Department of Computer Science & Engineering

United International University

CSE6011: Data Mining

Forecasting SMS Traffic and Balance Availability with Machine Learning

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Introduction

This report presents a comprehensive analysis of SMS traffic and balance availability for a specific set of clients, with a particular focus on predicting potential service interruptions during holidays. By employing advanced machine learning techniques, such as **polynomial regression**, we aim to accurately forecast future SMS traffic and balance levels, enabling clients to optimize their usage and avoid unexpected service disruptions.

By leveraging advanced data analytics, this study provides a comprehensive forecast of SMS traffic and balance levels, enabling organizations to proactively manage their client communication strategies and resource allocation. This predictive model accurately anticipates SMS traffic during peak periods, such as holidays, and offers hourly updates on balance levels for the next two days, ensuring a seamless and uninterrupted service experience for clients.

Ultimately, this research contributes to the field of machine learning applications and provides practical solutions for organizations seeking to effectively manage their SMS balance allocation to clients, particularly during peak demand periods like holidays.

Background

The Problem

In today's fast-paced world, SMS communication has become an integral part of our daily lives. For organizations with a large customer base, managing SMS traffic and ensuring adequate balance availability can be a complex challenge, especially during peak periods such as holidays. Service interruptions due to insufficient balance or overloaded networks can lead to customer dissatisfaction and financial losses.

The Solution

To address these challenges, this report presents a comprehensive analysis of SMS traffic and balance prediction & automation for a specific set of clients. By employing advanced machine learning techniques, such as **polynomial regression**, we aim to develop a predictive model that can accurately forecast future SMS traffic and balance levels. This information will empower organizations to make informed decisions regarding their communication strategies and resource allocation, ensuring a seamless and uninterrupted service experience for their clients.

The Benefits

a **Improved Service Quality:** Accurate predictions of SMS traffic and balance levels will enable organizations to proactively address potential issues, ensuring a consistent and reliable service experience for their clients.

b **Optimized Resource Allocation:** By understanding future demand, organizations can allocate resources more efficiently, reducing employees hours of struggle during the holidays and minimizing service disruptions.

c **Enhanced Customer Satisfaction:** A reliable and uninterrupted SMS service can significantly improve customer satisfaction and loyalty.

d **Data-Driven Decision Making:** The insights gained from this analysis will provide organizations with a data-driven foundation for making informed decisions about their SMS communication strategies.

This report aims to contribute to the field of machine learning applications and provide practical solutions for organizations seeking to optimize their SMS communication infrastructure and deliver exceptional customer service.

Literature Review

There are several ERP based system has been developed by many organizations including purchasing modules. Some are very expensive and huge resources and huge man powers are needed to make such environment fit for the organization, which most of the cases organizations don't have. Oracle E-Business Suite is one of them. Each and every organizations requires their own types of system which often requires a customized solution. Oracle E-Business Suite gives purchase module gives a whole customized solutions as per as southeast university procurement policy requires in daily basis. Requirements like requisition generations, requisition management, managing requisition item approval and notification systems, role wise access of the users to avoid unauthorized information, purchase order generations, order item receiving, supplier management, tender management, vendor management, automatic database backup system and so on can be solved by Oracle E-Business Suite's purchase module.[**?**]

Building a project like purchase management system by Oracle Forms can be more reliable, robust and efficient. It isn't just about data-entry into an Oracle database any more. Oracle Forms can get the job done that modern applications requires. Powerful desktop applications delivered with the easy and scalability of a web applications. An old technology but widely used in Oracle ERP. it's simple and fast but anybody can develop the way they want. It's originally developed to run on server-side. By using Oracle Forms creating graphical user interface is more easy and with the use of PL/SQL code it becomes more reliable. [**?**]

Oracle Database 11g deliver the highest quality of service in terms of manageability, high availability, and performance. It has capabilities to use and manage all the major application development environments such as PL/SQL, Java/JDBC, .NET and Windows, PHP, SQL Developer, and Application Express. It also helps organizations protect their information with unique secure configurations, data encryption and masking, and sophisticated auditing capabilities. [**?**, **?**]

PL/SQL includes procedural language elements like conditions and loops and so on. PL/SQL units like functions, procedures, types, packages, and triggers, which are stored in the database level for the purpose of re-usability by applications that uses Oracle Databases. PL/SQL is one of three key programming languages embedded in the Oracle Database, along with SQL itself and Java. It's completely portable, high-performance transaction-processing language and provides a built-in, interpreted and OS independent programming environment,high security level.[**?**, **?**]

There are three available alternatives for a Forms application nowadays. Doing nothing, Modernize and Migrate. Leaving as it is running Oracle Forms application is not a good idea at all. The java versions, browser versions are continuously updated and users changes operating systems regularly. But Doing nothing at all leaves the systems powerless to these changes, and unless at least upgraded to the latest version of Oracle Forms, even Oracle supports cannot help. [**?**]

Chapter 1

Development Methodology

1.1 Process Model

1.1.1 Unified Process

For developing a complex, long and ongoing project like this it needs a lower risk and certainty and good process model too. So, by understanding the consequences of the reasons, Unified Process model is being selected for this project. The purposes of selecting this model are it's Use Case driven to capture the user requirements . This model is incremental and iterative and it resolves the project risks related with the requirements.

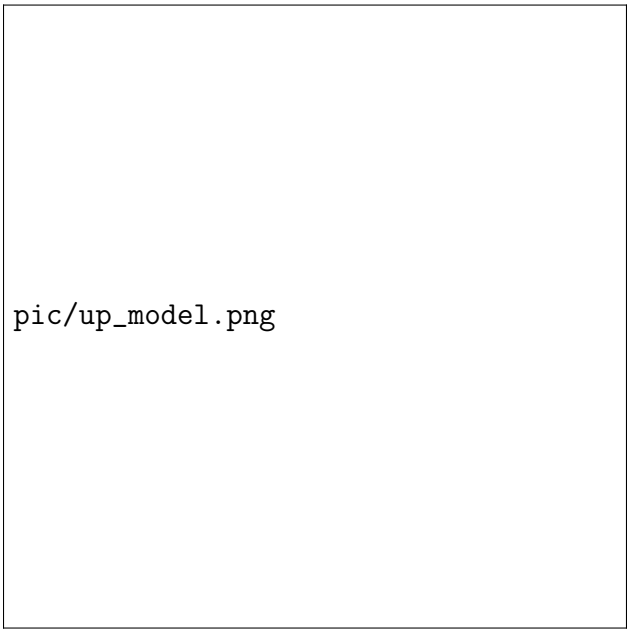


Figure 1.1: Unified Process Model

1.2 Diagrams

Diagrams gives the overview of the project and help develop efficient, effective and correct designs, particularly Object Oriented designs. Diagrams are also gives an environment to communicate clearly with project stakeholders (concerned parties: developers, customer, etc). UML diagrams are organized into two distinct groups: structural diagrams and behavioral or interaction diagrams.

a) **Behavioral UML diagrams**

   (a) Use case diagram

   (b) Activity diagram

b) **Structural UML diagrams**

   (a) Class diagram

   (b) Deployment diagram

c) **ER-Diagram**

d) **Schema Diagram**

e) **Data Flow Diagram**

1.2.1 Use Case Diagram

Use Case Diagram referred to as behavior diagrams used to describe a set of actions or event steps defining the interactions between a role(actor) and a system to achieve a goal. The main purpose of a use case diagram is to exhibit who interacts with the system, and the main goals they can achieve with it. In this project users are divided into several categories.

a) Administrator

b) Requisitioner

c) Approver

d) Buyer

e) Receiver

Figure 1.2: SEU Purchase Requisition Use-case Diagram

Name	Purchase Requisition Management System
ID	1
Description	User wants to log-in, view profile, edit, change password and log-out Admin wants to access user list and add user and assign roles Admin wants to roles list and add new roles and assign user Requisitioner wants to access the requisition list and add new requisition list Requisitioner wants to view requisition items Approver wants to approve or reject a requisition item Buyer wants to access the order list and add new order list Buyer wants to view requisition items Receiver wants to access the receipt list and add new receipt list Receiver wants to add new receipt item
Actors	Admin, Requisitioner, Approver, Buyer, Receiver
Preconditions	User must have a valid account and have to log-in
Main Flow	User log-in the system and performs with specific roles Admin add user , roles and assign roles the the users Requisitioner access the requisition list and add new requisition list & items Approver approves or rejects a requisition item by analysis Buyer access the order list, add new order list, items, schedules & distributions Receiver access the receipt list, add new receipt list & items
Postconditions	The system creates new roles, new users, assign roles System generates new requisition list and items and approved System generates new order list and items, schedules and distributions System generates new receive list and items

1.2.2 Activity Diagram

pic/Activity/seupr_full_activity.png

1.2.3 Class Diagram

The Class diagram represents classes, their component parts, and the way in which classes of objects are related to one another. A class diagram is a diagram describing the structure of the system. Used for capturing requirements and end user interaction.

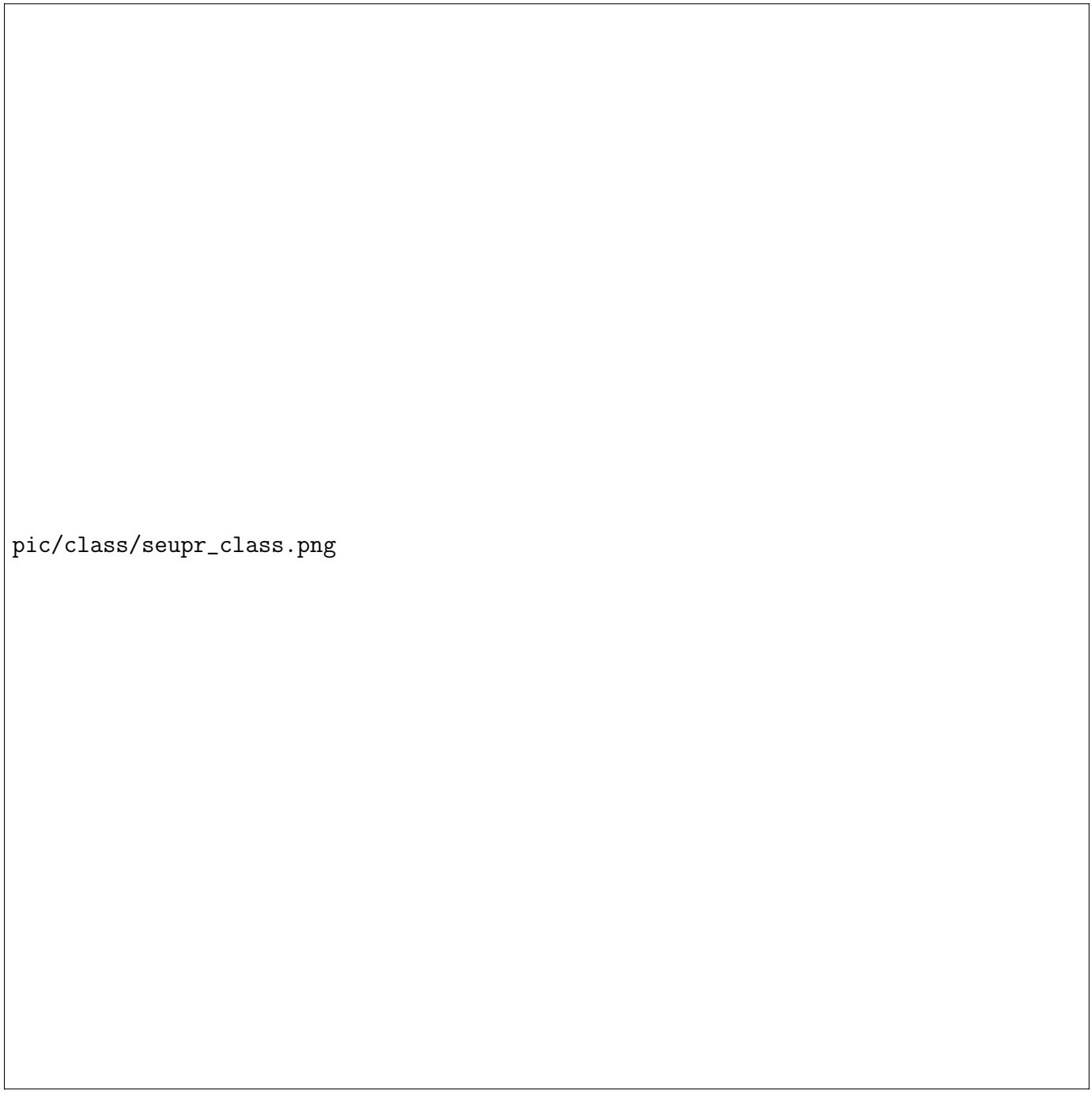


Figure 1.4: SEU Purchase Requisition Class Diagram

1.2.4 Entity Relationship Diagram

ERD describes the conceptual database design for the end users and represents main components of database: entities, attributes, and relationships. ERD describes how many tables is needed and what would be the relationship between them. ERD is simple and easy for the representation of a database. It helps a lot to understand the whole database.

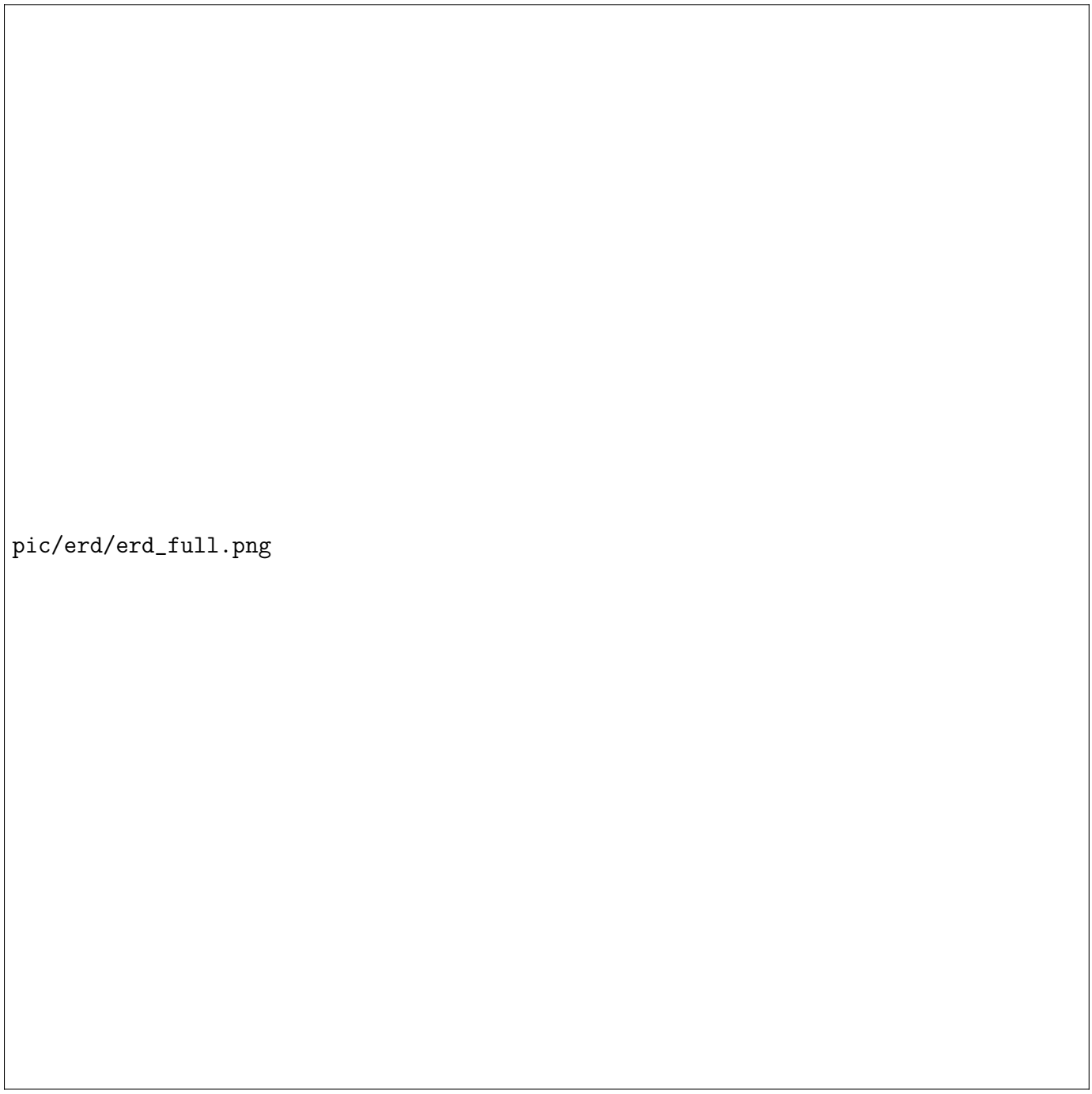


Figure 1.5: SEU Purcase Requisition Management System ERD

In, Figure-**??** the Entity Relationship Diagram of SEU Purchase Requisition Management System project is provided. This diagram is a graphical representation of this project's information system that shows the relationships of entity sets stored in a database. This ER diagrams illustrate the logical structure of physical databases of this project.

1.2.5 DFD (Data Flow Diagram)

Generally DFD shows the Flow of data but not order of events through the system. It is used for general or business purpose only. It is also known as Data Flow Graph and Bubble Chart.

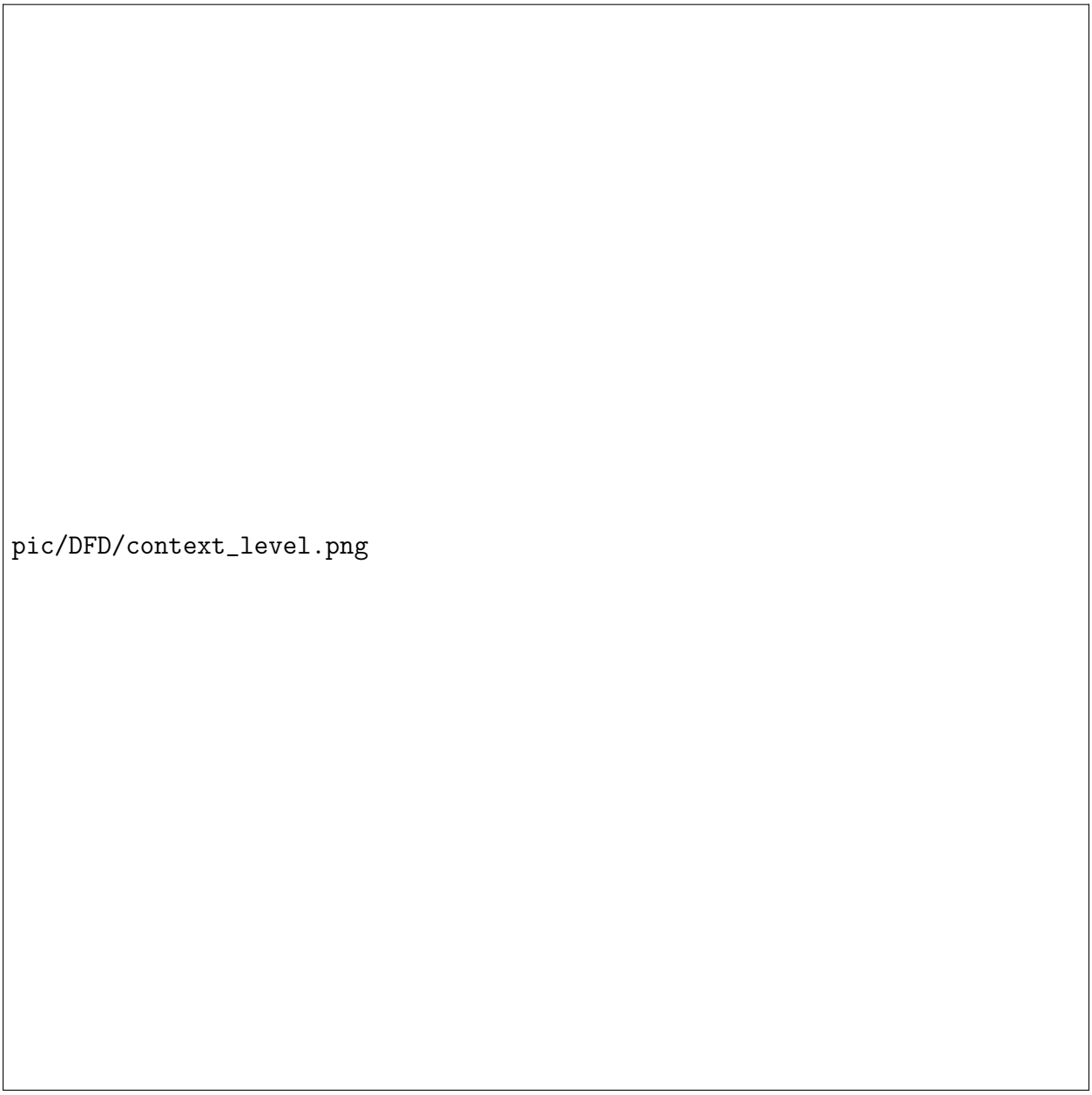
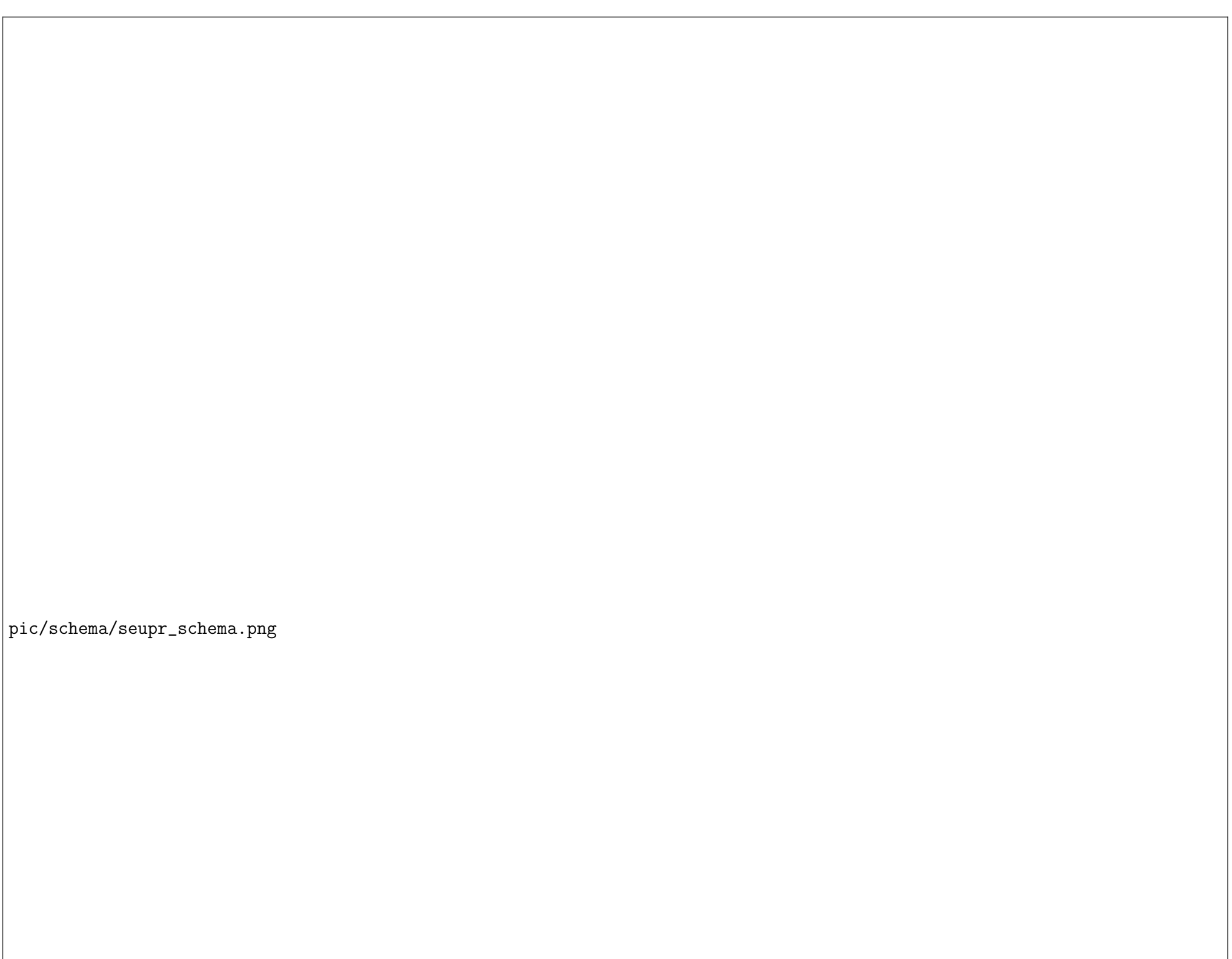


Figure 1.6: A context level DFD of SEU Purchase Requisition

1.2.6 Schema Diagram


pic/schema/seupr_schema.png

1.2.7 Deployment Diagram : Modeling a client/server system

Oracle Forms Services : Oracle Forms Services uses a three-tier architecture to deploy database applications:[**?**]

a) The client tier contains the Web browser, where the application is displayed and used.

b) The middle tier is the application server, where the application logic and server software reside.

c) The database tier is the database server, where enterprise data is stored.

Running a Form : Browser

a) http://seupr.com:8889/forms/frmservlet?config=seupr

Figure 1.8: A client/server system deployment diagram of SEU Purchase Requisition

Protocol	http
Host and domain	seupr.com
Port for HTTP Server or OC4J	80 default for HTTP Server 8889 default for OC4J
Forms Servlet Alias or static HTML file	/forms/frmservlet
Parameters: This section begins with "?"	config=seupr

SEU purchase requisition's URL consists of those components

Chapter 2

Tools

2.1 Hardware Requirement

a) A PC with Windows (preferred) operating system.

b) RAM is greater than or equivalent to 4 GB

c) Intel® Core™2 Duo Processor E8400 or higher

d) Secondary Memory atleast 10 GB

2.2 Software Requirement

2.2.1 Front End

a) Oracle Developer Suite 10g (10.1.2.0.2)

   (a) Oracle Form Builder [32-bit]

   (b) Oracle Reports Developer

b) Oracle SQL Developer (4.0.1.14)

c) SQL*Plus: Release 10.1.0.4.2 - Production

d) Enterprise Architect 13

e) Maxthon Browser [Version: 5.1.6.1000]

f) Mozilla Firefox Browser [Version: 40.0.1, 32-bit]

g) Sublime Text 3

2.2.2 Back End

a) Oracle Database 11g Enterprise Edition Release 11.2.0.1.0 - Production

b) Java SE Development Kit 6u45

2.2.3 Supported Platforms

a) Microsoft Windows (XP, Vista, 7, 8, 10)

b) macOS

c) Red Hat Linux

d) and others

Oracle Forms

a) **What is Oracle Forms?**

   (a) a component of Oracle Fusion Middleware.

   (b) a software product to create GUI for end users

   (c) It has an IDE including an object navigator, property sheet and code editor that uses PL/SQL.

   (d) originally developed to run server-side .

b) **Why Oracle Forms is being used?**

   (a) It is Oracle's long-established technology to design and build enterprise applications quickly and efficiently.

(b) Development the way you want it .

(c) Simple and fast.

(d) An old technology but widely used in Oracle ERP.

Chapter 3

Implementation

This projects has been divided into several modules to make the development of the project is much more easier. Such are -

3.1 Modules

This software has covered some specific modules. These modules are listed below :

a) Login Page

b) Information List

   (a) Unit List page

   (b) Bank List page

   (c) Company List page

   (d) Product Categories page

   (e) Product List page

   (f) Supplier List page

c) Purchase

   (a) Requisition Entry page

   (b) View Requisition items page

(c) Requisition approvals page

(d) Purchase order page

(e) Receipt page

d) Purchase Administration

(a) User Information page

(b) Roles page

e) Help

(a) Profile page

(b) Notifications page

(c) About Developer page

(d) Change Password page

(e) Calling About SEU Purchase Requisition Management System

(f) Log-out

3.2 Log-in Form

Logging in is a process where an individual access into a secured computer system by entering authentic identification. Here, in this page a authentic user must enter valid username and password to access the main system to perform a task. After successful logging in Home page will be appeared. Which user when access to the system, it will be stored in the database for security purpose. A valid user of course can modify the password and modify his own profile of course.

In, Figure-**??** the log-in page has been showed from this project. The user-name and password must be more than or equivalent to 4 characters and should be valid to access the home page.

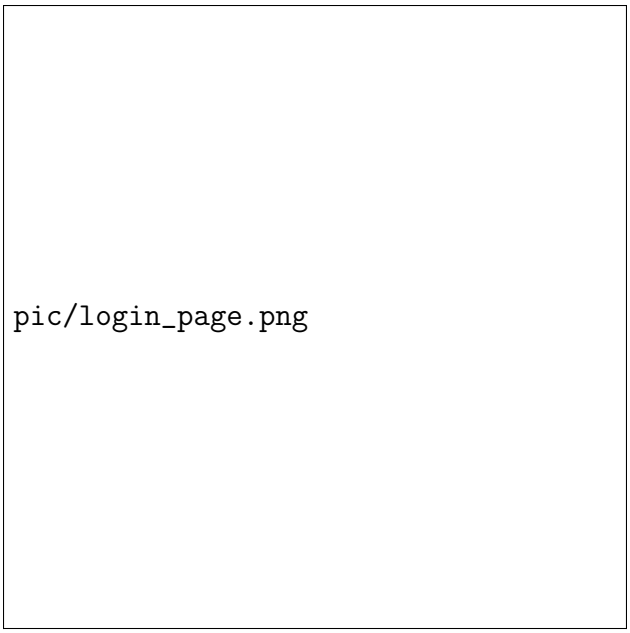


Figure 3.1: Log-in Page

3.3 Home Form

A home page is the initial page of a software application. It is also sometimes called main page as well. In, Figure-**??** the Home page has been showed. Any user with authentic username and password can access this page. In this page a user can see all the roles that has been assigned to that user.In this page a menu bar will be showed up in the header area of the page. By using the menu bar the user can go to the specific pages and does the jobs according to the roles.

3.4 Unit of measurement List Form

In, Figure-**??** UOM list page has been showed.Here a user can add an UOM to the system if he/she has the sufficient privilege to do that. Suppose, an item is pen and it's unit of measures is **each** and UOM code is **EA**. An UOM must be unique otherwise there an error will be prompted in that case.

UOM (Unit of Measure): along with a numeric value, to specify the quantity of an item. For example, each is a unit of measure that is used to specify a singular number of units of an item. Units of measure are used to define the quantity of an item when defining, stocking, planning, ordering, transacting, shipping, receiving, and counting items.

3.5 Bank List Form

In, Figure-**??** the bank list page has been showed. Here, a user can add a bank name if he/she has the privilege.

Bank id : auto increment. User does not have to worry Bank id.

Bank name : must be unique.

In Bank Account information block there can be multiple records and each record contains account name , account number, currency (in which currency the transactions will be occurred), account type.

Acct Name: Name of the bank account that this supplier or supplier site or employees of the organization uses. The list of values allow for only active supplier bank accounts. The user entry Bank Account name in Acct Name field supplier those supplier are active.

Acct Number: Bank account number of the bank account that this supplier or supplier site. User must entry supplier Account Number in Acct Number field.

Currency : have to use select currency if multiple currency is being used.

3.6 Product List Form

In, Figure-?? the product list page has been showed. Here, a user can add a product information if the user has the sufficient privilege.

product id : is the auto generated number which is generated by the system.

Product name : must be unique.

UOM : (Unit of Measurement) can be selected from the LOV(List Of values). When user clicked the lov button then a list will be prompted with data then user can select one of them and it be set to the UOM field.

product Description : user can add description of that product.

picture : select any picture with the format of .jpg, .png, .gif can be added to load in the database and then it will be retrieved automatically from the database when forms will be executed in the new-form-instance happened. **Caution:** Picture must be located in this

3.7 Supplier List Form

In, Figure-?? a user can add a supplier to the system and manage the suppliers if the user has the sufficient role or privilege to do that.

In this form supplier id is auto generated by the system, user shouldn't worry about that. Supplier name field must be entered and it should be unique as well. In organization name field the organization name of the supplier can be added. Bank account number is to be selected using lov button. The bank account number will be retrieved from the list of bank account. URL is the website where the supplier broadcasting their products. Inactive date is from which date the supplier can't do any dealing with the organization. Tax registration number and tax payer id can be added here too.

In supplier site information block at least one supplier site record should be added. In each record supplier site address , supplier site phone, supplier site name and agent name should be added.

In supplier site product price block product name can be selected using lov and then UOM would be automatically filled by the system. User should be added a valid price there and

also put comments. User can add multiple products here their specific price.

3.8 Requisition Entry Form

During a Requisition lifecycle, many people can act on the requisition including Employees, Buyers or buyer-planners, Approvers, Suppliers, Purchasing staff or employees. Here a requisition generator creates a requisition who must be a registered user and an employee of SEU of course and must have "Create Requisition" privilege. An employee can create requisition list which can contain multiple requisition items. In the description section a requisition generator can tells if it's urgent or not. In which currency the transactions will be occurred the user can select it using lov that has been assigned to that field. Prepared by and last updated time field will be automatically filled by the system.

In each requisition items, there will be information about requisition item id,the requestor's demanded product name (selected by using LOV), the requestor name(selected by using LOV), price of the product, quantity of that product that is required (QTY), total amount(which is automatically calculated, total amount = QTY * price), supplier site name, need by date, delivery locations and so on. Each item must need all level of approvals before generating purchase order against that requisition item.

Here, if the total amount for an item is less than or equal to 3000 then one approval is needed. If item total amount is greater than 3000 and less than or equal to 10,000 then it will need 2 approvals and if item total amount is greater than 10,000 then it will need 3 approvals. In this way the new rules can be applied. This is an automatic system. One trigger is created to complete this task. The trigger's code is given below. The software developer must maintain the code when the rules will be changed.

In Requisition Amount Distribution block there will be multiple records for each requisition items. Each record holds a bank account(suggesting an account to be charged) which is selected by using LOV, expenditure percent can't be more than 100% then expenditure

```
CREATE OR REPLACE TRIGGER REQ_ITEM_ROLES_LOAD_TR
AFTER UPDATE OF  QTY,PRICE ON REQUISITION_ITEMS
FOR EACH ROW
DECLARE
    TOTAL_AMUNT SEUPR.REQUISITION_ITEMS.PRICE%TYPE;
BEGIN
    TOTAL_AMUNT := NVL(:NEW.QTY, 0)*NVL(:NEW.PRICE, 0);

    IF UPDATING AND (NVL(:OLD.QTY, 0) != NVL(:NEW.QTY, 0) OR NVL(:OLD.PRICE, 0) != NVL(:NEW.PRICE, 0)) THEN

        IF(TOTAL_AMUNT>=10000) THEN
            DELETE FROM REQ_ITEMS_ROLES WHERE REQ_ITEM_ID=:NEW.REQ_ITEM_ID ;
            INSERT ALL
                INTO REQ_ITEMS_ROLES (REQ_ITEM_ID, ROLE_ID) VALUES (:NEW.REQ_ITEM_ID,1)
                INTO REQ_ITEMS_ROLES (REQ_ITEM_ID, ROLE_ID) VALUES (:NEW.REQ_ITEM_ID,2)
                INTO REQ_ITEMS_ROLES (REQ_ITEM_ID, ROLE_ID) VALUES (:NEW.REQ_ITEM_ID,3)
            SELECT * FROM dual;

        ELSIF(TOTAL_AMUNT>=3000 AND TOTAL_AMUNT<10000) THEN
           DELETE FROM REQ_ITEMS_ROLES WHERE REQ_ITEM_ID=:NEW.REQ_ITEM_ID ;

            INSERT ALL
                INTO REQ_ITEMS_ROLES (REQ_ITEM_ID, ROLE_ID) VALUES (:NEW.REQ_ITEM_ID,1)
                INTO REQ_ITEMS_ROLES (REQ_ITEM_ID, ROLE_ID) VALUES (:NEW.REQ_ITEM_ID,2)
            SELECT * FROM dual;

        ELSIF(TOTAL_AMUNT<3000) THEN
            DELETE FROM REQ_ITEMS_ROLES WHERE REQ_ITEM_ID=:NEW.REQ_ITEM_ID ;
            INSERT ALL
                INTO REQ_ITEMS_ROLES (REQ_ITEM_ID, ROLE_ID) VALUES (:NEW.REQ_ITEM_ID,1)
            SELECT * FROM dual;
        END IF;

        COMMIT;
    END IF;

    EXCEPTION
          WHEN OTHERS THEN
            NULL;
END;
```

amount's field will be automatically filled by system calculation.

Requisition items roles block is only for view. A used can ad or modify any information here. This page is for requisition creator so that he/she can view which approver and when did or didn't approve the requisition item and for which reason with comments. In, Figure-?? Requisition Entry Form is being showed. Some key things to remember :

a) After inserting and saving items in the requisition items block, the items cannont be deleted

b) Requisitioner has to wait to take it further steps till all the approvals for that item is being approved

c) Only the user who created the requisition item can access his/her own created item

d) If the requisition item once saved it cannot be changed by the creator

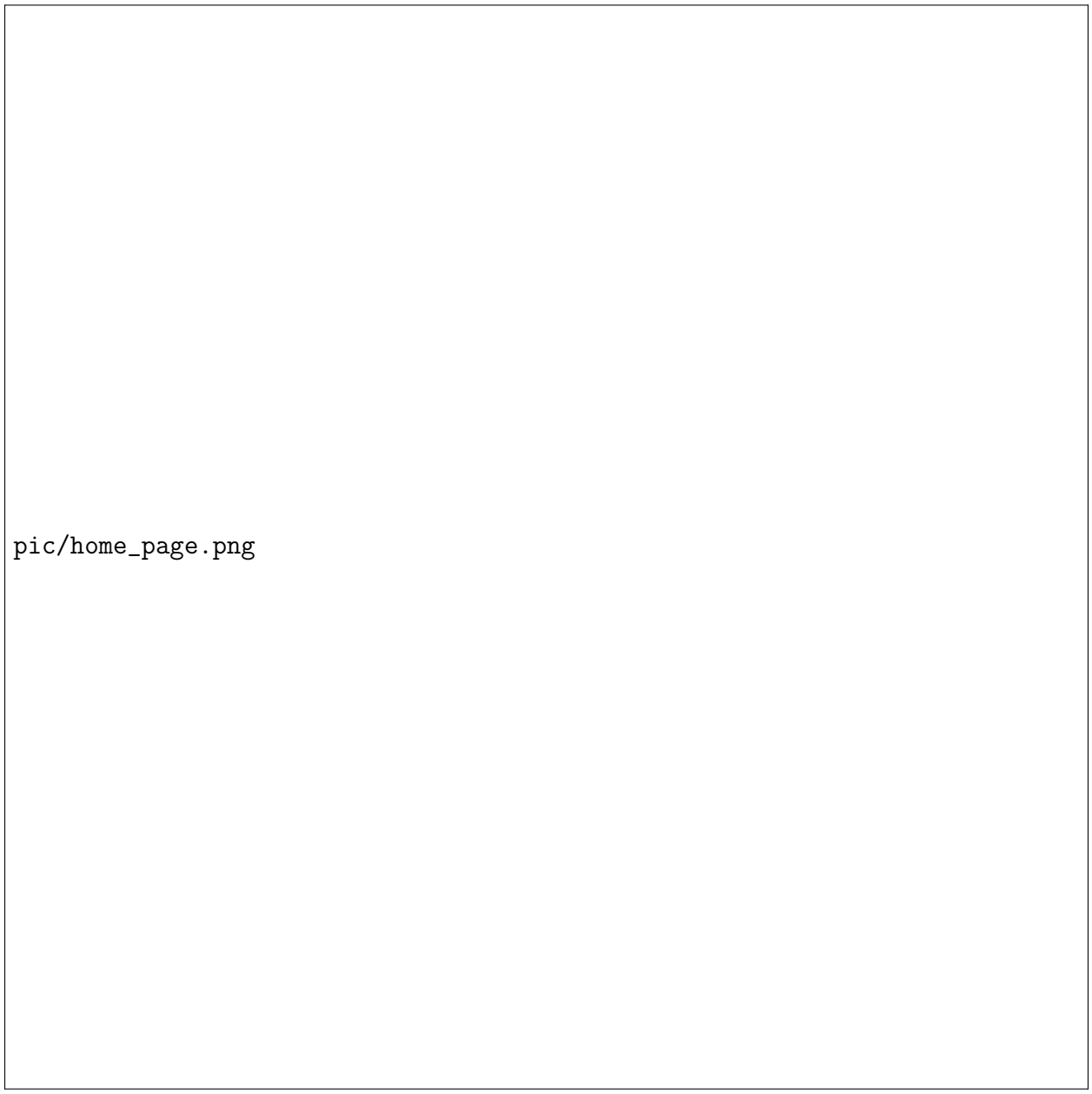


Figure 3.2: Home Page

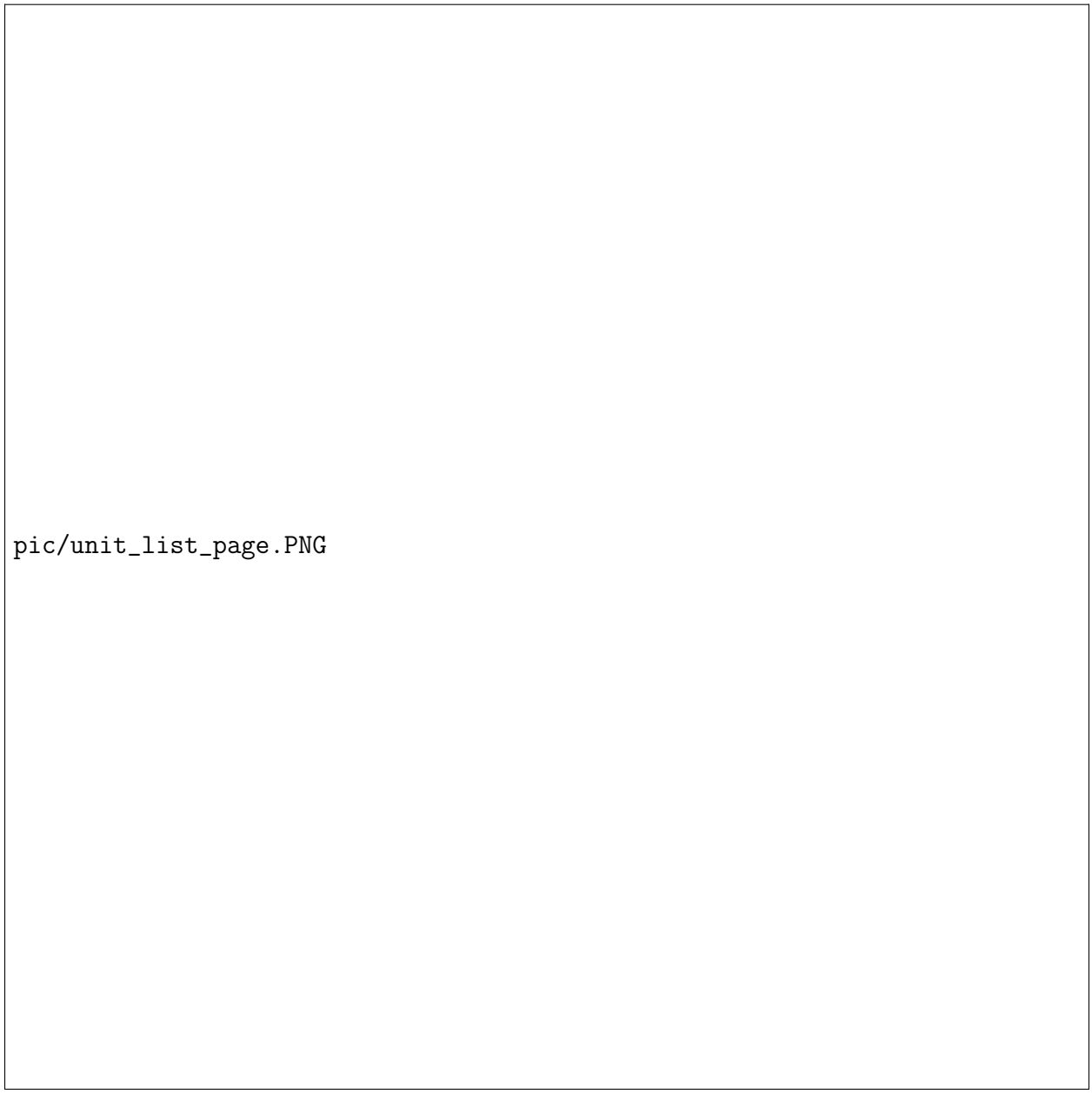


Figure 3.3: Unit of Measurement List Page

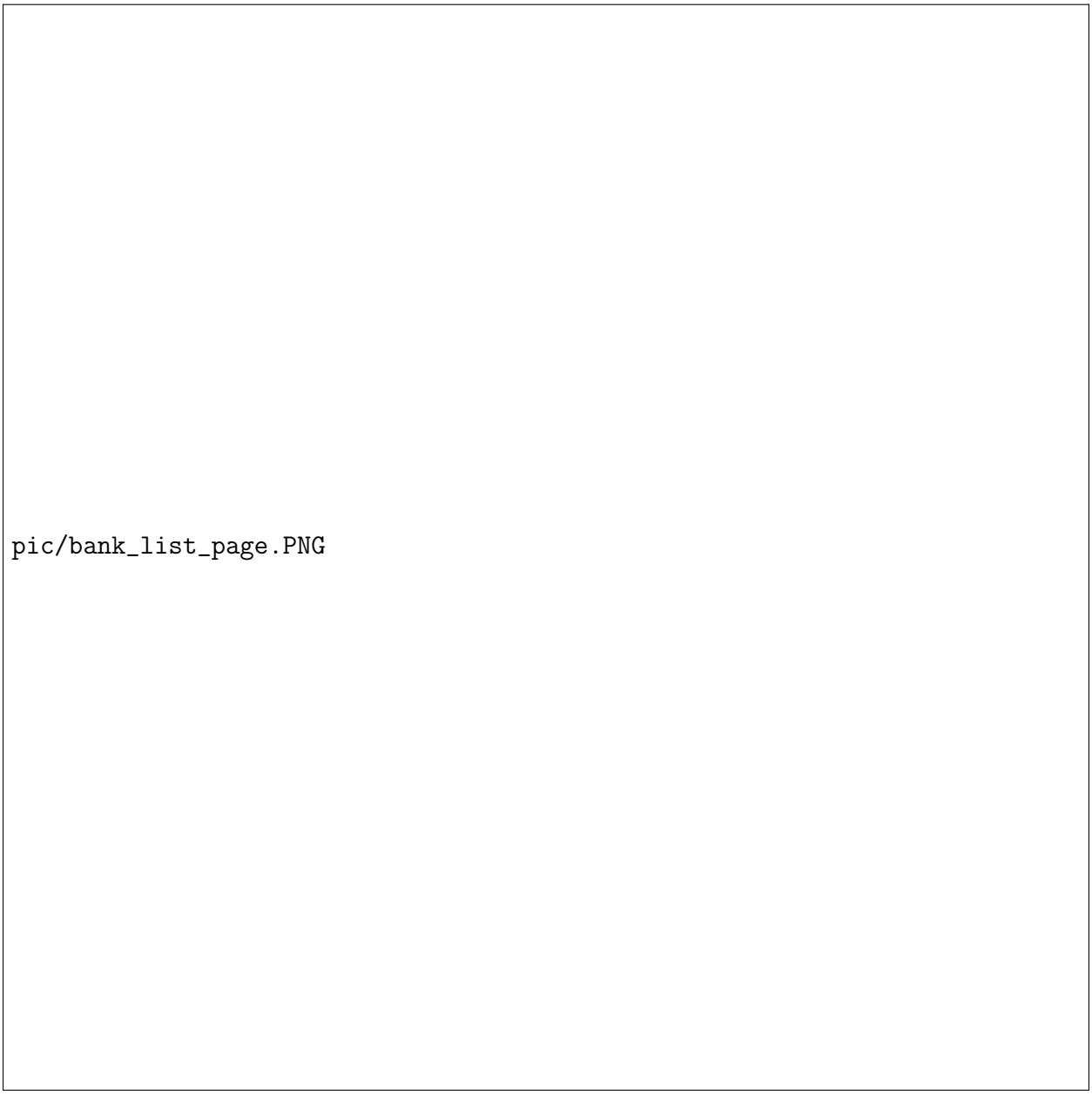


Figure 3.4: Bank List Page

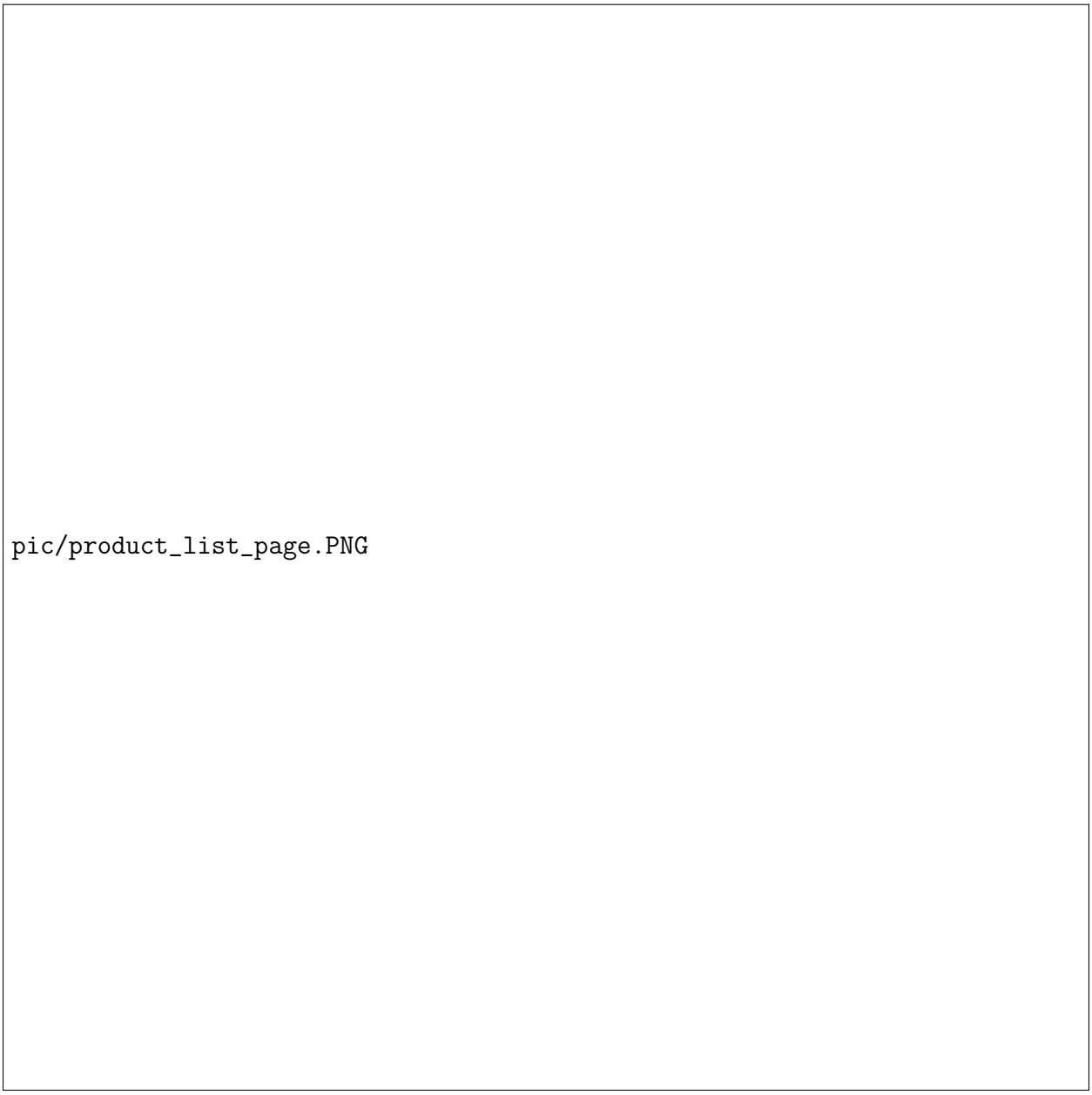


Figure 3.5: Product List Page

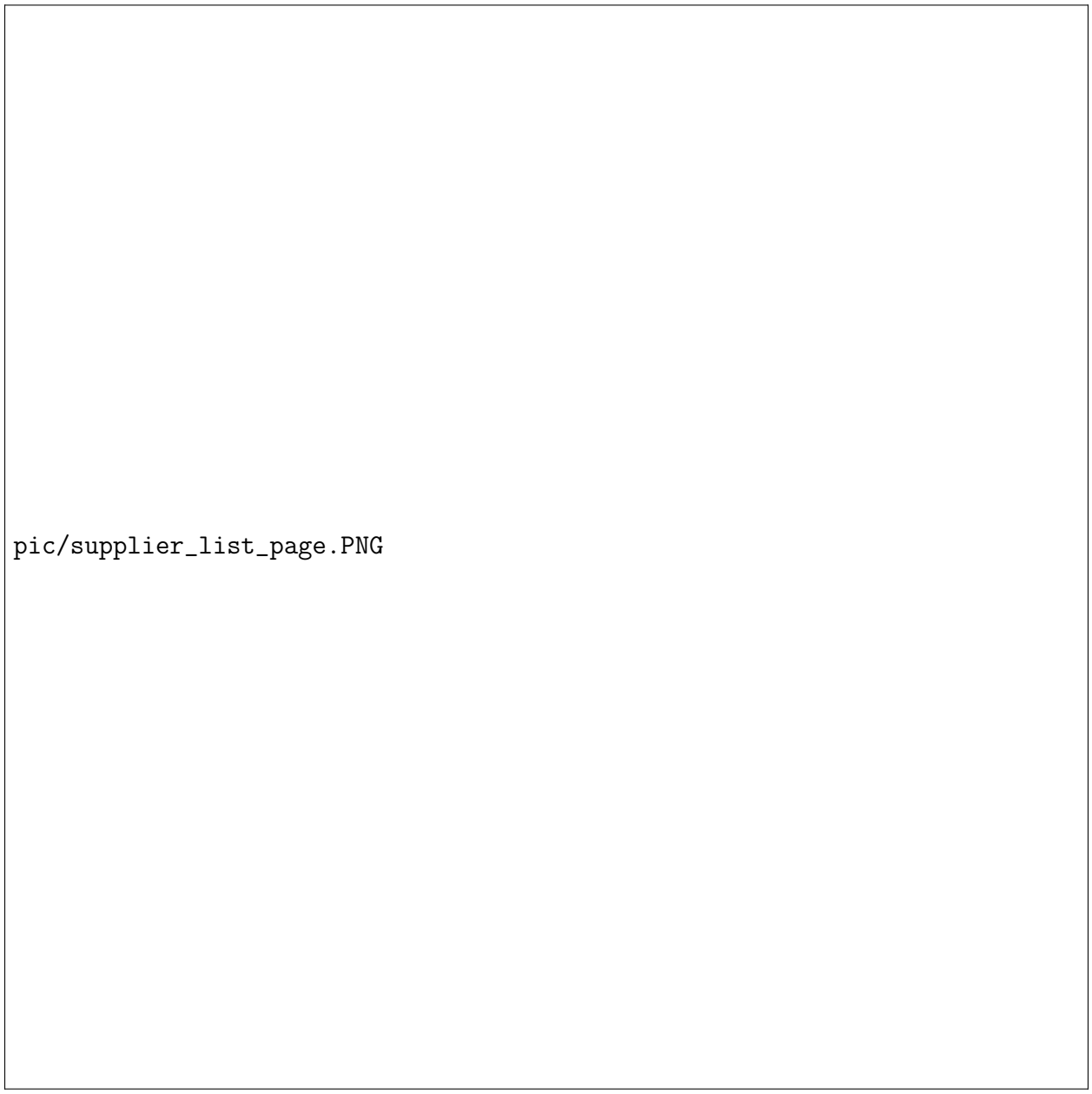
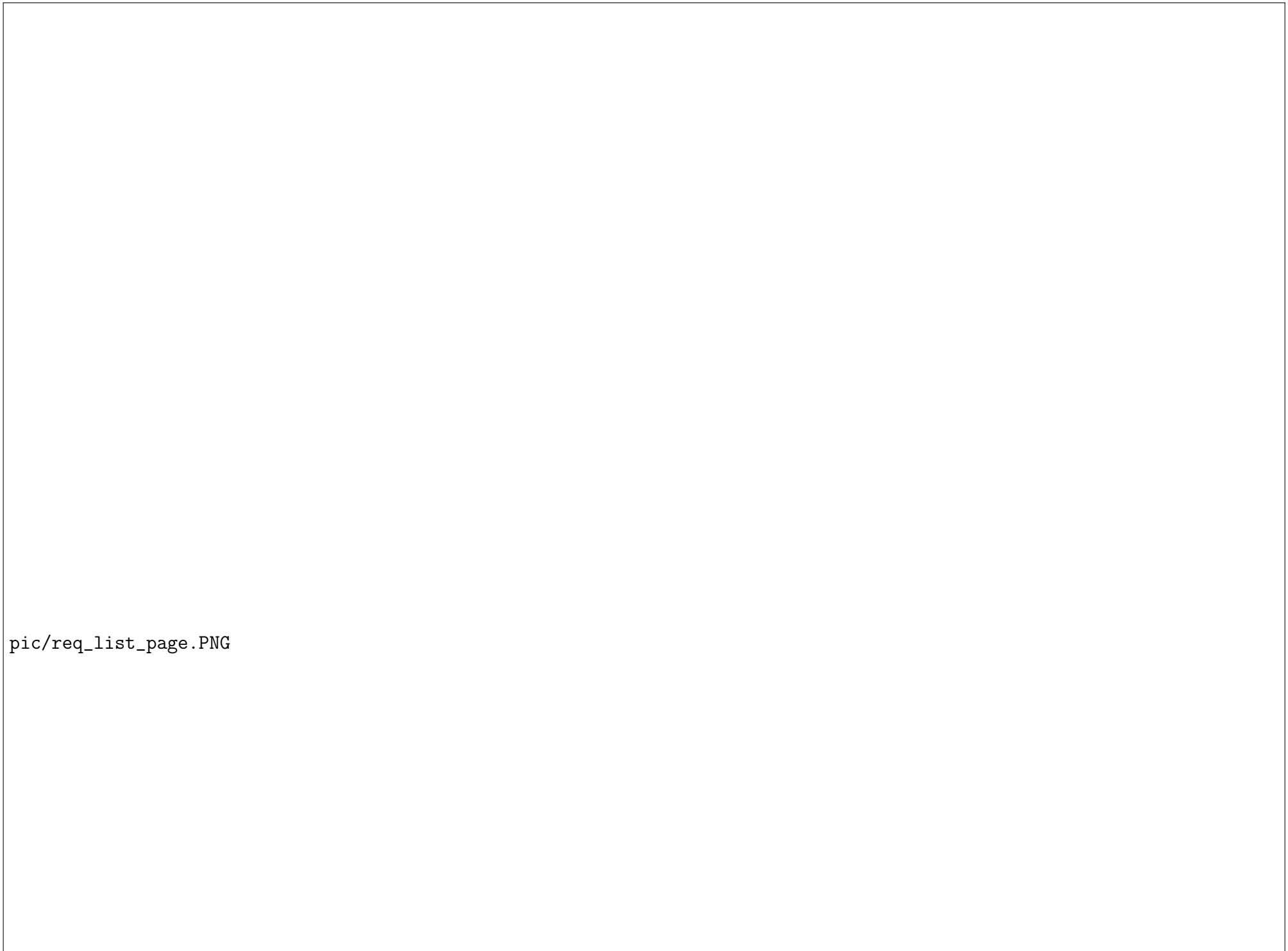


Figure 3.6: Supplier List Page



3.9 Requisition Approval List Form

A user with the role of "Requisition Approval" can access the form. Requisition items block is only for view. An approver can select one item from here to give approval. In requisition item roles needed block an approver ha to select yes or no in "is approve?" field. Once all the approval is given as yes by all the approvers then the item will be approved and it connot be changed anymore. Suppose, if a requisition item needs 3 approvals. If first approver gives approval then second approver can gain power to give approval. Again if second approver gives approvals then third approver can give approval.

pic/req_approval_list.PNG

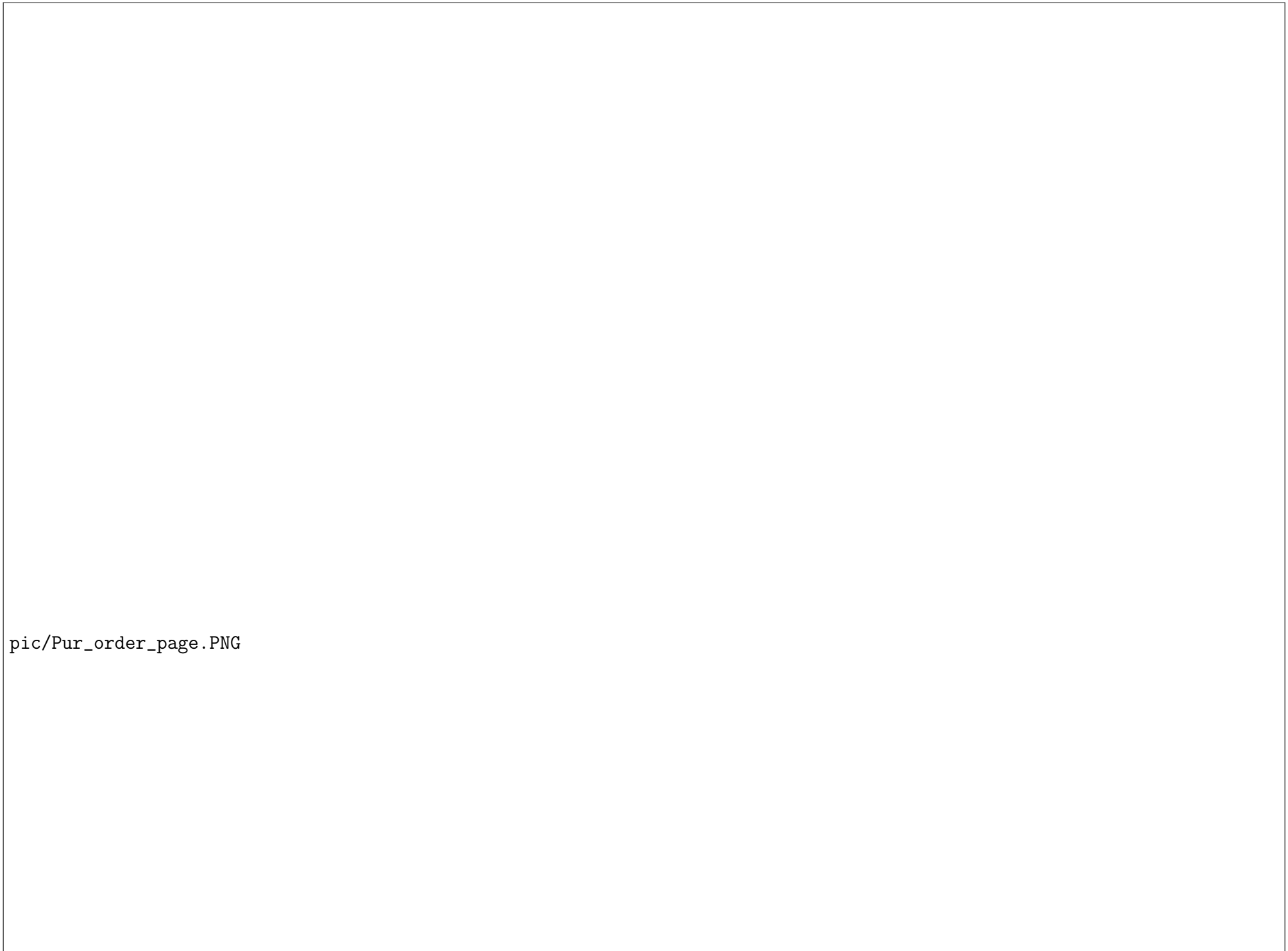
3.10 Purchase order Form

To access purchase order form a user must need "Buyer" role. A buyer can create a order and in that order can contain multiple order items. In the Order Entry block the buyer has to fill order type. In this case, order type is standard purchase order. Buyer has to add currency name, supplier name, supplier site by using different lov. Buyer should also add Description and Bill to location in the specific fields.

In the order items block, buyer can add multiple order items. Each order items can contains order item id which is automatically generated by the system and buyer shouldn't worry about that. Each order item must be against a unique requisition item. It is strictly restricted by the system. Buyer don't have to worry about that matter. Requisition item id is selected by the buyer using "Requisition item lov". Then Product name, UOM, price will be automatically filled by the system.

Each order item contains multiple shipment schedule if needed. Shipment schedules total qty, and charge amount will not be crossed cause of system automatic restriction.

Each shipment schedules contains multiple order distributions. Each distribution contains the bank account, expenditure percent and charge amount.



3.11 Receipt Form

To access the Receipt form a user must have “Add Receipt” Role. After accessing the receipt form a receiver all he has to do is write the name and select order shipment schedule id by using lov that has been set to that item and and write the received qty. Other than these three things a receiver doesn’t have to do anything. It’s very simple and all things are generated automatically by the system for more user friendly environment. Receipt date will be automatically set by system. UOM, requestor name, Expected qty and note to receiver will be automatically set. Commenting will be a good practice for future analysis and make the receipt form much more understandable.

pic/receipt_list_page.PNG

3.12 User Information Form

To access the User Information form a user must have "Add User" Role. Normally system administrator does have that kind of permissions. Administrator add user with roles to access the software application and do some specific functions. in this form the user must have to fill the user name and password field and first name and last name field to save the page.

Administrator should add some roles to the new user to access specific forms. The roles are uniquely added to the new user or already existed users too in the user roles block section. One thing to be remembered that role name must be unique for each user.

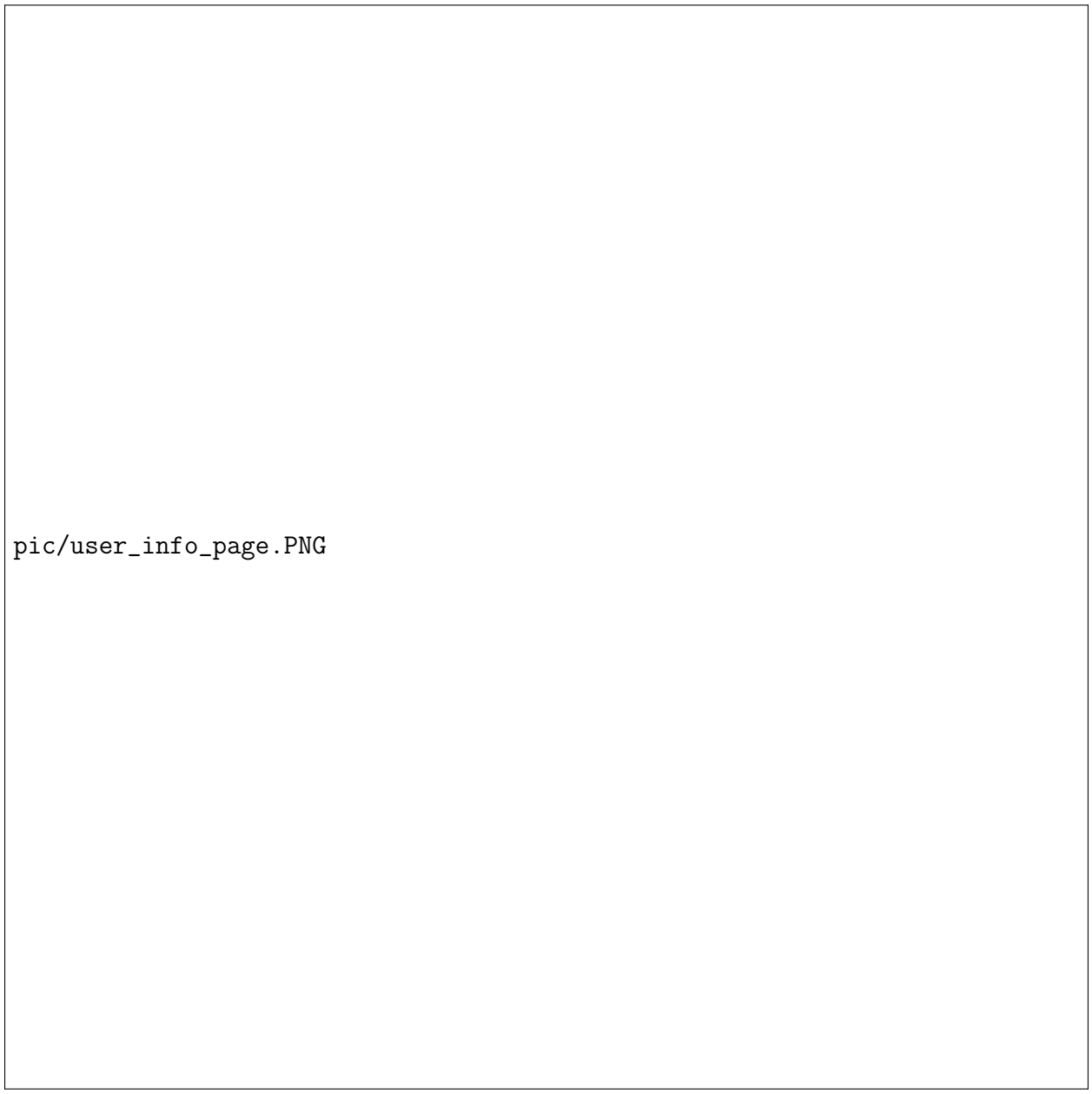


Figure 3.11: User Information Page

3.13 Roles Form

To access the Roles form a user must have "Add Role" Role. In this page normally for administrator user. The user add new unique roles for system privacy maintenance for user access controlling.

In Role information block role id is auto generated by system. Role is unique and user has to add new role by following organization policy. Role description is described as what is the purpose of that role.

In user role information block a user has to add user name by using lov and person name field will be automatically filled by the system. Start time means starting date from when the role is applied for that user and end time means when the role is terminated for that user.

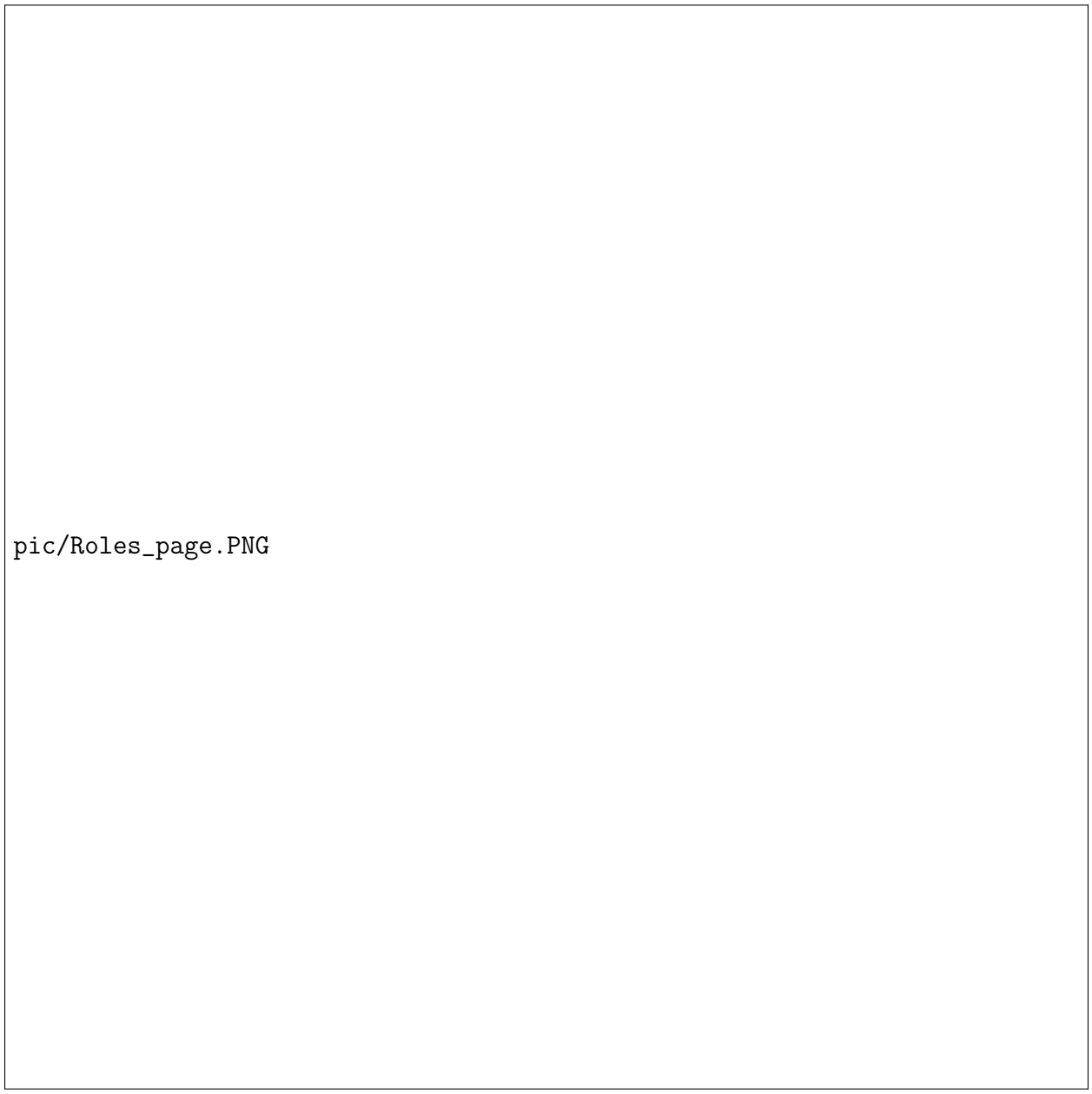


Figure 3.12: Roles Page

3.14 Profile Form

This page is for only user. Any user can access his/her own profile and edit information. User can add phone, blood group, address, Date of birth(DOB), NID, Marital status, select gender and so on. User also can change user name and email. Note, user role information is only for view for the user.

Title : These can be titles prefixing a person's name. Like Mr, Mrs, Miss, Ms, Sir, Dr.

First name & Last Name: First name is the person first part of the name. Last name is the person last part of the name. For example, Habibur Rahman, here Habibur is the first name and Rahman is the last name.

Address : is the location where the user is currently living.

Dob : is date of birth of the user.

Phone : is the contact number of the user

Blood Group : Human blood groups. like, O+,O-, A+, A- and so on.

NID : National Identity (NID) Card. Its use as a voter's identity card. If the user is more than 18 years old then he must have an NID.

Gender : male or female or other can be selected

Religion : Islam, Hinduism, Christianity , etc.

Username : is the name to access the software.

Email : xxx@gamil.com, xxx@yahoo.com, etc

Organization : where the user works

3.15 Notification Form

This page is for user to get instant message of the actions performed by other users. Suppose in requisition approval list form, if an item has all the approval yes then creator of that requisition item get a notification message with item id, time, which user performed the action, what approval is given and note. This notification system is created for users for better usage of the software and make this software very much user friendly. User can also delete all the notifications by clicking the Delete all button.

3.16 Change Password Form

In this page any user can access. The user can change the password by giving valid old password. The new password and re-type password must match to save the password.
Note: New password length must be greater than or equivalent to 4 character.

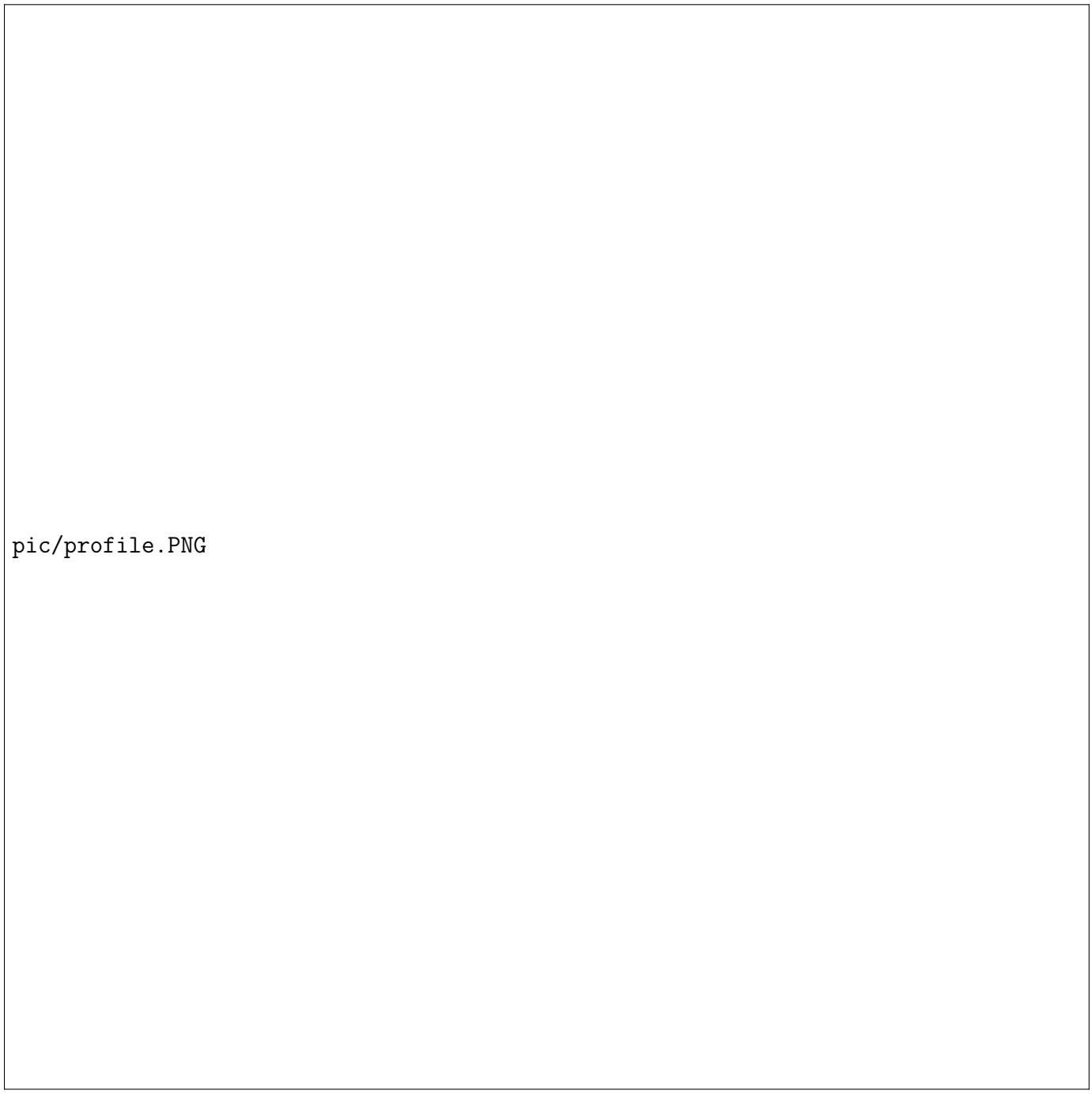


Figure 3.13: Profile Page

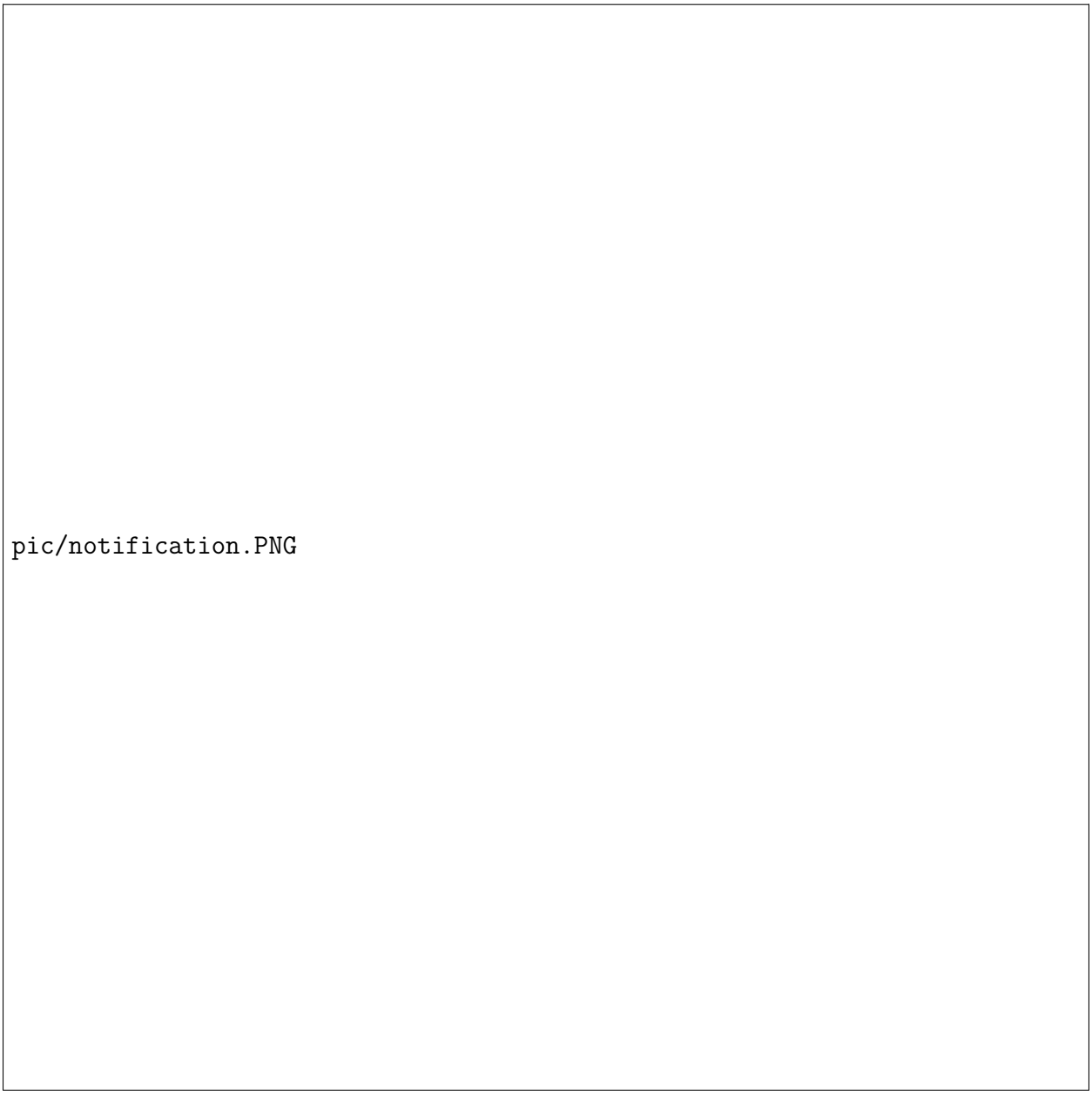


Figure 3.14: Notification Page

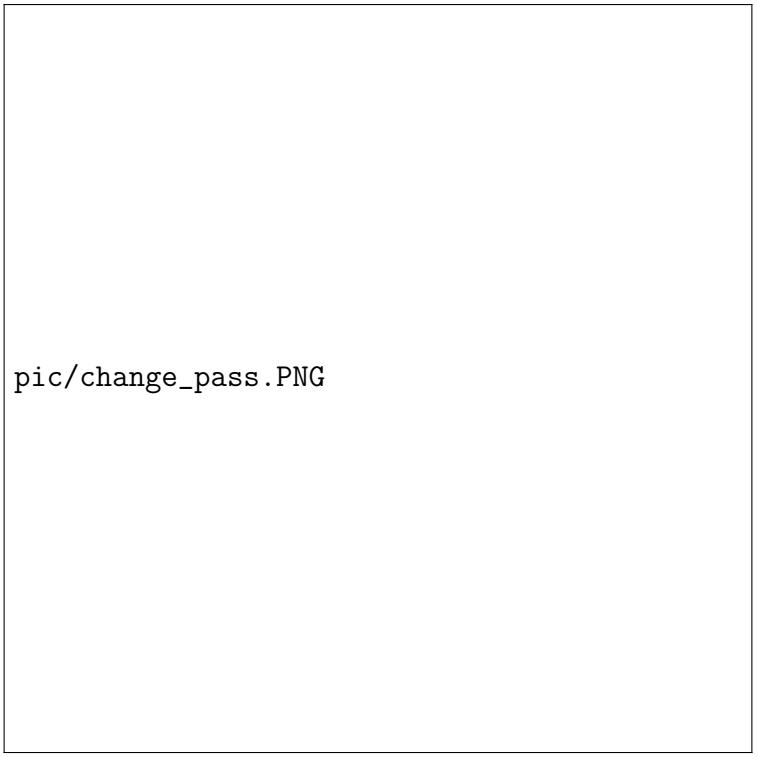


Figure 3.15: Change Password Page

Chapter 4

Limitations and Conclusion

Conclusion

This software projects is based on purchase requisition management system using Oracle Forms 10g. In here user creates requisition list which contains requisition item and each of them needs approvals. After being approved, a notification will be sent to the creator of that requisition item by the system automatically and the requisition item can be added as an order item in an order list by a buyer and purchase the item from suppler site. Then items are supplied by vendor and it is received by a receiver and the process ends. The user can made the purchase process in a single platform and don't have to waste time unnecessarily when the system is online. It needs more functionality like tender, auction process, market analyzing and other business processes to make it fully compatible to the SEU purchase requisition management system.

Limitations and Boundaries

Limited time, lack of resources and lack of industry level experiences are the main reasons for the limitations and boundaries of this project. Right now this software isn't accessible to everyone. It will be if there is a unique real IP and network configurations can be done. This software will be well designed and well be described to make it more user reliable, robust and user friendly in future implementations. This project requires jdk 6 version

which isn't quite appreciable for current time application users but jdk 8 will be used in future implementations.

Recommendations on Future Improvement

There is always room for improvements. In this software there are so many other functionalities to add.

a) This project can be implemented in Oracle E-Business Suite or Oracle Application Express or Oracle Forms 12c to make this project more reliable and more robust

b) Tender and Auction system can be added to maintain tender process. That part can describe the cost of the contract, submit the best prices, prices are compared to other vendors prices, cooperating about the quality of the goods or services during a specific periods.

c) Supplier Comparisons in terms of product's quality, price etc. Analyzing the Actual Costs, communicating different providers, Measuring Supply Performances.

d) Messaging System : For example, requisitioner wants to reminds the approver by a message to ensure requisition item approval.

e) Audit : To control risks, prevent fraud, ensure maximum savings and maintain regulatory requirements and maintain periodic audits to avoid unwanted risks.

f) Vendor Validation : Analyzing, if the vendor's plays an integral role in the organization, if they follow the guidelines, policies and continue to meet company criteria as SEU required.

g) Quality Assessment : By continuous checking the reports of the quality once the goods or services are received. Checking inventory reports, patterns of poor or damaged products may lead to review of the vendor's suitability for the organization.

Contribution

The purchase requisition management system is a new project in Southeast University. In the past no one worked on this subject. It may be a good solution to help the procurement process undoubtedly. And this is a nonprofit software application.

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