Resource Availability and Movement Tracking system

Submitted in partial fulfillment of the requirements
for the award of the degree of
Master of Science in Applied Science-Software Engineering
Bharathiar University
Coimbatore-641006

Submitted by
S.Yuvaraj
9837S0070

P-933

Under the guidance of
Mrs.Devaki Sr. Lecturer,
Kumaraguru College of Technology
Coimbatore
Mr. Ramamoorthy
Satyam Computers Service Ltd.,
Tidal Park
Chennai

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE-641006
APRIL 2003

CERTIFICATE

Department of Computer Science and Engineering
Kumaraguru college of Technology
Coimbatore-641006

This is to certify that the project work entitled "Resource Availability and Movement Tracking system" has been submitted by

Mr. S.Yuvaraj

In partial fulfillment of the award of the degree of
Master of Science in Applied Science-Software Engineering
Bharathiar University, Coimbatore
during the academic year 2002-2003

Internal Guide

Head of the Department

Certified that the candidate was examined by us in the Project Work Viva Voce Examination held on 05.04.03 and the University Register Number was 9837500070

Internal Examiner

External Examiner

Satyam

To

The Principal,

Kumaraguru College of Technology,

Coimbatore.

P-933

Dear Sir,

This is to certify that Mr. S. YUVARAJ. Has worked from Jan 2nd 2003 to Mar 31st 2003 as a Project Trainee with our project unit.

We have allocated a suitable project for him and under one of our project mentors. He did well during his training days.

Thanking you.

Yours truly,

For Satyam Computer Service Ltd. (EBS Unit)

K. Rammaurthi
Sr. Consultant

Satyam Computer Services Ltd.
(Unit : Enterprise Business Solutions)
Tidel Park, 3rd Floor, A-Block, 4, Canal Bank Road, Taramani, Chennai-600 113. India
Tel : +91-44-2254 0321 Fax : +91-44-2254 0366 Web site : http://www.satyam.com
Regd. Office : Mayfair Centre, S P Road, Secunderabad - 500 003, India.
Development Centers at Bangalore, Bhubaneswar, Chennai, Hyderabad, Pune & Secunderabad

Declaration

I S. Yuvaraj do here by declare that this industrial project done at Satyam Computers Service Ltd., Chennai submitted to Kumuraguru College of Technology, Coimbatore for the award of M.Sc Software Engineer degree.

Acknowledgement

I wish to express my thanks to my beloved **parents** without whom I can't do the project and helped me in getting the project in this company by providing all kind of help from knowledge to finance.

I express my sincere thanks to **Mr. Ramamoorthy, Satyam Computers Service Ltd.**, Tidal Park, Chennai for providing me this opportunity to do the project in their Company.

I express my profound gratitude and thanks to my external guides Mr. **Ramamoorthy** for the guidance he provided during the development of the project.

I am bound to express my gratitude to **Dr. K.K Padmanabhan** B.Sc.(Engg),M.Tech, Ph.D. Principal, Kumaraguru College of Technology, Coimbatore for his assistance in getting the project work.

I wish to express my grateful thanks to **Dr. S. Thangasamy**, Prof & HOD, and our course-coordinator and my internal guide **Mrs. Devaki** Sr. Lecturer, Department of Computer Science and Engineering, Kumaraguru College of Technology, Coimbatore for constantly encouraging me to pursue new goals and ideas and have given their tremendous guidance and suggestions throughout the project.

S. Tuvaraj

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Synopsis

Resource Availability and Movement Tracking System (RAMTS) acts according to the needs of Satyam Computers Service Ltd. The project starts right from the associate or employee details registration. Once the resource is registered a associate id for that particular associate is assigned for reference.

With respect to the skill sets of that particular associate, a project is assigned. If the associate has got no idea about the software then the associate is put into a period of training. After the training period is over the associate has to start the project from the date he is assigned to start with and also finish it on the end date assigned to him.

The onsight and offsight projects are given to a associate after verifying his previous experience and his performance until is last project was done. This is continued until the associate is working in the company.

Introduction About The Organization

Delivering What Business Demands

Satyam Computer Services Ltd. is a leading global consulting and IT services company-offering solutions that offer a wide array of solutions for a range of key verticals and horizontals. Starting from the strategy consulting right through to implementing IT solutions for clients, Satyam straddles this entire space. It has excellent domain competencies in verticals such as Automotive, Banking & Financial Service, Insurance & Healthcare, Manufacturing, and Telecom-Infrastructure-Media-Entertainment-Semiconductors (TIMES). As a diverse end-to-end IT solutions provider, offers a range of expertise aimed at helping customers re-engineer and re-invent their businesses to compete successfully in an ever-changing marketplace, with the final objective of giving clients the competitive edge in the marketplace.

Satyam's development centers in India, the USA, the UK, the Middle East, Japan, Singapore and Australia serve over 270 global companies, including around 76 Fortune 500 corporations.

The company's marketing network spans 45 countries across five continents. Satyam has strategic technology and marketing alliances with about 60 top-notch companies. This need-driven deployment of domain and technology expertise brings to customers a range of solutions and products that enhance performance and competitiveness. We follow a specially developed Business Continuity Model (BCM), which allows us to continue mission critical operations of our clients even in the most challenging times.

The Competency:

Satyam's Enterprise Business Solutions unit has forged a robust competency in strategic consulting. It has a proven track record in strategizing and implementing solutions, which address both the technology as well as the business issues that clients are faced with. These solutions, have successfully imparted that winning competitive edge to clients businesses as well as benefiting their bottom lines in clearly measurable terms. A TI cycle is a case in point where Satyam helped to achieve significant cost savings and improve process efficiencies.

HARDWARE CONFIGURATION

PROCESSOR	:	PENTIUM IV
CLOCK SPEED	:	400MHZ
RAM	:	128MB
CACHE	:	512 Caches
HARD DISK	:	8 GB
MONITOR	:	VGA 14" COLOR MONITOR
PRINTER	:	HP LASER JET 4 PLUS

Software Specification

OPERATING SYSTEM	: WINDOWS 2000
FRONT END	: ACTIVE SERVER PAGES
BACK END	: ORACLE 8.i
WEB SERVER	: PERSONAL WEB SERVER
HTML EDITOR	: MICROSOFT VISUAL INTERDEV 6.0
BROWSER	: I.E 5.5

Graphic Tools Used :

Adobe PhotoShop 6.0

Microsoft FrontPage Editor

About the Software's Used:

What is ASP?

- ASP stands for Active Server Pages
- ASP is a program that runs inside **IIS**
- IIS stands for Internet Information Services
- IIS comes as a free component with **Windows 2000**
- IIS is also a part of the **Windows NT 4.0 Option Pack**
- The Option Pack can be **downloaded** from Microsoft
- **PWS** is a smaller - but fully functional - version of IIS
- PWS can be found on your **Windows 95/98 CD**

ASP Compatibility

- ASP is a Microsoft Technology
- To run IIS you must have Windows NT 4.0 or later
- To run PWS you must have Windows 95 or later
- ChiliASP is a technology that runs ASP without Windows OS
- InstantASP is another technology that runs ASP without Windows

What is an ASP File?

- An ASP file is just the same as an HTML file
- An ASP file can contain text, HTML, XML, and scripts
- Scripts in an ASP file are executed on the server
- An ASP file has the file extension ".asp"

How Does ASP Differ from HTML?

- When a browser requests an HTML file, the server returns the file
- When a browser requests an ASP file, IIS passes the request to the ASP engine. The ASP engine reads the ASP file, line by line, and executes the scripts in the file. Finally, the ASP file is returned to the browser as plain HTML

What can ASP do for you?

- Dynamically edit, change or add any content of a Web page
- Respond to user queries or data submitted from HTML forms
- Access any data or databases and return the results to a browser
- Customize a Web page to make it more useful for individual users
- The advantages of using ASP instead of CGI and Perl, are those of simplicity and speed
- Provides security since your ASP code can not be viewed from the browser

- Since ASP files are returned as plain HTML, they can be viewed in any browser
- Clever ASP programming can minimize the network traffic

The Basic Syntax Rule

An ASP file normally contains HTML tags, just like an HTML file. However, an ASP file can also contain **server scripts**, surrounded by the delimiters <% and %>. Server scripts are **executed on the server,** and can contain any expressions, statements, procedures, or operators valid for the scripting language you prefer to use.

Lifetime of Variables

A variable declared outside a procedure can be accessed and changed by any script in the ASP file.

A variable declared inside a procedure is created and destroyed every time the procedure is executed. No scripts outside the procedure can access or change the variable.

To declare variables accessible to more than one ASP file, declare them as session variables or application variables.

Session Variables

Session variables are used to store information about ONE single user, and are available to all pages in one application. Typically information stored in session variables are name, id, and preferences.

Application Variables

Application variables are also available to all pages in one application. Application variables are used to store information about ALL users in a specific application.

Introduction

Talking of a large system explicitly for software developments company (***Satyam Computer Services Ltd. SCSL***) Which handles lot of projects at a given instance of time and which are to be delivered to the respective clients on due date.

So, an effective project planning and monitoring has to be done as per cost estimation and schedule and quality of the software. In this process the project manager has a key role to play.

Project planning and monitoring control involves mostly with the resource availability and movement tracking system, which is to be handled carefully and accurately as it directly have an impact on the cost and quality of the software.

Terms:

Users:

The users are a group of people who have the privileges to carry out certain tasks within the system.

1: System Administrator.

2:General Users.

Resources:

Resources are employees of **SCSL** who are treated as assets to be utilized or consumed by the projects for various clients.

The resources carry with them a set of competencies, which could be technical, organizational, managerial, etc and based on a combination of these factors, assignments takes place across all projects. The competencies are assessed continuously and are updated into the system from time to time. The resources are either onsite or offshore or offsite depending upon there work.

Projects:

Projects are normally carried out for various clients' spread across many countries and they are of varying nature. The timeline of the project decides the number of resources to be assigned for the project and this goes through different phases each with its own set of deliverables. The Quality Management System (QMS) specifies the process guidelines for all the projects and serves as a process roadmap, which can be followed under any set of environments. QMS specifies all activities: checklists at each stage of the Software Development Life Cycle (SDLC) can thereby eliminate any risk that the project may face at any time.

1:User Action:

1.1Log-in Users:

The system enables only privileged users to log in and performs the desired operations on a well-defined set of data pertaining to the projects, resources, etc.

1.1.2 Create Users:

The create user screen enables creation of new user who can perform these operations upon successful log-in wherein his privileges are ascertained and carried across all screens. The privileged user can create new projects, new resources, assign resources to various projects all the assignments, perform all the statistical functions and prepare the reports from the information captured time to time.

2: Resource creation /tracking:

2.1 Creation of Resource:

The user after successfully logging-in to the system creates resources, which are the assets of the company and have certain sets of competencies.

2.2 Availability of Resource:

The users then select resource from the view availability screen depending on certain criteria like date or skill set or location, etc.

2.3 Movement of Resource:

The user then keep track of the resources and their movements from the movement tracking screen depending on certain criteria like associate name or associate id.

2.4Assignment of Resource:

The user assigns the resources to projects. Depending on their availability on the due date, the competency of the resources and other factors.

3: Skill Management:

3.1 Assignment of Skills:

There are lots of software and tools available in the market and as an associate of a software development companies he /she has to know the available software and tools. The skill management problem is defined to keep track of the associates' knowledge of these software and tools.

4: Project Creation /Tracking:

4.1 Creation of Projects:

The user after entering the system creates project when the company is assigned a project with the relevant details like scheduled date to start, likely to deliver date which can be extended if required, technology used, etc.

4.2 Assignment of Projects:

The users depending on the criteria's of the project assign relevant details and the resources through project assignment screen.

4.3 Completion of Projects:

The user also keeps track of the projects which are going on and which are to be delivered on the due date. The relevant data's are to be carefully watched as companies policy and name comes in picture.

5:Training:

5.1 Assignment of Training:

Resources undergo training, which is a part and parcel of ***Satyam*** curriculum. The resources undergo three kind of training induction, QMS, and regular training. The resources have to go induction training at least once as in this training they are introduced to the ***Satyam***. In the QMS training the resources are given idea about the quality framework and every ***satyamite*** has to go at least 40 hours of training in a year. It can be either technical or non-technical.

6: Warning System:

6.1 Project going over date:

A user is a person at the managerial level. The user has to take decisions at managerial level i.e. long term decisions as well as he has to look for the future that the project doesn't deviate from its track and if at all it does the user has to look into it and take necessary action. One of the common problem that occurs in the software industry is they are not able to deliver the project on the due date for various reasons. So a warning system helps in alarming the user that the project is deviating from its track and help in guiding the user to take the necessary actions.

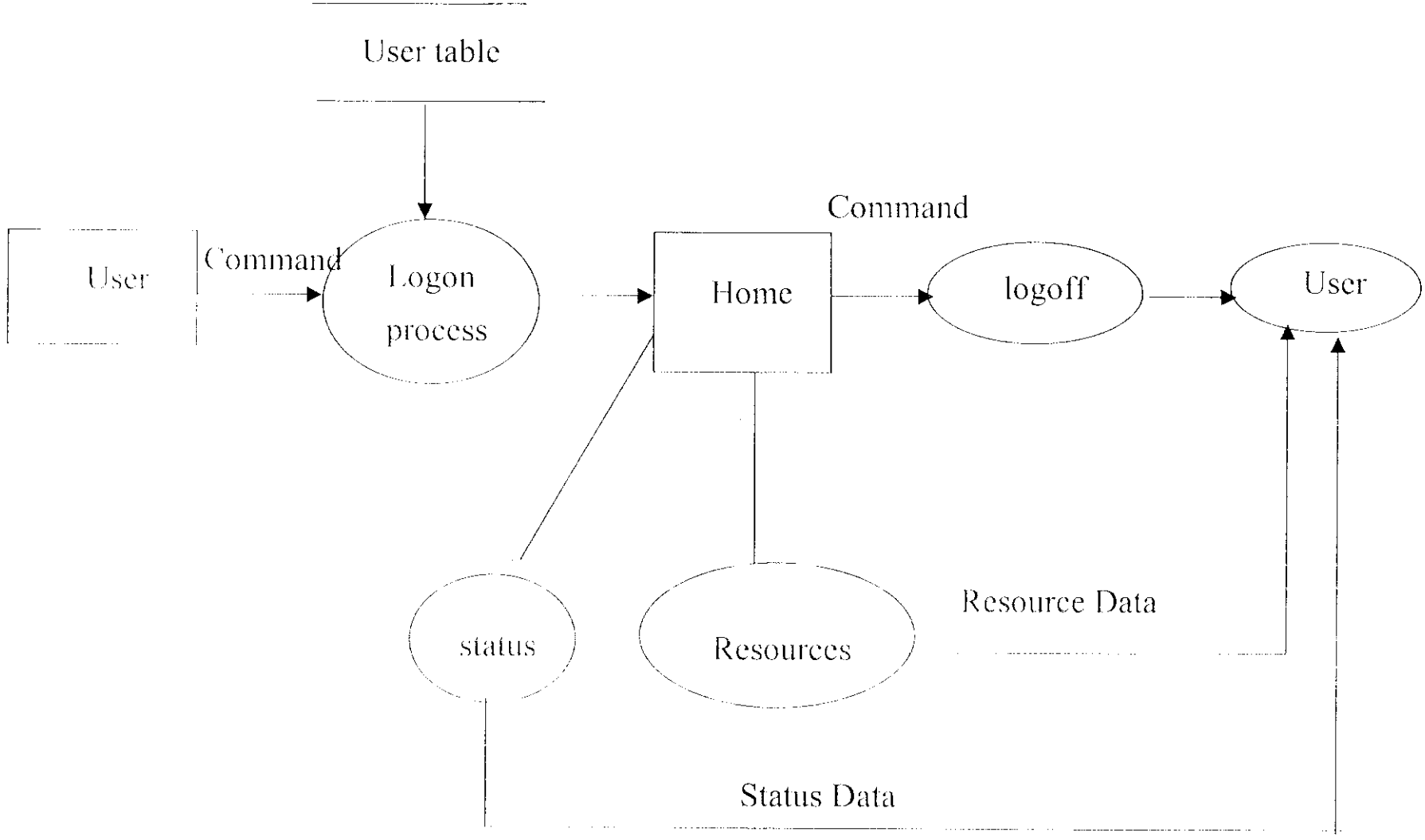
6.2 Scarcity of Resources:

Warning system help the user to look into the system to keep track of the resources i.e. are the resources aren't enough to fulfil the requirements? Or Resources are in bench i.e. idle, without any assignment of projects because this will increase the expenditure of the company.

Project Objective:

To capture all the data pertaining to the resources and present these in various views as per requirements.

DATA FLOW DIAGRAM
LEVEL 1



CONTEXT ANALYSIS DIAGRAM
LEVEL 0

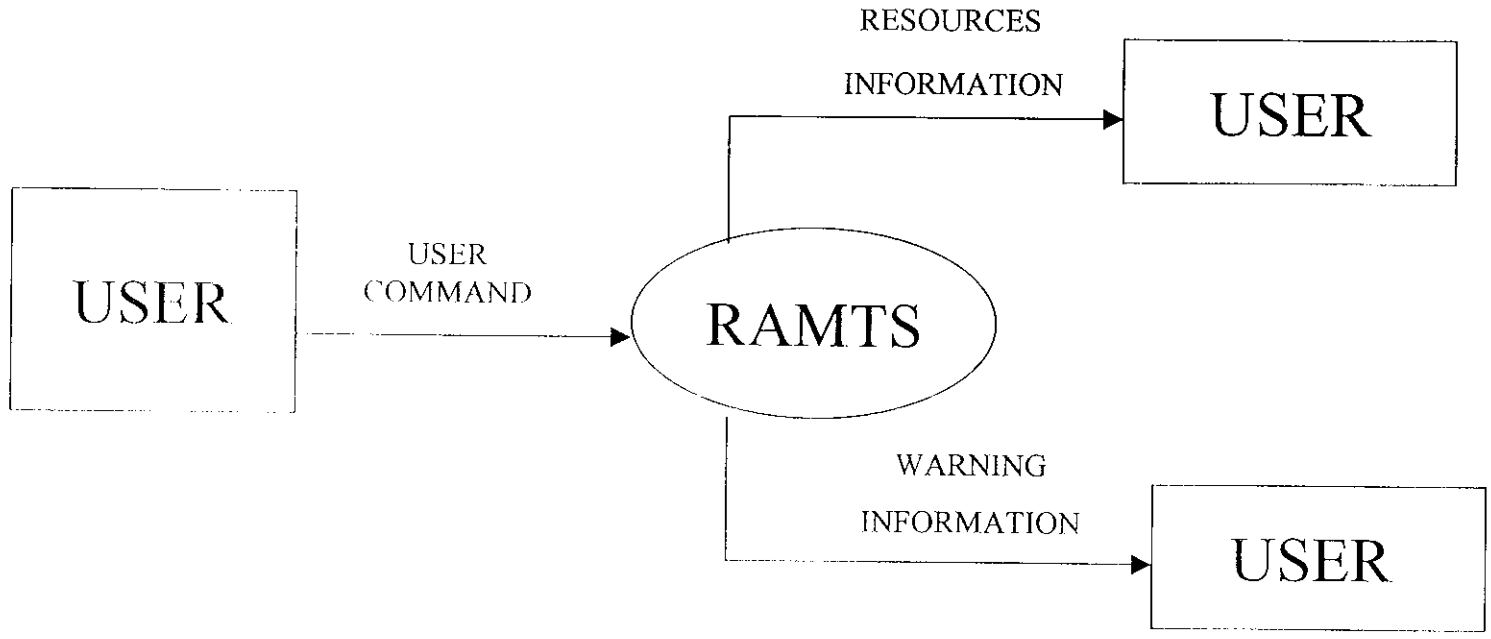


Table Design

LIST OF TABLES

1. Associate_Master
2. Project_Master
3. Location_Master
4. Skill_Master
5. Onsite_Location_Master
6. Offshore_Location_Master
7. Training_Master
8. Client_Master
9. Associate_Details
10. Project_Details
11. Project_Description
12. Employee_Skills
13. User_Password
14. Status_Table
15. Associate_Project
16. Associate_Training

RAMTS TABLE DESIGN

1.ASSOCIATE_MASTER

PRIMARY KEY : ASSOCIATE_ID

Field Name	Field Type	Field Size	Key
ASSOCIATE_ID	VARCHAR2	10	PRIMARY KEY
ASSOCIATE_NAME	VARCHAR2	30	
DT_OF_JOIN	DATE		

2.LOCATION_MASTER

PRIMARY KEY : LOC_ID

Field Name	Field Type	Field Size	Key
LOC_ID	VARCHAR2	5	PRIMARY KEY
LOC_NAME	VARCHAR2	20	

3.SKILL_MASTER

PRIMARY_KEY : SKILL_ID

Field Name	Field Type	Field Size	Key
SKILL_ID	VARCHAR2	5	Primary Key
SKILL_NAME	VARCHAR2	20	

4.ONSITE_LOCATION_MASTER

PRIMARY KEY : ONSITE_ID

Field Name	Field Type	Field Size	Key
ONSITE_ID	VARCHAR2	5	Primary Key
ONSITE_NAME	VARCHAR2	20	
COUNTRY	VARCHAR2	15	

5.ASSOCIATE_DETAILS

PRIMARY KEY : ASSOCIATE_ID

FOREIGN KEY : LOC_ID REFERENCING LOCATION_MASTER

Field Name	Field Type	Field Size	Key
ASSOCIATE_ID	VARCHAR2	10	PRIMARY KEY
DESIGNATION	VARCHAR2	20	
EXPERIENCE	NUMBER	3,1	
LOC_ID	VARCHAR2	5	FOREIGN KEY
DATE_OF_BIRTH	DATE		
FLAG	VARCHAR2	5	
EMAIL	VARCHAR2	30	

6.OFFSHORE_LOCATION_MASTER

PRIMARY KEY : OFFSHORE_ID

Field Name	Field Type	Field Size	Key
OFFSHORE_ID	VARCHAR2	5	PRIMARY KEY
OFFSHORE_NAME	VARCHAR2	20	

7.TRAINING_MASTER

PRIMARY KEY : TRAINING_ID

Field Name	Field Type	Field Size	Key
TRAINING_ID	VARCHAR2	10	PRIMARY KEY
TRAINING_NAME	VARCHAR2	20	
DURATION	NUMBER	3	

8.CLIENT_MASTER

PRIMARY KEY : CLIENT_ID

Field Name	Field Type	Field Size	Key
CLIENT_ID	VARCHAR2	10	PRIMARY KEY
CLIENT_NAME	VARCHAR2	30	

9.PROJECT_MASTER

PRIMARY KEY : PROJECT_ID

Field Name	Field Type	Field Size	Key
PROJECT_ID	VARCHAR2	10	PRIMARY KEY
PROJECT_NAME	VARCHAR2	30	
START_DATE	DATE		
END_DATE	DATE		

10.PROJECT_DETAILS

FOREIGN KEY : PROJECT_ID REFERENCING PROJECT_MASTER
CLIENT_ID REFERENCING CLIENT_MASTER
ASSOCIATE_ID REFERENCING ASSOCIATE_MASTER

Field Name	Field Type	Field Size	Key
PROJECT_ID	VARCHAR2	10	FOREIGN KEY
CLIENT_ID	VARCHAR2	10	FOREIGN KEY
ASSOCIATE_ID	VARCHAR2	10	FOREIGN KEY

11.PROJECT_DESCRIPTION

FOREIGN KEY: PROJECT_ID REFERENCING PROJECT_MASTER
LOC_ID REFERENCING LOCATION_MASTER

Field Name	Field Type	Field Size	Key
PROJECT_ID	VARCHAR2	10	FOREIGN KEY
PLATFORM	VARCHAR2	50	
STRENGTH	NUMBER	4	
LOC_ID	VARCHAR2	5	FOREIGN KEY

12.EMPLOYEE_SKILLS

FOREIGN KEY :ASSOCIATE_ID REFERENCING ASSOCIATE_MASTER
SKILL_ID REFERENCING SKILL_MASTER

Field Name	Field Type	Field Size	Key
ASSOCIATE_ID	VARCHAR2	10	FOREIGN KEY
SKILL_ID	VARCHAR2	5	FOREIGN KEY

13.USER_PASSWORD

FOREIGN KEY :ASSOCIATE_ID REFERENCING ASSOCIATE_MASTER

Field Name	Field Type	Field Size	Key
ASSOCIATE_ID	VARCHAR2	10	FOREIGN KEY
PWD	VARCHAR2	10	

14.STATUS_TABLE
FOREIGN KEY: PROJECT_ID REFERENCING PROJECT_MASTER

Field Name	Field Type	Field Size	Key
PROJECT_ID	VARCHAR2	10	FOREIGN KEY
STATUS	VARCHAR2	10	

15.ASSOCIATE_PROJECT

FOREIGN KEY :ASSOCIATE_ID REFERENCING ASSOCIATE_MASTER
LOC_ID REFERENCING LOCATION_MASTER
ONSITE_ID REFERENCING ONSITE_LOCATION_MASTER
OFFSHORE_ID REFERENCING OFFSHORE_LOCATION_MASTER

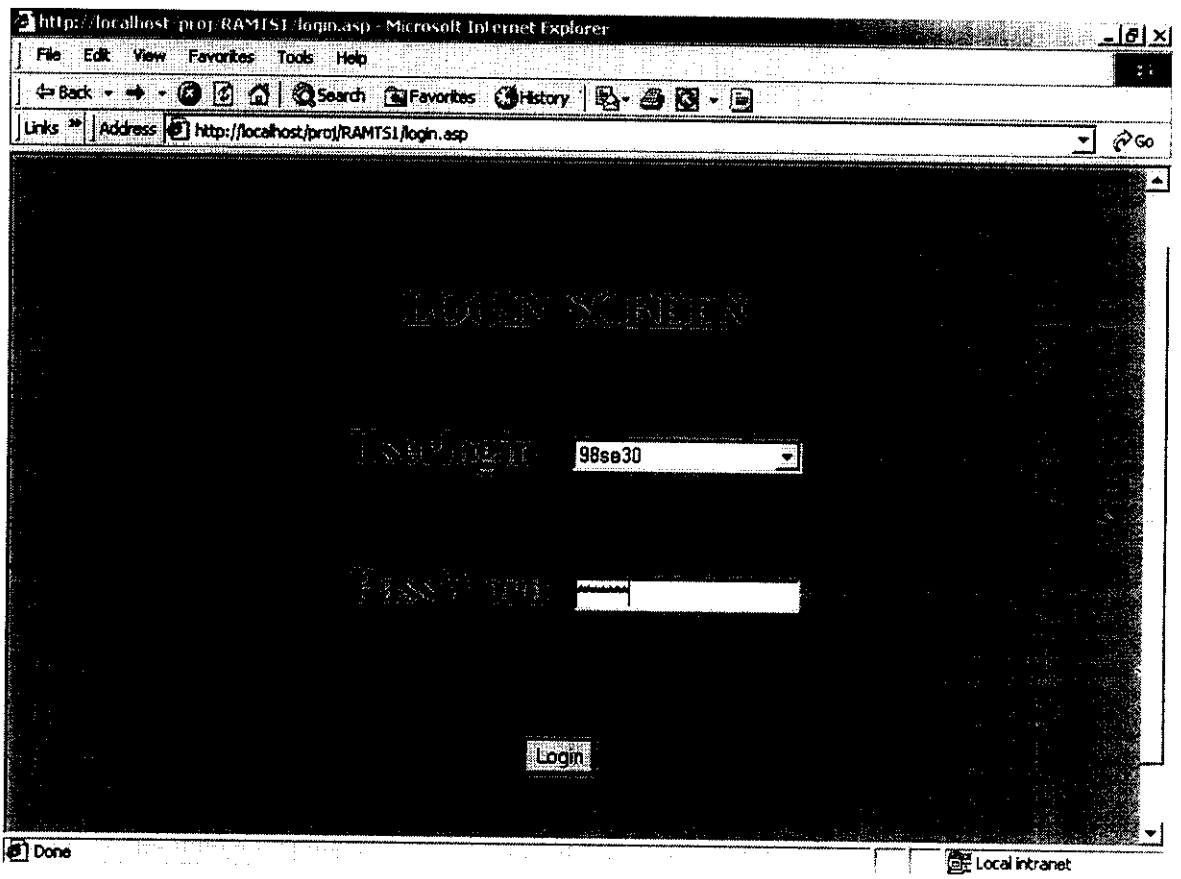
Field Name	Field Type	Field Size	Key
ASSOCIATE_ID	VARCHAR2	10	FOREIGN KEY
LOC_ID	VARCHAR2	5	FOREIGN KEY
ONSITE_ID	VARCHAR2	5	FOREIGN KEY
OFFSHORE_ID	VARCHAR2	5	FOREIGN KEY
DATE_OF_JOIN	DATE		
DATE_OF_LEAVE	DATE		
ROLE	VARCHAR2	10	
PROJECT_ID	VARCHAR2	10	FOREIGN KEY

16.ASSOCIATE_TRAINING

FOREIGN KEY :ASSOCIATE_ID REFERENCING ASSOCIATE_MASTER
TRAINING_ID REFERENCING TRAINING_MASTER

Field Name	Field Type	Field Size	Key
ASSOCIATE_ID	VARCHAR2	10	FOREIGN KEY
TRAINING_ID	VARCHAR2	10	FOREIGN KEY
DURATION	NUMBER	3	
START_DATE	DATE		
END_DATE	DATE		

Input and Output Screen Design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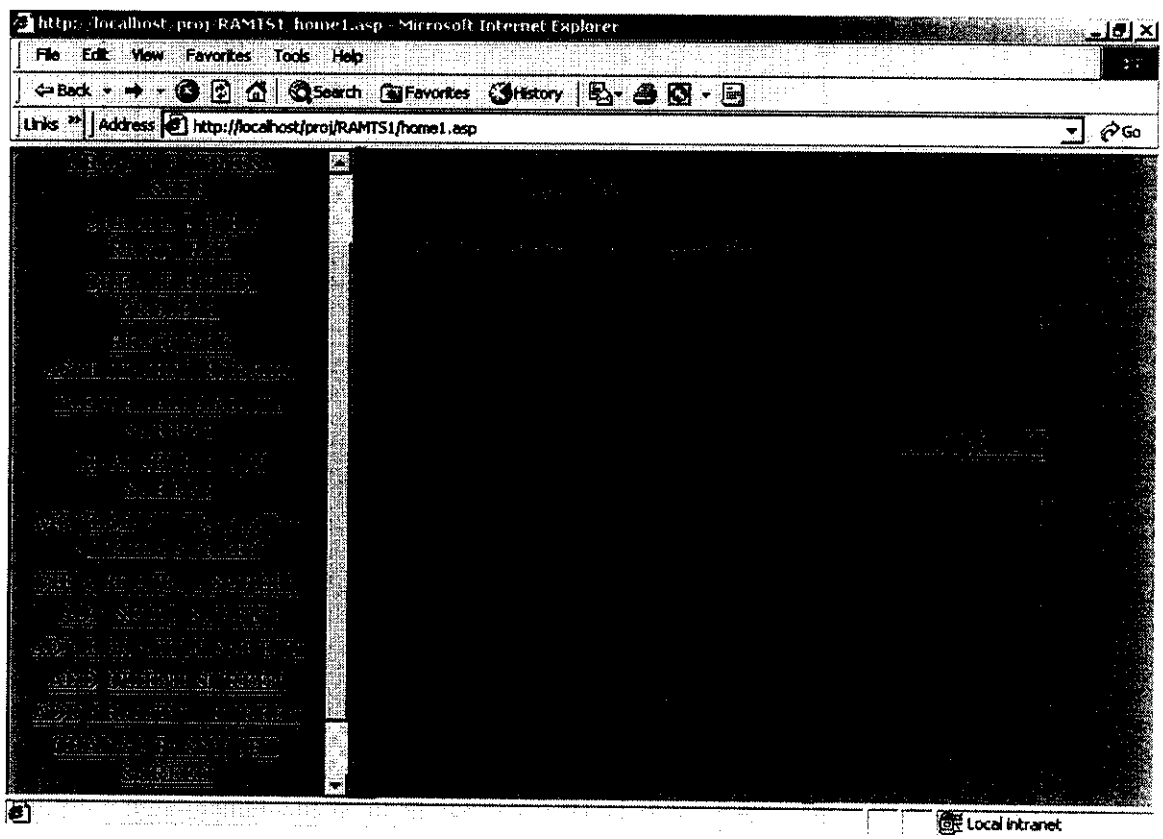
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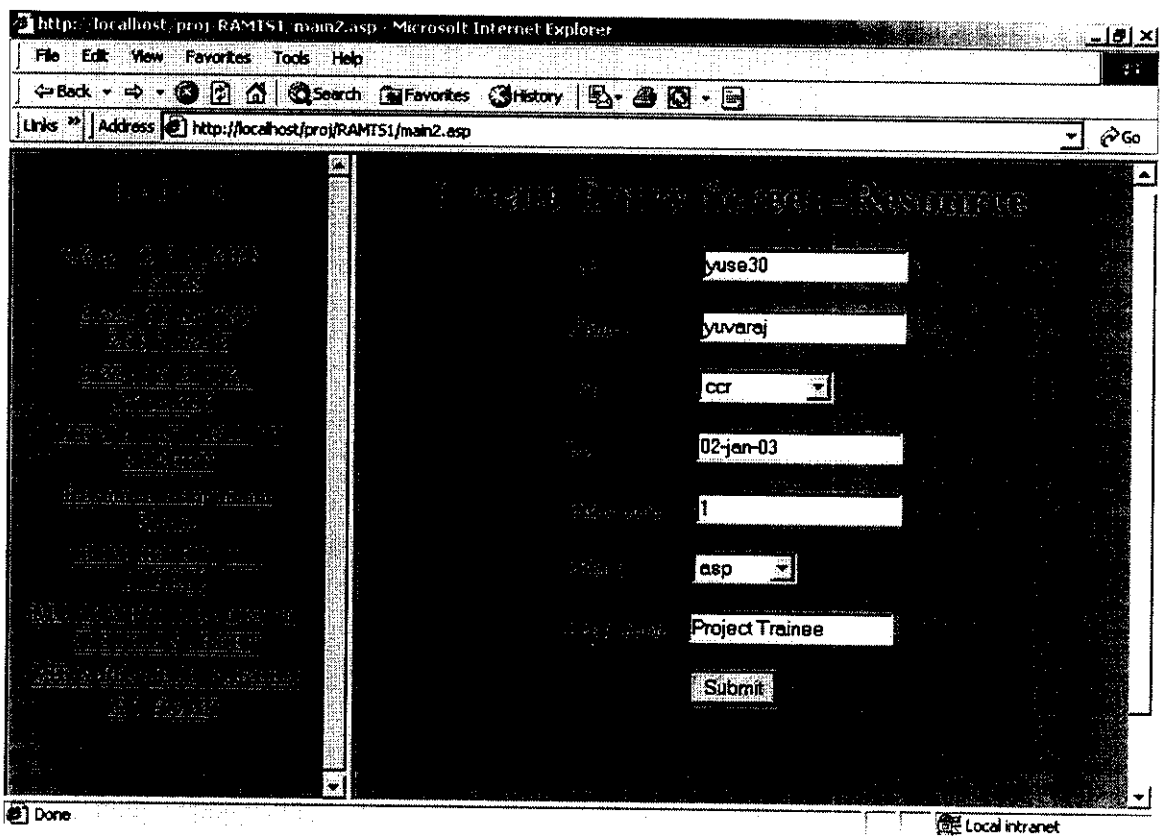
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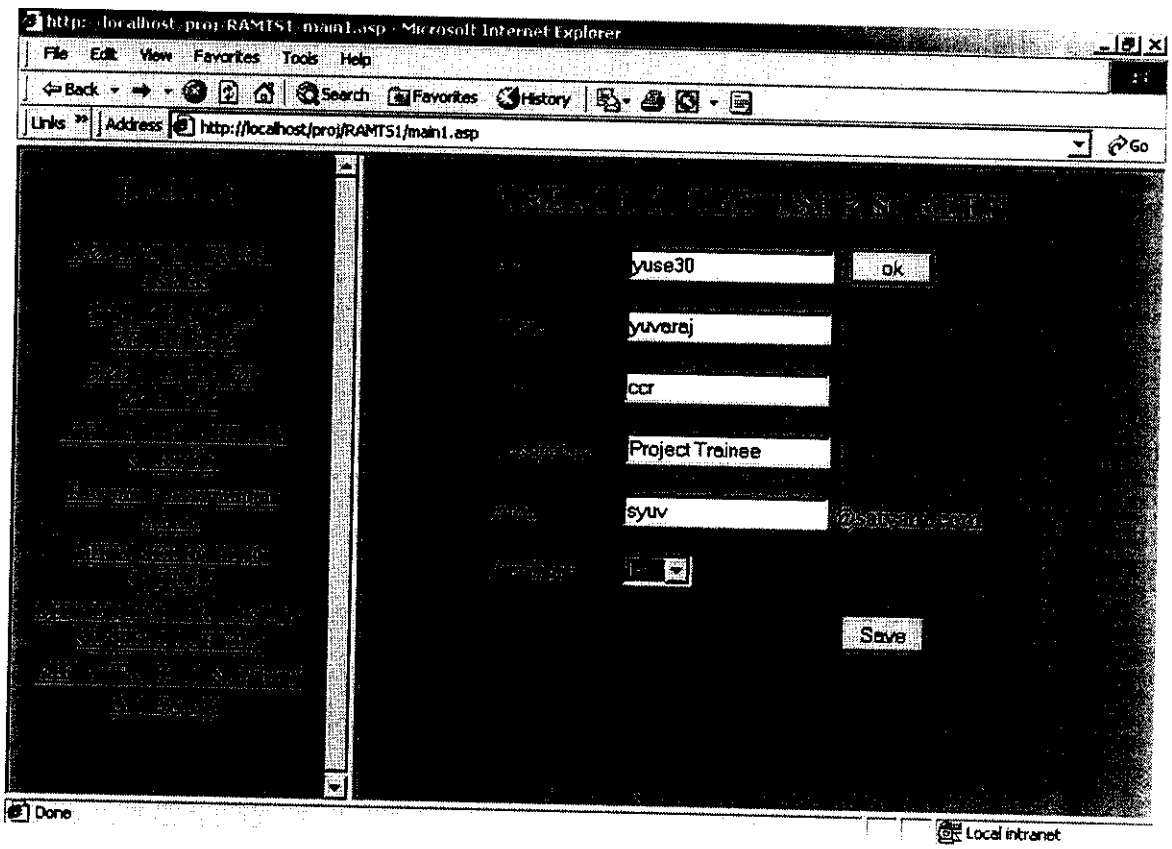
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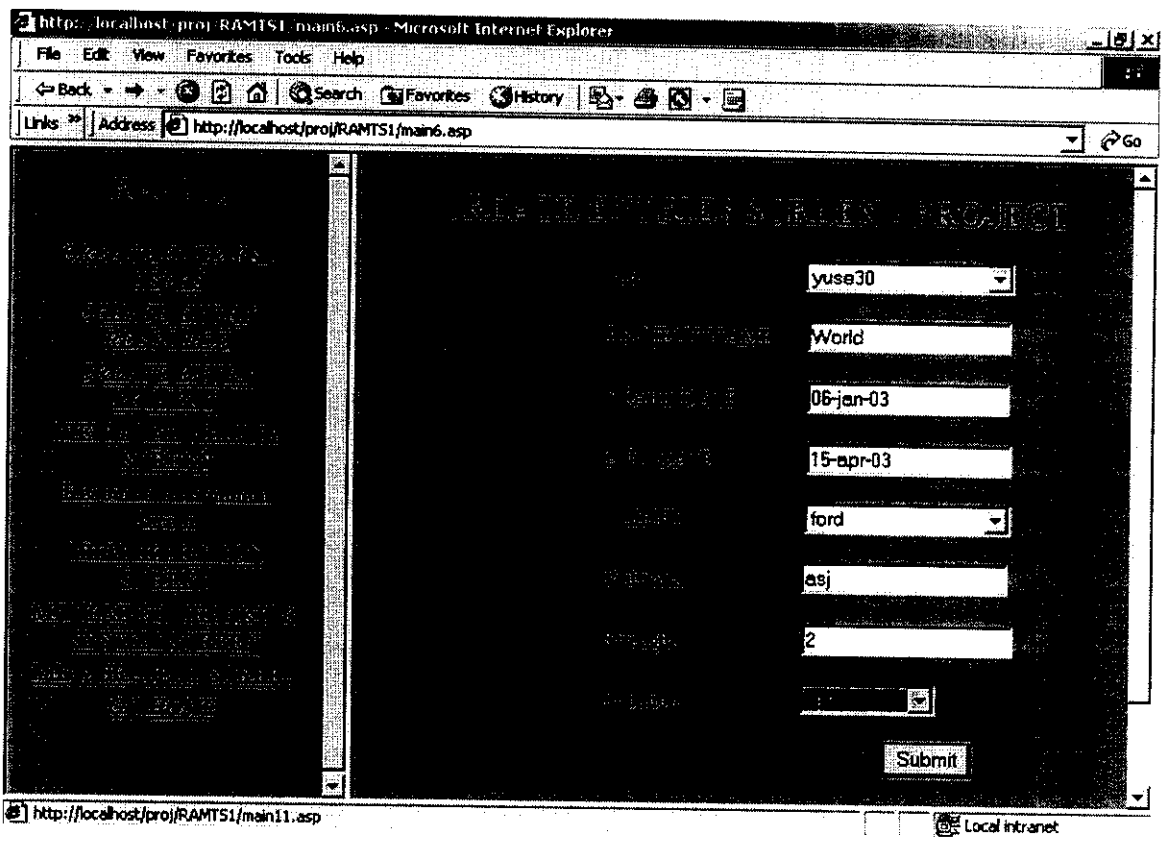
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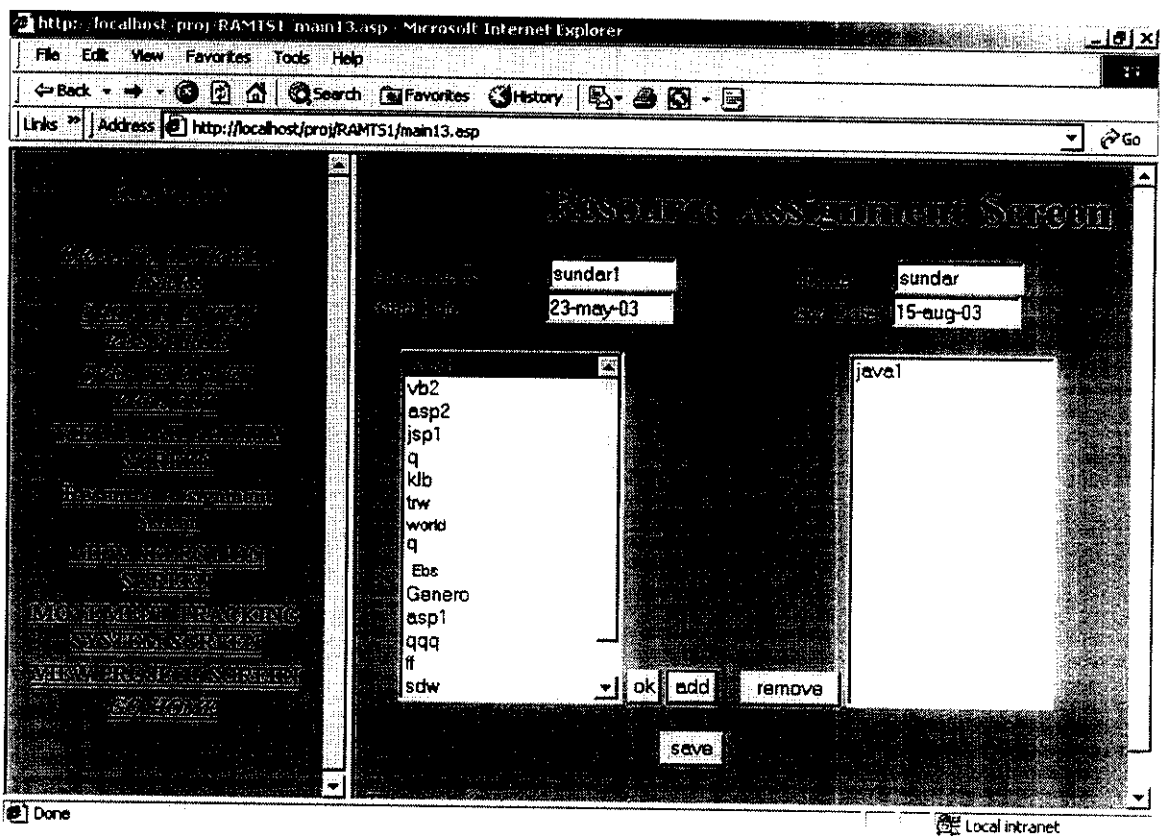
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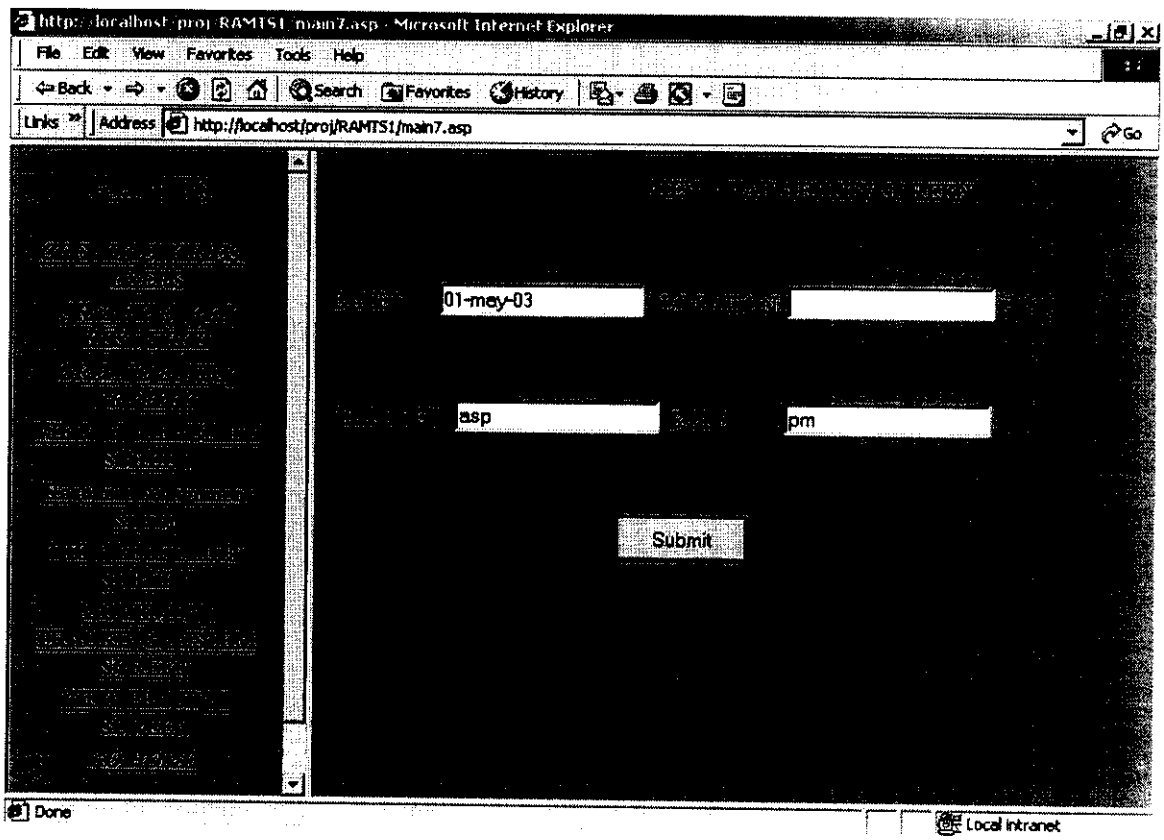
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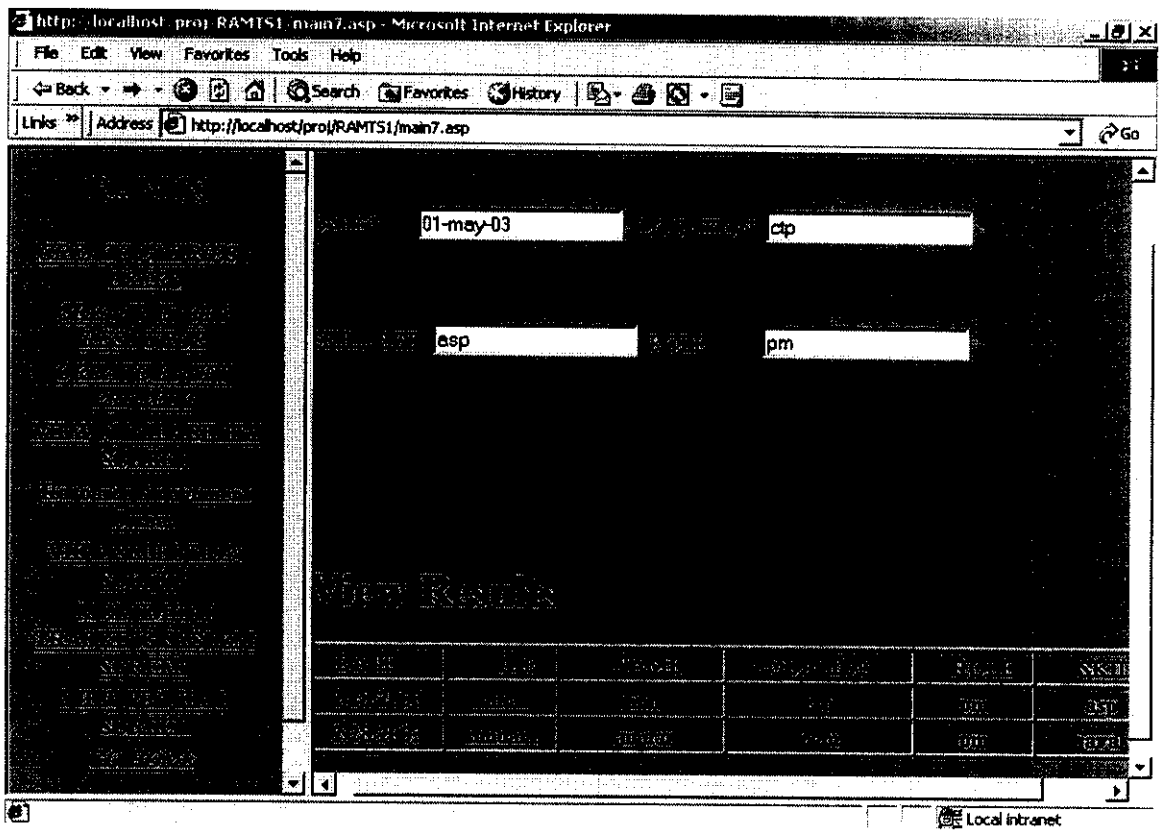
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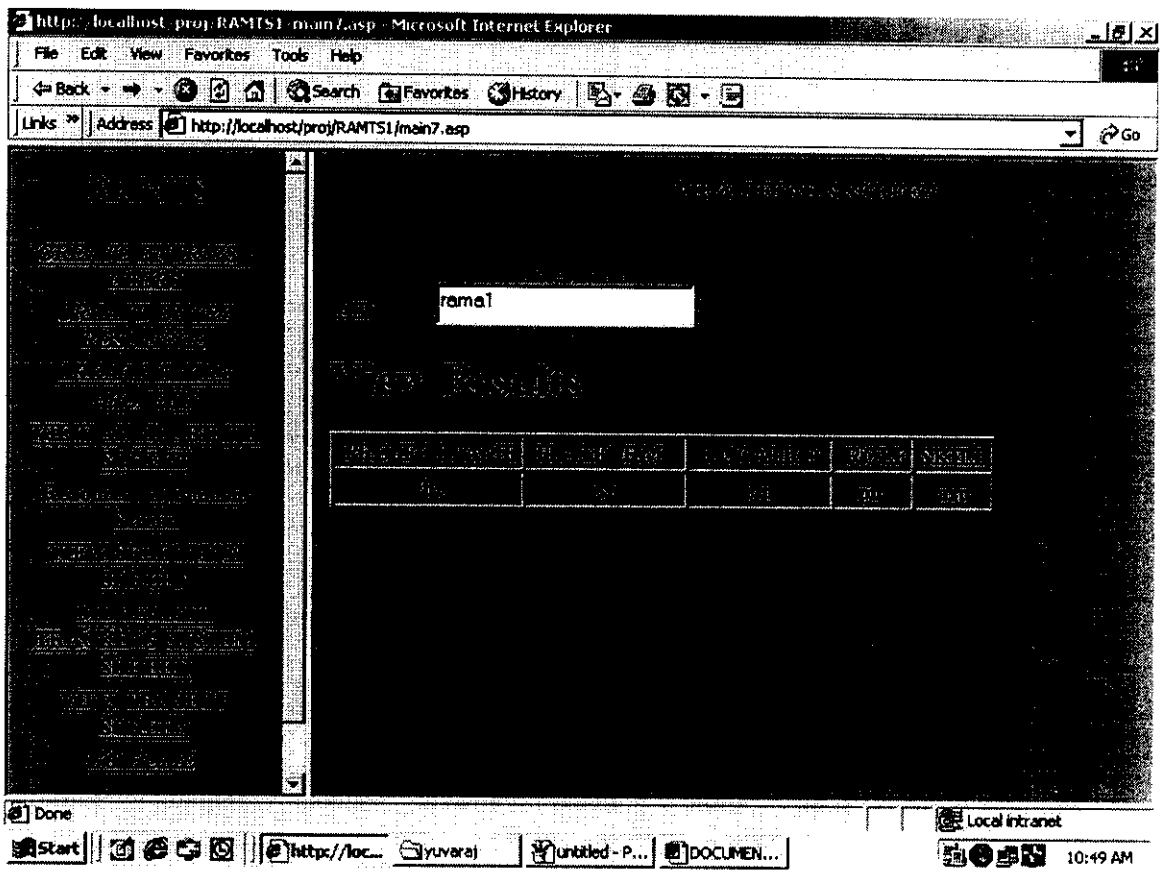
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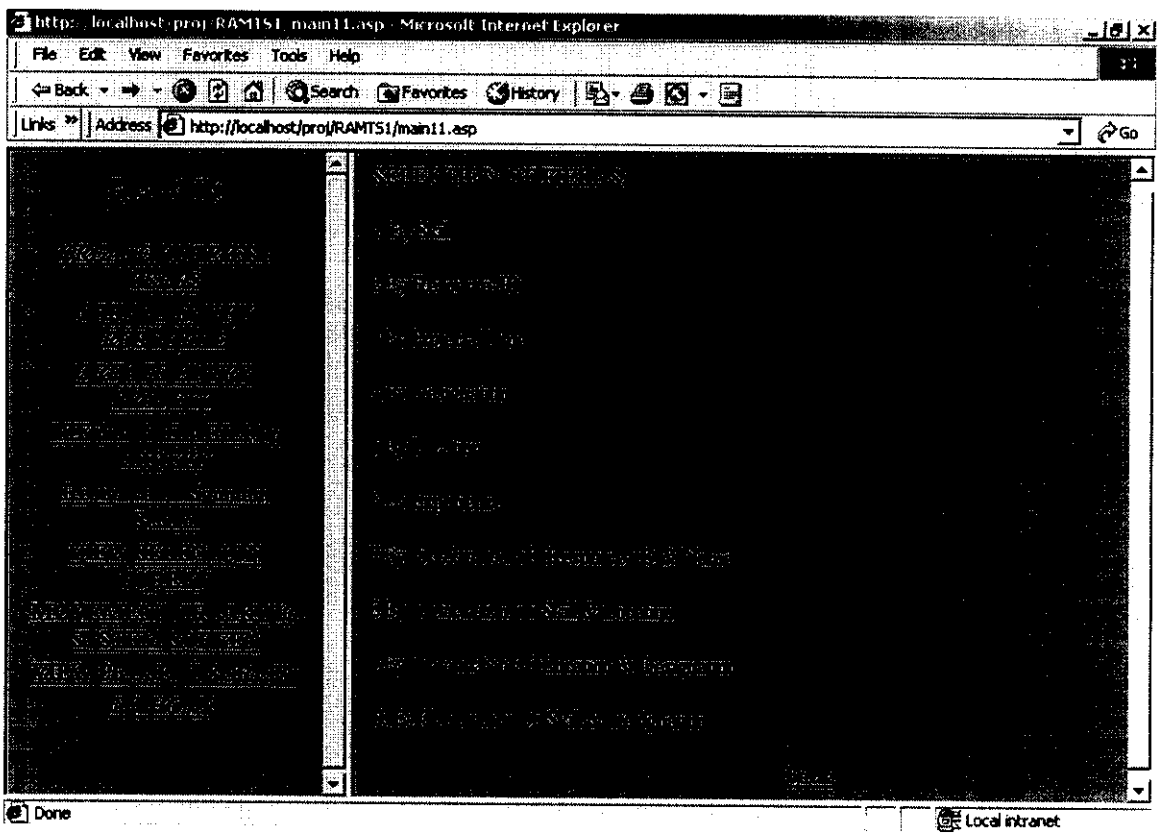
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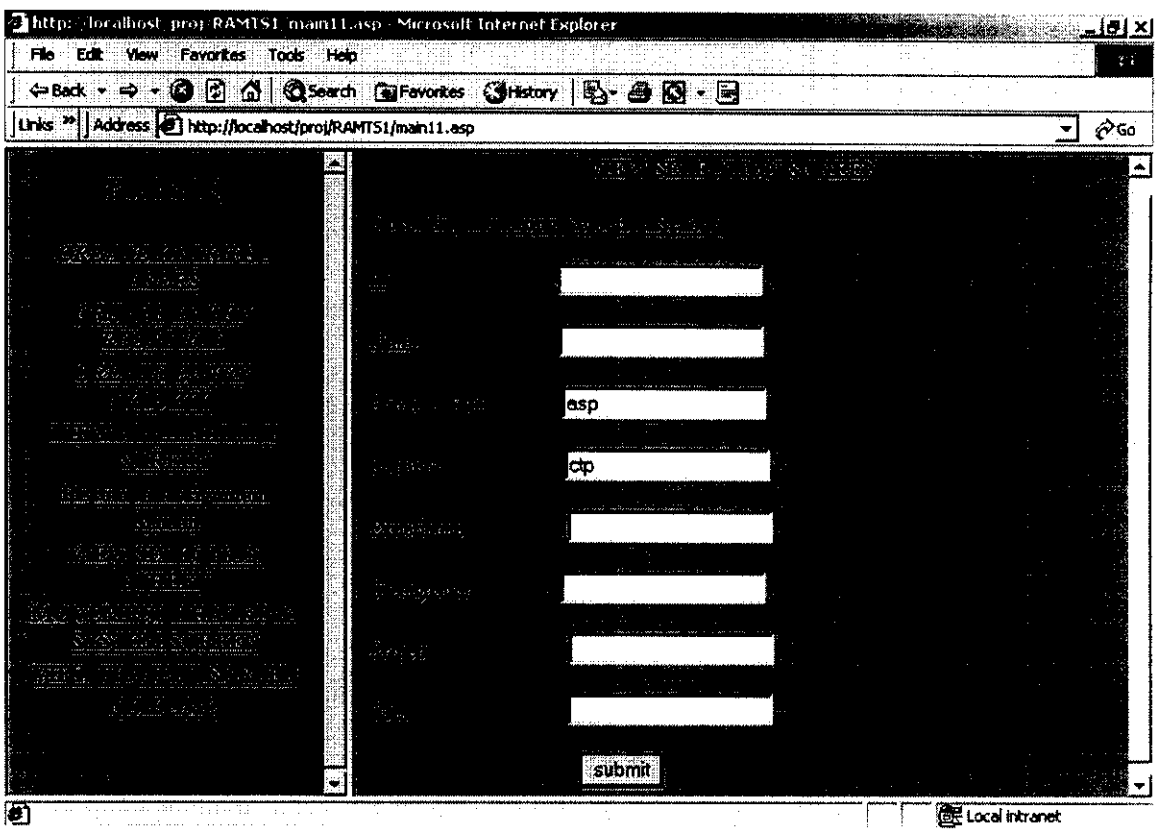
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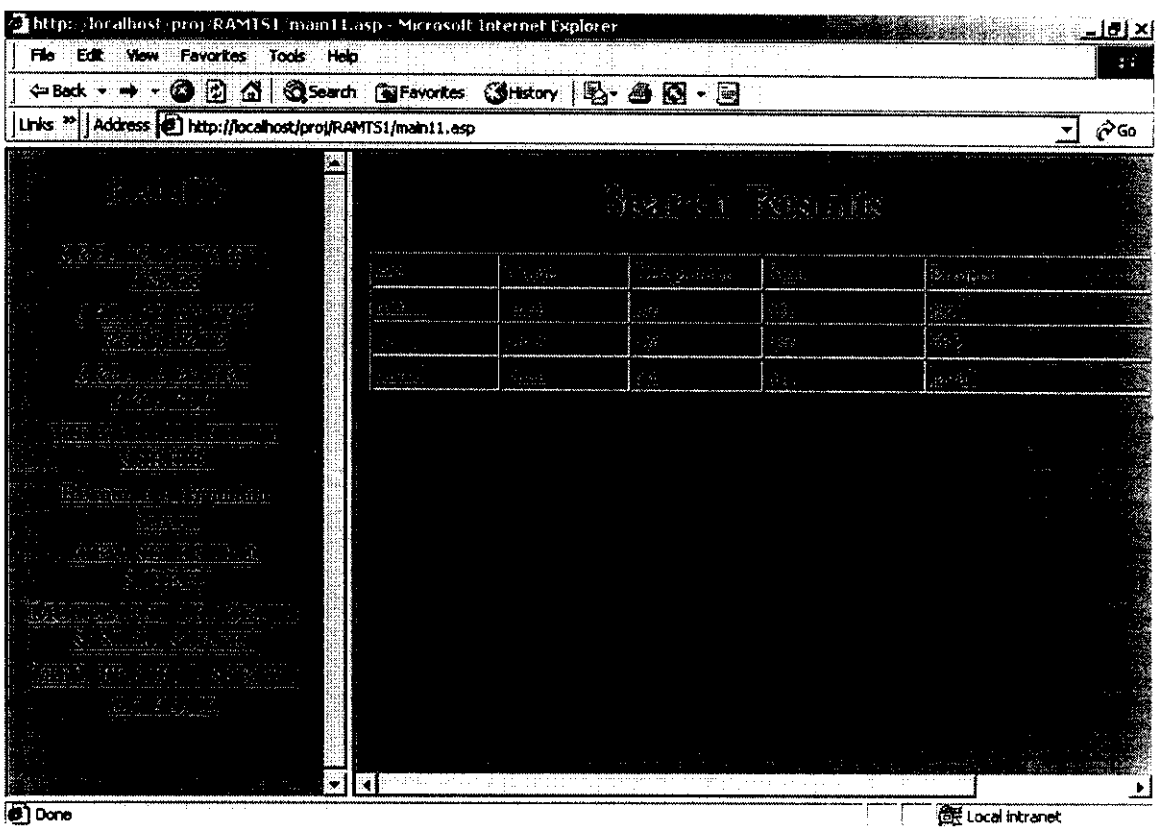
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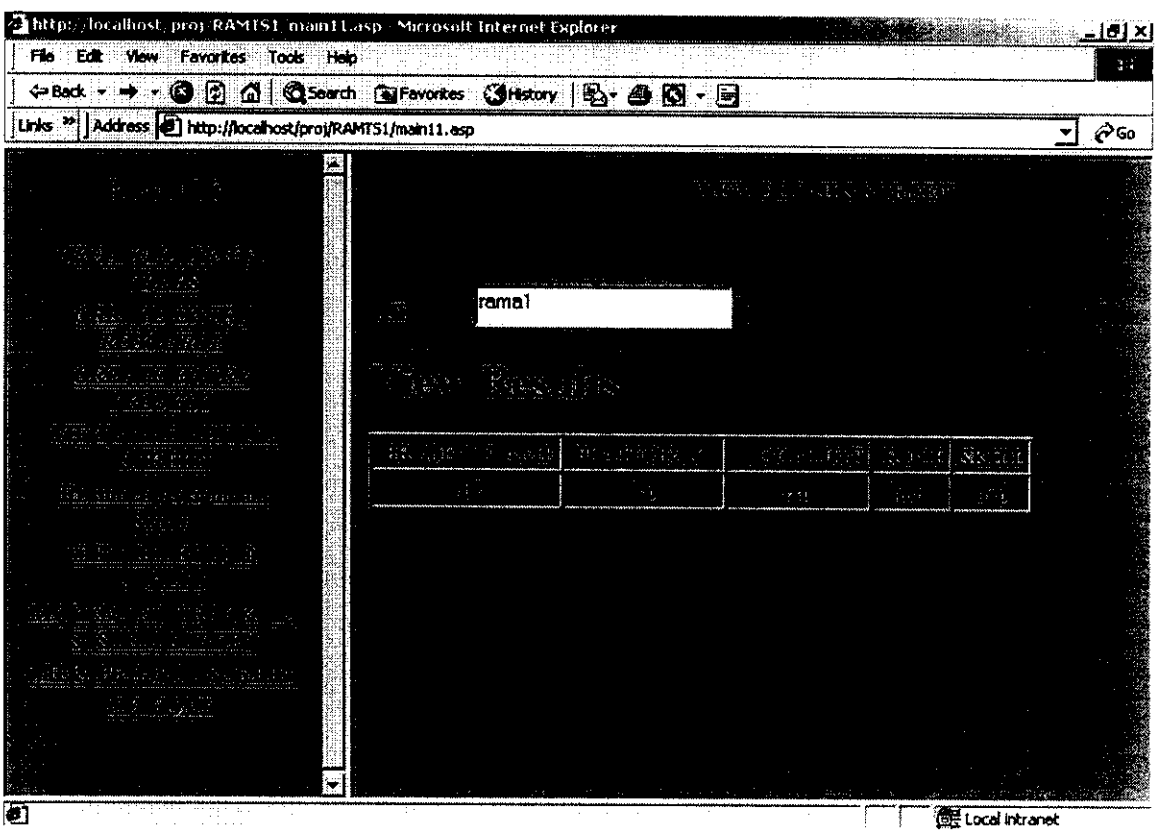
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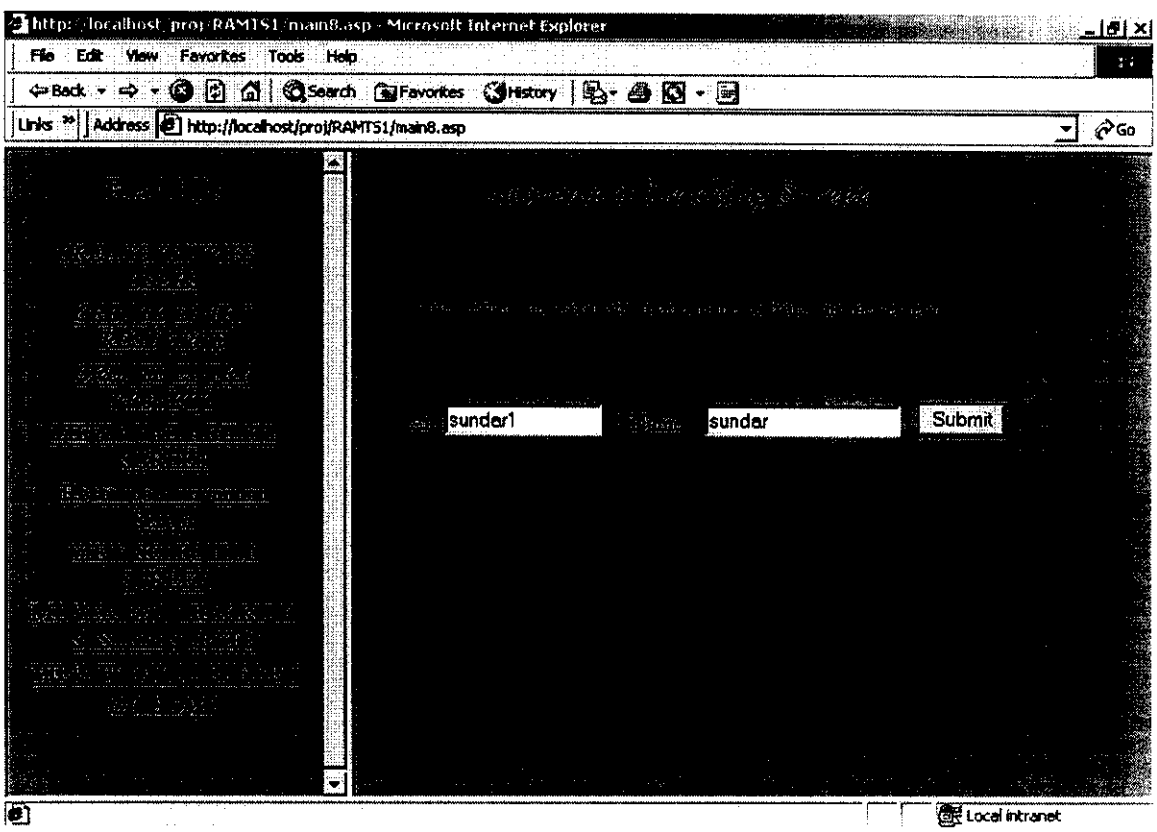
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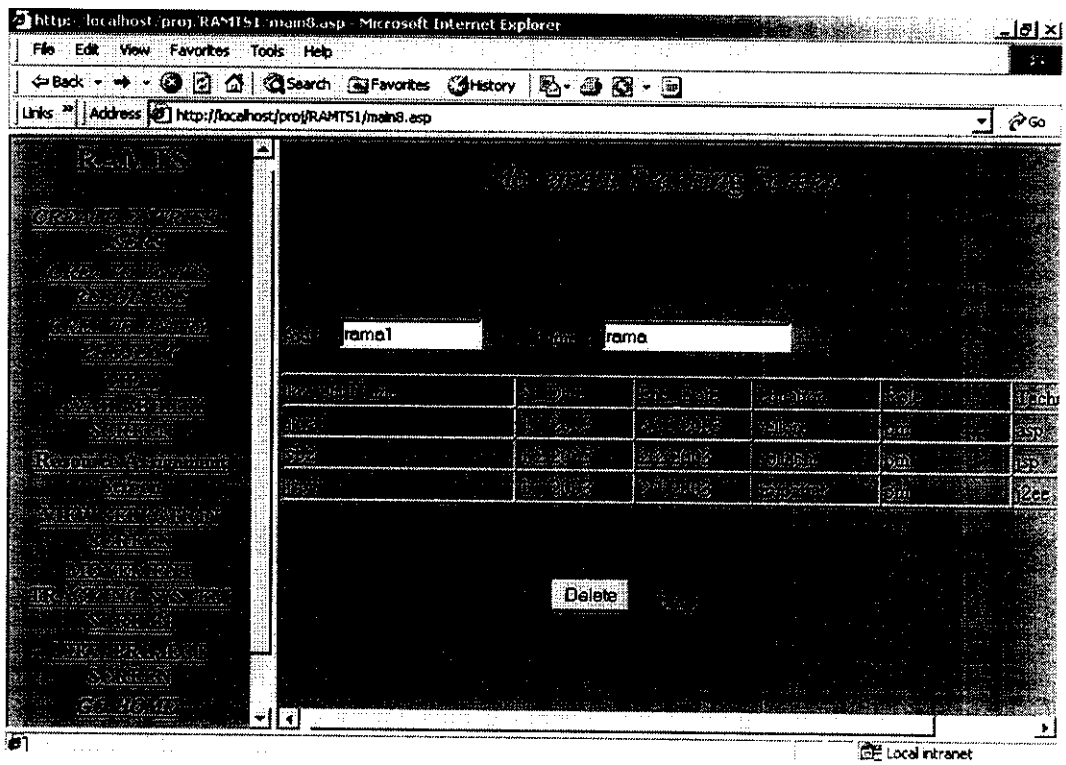
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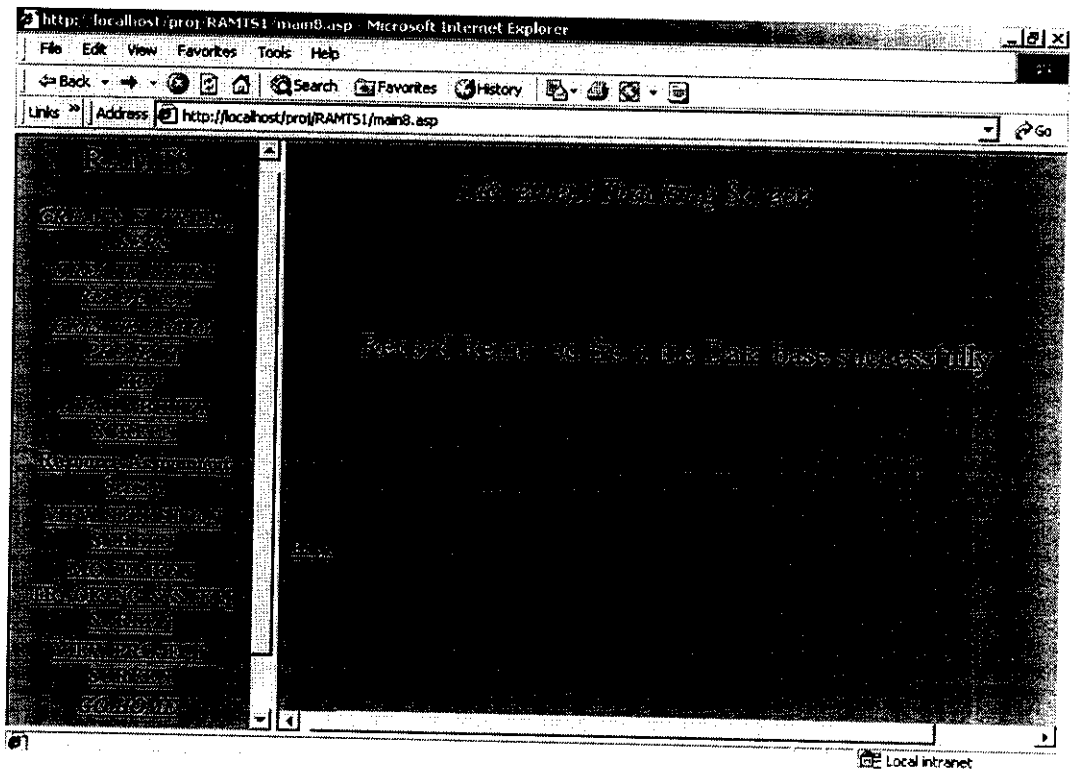
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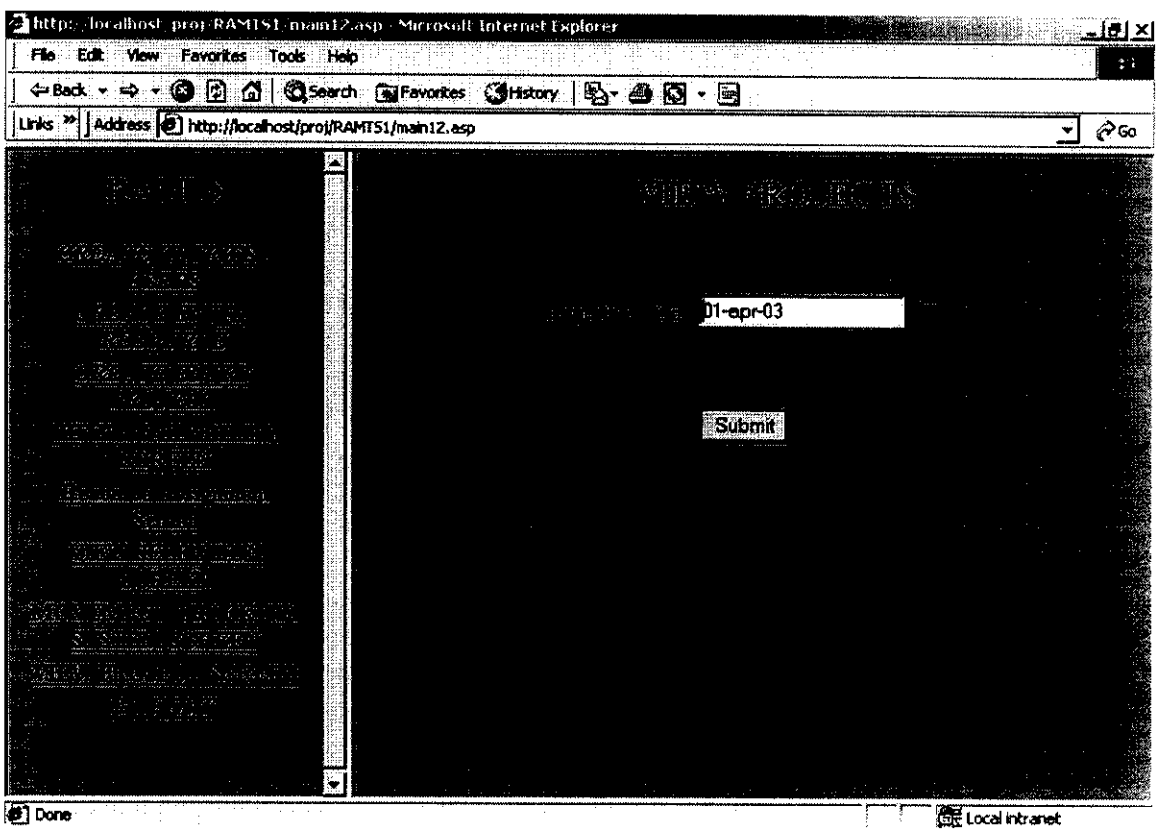
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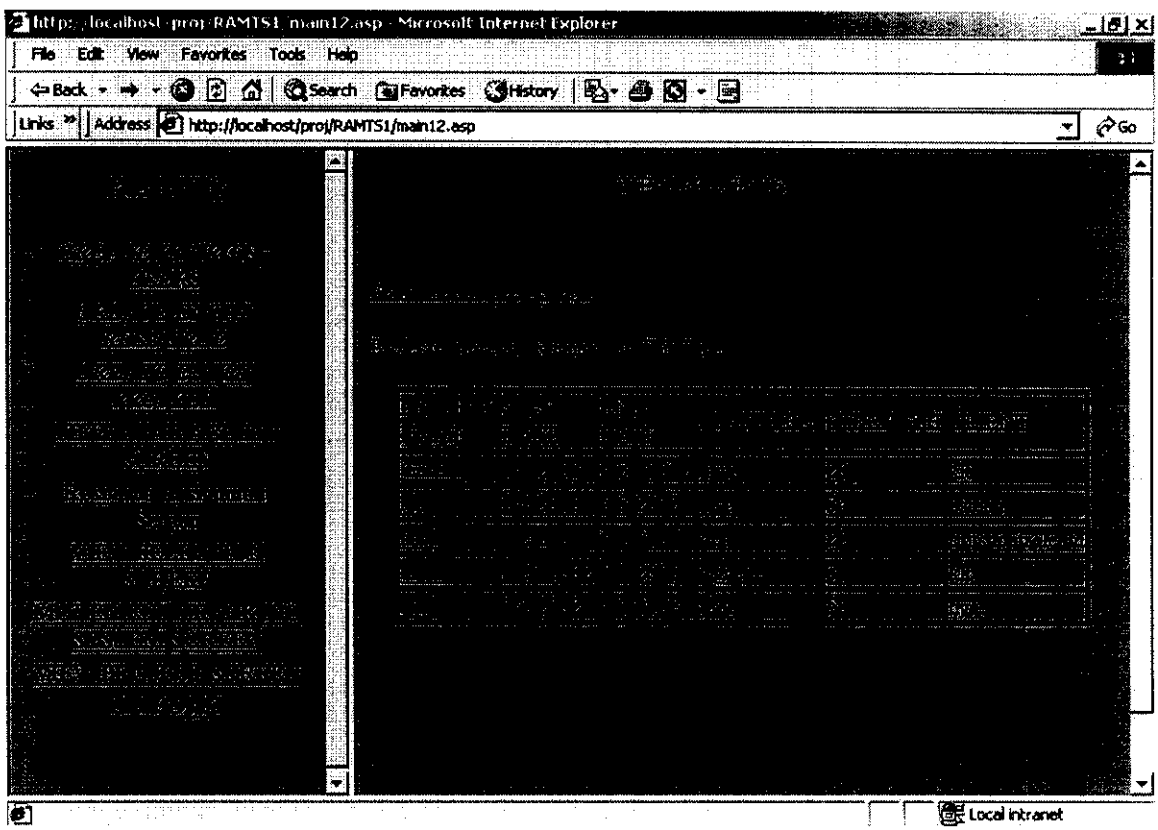
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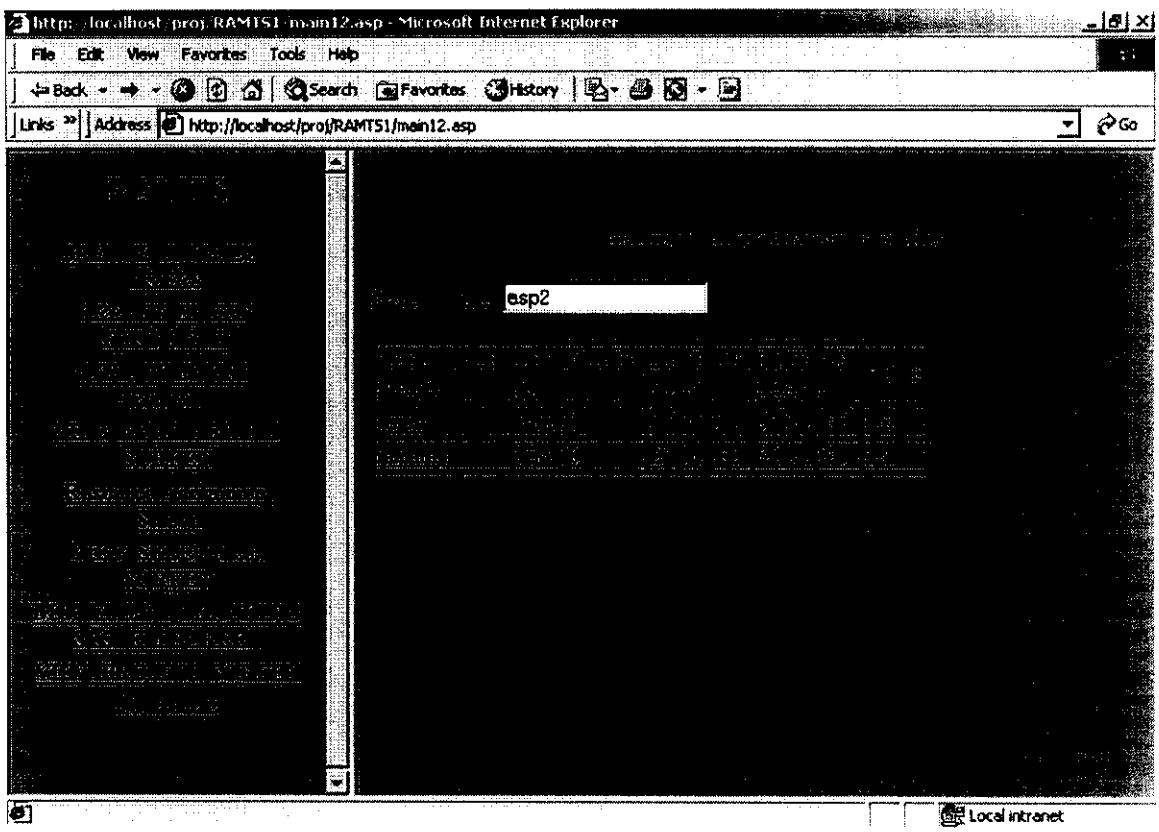
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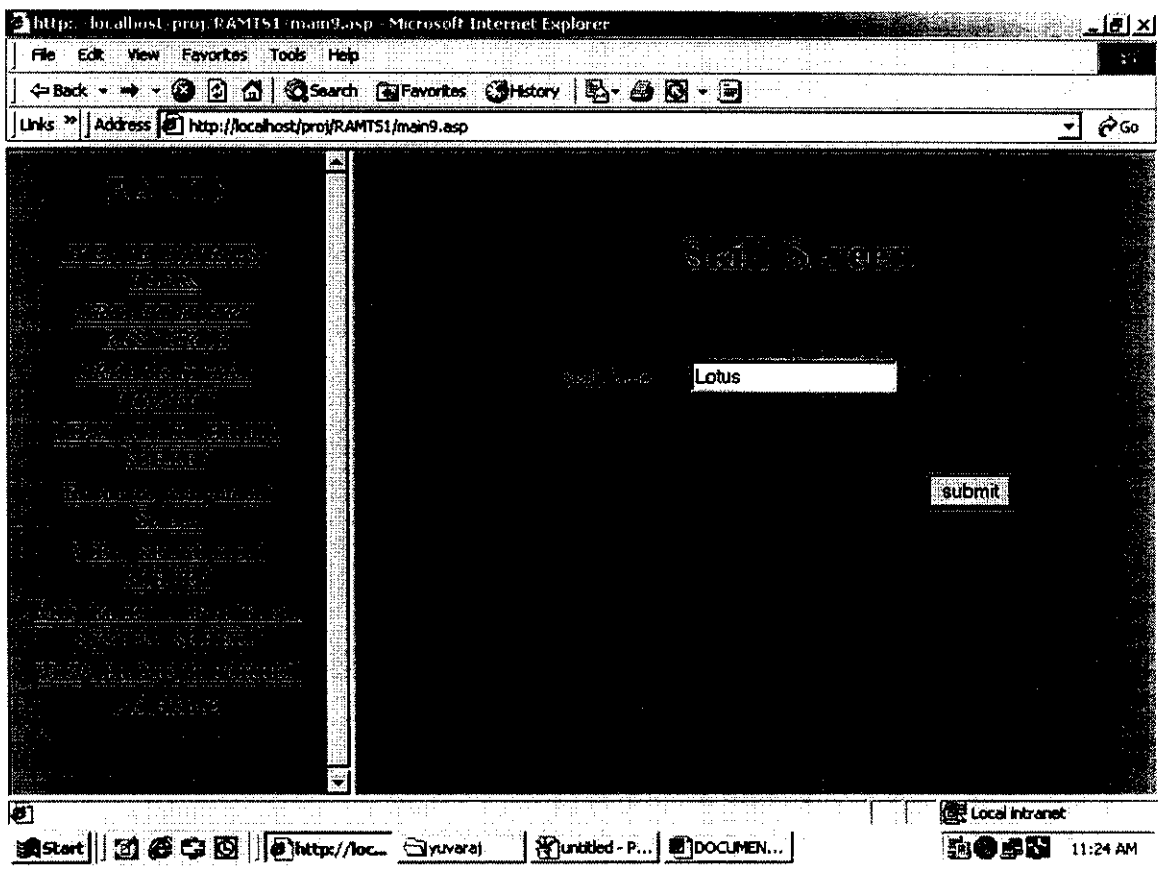
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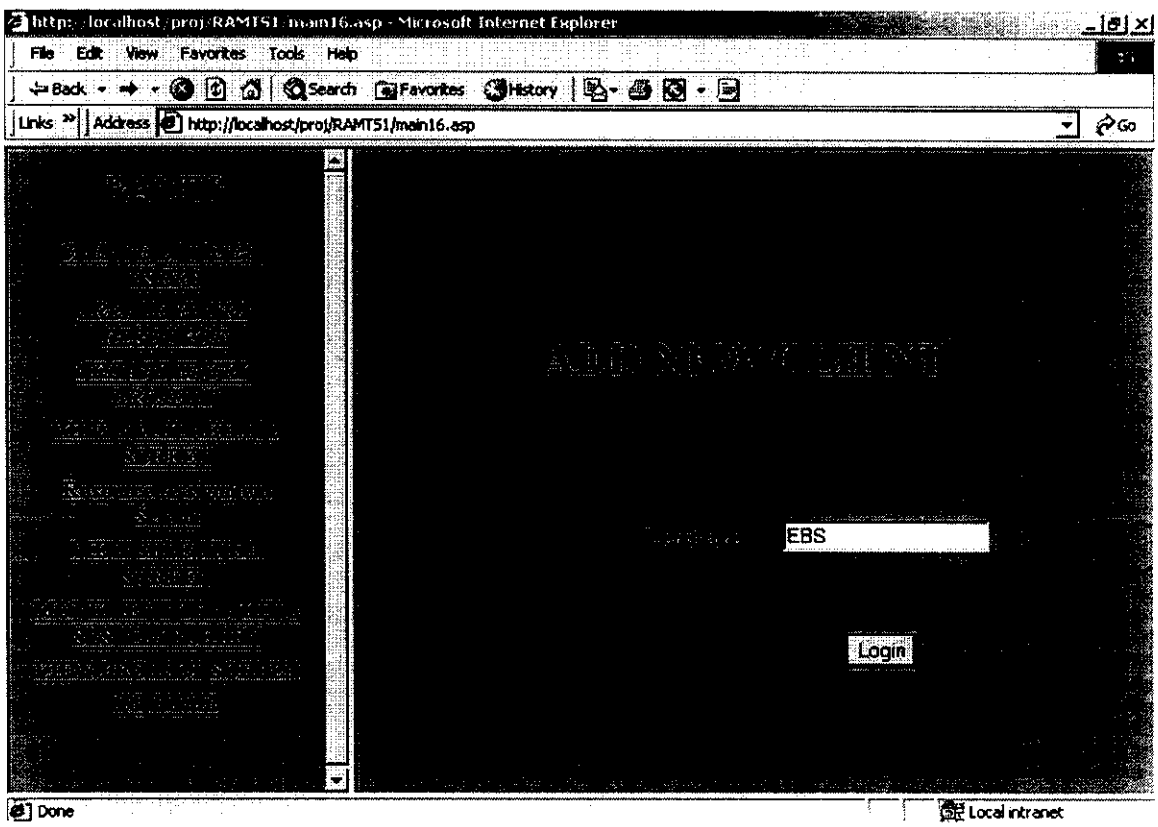
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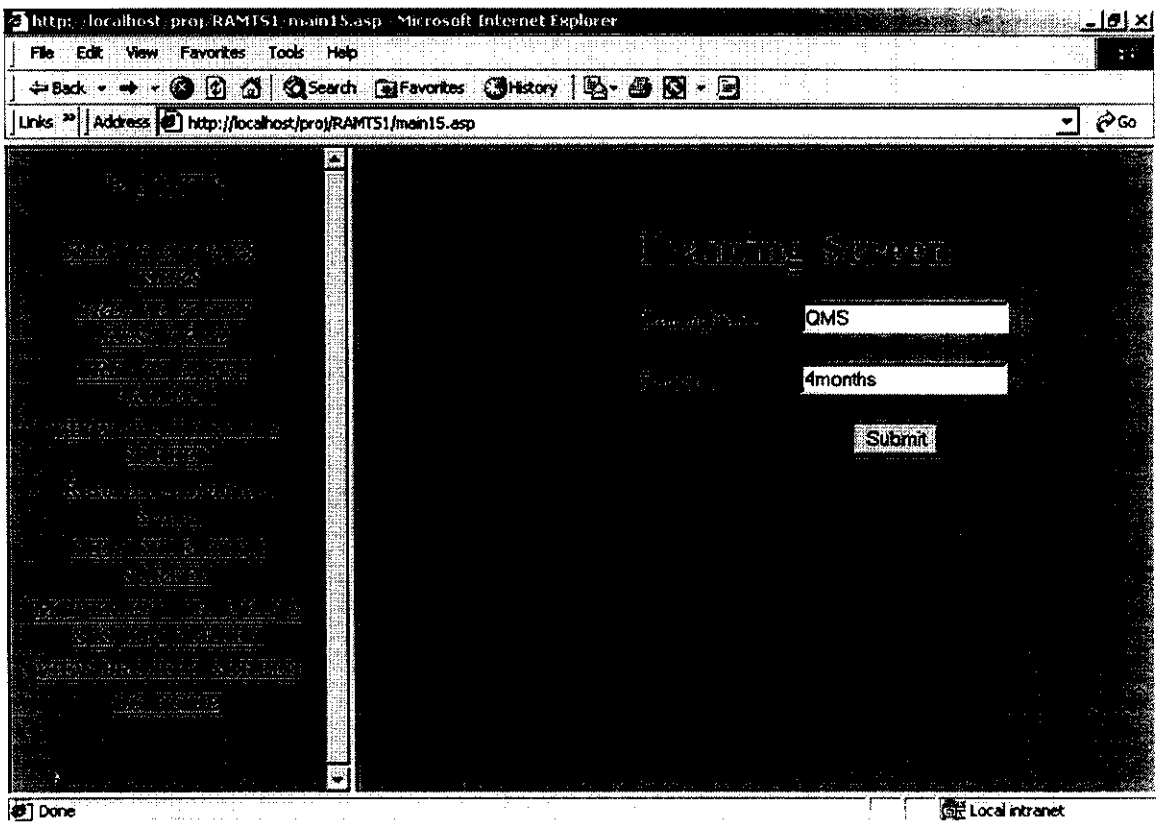
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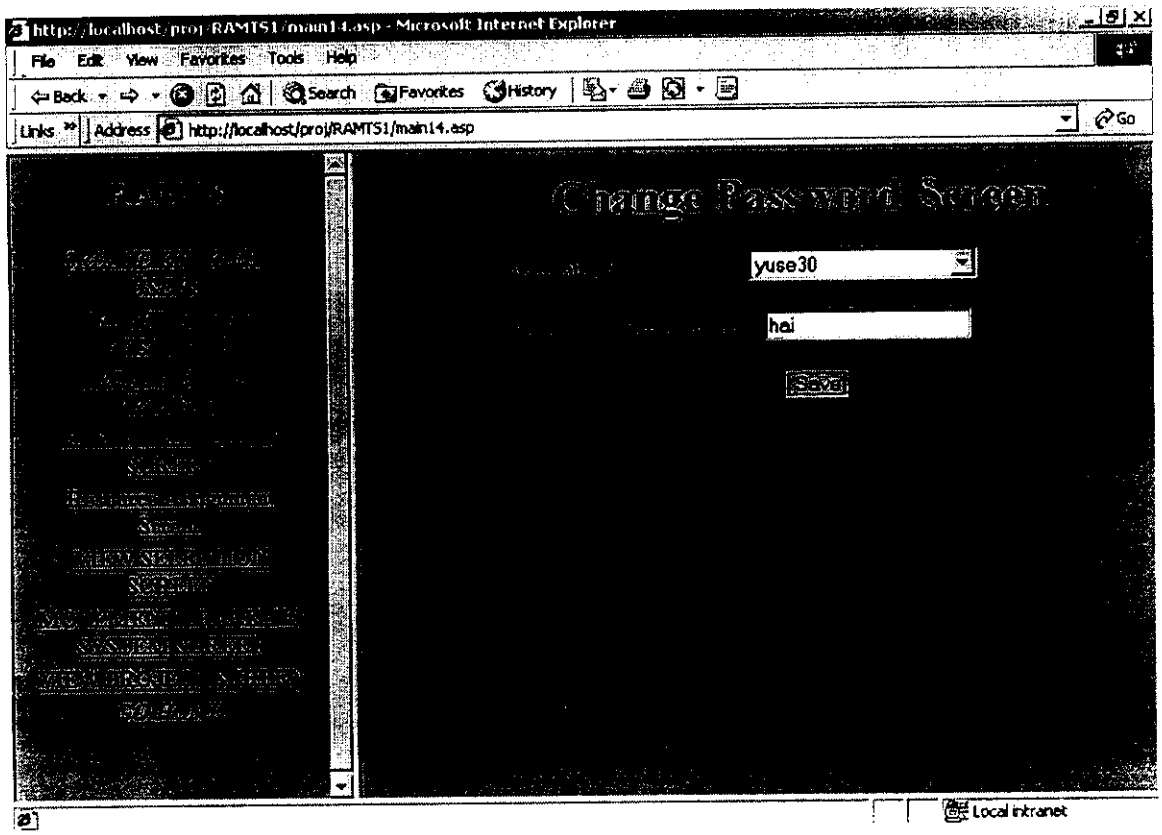
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TESTING AND IMPLEMENTATION

Software Testing Fundamentals

Testing Objectives :

Testing is a process of executing a program with the intent of finding an error.

Software testing is a critical element of software quality assurance and represents the ultimate review of system specification, design and coding. Testing is the last chance to uncover the errors defects in the software and facilitates delivery of quality system

Testing Principles :

The basic principles for effective software testing are as follows:

- A good test case is one that has a high probability of finding an as-yet undiscovered error.
- A successful test is one that uncovers an as-yet-undiscovered error.
- All tests should be traceable to the customer requirements
- Tests should be planned long before testing begins
- Testing should begin " in the small" and progress towards testing "in the large"
- Exhaustive testing is not possible

Testing strategies :

Testing begins at the unit level and works "outward" toward the integration of the entire system

- Different testing techniques are appropriate at different points of S/W development cycle.

Four phases of Testing:

- Unit Testing
- Integration Testing
- System Testing
- Acceptance Testing

The context of Unit and Integration testing changes significantly in the Object Oriented (OO) projects. Class Integration testing based on sequence diagrams, state-transition diagrams, class specifications and collaboration diagrams forms the unit and Integration testing phase for OO projects.

For Web Applications, Class integration testing identifies the integration of classes to implement certain functionality.

The meaning of system testing and acceptance testing however remains the same in the OO and Web based Applications context also. The test case design for system and acceptance testing however need to handle the OO specific intricacies.

Unit Testing

As per the "V" diagram of SDLC, testing begins with Unit testing. Unit testing makes heavy use of White Box testing techniques, exercising specific paths in a unit's control structure to ensure complete coverage and maximum error detection.

Unit testing focuses verification effort on the smallest unit of software design - the unit. The units are identified at the detailed design phase of the software development life cycle, and the unit testing can be conducted parallel for multiple units. Five aspects are tested under Unit testing considerations:

- The module interface is tested to ensure that information properly flows into and out of the program unit under test.
- The local data structure is examined to ensure that data stored temporarily maintains its integrity during all steps in an algorithm's execution.
- Boundary conditions are tested to ensure that the module operates properly at boundaries established to limit or restrict processing.
- All independent paths (basis paths) through the control structure are exercised to ensure that all statements in a module have been executed at least once.
- And finally, all error-handling paths are tested.

Integration Testing for Web applications:

Collaboration diagrams, screens and report layouts are matched to OOAD and associated class integration test case report is generated

Regression Testing :

Each time a new module is added as part of integration testing, new data flow paths may be established, new I/O may occur, and new control logic may be invoked. These changes may cause problems with functions that previously worked flawlessly. In the context of integration test strategy, regression testing is the re-execution of some subset of tests that have already been conducted to ensure that changes have not propagated unintended side effects.

System Testing :

After the software has been integrated (constructed), sets of high order tests shall be conducted. System testing verifies that all elements mesh properly and the overall system function/performance is achieved.

Security Testing :

In case of web applications, one has take into account testing with appropriate firewall set-up. For data security, one has to take into consideration Data Transfer Checksum, Encryption or use of digital certificates, MD5 hashing on al vulnerable data and database integrity. For User security, encrypted passwords, audit trail logs containing (who, where, why, when and what information , auto log out User, as system specifications (e.g. 5 minutes of inactivity), display of user information on the UI can be taken care by designing to code programmatically.

Validation or functional testing :

This is typically a core aspect of testing to determine if the Web site functions correctly as per the requirements specifications. Sites utilising CGI-based dynamic page generation or database-driven page generation will often require more extensive validation testing than static-page Web sites

Acceptance Testing :

When custom software is built for one customer, a series of acceptance tests are conducted to enable the customer to validate all the requirements. Acceptance tests are conducted at the development site or at the customer site depending upon the requirements and mutually agreed principles. Acceptance testing may be conducted either by the customer or Satyam depending on the type of project & the contractual agreement. A series of acceptance tests are conducted to enable the customer to validate all requirements as per user requirement document (URD).

Black-box Testing :

Black-box tests are used to demonstrate that the software functions are operational; that input is properly accepted and output is correctly produced; and that the integrity of external information (e.g., data files) is maintained. It enables the developer to derive sets of input conditions (test cases) that will fully exercise all functional requirements for a program.

White-box Testing :

White-box testing of software is designed for close examination of procedural detail. Providing test cases that exercise specific sets of conditions and/or loops tests logical paths through the software.

Future Enhancements

In this Resource Availability and Movement Tracking System Report generation, Earlier Warning screens and printing the report generated are to be developed in future. Then the software is to be web enabled given rights to the resources or the associates to access this software in the company to know about their status.

Conclusion

A great deal of time and effort have put into the designing of the software entitled "RESOURCE AVALIABILITY AND MOVEMENT TRACKING SYSTEM". A menu driven and user friendly to maintain complete record of resources, projects, client, skills, training undertaken by the resources, offshore and on sights undertaken by the resources etc.,

After a thorough analysis study this software was developed. The system is developed in such a way that the resulting solution would satisfy the organization.

BIBLIOGRAPHY