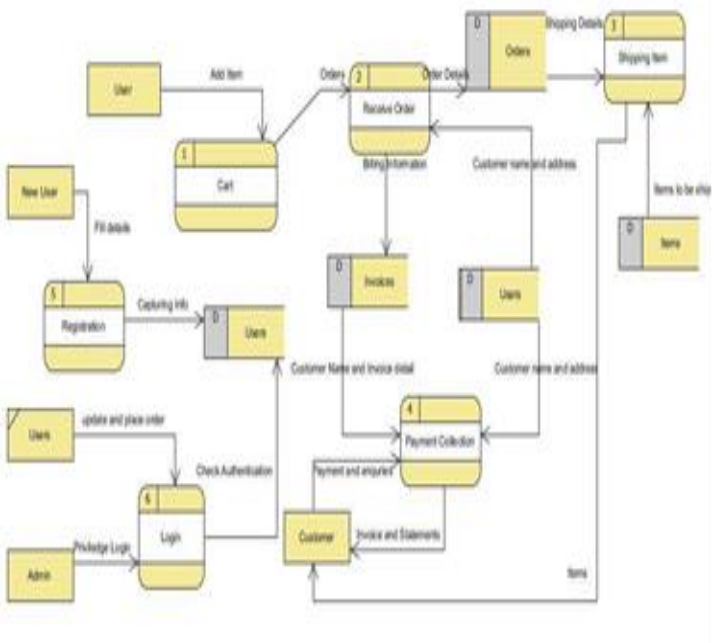

Fig.2.4. Data flow diagram Level 1

Data flow diagram level 2: In this level the customer can browse their catalog, add and remove item in their cart and make order. After selecting their cart they also can checkout and move order.

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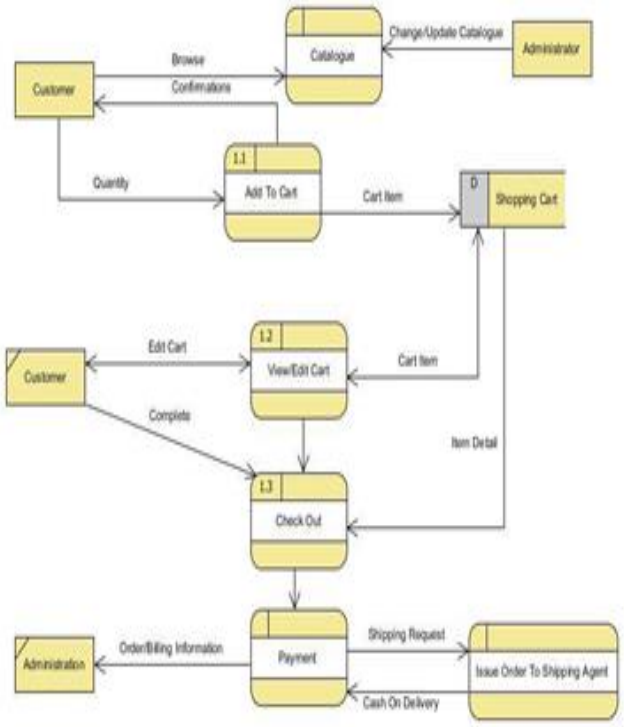

Fig.2.5 Data flow diagram level 2

Data flow diagram level 3: Registration

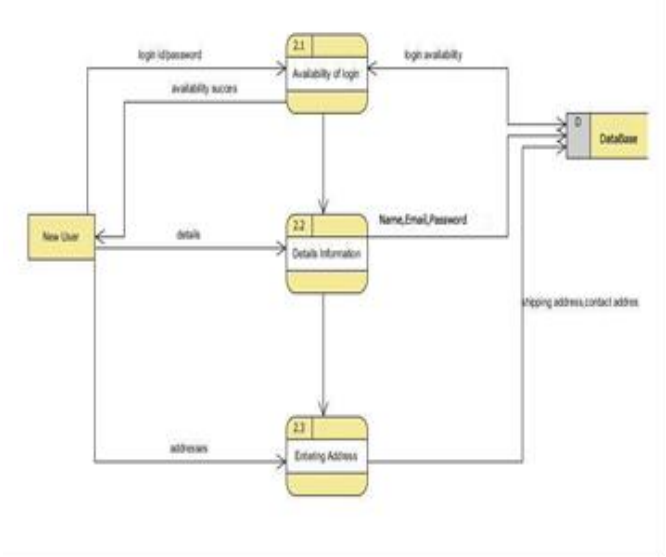

Fig.2.5. Data flow diagram level 3

Data flow diagram Level 4: Maintenance. Admin has capability to maintain catalog which can contain all the items of the stock and their price rate.

Fig.2.7. Data flow diagram Level 4

ıta flow diagram Level 5: Login. Through level 5 user can ǥin with their password. If the entered data is valid it store :o the home page otherwise a message is initiated and ovide to user to give valid details.

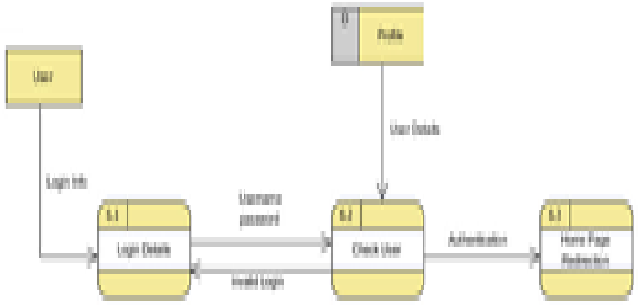

Fig.2.8. Data flow diagram Level 5

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D. E-R diagram

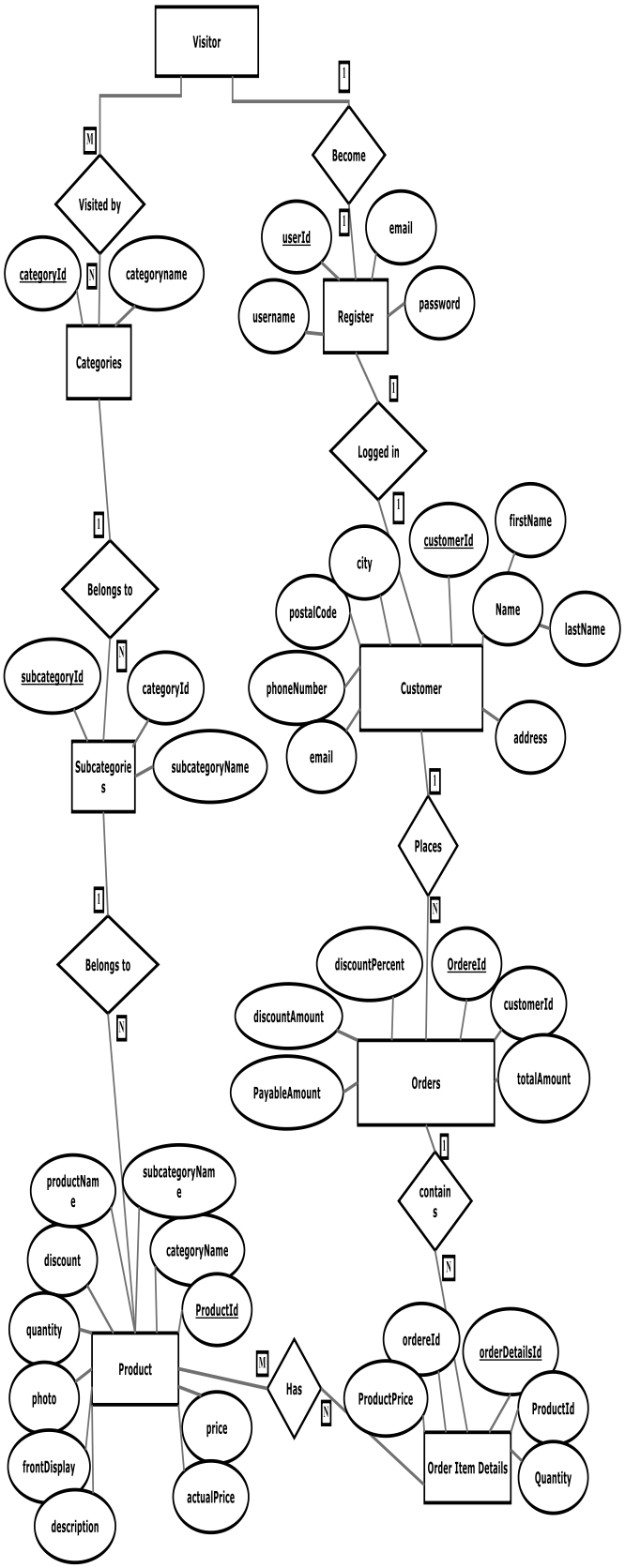

Fig.2.9. E-R diagram

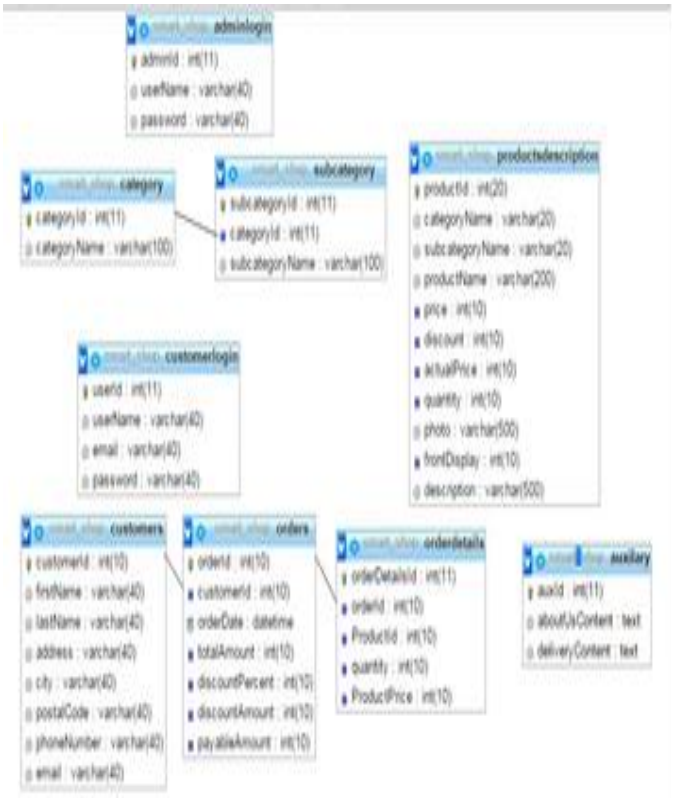

Fig.2.10. Database table and relations

E. Use Case Diagram

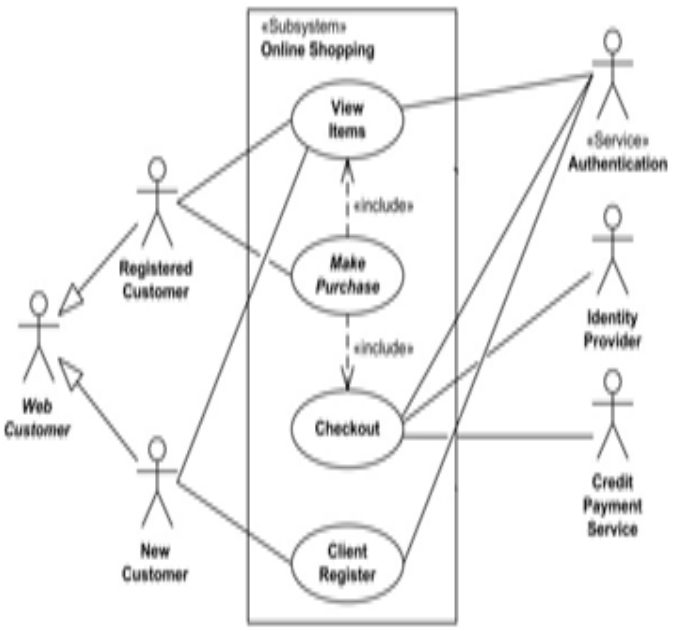

Fig.2.11. Use Case Diagram

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F. System Flow Chart

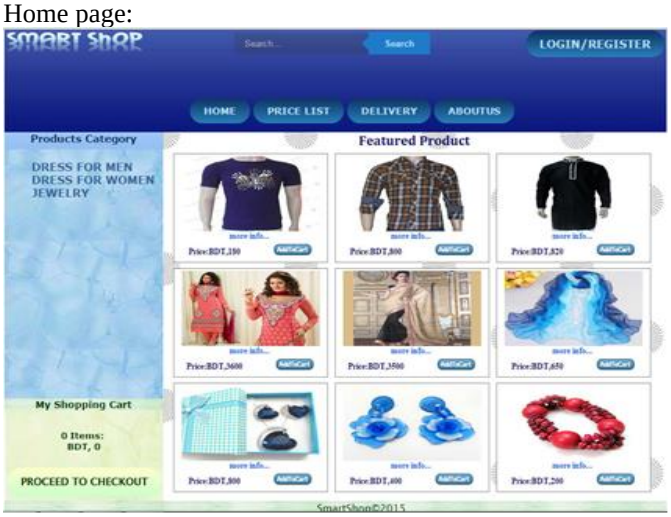
Fig.2.12. System Flowchart

III. SOFTWARE DESIGN

For designing online business software required some process which is divided in some module. These module are Login, Registration, Search, Category, Sub Category, Product details, Check out, Order info and auxiliary module. The login system module is used to compare the User admin panel and the user login window. The system administrators define the role and provide the permission level for the user. This module also has the ability to create and delete user account and reset the password. The category information is composed by using category module and the sub category information composed by the sub category module. The product detail and registration is composed by using product detail module and registration module respectively. The order module composed the order information.

A. Screen shot of software implementation

Home page:



Product list page:

Product Detail Page:

Product detail with large picture:

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Login Page:

Registration Page:

Shopping cart Page:

About us page:

Shipping and delivery Page:

Checkout Pages:

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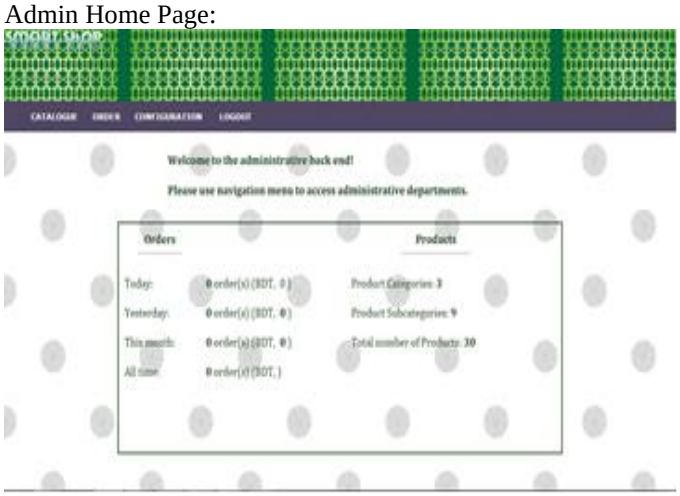
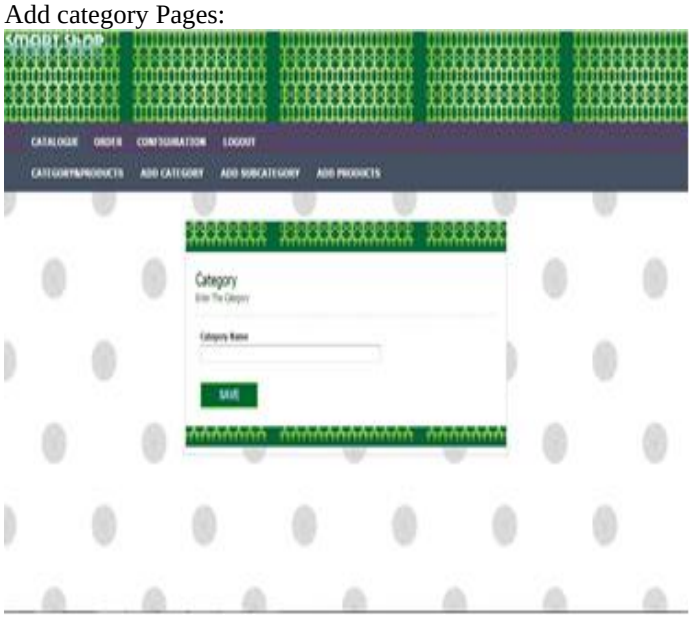
Login Page:

Admin Home Page:



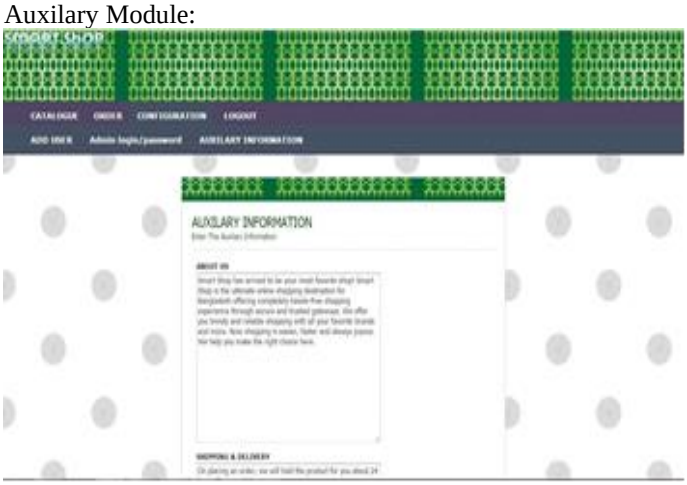
Add category Pages:



Add Sub category Page:

Add Products Page:

Auxilary Module:



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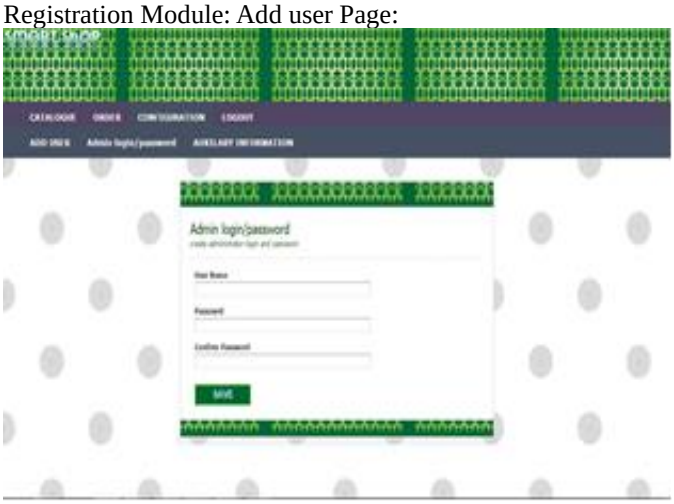
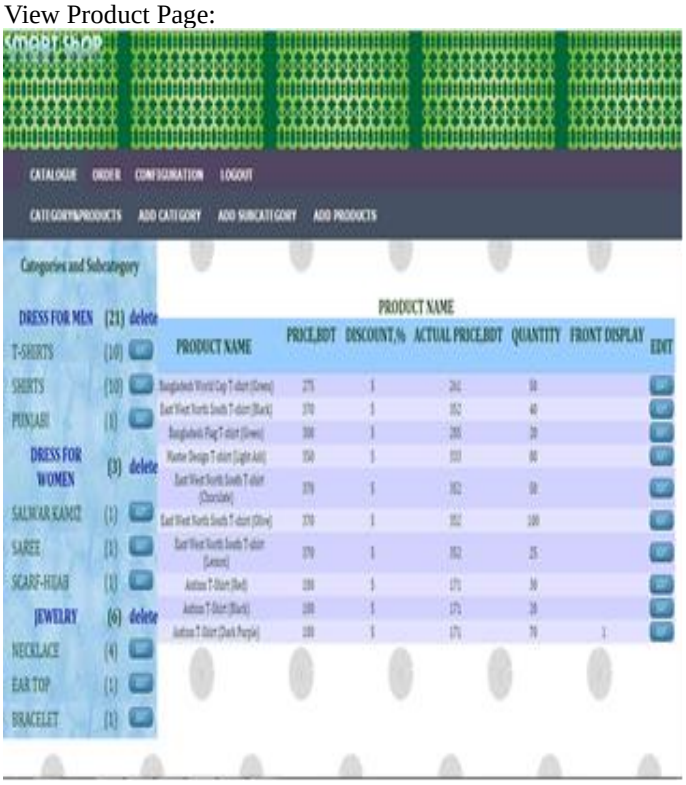
Registration Module: Add user Page:



Edit Admin Use page:

List of Orders page:

View Product Page:



IV. SOFTWARE TESTING

A. Testing Plan

For system design testing is essential and it is checking the exactness of the system. The black box testing is used to check the system work perfectly. The input and the relevant output is feeding the black box test. After taking inputs and outputs different types of analysis is taking place for find out that they provide desired outcome which provides assurance of the system work perfectly. In this research work the test and implementation work parallel.

B. Testing Schedule

The system testing follow predominant manner in “Black Box” based and the schedule of testing follow the schedule of implementation. Testing is the combination of bottom up and top-down and every unit is tested uniquely. Then the whole system is tested at a same time and the final test of the system completed successfully. The block box testing is unable to test the internal activities of the system.

Code Walkthrough:

The checking of each part of code is completely my responsibility because I work as a developer in this research work. It is more convenient to find error during testing cycle rather than later finding. After completing the coding for website design, it becomes essential to complete the test of whole system. During the test season mainly check syntax error, incorrect function or variable name and inefficient data structures. After changing the whole system the further walkthrough taking place and continued.

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Component Testing:
The component testing is occurred instantly on the developing machine after giving the code all clear in the cod-walkthrough. The individual function code is compiled and executed to see the performance of the function. If a part of code does not provide expected result, the code should check against the specification requirement.

Bottom-up Integration testing:
The bottom-up integration testing is applied on the region where all the component combined together and try to find out all the part work perfectly. If there find any error the code and unit testing is reviewed for pointing and fixing the problem.

System Test:
In this section the user and the visitors give their opinion that the developer follow the objective of the project correctly and implemented accurately. This checking considers two major issues like function testing and performance testing.

V. QUALITY ASSURANCE PLAN

The work on developing and maintaining based must need to include quality assurance plan which specified the project objective. The standard which measured the quality assurance performance depend on the procedural and organizational formation. For assurance the software quality need to contain some content and the content according to the standard of IEEE is given below.

1. Intention or motive
2. Reference archives
3. Administration or Arrangement
4. Provides appropriate materials
5. Standards, Exercise and Provision
6. Inspection and Observation
7. Configuration Directorate
8. Complication representation and Refining Work
9. Instrument, Artifice and Methodologies
10. Code, Media and Supplier monitoring
11. Document gathering, Maintenance and Protection.

A. Intention or Motive:

For setting up specific target, operation and responsibilities needed for producing an efficient and effective quality assurance function for online business which is the main motive or intention of the quality assurance plan. The quality assurance plan for the online business website supplies an essential framework for ensuring a fixed and effective software quality assurance direction along with the lifecycle of the project. The quality assurance has capability to make verification of the documentation and the software which provides all technical requirements.

B. Administration or Management:

According to the standard of IEEE the quality assurance plan maintain three perspective actions.
Organization: The organizational part selects and provides some roles and regulations for team members. It is essential for the cheap of the software quality assurance organization to have sufficient freedom for performing the verification. The quality and influence is maintained by the functional groups is introduced below.

1. Program manager responsibilities:
    a. For auditing and reporting on the project's QA function, the manager tries to identify the isolated or group freedom. Identification the isolated or group freedom from the work.
    b. For the implementation of software and system he/she identify the quality factor.
2. Project Manager responsibilities:
    a. During the question of quality of the product the program manager tries to find out the solution.
    b. According to the program management plan manager tries to identify, develop and maintain the planning documents.
3. For the implementation of engineering contemplation and procedures the system engineer tries to plan the document.
4. The quality factor is identified or implemented or evaluated by the software designer.
5. The software testing procedures mainly test the software implement procedure, implementation and method.
6. The quality factor is measured by the system testing process.
7. Logistics responsibilities:
    a. Logistics review and comment on the SQA plan.
    b. The online shopping quality program is implemented according to SQA plan.
8. Software Configuration Management procedure, document and method are implemented by using SCM (Software Configuration Management).
9. Independent Verification and Validation is implemented the project planning document, procedure and all other method.
10. Systems Engineering Process Office (SEPO) responsibilities:
    a. Manage SQA action.
    b. Conformation of SQA training appearance.
    c. Try to help software processing engineer and improvement.

Tasks:
The performance of the SQA task is depended on the software activities which are taking place. Before completing a task more than one SQA task is performing jointly. SQA plan provides some task which is given below:

1. Assess the System Requirements
2. Analysis the System Design procedure
3. Analysis the Software Requirements
4. Assess Software Tools
5. Describe and assess Software Implementation and Unit Testing method.
6. Analysis End-item delivery method
7. Assess Configuration Management procedure

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Responsibilities:
During the software developing period the project manager, design manager and development group are responsible for applying quality control.
The quality manager responsibilities:

1. Quality manager provides the quality personnel duties on the work of quality assurance.
2. Worked with the project manager for the agreement of the quality plan.
3. He/She provide the approval on the report of observation committee.
4. Trying to find out the solution of the conflicting statement between the project manager and the quality personnel.
5. Reviewing the project personnel activities and provides a satisfactory statement on behalf to quality plan requirement.
6. Provide solution on lots of confliction action with the project manager.
7. Taking proper action on the trends of fault evaluation.

C. Appropriate Materials:
In this section, lots of description and reviewing process is taking place for various materials or document of the quality assurance plan. This portion mainly covered the following steps:

1. Software Requirements Specification (SRS)
2. Design Description, Verification plan and verification report of the software.
3. The software quality manual and quality management system is mentioned with respect to the standard of ISO, CMM and IEEE.
4. Provides the guideline of the user, operator and programmer.
5. Planning the management configuration.
6. Motivation of the Software Quality.

D. Standards, Exercise and Provision:
For producing a high quality product it is essential to verify, conforming and assigned individually. In this segment mainly introduced some method through which the quality of the product remain high. The cost and the schedule status are determined by using the following measurement of SQA.

1. The milestone dates when the project completed.
2. Planned work routine
3. Actual work completed
4. Expanded the planned effort.
5. Expended the actual effort.
6. Expanded the planned funds.

E. Inspaction and Obsevation:
The inspection and observation section of the software assurance plan will be reviewed the technological and manufacturing activities and their carried out process. There is set of reviews on the standard of ANSI.

1. The software requirement specification (SRS) is defined the acceptance of the defining document and also check the sufficient document requirement.
2. Primary Design Review process has the ability to approve the document of top-level design.
3. Critical Design Review capable for approving the detailed designing material for the next development.
4. Software Verification Review process approves the testing plan and it has the ability to check the sufficiency and fulfillment of the procedural description.
5. Functional observation is work for verifying the all software requirement is available or not.
6. Physical observations verify that all the comfortable documents reached to the user or not.
7. In-Process observations verify the consistency of the sample design.

F. Configuration Directorate:
During the development of software it is essential to identify configuration, control configuration, count the status of configuration and audit the configuration and these work are done by the configuration directorate.

G. Complcation Representation and Refining Work:
The main activities of this section are to find out the defect of the software and find out best suited solution and this is a closed loop system. The defect which is discovered should be reported appropriately and give solution properly. For determining the significance of every specific problem should be analysis properly and should be divided them in some categories with having severity level and priority number. Then appropriate solution and target date for completion should be selected for every problem.

H. Instruments, Artifice and Mehtodologies:
Instruments – For designing software some essential tools need to provide without limitation. The required instrument list is given below:

1. Utilities of the operating system
2. Aids of debugging
3. Assistance of documentation
4. Check-lists
5. Arrangement of preprocessors
6. File comparator
7. Analyzer of the structure, execution and code
8. Qualified auditor and simulator
9. Performance monitors
10. Packages for statistical analysis
11. File or folder for software development
12. The matrices for software trace
13. Drivers for testing
14. Generators for testing case
15. Tools for static or dynamic testing
16. Case tools for information engineer

I. Code Monitoring:
The code monitoring provides the action which includes below:

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1. For controlling the software labeling and cataloging activities taking place.
2. Code monitoring system identifies the physical location under controlling the software.
3. This section also capable to identify location, maintain and use of backup copies. It also distributes the copies of code.
4. The document is identified by the code monitoring system and it is affected during change.
5. Establishment of modern version
6. Provide the code for user access.

J. Media Monitoring:

The Media monitoring portion of the quality assurance plan describe the protection process form damage or unauthorized access. This section provides below factors which is responsible for the security violation:

1. Damaging the fire, water and structure.
2. Variation of energy
3. Pollution
4. Trespass without authorization.
5. Viruses and Worms
6. Abuse of data, services and software.

K. Supplier Monitoring:

Before taking any decision for buying software all the project member should be addressed all the requirements and provided that to an appropriate supplier or vendor. This also follows the software tool evaluation process. For describing the technical support, handling the user questions and problems the supplier need to follow a specific evaluation process.

L. Document gathering, Maintenance and Protection:

The activities which are taken place by the quality assurance plan based on the documentation and the quality assurance committee preserved all the documents and history of the product throughout the software lifecycle. For improving the process there have a trend to review the collected m data. All the document and records are preserved and compiled by the SDL or Archival storage of the product life cycle.

VI. CONCLUSION

The main goal of this research is to design and implement database and software and testing and quality assurance checking the software on the platform to E-commerce. With the increment of dependency of customer to by their daily goods lots of new businessman engaged with the online business. So it becomes so difficult for the traders to exist in the market permanently. As need to faces lots of complexity and manage it instantly and need to implement new innovative idea. With the increment of customer the manageable data is increased and its essential to manage these data without waste. They also need to display their goods in a attractive way. For managing huge amount of data and display their good the need a strong database and a website which is design in this paper accurately. The software need to test and check it's quality to cope with the demand of the traders. Through this database the businessman can easily manage their different types of data and by using the software they can display their product, taking order form customers, calculate his business status, the acknowledge customer requirement and so on. So in this research work I design a database, software, testing and quality assurance of the software is done perfectly.

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