

TCC Automation Software

Report

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Submitted By:
Sandeep Kaur
90370821211
D4 IT

Department of Information Technology
GURU NANAK DEV ENGINEERING COLLEGE
LUDHIANA-141006

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Abstract

TCC Automation Project discusses the work done in Testing and Consultancy Cell and in what way that work is made easier using this Software. This project is not only concerned about only one department. However it can be used universally by any department just by changing the content of Database. Automation is the use of control systems and information technologies to reduce the need for human work in the production of goods and services. Raw data storage, electronic transfer, and the management of electronic business information comprise the basic activities of an office automation system.

TCC Project was made keeping in mind the type of work done in this cell and how this software would help to do the same work but reducing the work load to a great extent. Automation of manual work had been the main concern.

Also, this project is completely open source and is made using Django, Html, Python, CSS, JavaScript, Bash Script and MySql and the entire code is available to the user as and when required. There is also Complete developer Documentation as well as User manual alongwith it for making the developing and using the Software a lot easier.

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1 Introduction To Organisation

I had my Six Weeks Institutional Training at TCC(Testing And Consultancy Cell), GNDEC Ludhiana. Guru Nanak Dev Engineering College was established by the Nankana Sahib Education Trust (NSET) Ludhiana. The Nankana Sahib Education Trust(NSET) was founded in memory of the most sacred temple of Sri Nankana Sahib, birth place of Sri Guru Nanak Dev Ji. With the mission of Removal of Economic Backwardness through Technology Shiromani Gurudwara Parbandhak Committee (SGPC) started a Poly technical was started in 1953 and Guru Nanak Dev Engineering College was established in 1956.

NSET resolved to uplift Rural areas by admitting 70% of students from these rural areas ever year. This commitment was made to nation on 8th April, 1956, the day foundation stone of the college building was laid by Dr. Rajendra Prasad Ji, the First President of India. The College is now ISO 9001:2000 certified.



Figure 1: Guru Nanak Dev Engineering College

Guru Nanak Dev Engineering College campus is spread over 88 acres of prime land about 5 Km s from Bus Stand and 8 Km s from Ludhiana Railway Station on Ludhiana-Malerkotla Road. The college campus is well planned with beautifully laid out tree plantation, pathways, flowerbeds besides the well maintained sprawling lawns all around. It has beautiful building for

College, Hostels, Swimming Pool, Sports and Gymnasium Hall Complex, Gurudwara Sahib, Bank, Dispensary, Post Office etc. There are two hostels for boys and one for girls with total accommodation of about 550 students. The main goal of this institute is:

- To build and promote teams of experts in the upcoming specialisations.
- To promote quality research and undertake research projects keeping in view their relevance to needs and requirements of technology in local industry.
- To achieve total financial independence.

1.1 TESTING AND CONSULTANCY CELL

My Six Weeks Institutional Training was done by me at TCC (Testing And consultancy Cell), GNDEC Ludhiana under the guidance of Dr. H.S.Rai (Dean Testing and Consultancy Cell). Testing and Consultancy Cell was established in the year 1979 with a basic aim to produce quality service for technical problems at reasonable and affordable rates as a service to society in general and Engineering fraternity in particular.



Figure 2: Testing and Consultancy Cell

Consultancy Services are being rendered by various Departments of the College to the industry, State Government Departments and Entrepreneurs and are extended in the form of expert advice in design, testing of materials & equipment, technical surveys, technical audit, calibration of instruments, preparation of technical feasibility reports etc. This consultancy cell of the college has given a new dimension to the development programmers of the College. Consultancy projects of over Rs. one crore are completed by the Consultancy cell during financial year 2009-10.

Ours is a pioneer institute providing Consultancy Services in the States of Punjab, Haryana, Himachal, J&K and Rajasthan. Various Major Clients of the Consultancy Cell are as under:

- Larson & Turbo.
- Multi National Companies like AFCON & PAULINGS.
- Power Grid Corporation of India.
- National Building Construction Co.
- Punjab State Electricity Board.
- Punjab Mandi Board.
- Punjab Police Housing Corporation.
- National Fertilizers Ltd.
- PUNSUP
- Postal & Telecom Department, Govt. of India.

2 Latex

2.1 Introduction to L^AT_EX

L^AT_EX, I had never heard about this term before doing this project, but when I came to know about it's features, it is just excellent. LaTeX (pronounced /letk/, /letx/, /ltx/, or /ltk/) is a document markup language and document preparation system for the T_EX typesetting program. Within the typesetting system, its name is styled as L^AT_EX. Within the typesetting system, its name is styled



Figure 3: Donald Knuth, Inventor Of T_EX typesetting system

as L^AT_EX. The term L^AT_EX refers only to the language in which documents are written, not to the editor used to write those documents. In order to create a document in L^AT_EX, a .tex file must be created using some form of text editor. While most text editors can be used to create a L^AT_EX document, a number of editors have been created specifically for working with L^AT_EX.

L^AT_EX is most widely used by mathematicians, scientists, engineers, philosophers, linguists, economists and other scholars in academia. As a primary or intermediate format, e.g., translating DocBook and other XML-based formats to PDF, L^AT_EX is used because of the high quality of typesetting achievable by T_EX. The typesetting system offers programmable desktop publishing features and extensive facilities for automating most aspects of typesetting and desktop publishing, including numbering and cross-referencing, tables and figures, page layout and bibliographies.

L^AT_EX is intended to provide a high-level language that accesses the power of T_EX. L^AT_EX essentially comprises a collection of T_EX macros and a program to process LaTeX documents. Because the T_EX formatting commands are very low-level, it is usually much simpler for end-users to use L^AT_EX.

2.2 Typesetting

L^AT_EX is based on the idea that authors should be able to focus on the content of what they are writing without being distracted by its visual presentation. in preparing a L^AT_EX document, the author specifies the logical structure using familiar concepts such as chapter, section, table, figure, etc., and lets the L^AT_EX system worry about the presentation of these structures. it therefore encourages the separation of layout from content while still allowing manual typesetting adjustments where needed.

```
\documentclass[12pt]{article}
\usepackage{amsmath}
\title{\LaTeX}
\date{}
\begin{document}
  \maketitle
  \LaTeX{} is a document preparation system
  for the \TeX{} typesetting program.
  \par
   $E=mc^2$ 
\end{document}
```

3 Project Preview

3.1 The Existing System

Introduction :

The Software running today does all the entry and management of the Jobs, all done by Consultancy employees. The existing system manage the generation of Bill, Receipts and Vouchers very efficiently.

Limitations of Current System :

- Currently, there is no central environment where the clients can register themselves online and order for a Job or can get information from and manage their own tasks. The existing system involves the employers of Consultancy Cell managing information by interacting directly with the clients about there Jobs.
- Moreover, there is a need for a Search module that searches the previously registered Client, so that redundancy can be reduced to the maximum.
- Also the current Software requires the proper Normlisation of Database.
- Apart from all these there is a need to make the calculation of total amount of Job done to be automated by Software itself. The current system requires the manual calculation.
- There is also a need of proper Developer Documentation.
- There should be a single click installation procedure for the Software.
- Reports are not generated in the Software.

3.2 Software Functions Provided in Proposed system

Registration & Login :

The software user would be required to Register through a screen. After authentication and login he would be able to access only those areas for which he is capable to access.

Administrator Maintenance :

Administrator can add or update the details, and also can see information of all employees and can see his or her information. New Database table information can also be added.

Employee Maintenance :

As employees are directly related to clients, so they are able to add or update the details of clients using this section. Admin can see all the clients. Employees can manage their clients only.

Client Maintenance :

Clients are the end users that benefit from the TCC Automation Software. A client can get information of all the available work done in Testing Consultancy Cell also apply for same. They can also view the status of there previous works done in the Cell.

Catalog :

Using the Catalog, the clients can get an estimate of price for all the tests done in the Cell. Catalog lists down all the works done in the Cell.

Cart :

Using this functionality, a client can test multiple materials in a single Job, thus getting only one Receipt and Bill for a Job.

Report Generation :

The Report generation for a material tested is made easier now. The reports generated can then be downloaded in pdf format and then can be given to the repective clients.

4 My Project

4.1 Introduction to Automation

Automation is the use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services.

Office automation is intended to provide elements which make it possible to simplify, improve, and automate the organization of the activities of a company or a group of people.

We show our ingenuity everyday through our associates' high level of performance. We provide solutions to help our clients improve internal processes, save money and deliver results. That is "ingenuity at work".

Automation is all about using the computer to:

- Make your work less tedious.
- Trim hours off your workload.
- Reduce repetitive keyboard strokes or mouse-clicks.
- Make data entry easier with fewer tabs or mouse movements.
- Take any job you do longhand and make the computer do it for you.

The use of computer systems to execute a variety of office operations, such as word processing, accounting, and e-mail Rrefers to what we call automation. Office automation almost always implies a network of computers with a variety of available programs. Automation helps in optimizing or automating existing office procedures.

4.2 Enterprise Resource Planing

After knowing the requirements, the main concern then was using which technology these requirement can be fulfilled. As the majore requirement been Client handling, handling the jobs of client, automatic generation of clients, providing efficient services, accounting etc, so des are the features of ERP Softwares. So we started using searching for best Open Source ERP System.

Enterprise resource planning (ERP) systems integrate internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service, customer relationship management, etc. ERP systems automate this activity with an integrated software application. The purpose of ERP is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders. Three ERP Software were first selected and then rejected.

The Open Source ERP Softwares selected were :

- OpenBravo
- Apache OFBiz
- WebERP

Openbravo ERP is a web-based ERP business solution for small and medium sized companies that is released under the Openbravo Public License, based on the Mozilla Public License. Using Openbravo ERP, organizations can automate and register most common business processes. The following processes are supported: Sales, Procurement, Manufacturing, Projects, Finance, MRP and more.

Reason for its rejection being, it was not completely Open Source. Numerous commercial functional extensions are available on the Openbravo Exchange(paid version) which can be procured by users of the Professional Subscription version of Openbravo ERP.

Apache OFBiz Apache Open For Business (Apache OFBiz) is an open source enterprise resource planning (ERP) system. It provides a suite of enterprise applications that integrate and automate many of the business processes of an enterprise. Apache OFBiz is a framework, provides a common data model and a rich set of business process. All applications are built around a common architecture using common data, logic and process components.

Reason for its rejection being, it was more like shopping Cart Oriented. So this was not required.

WebERP webERP is an open source ERP system for Small and Medium-sized Enterprise (SME). Some of its salient features are : Inventory Management, Accounts Receivable, Sales Orders and Quotations, User defined sales analysis, Multi-currency, complex tax system support, and many more.

Reason for its rejection being, that it is very vast. It is designed for organisation having multiple branches accross the world. So in order to making it fit for TCC, it had to be customized a lot, thus loosing lot of the standards set in the software.

Thus after rejecting the working on ERP system, the project was started using Django Framework from the scratch.

4.3 Product Definition

TCC Automation is a Web Application Software for easy, quick, and secure data processing that will automate the tasks of a Testing & Consultancy Cell or any other Similar office. This involves maintaining information of client, verifying information provided by client, entering the jobs and then getting the Receipt Bill and Voucher automatically generated. TCC Automation Software is basically designed for those companies or Organisations which provide different types of services to all types of clients. Keeping track of different works done by different clients and then getting all the reports of the work done is not an easy job. To make these tasks easy with all functions performed quickly, Automation Software will be quite helpful. Administrator will be the super user of the application who will configure system information such as adding new products and their information or editing or deleting the old ones, managing employees and clients. Employers are the representatives who can manage their related information and can update details of their clients and manage their jobs to the completion. Clients are the end users who want their work done through or by the Organisation. They can themselves register themselves, add their job and can see only their works and information.

Feasibility Analysis : Feasibility analysis aims to uncover the strengths and weaknesses of a project. In its simplest term, the two criteria to judge feasibility are cost required and value to be attained. As such, a well-designed feasibility analysis should provide a historical background of the project, description of the project or service, details of the operations and management and legal requirements. Generally, feasibility analysis precedes technical development and project implementation. There are some feasibility factors by which we can determine that project is feasible or not:

- 1) **Technical feasibility :** Technological feasibility is carried out to determine whether the project has the capability, in terms of software, hardware, personnel to handle and fulfill the user requirements. The assessment is based on an outline design of system requirements in terms of Input, Processes, Output and Procedures. TCC Automation Software is technically feasible as it is built up in Open Source Environment and thus it can be run on any Open Source platform.
- 2) **Economic feasibility :** Economic analysis is the most frequently used method to determine the cost/benefit factor for evaluating the effectiveness of a new system. In this analysis we determine whether the benefit is gain according to the cost invested to develop the project or not. If benefits outweigh costs, only then the decision is made to design and implement the system. It is important to identify cost and benefit factors, which can be categorized as follows: 1. Development costs; and 2. Operating costs. TCC Automation Software is also Economically feasible with 0 Development and Operating Charges as it is developed in Django framework and python language which is FOSS technology and the software is operated on Open Source platform.
- 3) **Legal feasibility :** In this type of feasibility study we basically determine whether the project conflicts with legal requirements, e.g. a data processing system must comply with the local Data Protection Acts. But TCC Automation Software has been developed for the Office Automation process with properly Licensed technologies. Thus is the legal process.
- 4) **Operational feasibility :** Operational feasibility is a measure of how well a project solves the problems, and takes advantage of the opportunities identified during scope definition

and how it satisfies the requirements identified in the requirements analysis phase of system development. All the Operations performed in the software are very quick and satisfies all the requirements.

- 5) **Behavior Feasibility** : In this feasibility we check about the behavior of the proposed system software i.e. whether the proposed project is user friendly or not, whether users can use the project without any training because of the user friendliness or not. Tcc Automation Software is very user friendly as it user interacts with it through web.

4.4 Software Requirement Analysis

A Software Requirements Analysis for a software system is a complete description of the behavior of a system to be developed. It includes a set of use cases that describe all the interactions the users will have with the software. In addition to use cases, the SRS also contains non-functional requirements. Non-functional requirements are requirements which impose constraints on the design or implementation. **Purpose** : TCC Automation Software is a web based software and the main purpose of this project is to:

1. Perform most of the task of Testing & Consultancy Cell online and make it dynamic.
2. Make the Registration and Searching easier.
3. Automatic calculation of the amount for the work done.
4. Reduce the dependencies between people involved with the process.
5. Increasing the transparency.

General Description TCC Automation Software is basically designed for those companies or Organisations which provide different types of services to all types of clients. Keeping track of different works done by different clients and then getting all the reports of the work done is not an easy job. To make these tasks easy with all functions performed quickly, Automation Software will be quite helpful.

Administrator will be the super user of the application who will configure system information such as adding new products and their information or editing or deleting the old ones, managing employees and clients.

It will be an enterprise software, so it is distributed and data centric. This Software is designed on the basis of web application architecture. In this application, MySQL database will be used to store data related to employees, material, jobs, labs, tests, clients, amounts etc. Since database is on Server, so any number of users can work simultaneously and can share their data with each other. It is developed using Django, Python, HTML, CSS and JavaScript.

Users of the System

1. Administrator : Administrator can add or update (activate/inactivate) the details, and also can see information of all employees and can see his or her information. New labs, materials or tests can be added or the existing can also be updated.
2. Employee : As employees are directly related to clients, so they are able to add or update the details of clients using this section. Administrator can see all the clients. Employees can manage their clients only, and particular client can see his or her detail.
3. Client : Clients are the end users that benefit from the Automation Software. A client can get information of all services available, and thus can apply for same. They can also view the status of the number of the previous jobs done by them in the Organisation.

Specific Requirements : This phase covers the whole requirements for the system. After understanding the system we need the input data to the system then we watch the output and determine whether the output from the system is according to our requirements or not. So what we have to input and then what we'll get as output is given in this phase. This phase also describes the software and non-function requirements of the system.

Input Requirements of the System

1. Client Details
2. Job Details
3. Extra Charges Details
4. Lab Details
5. Organisation & Department Details
6. Rate List
7. Staff Details

Output Requirements of the System

1. Interface for administrator to configure the system.
2. Listing of all the services offered.
3. Interface for clients and employees.
4. Automatic generation of reports, Bills, Receipts, and Vouchers for clients.
5. Calculation of Job amount.
6. Generation of Registers with Certain requirements.

Special User Requirements

1. Automatic Email Generation and Sending to the concerned person.

Software Requirements

1. Programming language : Python 2.7 or any
2. Framework : Django 1.4
3. Web Languages : Html, Java Script, CSS
4. Database : MySQL Database Server 5.1
5. Documentation : Doxygen 1.8.3
6. Text Editor : Gedit, Geany
7. Operating System : Ubuntu 12.04, 12.10 or any Open Source
8. Debugger : Django Debugger, Django shell, Terminal
9. Web Server : Apache 2.4

Non functional requirements

1. Scalability: System should be able to handle a number of users. For e.g. handling around thousand users at the same time
2. Usability: Simple user interfaces that a layman can understand.
3. Speed: Speed of the system should be responsive i.e. Response to a particular action should be available in short period of time. For e.g.: Updating the project tasks takes few seconds for the changes if the entry is not starred.

4.5 Introduction to Django

Django is a web framework designed to help you build complex web applications simply and quickly. Its written in the Python programming language. Django is an open source web application framework written in python. It lets you build high-performing, elegant Web applications quickly. Django focuses on automating as much as possible. Django's primary goal is to ease the creation of complex, database-driven websites. Django emphasizes reusability and "pluggability" of components, rapid development, and the principle of don't repeat yourself. Python is used throughout, even for settings, files, and data models. Django also provides an optional administrative create, read, update and delete interface that is generated dynamically through introspection and configured via admin models.

Django takes its name from the early jazz guitarist Django Reinhardt, a gypsy savant who managed to play dazzling and electrifying runs on his instrument even though two of the fingers on his left hand were paralyzed in an accident when he was young.

Thus, its a fitting name for the framework: Django can do some very complex things with less code and a simpler execution than youd expect. It doesnt take a heavy hand to build with Django. The framework does the repetitive work for you, allowing you to get a working website up quickly and easily.

Django's DRY pledge

Django was designed from the ground up to handle two common web developer challenges: intensive deadlines and strict adherence to the Dont Repeat Yourself (DRY) principle. DRY sounds exactly like what it is: Why write the same code over and over again?

The result is a fast framework, nimble and capable of generating full site mockups in a very short time. Djangos slogan captures its essence quite nicely: The web framework for perfectionists with deadlines.

What Django is

Perhaps the most common misconception about Django is that its a content management system. Its not. Its a web framework. It is a tool in which to build a CMS, like Drupal or other systems, but not one in itself.

Installation of Django

Installation of Django is also very easy. The Django version is: Django 1.4.

Type the commands in the terminal:

```
$ wget http://www.djangoproject.com/download/1.4/tarball
```

```
$ tar xzvf Django-1.4.tar.gz
```

```
$ cd Django-1.4
```

```
$ sudo python setup.py install
```

This will install the django on your pc/laptop.

MTV

Django adopts the standard MVC(Model-View-Controller) design pattern. But instead, their naming convention is the MTV(Model-Template-View).

- **Model:** is an object relational mapping to your database schema. So each model is a class which represent a table in your database. Django models provide easy access to an underlying data storage mechanism, and can also encapsulate any core business logic, which must always remain in effect, regardless of which application is using it. Models exist independent of the rest of the system, and are designed to be used by any application that has access to them. In fact, the database manipulation methods that are available on model instances can be utilized even from the interactive interpreter, without loading a Web server or any application-specific logic.
- **Template :** is simply HTML for your views. It also allows you to display different messages depending on whether or not a user logged in. Templates are Djangos provided way of generating text-based output, such as HTML or emails, where the people editing those documents may not have any experience with Python. Therefore, templates are designed to avoid using Python directly, instead favoring an extensible, easy-to-use custom language built just for Django.
- **View :** could be a homepage or a page to display a user's information, for instance. A view accepts user input, including simple requests for information; behaves according to the applications interaction logic; and returns a display that is suitable for users to access the data represented by models.

Development Server in Django

Change into the outer `mysite` directory, if you haven't already, and run the command `python manage.py runserver`. You'll see the following output on the command line:

```
Validating models...
0 errors found.
```

```
Django version 1.4, using settings 'mysite.settings'
Development server is running at http://127.0.0.1:8000/
Quit the server with CONTROL-C.
```

You've started the Django development server, a lightweight Web server written purely in Python. We've included this with Django so you can develop things rapidly, without having to deal with configuring a production server – such as Apache – until you're ready for production.

Now's a good time to note: DON'T use this server in anything resembling a production environment. It's intended only for use while developing. (We're in the business of making Web frameworks, not Web servers.)

Now that the server's running, visit `http://127.0.0.1:8000/` with your Web browser. You'll see a "Welcome to Django" page, in pleasant, light-blue pastel. It worked!

Database setup

In this we need to edit the `settings.py` file of the Project, that is the configuration file. It's a normal Python module with module-level variables representing Django settings. Change the following keys in the `DATABASES` 'default' item to match your database connection settings.

- **ENGINE** – Either `'django.db.backends.postgresql_psycopg2'`, `'django.db.backends.mysql'`, `'django.db.backends.sqlite3'` or `'django.db.backends.oracle'`. Other backends are also available.
- **NAME** – The name of your database. If you're using SQLite, the database will be a file on your computer; in that case, **NAME** should be the full absolute path, including filename, of that file. If the file doesn't exist, it will automatically be created when you synchronize the database for the first time (see below). When specifying the path, always use forward slashes, even on Windows (e.g. `C:/homes/user/mysite/sqlite3.db`).
- **USER** – Your database username (not used for SQLite).
- **PASSWORD** – Your database password (not used for SQLite).
- **HOST** – The host your database is on. Leave this as an empty string if your database server is on the same physical machine (not used for SQLite).

If you're new to databases, we recommend simply using SQLite by setting **ENGINE** to `'django.db.backends.sqlite3'` and **NAME** to the place where you'd like to store the database. SQLite is included as part of Python 2.5 and later, so you won't need to install anything else to support

your database.

While you're editing `settings.py`, set `TIME_ZONE` to your time zone. The default value is the Central time zone in the U.S. (Chicago).

Also, note the `INSTALLED_APPS` setting toward the bottom of the file. That holds the names of all Django applications that are activated in this Django instance. Apps can be used in multiple projects, and you can package and distribute them for use by others in their projects.

By default, `INSTALLED_APPS` contains the following apps, all of which come with Django:

- `django.contrib.auth` – An authentication system.
- `django.contrib.contenttypes` – A framework for content types.
- `django.contrib.sessions` – A session framework.
- `django.contrib.sites` – A framework for managing multiple sites with one Django installation.
- `django.contrib.messages` – A messaging framework.
- `django.contrib.staticfiles` – A framework for managing static files.

These applications are included by default as a convenience for the common case.

Each of these applications makes use of at least one database table, though, so we need to create the tables in the database before we can use them. To do that, run the following command:

```
$ python manage.py syncdb
```

The `syncdb` command looks at the `INSTALLED_APPS` setting and creates any necessary database tables according to the database settings in your `settings.py` file. You'll see a message for each database table it creates, and you'll get a prompt asking you if you'd like to create a superuser account for the authentication system. Go ahead and do that.

Projects vs. apps

What's the difference between a project and an app? An app is a Web application that does something – e.g., a Weblog system, a database of public records or a simple poll app. A project is a collection of configuration and apps for a particular Web site. A project can contain multiple apps. An app can be in multiple projects.

Django Applications used :

Django Registration : is an extensible user-registration application for Django. This is a fairly simple user-registration application for Django, designed to make allowing user signups as painless as possible. It requires a functional installation of Django 1.3 or newer, but has no other dependencies.

Django Registration module is easily installed using :

```
$ pip install django-registration
```

Django Tagging : This is a generic tagging application for Django, which allows association of a number of tags with any Model instance and makes retrieval of tags simple.

Django Registration module is easily installed using :

```
$ pip install django-tagging
```

Contact form : This is a simple contact form for user interaction so that whenever useer feels any need or has any query, can directly contact the cell through a mail.

4.6 Introduction to Python

Python is a dynamic language, as in python coding is very easy and also it require less coding and about its interpreted nature it is just excellent. Python is a high level programming language and Django which is a web development framework is written in python language.

Python is an easy to learn, powerful programming language. Python runs on Windows, Linux/Unix, Mac OS X. Python is free to use, even for commercial products. Python can also be used as an extension language for existing modules and applications that need a programmable interface. Python is free to use, even for commercial products, because of its OSI-approved open source license.

Python supports multiple programming paradigms, including object-oriented, imperative and functional programming styles. It features a fully dynamic type system and automatic memory management, similar to that of Scheme, Ruby, Perl, and Tcl. Like other dynamic languages, Python is often used as a scripting language, but is also used in a wide range of non-scripting contexts. Python is intended to be a highly readable language. It is designed to have an uncluttered visual layout, frequently using English keywords where other languages use punctuation. Similar to other scripting languages, Python programmers are usually more productive than C, C++ and Java programmers

Python uses whitespace indentation, rather than curly braces or keywords, to delimit blocks; a feature also termed the off-side rule. An increase in indentation comes after certain statements; a decrease in indentation signifies the end of the current block.

Installation of Python Installation of python is a very easy proccess. The current python versions are: Python 2.7.1 and Python 3.2.

Type the commands in the terminal:

```
$ wget http://www.python.org/ftp/python/2.7/Python-2.7.tgz
```

```
$ tar xzf Python-2.7.tgz
```

This will install the python on your pc/laptop.

4.7 MySQL Database Server

Introduction Although Django supports all the Databases like sqlite, Mysql, postgresql etc but I used the Mysql. Mysql is worlds most popular open source database It is a relational database management system (RDBMS) that runs as a server providing multi-user access to a number of databases. It is named after developer Michael Widenius daughter, My. The SQL phrase stands for Structured Query Language. MySQL is written in C and C++.

Free-software-open source projects that require a full-featured database management system often use MySQL.

MySQL is also used in many high-profile, large-scale World Wide Web products, including Wikipedia, Google (though not for searches) and Facebook. **Uses** MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP web application software stack LAMP is an acronym for Linux, Apache, MySQL, Perl/PHP/Python. MySQL is used in some of the most frequently visited web sites on the Internet, including Flickr, Nokia.com, YouTube, Wikipedia, Google and Facebook.

One of the greatest advantage of Django is that it synchronises the database only with one command without having any need to send different queries for insertion, deletion, updation etc. There is a file named models.py which is used for purpose of creating database.

Following are main features of Apache Server :

1. MySQL is a database management system: A database is a structured collection of data. It may be anything from a simple shopping list to a picture gallery or the vast amounts of information in a corporate network. To add, access, and process data stored in a computer database, you need a database management system such as MySQL Server. Since computers are very good at handling large amounts of data, database management systems play a central role in computing, as standalone utilities or as parts of other applications.
2. MySQL is a relational database management system: A relational database stores data in separate tables rather than putting all the data in one big storeroom. This adds speed and flexibility. The SQL part of MySQL stands for Structured Query Language. SQL is the most common standardized language used to access databases and is defined by the ANSI/ISO SQL Standard. The SQL standard has been evolving since 1986 and several versions exist. In this manual, SQL-92 refers to the standard released in 1992, SQL:1999 refers to the standard released in 1999, and SQL:2003 refers to the current version of the standard. We use the phrase the SQL standard to mean the current version of the SQL Standard at any time.
3. MySQL software is Open Source: Open Source means that it is possible for anyone to use and modify the software. Anybody can download the MySQL software from the Internet and use it without paying anything.
4. The MySQL Database Server is very fast, reliable, and easy to use: MySQL Server was originally developed to handle large databases much faster than existing solutions and has been successfully used in highly demanding production environments for several years. Although under constant development, MySQL Server today offers a rich and useful set of functions. Its connectivity, speed, and security make MySQL Server highly suited for accessing databases on the Internet.

5. MySQL Server works in client/server or embedded systems: The MySQL Database Software is a client/server system that consists of a multi-threaded SQL server that supports different backends, several different client programs and libraries, administrative tools, and a wide range of application programming interfaces (APIs).
6. A large amount of contributed MySQL software is available: It is very likely that your favorite application or language supports the MySQL Database Server.

4.8 Debconf

Debconf is a backend database, with a frontend that talks to it and presents an interface to the user. There can be many different types of frontends, from plain text to a web frontend. The frontend also talks to a special config script in the control section of a debian package, and it can talk to postinst scripts and other scripts as well, all using a special protocol. These scripts tell the frontend what values they need from the database, and the frontend asks the user questions to get those values if they aren't set.

1. Template– It contains all the notes, different questions you want to ask the user, be it boolean(true/false), multiple answer, string inputs, displaying notes, everything you want to display or ask the user. P.S. :make sure you leave a space in the begining of the Long Description, check the file in case you have any doubt.
2. Config– Next, decide what order the questions should be asked and the messages to the user should be displayed from the template file we talked about earlier.
Config script does all this, it has no other job than to display notes and questions from template file and take input from the user in the form of answers to the question it asked.
3. Script– The job of this script is to use the input stored in debconf database. It all depends how you want to use the inputs, I jave just printed the inputs stored.

4.9 Apache Web Server

The **Apache HTTP Server**, commonly referred to as Apache (/pti/ -PA-chee), is a web server software notable for playing a key role in the initial growth of the World Wide Web. Apache is developed and maintained by an open community of developers under the auspices of the Apache Software Foundation. The application is available for a wide variety of operating systems, including Unix, FreeBSD, Linux, Solaris, Novell NetWare, OS X, Microsoft Windows, OS/2, TPF, and eComStation. Released under the Apache License, Apache is open-source software.

The goal of this project is to provide a secure, efficient and extensible server that provides HTTP services in sync with the current HTTP standards.

Following are main features of MySQL:

1. Apache supports a variety of features, many implemented as compiled modules which extend the core functionality. These can range from server-side programming language support to authentication schemes. Some common language interfaces support Perl, Python, Tcl, and PHP. Popular authentication modules include `mod _ access`, `mod.auth`, `mod.digest`, and `mod.auth.digest`, the successor to `mod.digest`. A sample of other features include Secure Sockets Layer and Transport Layer Security support (`mod.ssl`), a proxy module (`mod.proxy`), a URL rewriter (`mod.rewrite`), custom log files (`mod.log.config`), and filtering support (`mod.include` and `mod.ext.filter`).
2. Apache features configurable error messages, DBMS-based authentication databases, and content negotiation. It is also supported by several graphical user interfaces (GUIs).
3. It supports password authentication and digital certificate authentication. Apache has a built in search engine and an HTML authorizing tool and supports FTP.

4.10 Doxygen

Doxygen is a documentation generator, a tool for writing software reference documentation. The documentation is written within code, and is thus relatively easy to keep up to date. Doxygen can cross reference documentation and code, so that the reader of a document can easily refer to the actual code.

Doxygen supports multiple programming languages, especially C++, C, C#, Objective-C, Java, Python, IDL, VHDL, Fortran and PHP.[2] Doxygen is free software, released under the terms of the GNU General Public License.

Design

Like Javadoc, Doxygen extracts documentation from source file comments. In addition to the Javadoc syntax, Doxygen supports the documentation tags used in the Qt toolkit and can generate output in HyperText Markup Language (HTML) as well as in Microsoft Compiled HTML Help (CHM), Rich Text Format (RTF), Portable Document Format (PDF), LaTeX, PostScript or man pages.

Uses

Doxygen can be used with C, C++, C#, Fortran, Java, Objective-C, PHP, Python, IDL (CORBA, Tcl and Microsoft flavors), VHDL, and to some extent D. It runs on most Unix-like systems, Mac OS X and Windows.

The first version of Doxygen borrowed code from an early version of DOC++ (developed by Roland Wunderling and Malte Zockler at Zuse Institute Berlin); later, the Doxygen code was rewritten by Dimitri van Heesch.

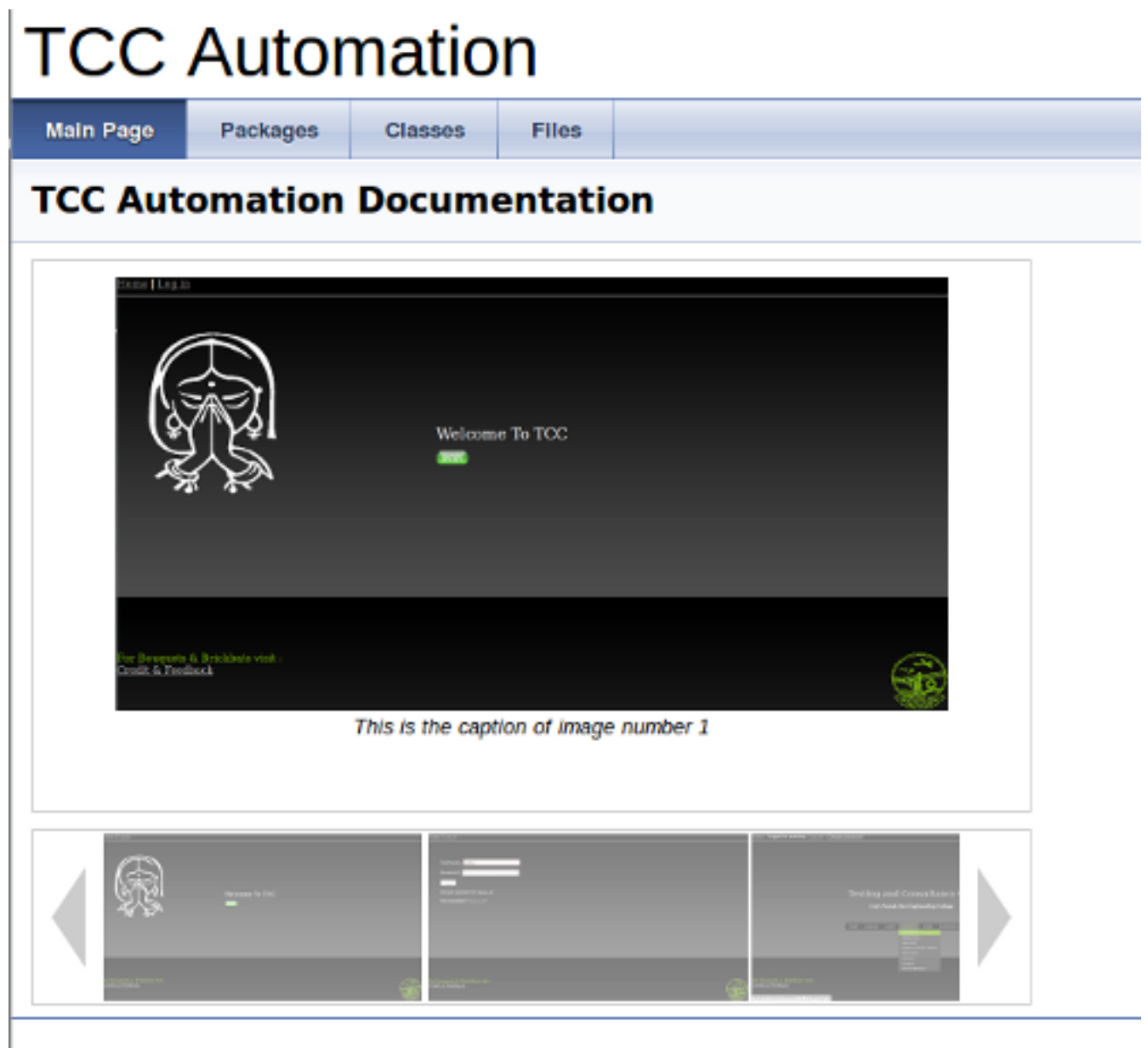


Figure 4: Doxygen home page


TCC Automation

Main Page	Packages	Classes	Files
Class List	Class Index	Class Hierarchy	Class Members

Automation > tcc > models > Report >

Automation.tcc.models.Report Class Reference

Inheritance diagram for Automation.tcc.models.Report:



```
graph BT; Report[Automation.tcc.models.Report] --> Model[Model];
```

Public Member Functions

```
def __unicode__
```

Static Public Attributes

```
tuple name models.CharField(max_length=50)
```

Detailed Description

```
** Report **

Report Class to reterive any Report Information,
when we fill Job Number and type of Report Store in Database
```

Figure 5: Documentation of models.py file

4.11 Shell Scripting

What is Bash?

Bash is a “Unix shell”: a command-line interface for interacting with the operating system. It is widely available, being the default shell on many GNU/Linux distributions and on Mac OS X; and ports exist for many other systems. It was created in the late 1980s by a programmer named Brian Fox, working for the Free Software Foundation. It was intended as a free-software alternative to the Bourne shell (in fact, its name is an acronym for “Bourne-again shell”), and it incorporates all features of that shell, as well as new features such as integer arithmetic and in-process regular expressions.

What is Shell ?

The shell is the program which actually processes commands and returns output. Most shells also manage foreground and background processes, command history and command line editing. These features (and many more) are standard in bash, the most common shell in modern linux systems.

What is shell scripting?

In addition to the interactive mode, where the user types one command at a time, with immediate execution and feedback, Bash (like many other shells) also has the ability to run an entire script of commands, known as a “Bash shell script” (or “Bash script” or “shell script” or just “script”). A script might contain just a very simple list of commands or even just a single command or it might contain functions, loops, conditional constructs, and all the other hallmarks of imperative programming. In effect, a Bash shell script is a computer program written in the Bash programming language.

Shell scripting is the art of creating and maintaining such scripts.

Shell scripts can be called from the interactive command-line described above; or, they can be called from other parts of the system. One script might be set to run when the system boots up; another might be set to run every weekday at 2:30 AM; another might run whenever a user logs into the system.

Shell scripts are commonly used for many system administration tasks, such as performing disk backups, evaluating system logs, and so on. They are also commonly used as installation scripts for complex programs. They are particularly suited to all of these because they allow complexity without requiring it: if a script just needs to run two external programs, then it can be a two-line script, and if it needs all the power and decision-making ability of a Turing-complete imperative programming language, then it can have that as well.

Some of the powerful commands used:

- SED : Sed is the ultimate stream editor, sed is a marvelous utility. Sed has several commands, but most people only learn the substitute command.
- AWK : AWK is an important and excellent filter, and report writer. AWK is an excellent tool for processing these rows and columns, and is easier to use AWK than most conventional programming languages.

Many features of shell scripting are also put to use :

- Functions.
- Arrays.
- Commands like sed, awk.
- Use of mysql commands through shell-importing,exporting a database, etc.

4.12 Design

System Design : Systems design is the process or art of defining the architecture, components, modules, interfaces, and data for a system to satisfy specified requirements. One could see it as the application of systems theory to product development. There is some overlap with the disciplines of systems analysis, systems architecture and systems engineering.

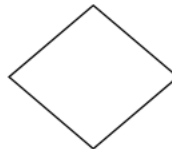
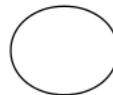
1. External design: External design consists of conceiving, planning out and specifying the externally observable characteristics of the software product. These characteristics include user displays or user interface forms and the report formats, external data sources and the functional characteristics, performance requirements etc. External design begins during the analysis phase and continues into the design phase.
2. Logical design: The logical design of a system pertains to an abstract representation of the data flows, inputs and outputs of the system. This is often conducted via modeling, which involves a simplistic (and sometimes graphical) representation of an actual system. In the context of systems design, modelling can undertake the following forms, including:
 - Data flow diagrams
 - Entity Relationship Diagrams
3. Physical design: The physical design relates to the actual input and output processes of the system. This is laid down in terms of how data is input into a system, how it is verified/authenticated, how it is processed, and how it is displayed as output.

Design Notations:

Data Flow diagrams:

1. Process**2. Data Flow****3. Data Store****4. External Entity**

Flow Charts:

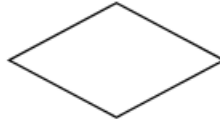
1. Process**2. Data****3. Decision****4. Terminator****5. Connector**

Entity Relationship Diagrams:

1. Entities



2. Relationships



3. Attributes



4. Foreign Key

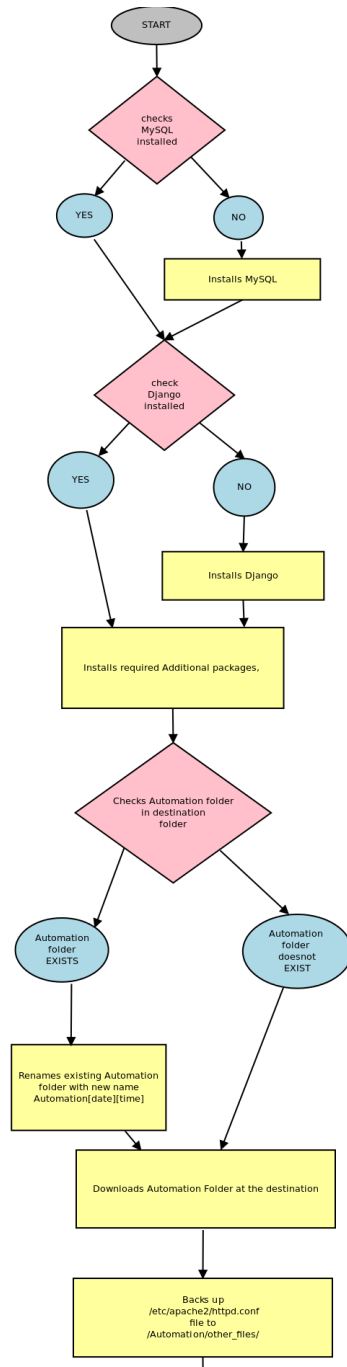


5. Primary Key



Detailed Design We basically describe the functionality of the system internally. The internal design describes how data is flowing from database to the user and how they both are internally connected. For this reason we can show the design of the system in detailed manner by many ways:

Flowchart A flowchart is a type of diagram that represents an algorithm or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. This diagrammatic representation can give a step-by-step solution to a given problem. Process operations are represented in these boxes, and arrows connecting them represent flow of control. Data flows are not typically represented in a flowchart, in contrast with data flow diagrams; rather, they are implied by the sequencing of operations. Flowcharts are used in analyzing, designing, documenting or managing a process or program in various fields



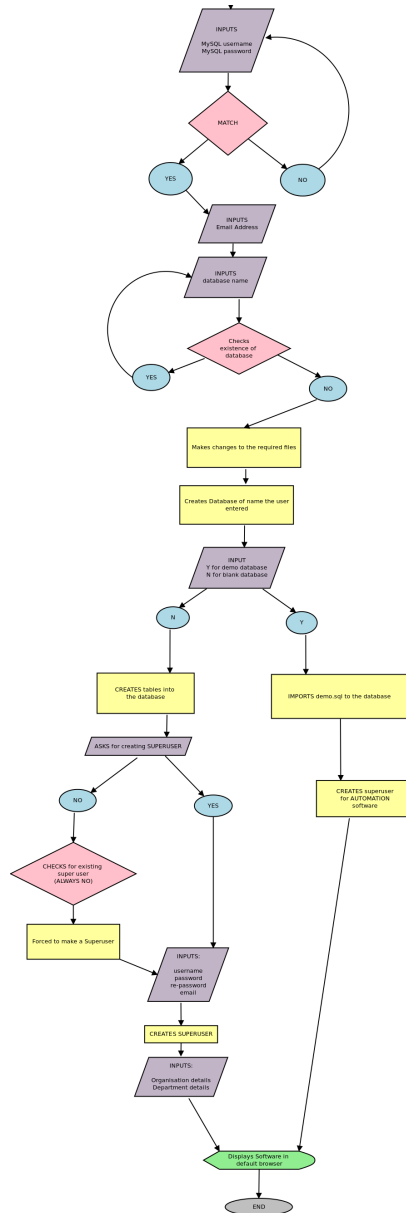


Figure 6: Flow Chart for Installation

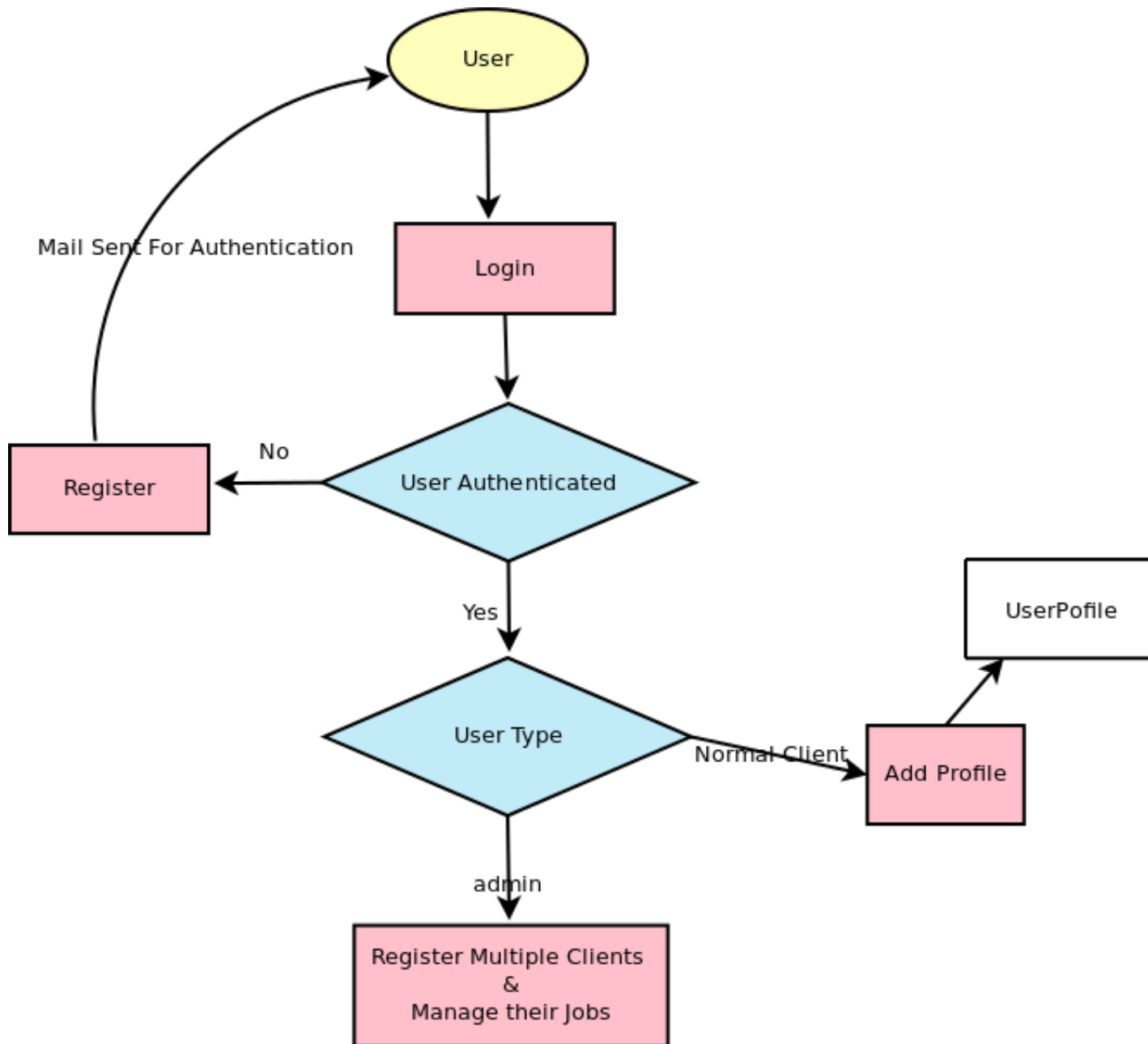


Figure 7: Flow Chart for Registration

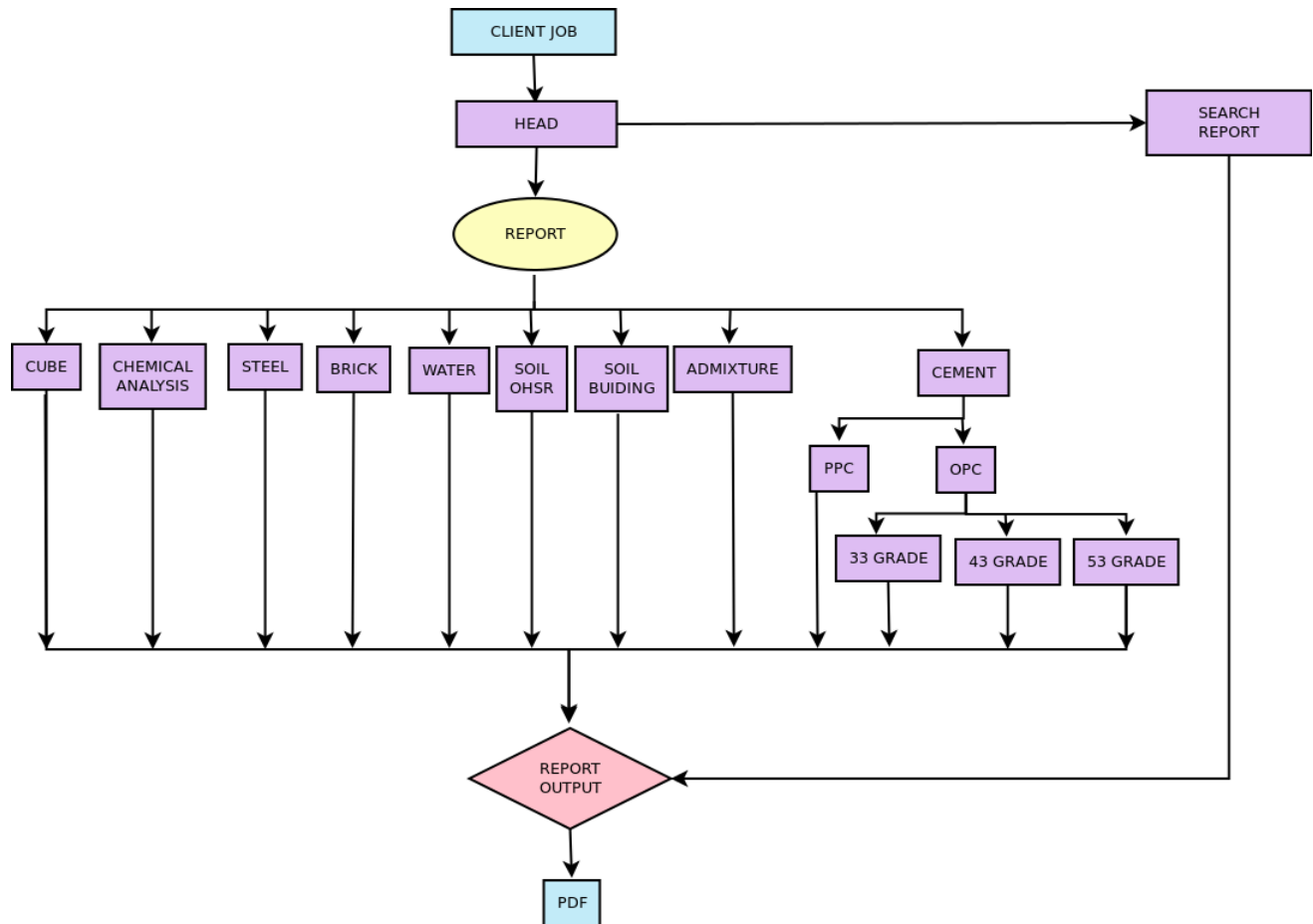


Figure 8: Flow Chart for Reports

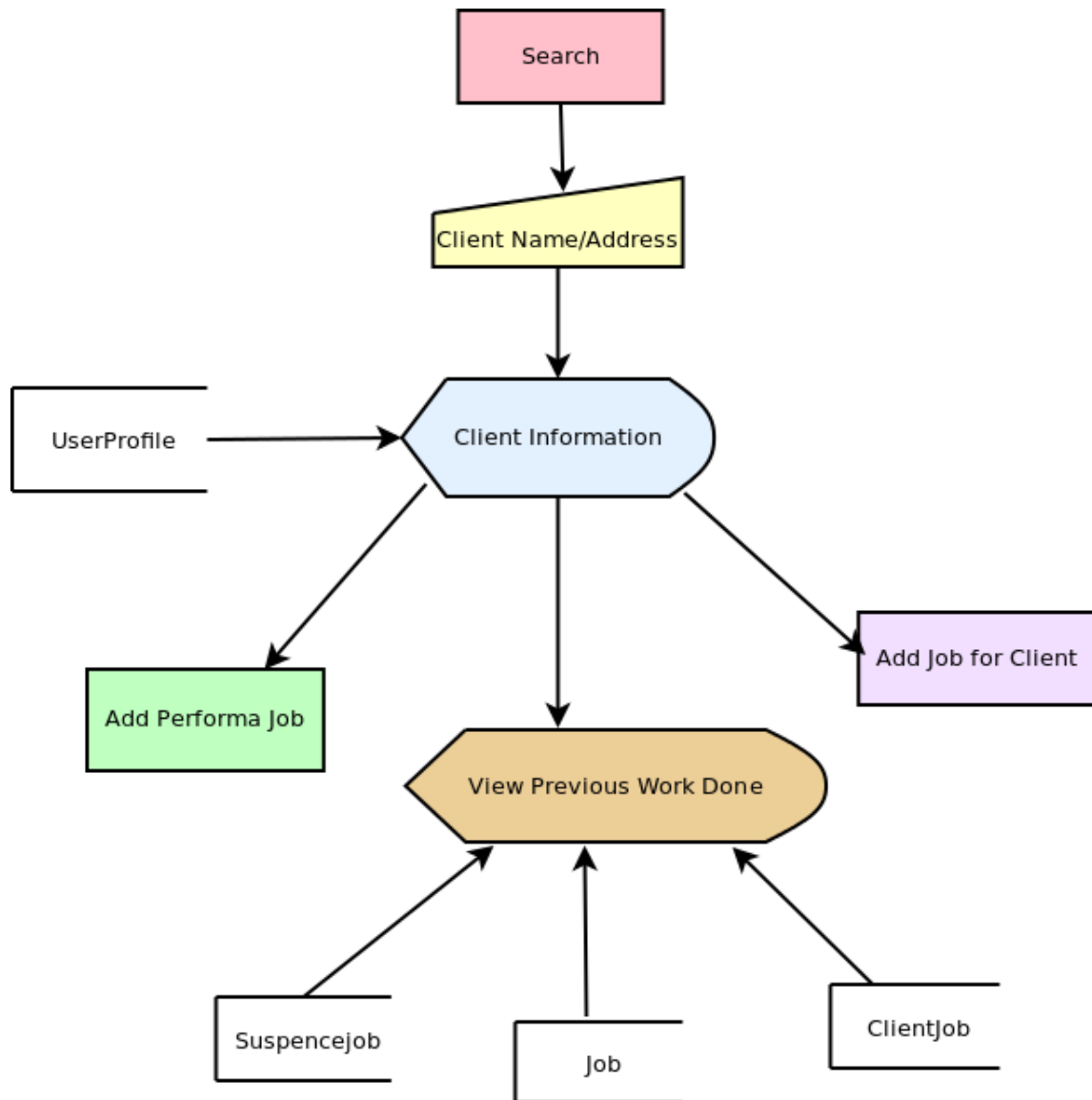


Figure 9: Flow Chart for Searching a Client

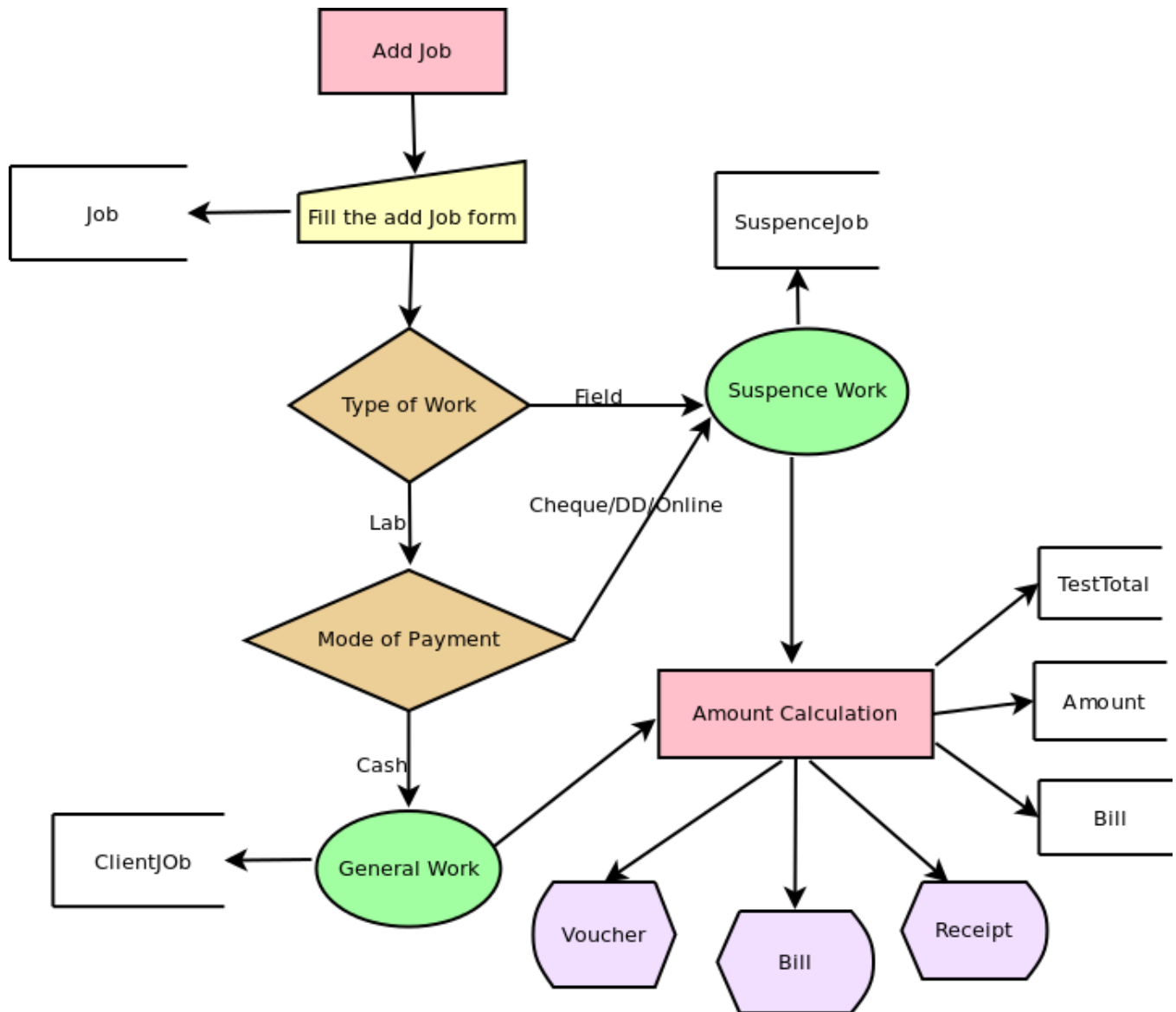


Figure 10: Flow Chart for adding a Job

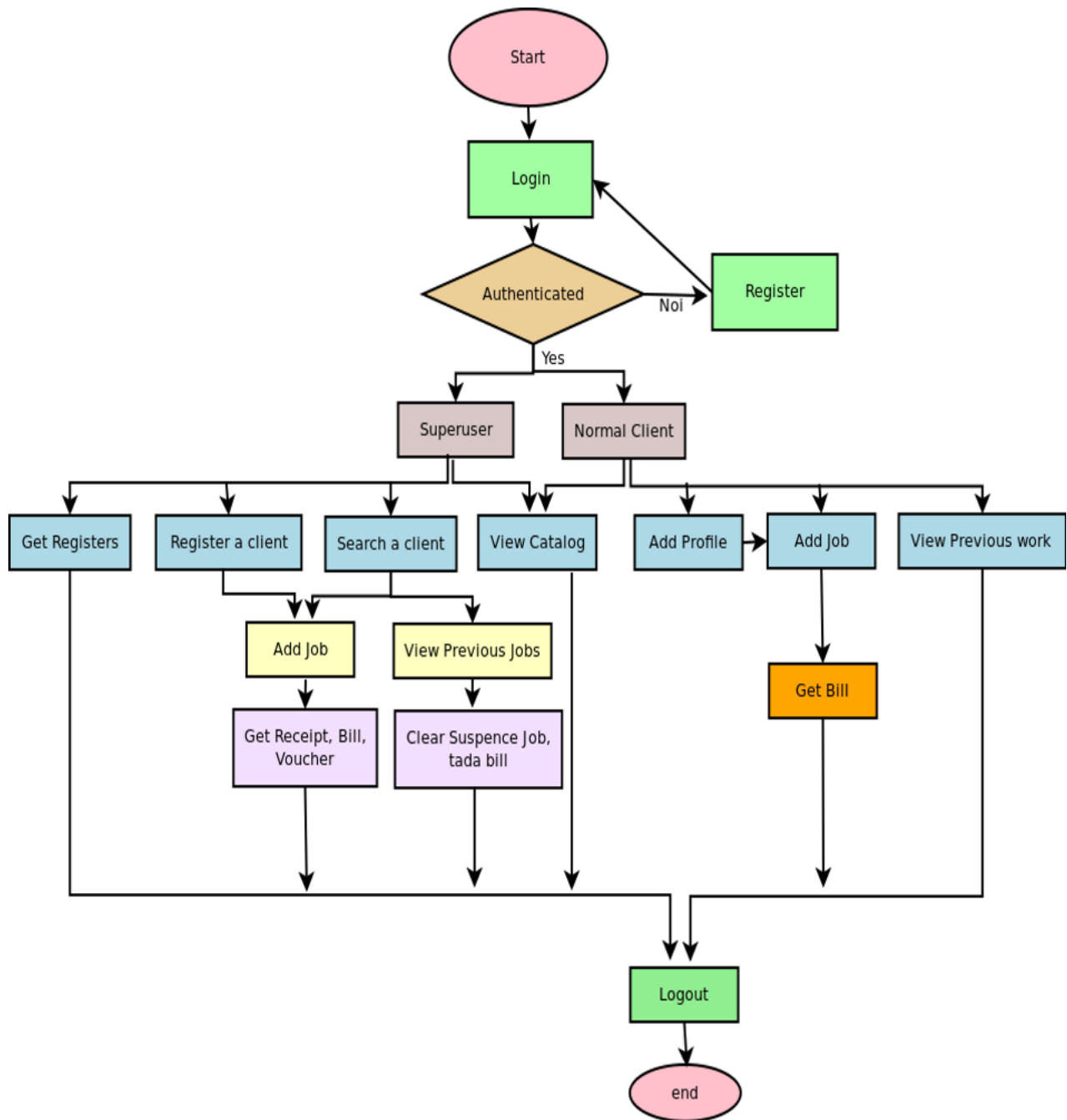
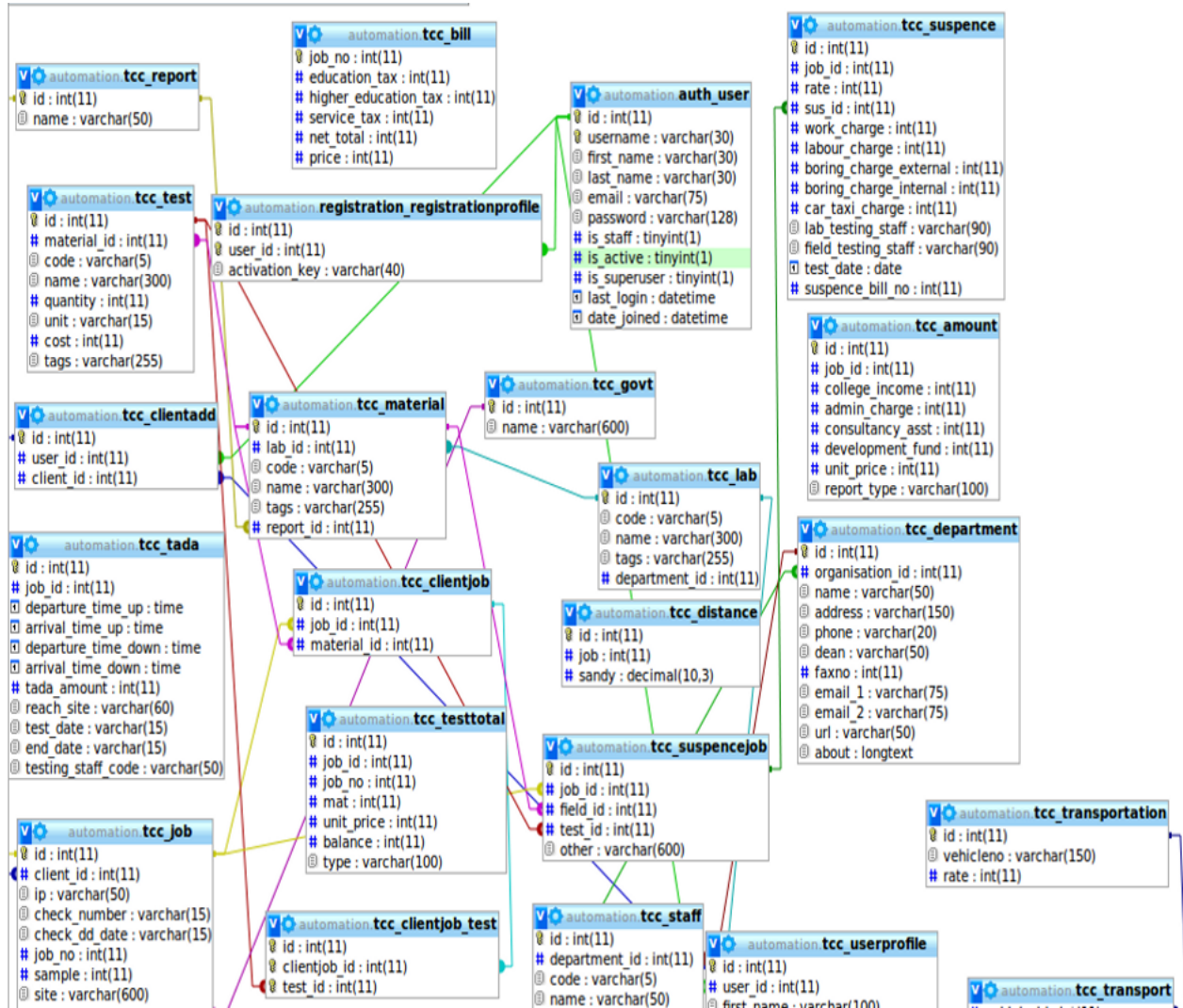


Figure 11: Flow Chart for software

Database Design



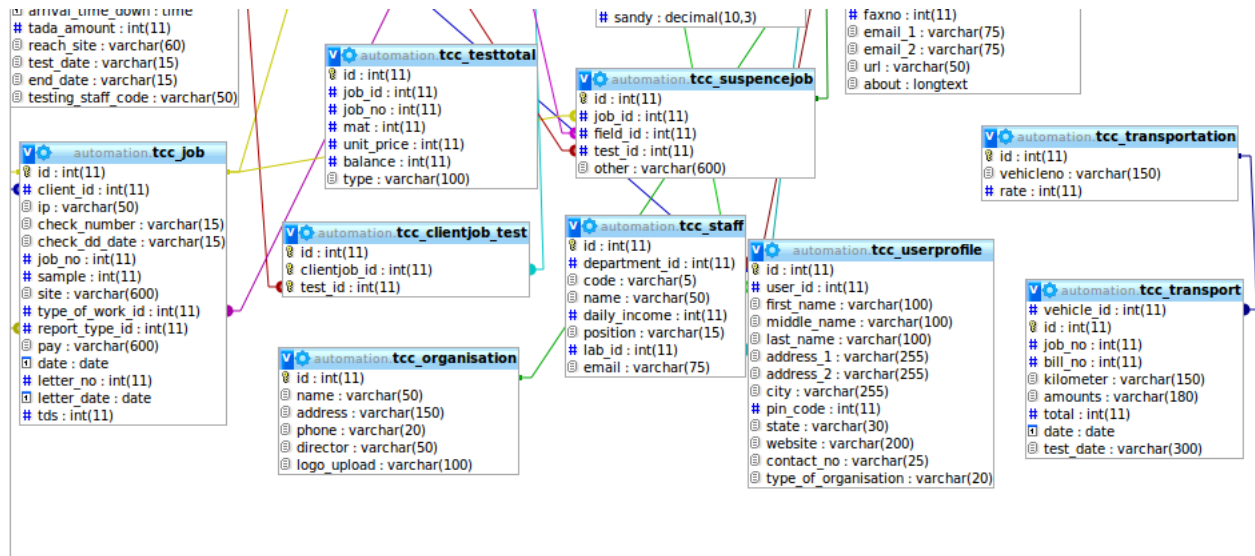


Figure 12: Database Design

4.13 Introduction to TCC Automation Software

Testing & Consultancy Cell is a Department in our college that provide testing and Consultancy services to different clients. This cell does a lot of work like managing the clients, handling there work till completion. This work also requires managing a lot of paper work. Thus TCC Automation Software comes into the use.

Features of the Software

- Open Source
- User Interactive Software
- Online
- Dynamic
- Proper User and Admin interface
- Catalog
- Distance Calculation through map
- Efficient Search module
- Universal (Can be changed according to application/work)
- Report generation
- Single click installation
- Proper User and developor documentation

4.14 Modules of the Software

1. **Installation** : Installation of the Software and that too smoothly is the most important step for making the software run. The installation module is made, keeping in mind the different platforms or the versions of the system. The installation procedure is made very easy, informing the users about all the changes that are to be made in his/her system.
2. **Registration** : This involves user authentication, login, user Registration as a client. There are different views of the software that varies on the user using it. That means user is able to see only that part to which he/she is authenticated.
3. **Catalog** : Catalog provides all the information about the product, there rate, quantity etc. Seeing the catalog list user can get an estimate of the total amount he would spend on entering a Job or work.
4. **Job Entry** : Job entry module involves entering the Job or work that need to be done in a particular lab or a site. This also involves getting the distance between the organisation and site. The client can add both Lab and Field works. Multiple works can be done in a single Job.
5. **Amount Calculation** : Depending on the type of work to be done, material tested and number of tests to be performed the amount is automatically calculated by the Software. Then on the calculated amount the divisions are done and then taxes are applied.
6. **Search** : The search module includes searching a client or Job that has previously been added. After getting the results of the search, the operations like getting the previous work done by the client, status of those works or further adding new works are performed.
7. **Bill, Receipt & Voucher Generation** : In this module after all the calculations done and data saved, the Bill, Receipt and the Voucher for the Job is generated that then is to be returned to the client.
8. **Registers Generation** : This module involves retrieving all the previous entries that were performed. These registers include : Daily Report, Monthly Register, Main Register, Suspense Clearance Register, Lab Report, Client Report etc.
9. **CashBook** : CashBook module involves managing all the money transactions. It involves all the cash debited or credited and the transactions made on them.
10. **Reports Generation** : Report Generation module includes generating the complete report for the field work. This gives the detailed information about the work done, staff members involved in doing the work, calculations done etc. Multiple Reports are generated for a work done from different labs. Once the report is generated one can download it too.

4.15 Automation Software in Detail

Admin Interface

The admin Interface is the Software interface for only admin. Using this interface admin can make all the changes in the Software. He/She is the utmost authority. The services that are given to the end user can be added, updated or deleted by the admin. Admin is the one who gives the permission for certain authority of a User.

Django administration
Welcome, **sandeep**. Change password /

Site administration

Auth	
Groups	+ Add Change
Users	+ Add Change
Registration	
Registration profiles	+ Add Change
Sites	
Sites	+ Add Change
Tagging	
Tagged items	+ Add Change
Tags	+ Add Change
Tcc	
Departments	+ Add Change
Govts	+ Add Change
Jobs	+ Add Change
Labs	+ Add Change
Materials	+ Add Change
Organisations	+ Add Change
Payments	+ Add Change
Reports	+ Add Change
Staffs	+ Add Change
Tests	+ Add Change
Transportations	+ Add Change

Recent Actions

My Actions

- [+ Dr. Hardeep Singh Rai](#)
Staff
- [+ Hilly area](#)
Test
- [+ Semi-Hilly area](#)
Test
- [+ Plain area](#)
Test
- [+ Survey](#)
Material
- [+ Surveyy](#)
Lab
- [+ 6 months training](#)
Material
- [+ 6 week training](#)
Material
- [+ 2 week training](#)
Material
- [+ MBA](#)
Lab

Figure 13: Admin Interface

Welcome Screen

This Welcome Screen is visible as soon as the link to the Software is opened. This screen is visible to all the users even if they are authenticated or not.

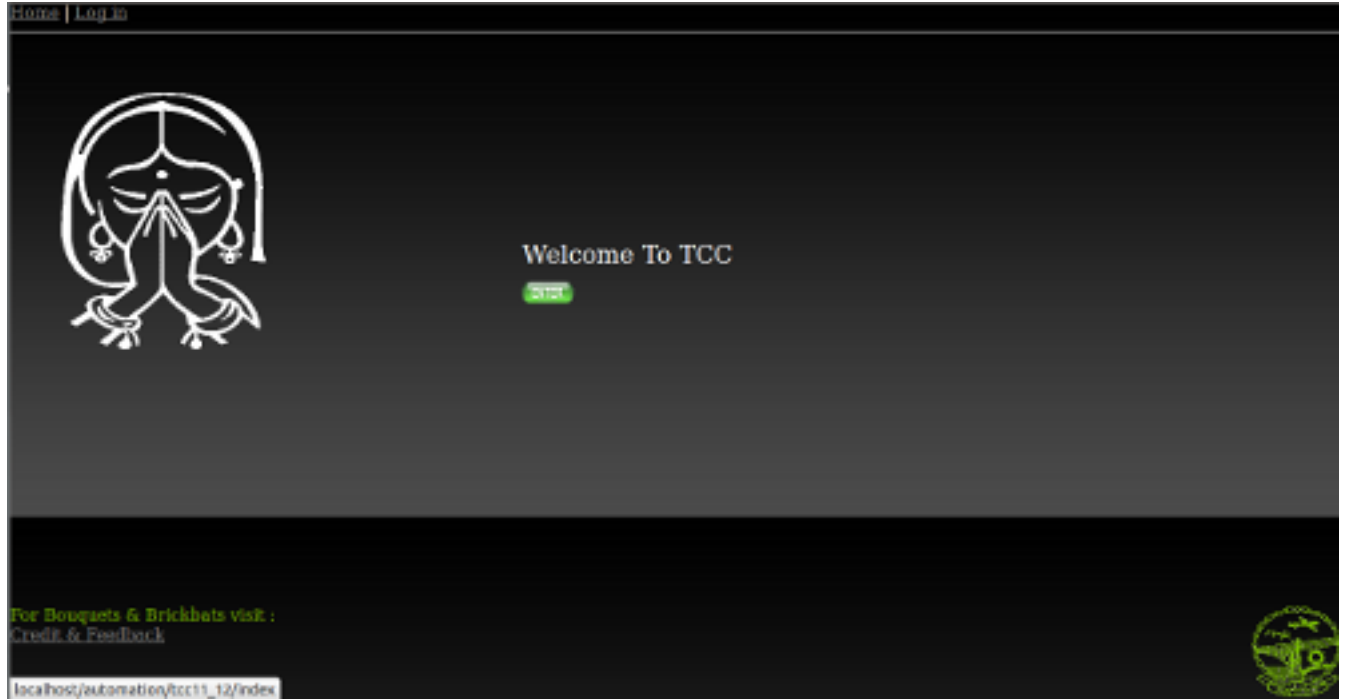
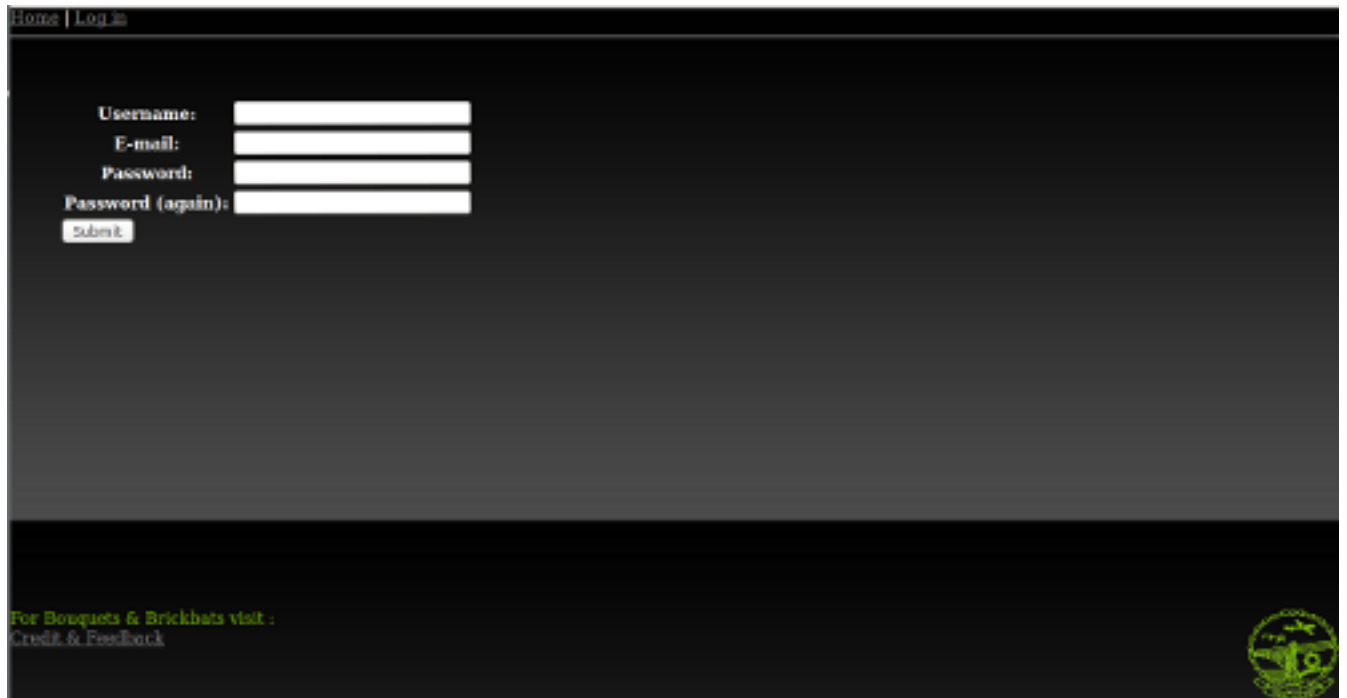


Figure 14: Welcome Screen

Registration & Login

When a User tries to login into the Software, the software checks, whether the user is valid or is authenticated. If yes, the user login into the Software is successful, else the User needs to register himself as the User. As soon as the user registers himself, he will be sent an activation mail. In order to activate the account, the user has to open that link and login himself. Only the authenticated user is able to use the features of the software or work with it.



The image shows a web browser window with a registration form. The browser's address bar shows 'Home | Login'. The form is titled 'Registration' and contains the following fields and buttons:

- Username:** A text input field.
- E-mail:** A text input field.
- Password:** A text input field.
- Password (again):** A text input field.
- Submit**: A button.

Below the form, there is a section for 'For Bouquets & Brickbats visit : Credit & Feedback' with a link to 'Credit & Feedback'. In the bottom right corner, there is a circular logo featuring a globe and the text 'TCC Automation Software'.

Figure 15: Registration Screen

Employee Login

An employee is the User who has the authority to register other clients into the Software and then add there jobs or manage them. Once an authenticated employee login into the system, he/she is able to use all the fuctionality availble to him/her. He can add the clients, handle them, see the wotk of all the clients. A lot of features are availaber for the employer to automate his work and make it easy.



Figure 16: Employe Interface

Normal User Login

A normal User is considered as the client. He has very limited access on the features of the software. In TCC Automation Software, the users have different web interface of the Software depending on the authority they are given. A normal User can have the information about all the services available, ask for a service, thus registering what actually he wants. He can also see the previous services he used from the Cell.

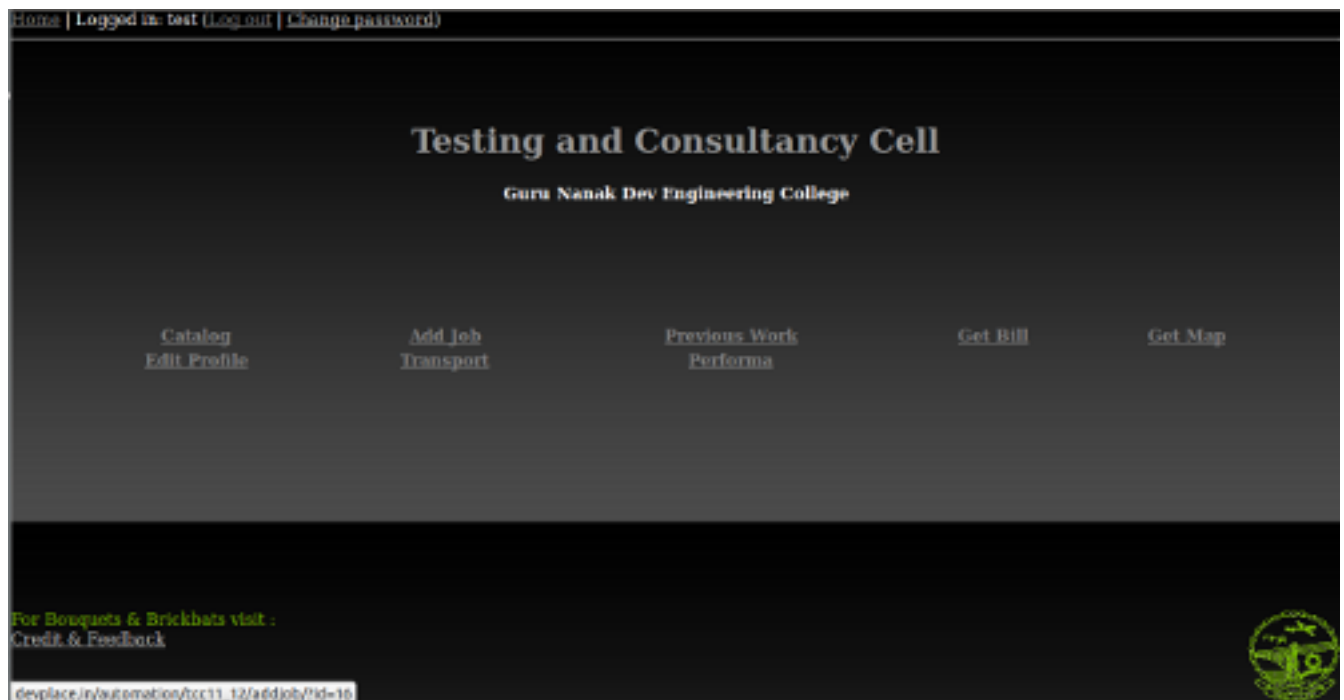


Figure 17: Normal User Interface

Catalog

Catalog provides all the information about the product, there rate, quantity etc. Seeing the catalog list user can get an estimate of the total amount he would spend on entering a Job or work. A catalog represents a collection of products that you group into categories. You can then use this information to create, within a Commerce Server-enabled Web site, Web pages that let your customers browse your collection of products. The categories in your catalogs can have sub-categories, and products may appear in multiple categories.

Home | Logged in: sandeep (Log out | Change password)

Catalog

S.No	Materials	S.No	Test for Soil for BC	Quantity	Cost
1	Bricks	1	depth 0 to 10	6000 meter	0
2	Fine Aggregate (Soil)	2	depth 10 to 20 m	6000 meter	900
3	Pavers/Beams	3	depth 20 to 30 m	6000 meter	1200
4	Cement	4	depth more than 30 m	6000 meter	1500
5	Soil for BC				
6	QHSR				
7	Coarse Aggregate (Soil)				
8	Cubes				
9	Steel				
10	Mix Design				
11	Wood				
12	Chemical testing				
13	Water/Waster Water				
14	2 week training				
15	6 week training				
16	6 months training				
17	Survey				

For Bouquets & Brickbats visit :
Credit & Feedback

localhost/automation/tcc11_12/rate/11d-5


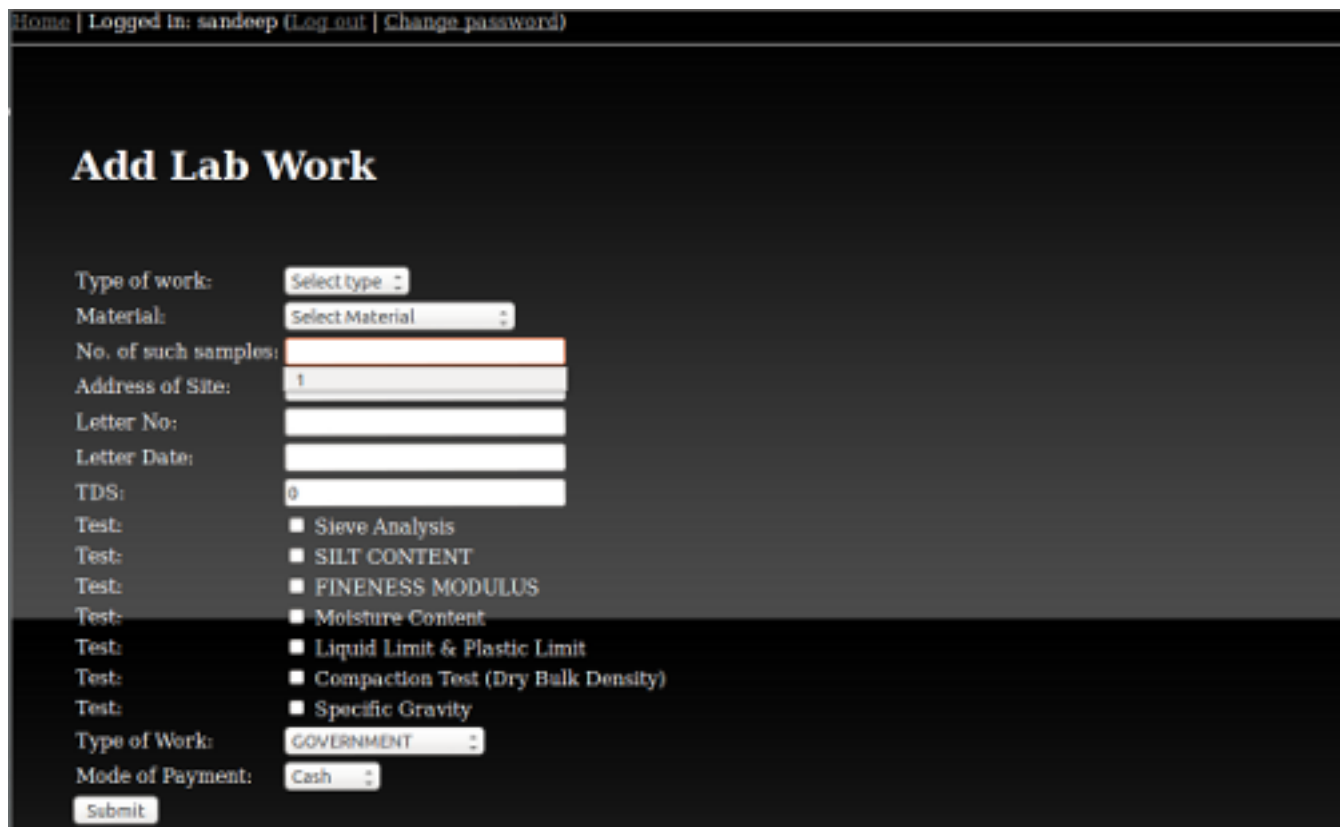


Figure 18: Catalog

Catalogs contain hierarchies and relationships that you use to organize the products in the catalog to make it easier for customers to navigate to the products that they want to buy. You can create category hierarchies and relationships among categories and products that are in the same catalog or in different catalogs. For example, if you have a large catalog, you can create a parent category that includes several other categories, known as child categories. When customers navigate to the parent category, the child categories appear; enabling customers to navigate quickly to the category that contains the products they want.

Add Job

Both employee and Normal User can add the Job. The only difference is that an employee can add multiple jobs for his different clients and normal user can add the jobs for only himself. For adding the job one needs to fill all the necessary data required for a work to be done. All the calculations about the amount for the Job is done in the backend. Only after you click the submit button you will be able to see the results.



Home | Logged in: sandeep (Log out | Change password)

Add Lab Work

Type of work:

Material:

No. of such samples:

Address of Site:

Letter No:

Letter Date:

TDS:

Test: ☐ Sieve Analysis

Test: ☐ SILT CONTENT

Test: ☐ FINENESS MODULUS

Test: ☐ Moisture Content

Test: ☐ Liquid Limit & Plastic Limit

Test: ☐ Compaction Test (Dry Bulk Density)

Test: ☐ Specific Gravity

Type of Work:

Mode of Payment:

Figure 19: Add Job Form

Search Module

The search module include searching a client or Job that has previously been added. After getting the results of the search, the operations like getting the previous work done by the client, status of those works or further adding new works are performed. It is an important feature of the software as it keeps the track of the clients getting services from the organisation.

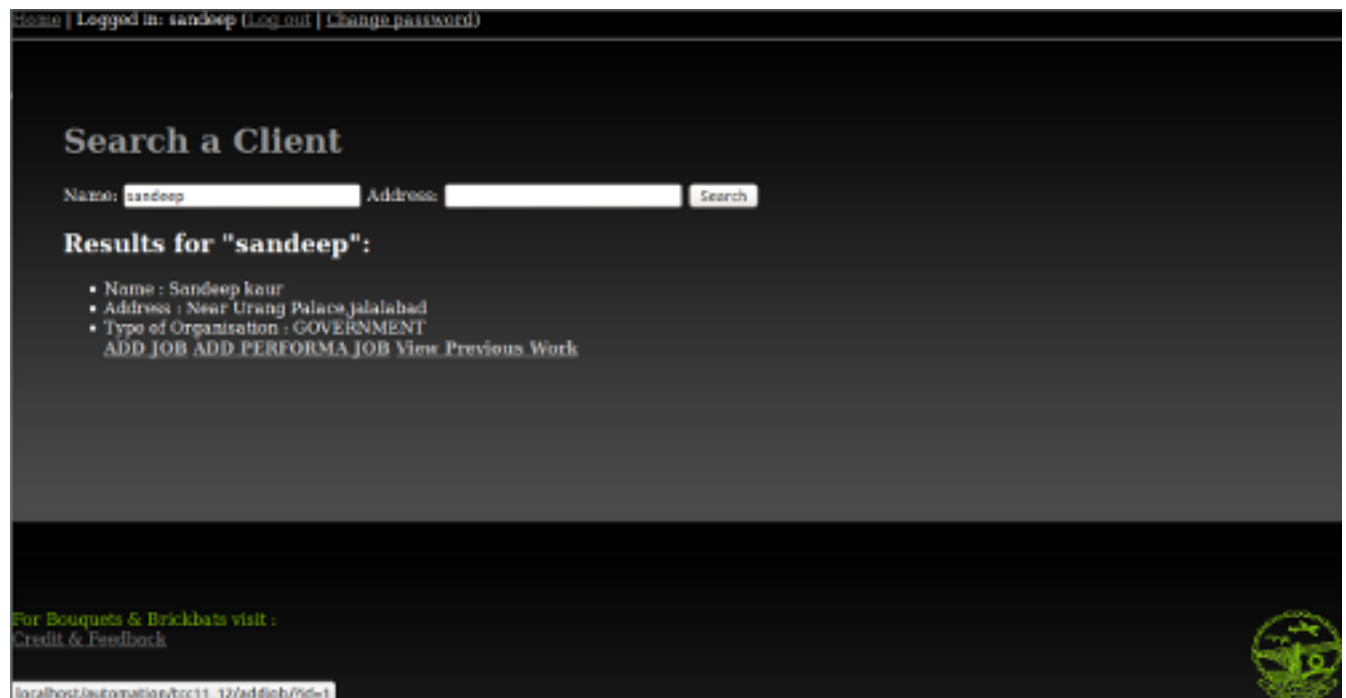


Figure 20: Search Module

In this, the Software looks for the certain keyword you entered in the corresponding table. The filtration is done and those results with matching keywords are listed.

Bill, Receipt & Voucher generation

Once the Job is entered into the software, irrespective of when it will start, the client is required to make the payment. After that he is given the Receipt and bill for his work. The Bill, Receipt and Voucher are automatically generated only after a complete and valid Job is added into the software.



Figure 21: Get Bill, Receipt & Voucher

Registers Generation

This module involves retrieving all the previous entries that were performed. These registers include : Daily Report, Monthly Register, Main Register, Suspence Clearance Register, Lab Report, Client Report etc. For getting different registers different queries are performed or filter are applied, depending on the need.

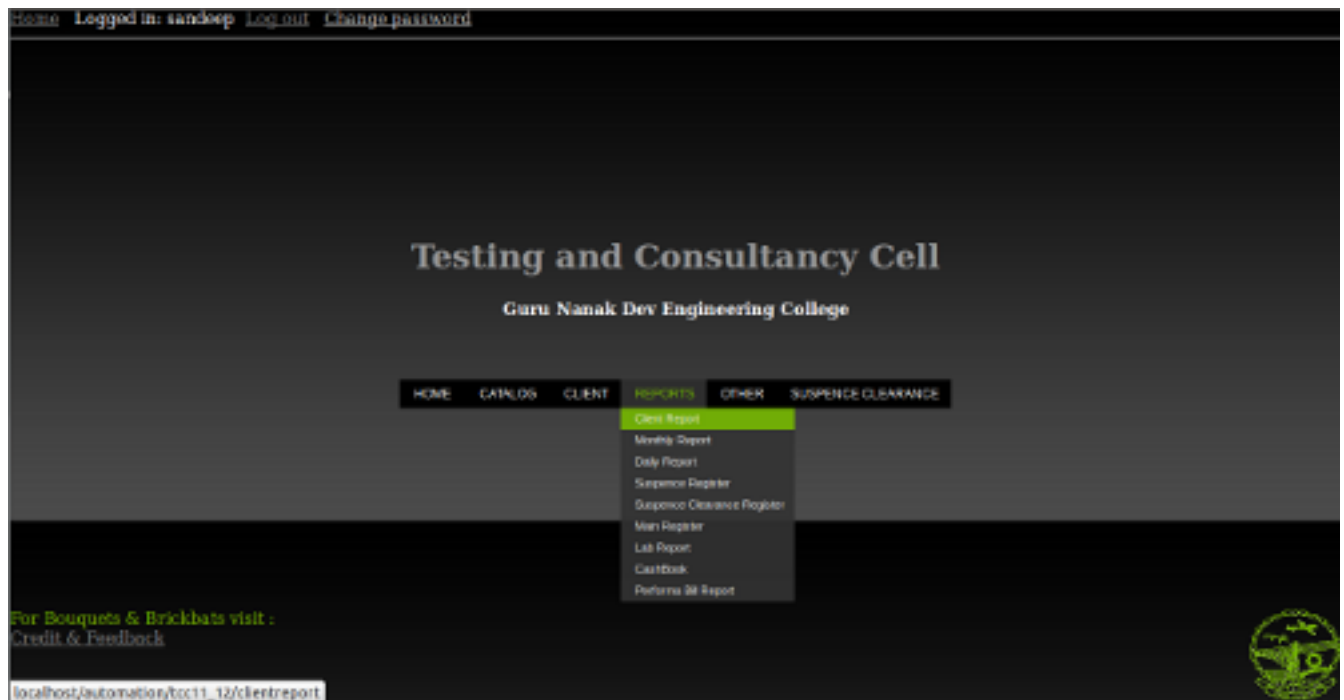


Figure 22: Select the Register

Registers generated in the software

Following are the reports generated in TCC Automation software :

- Suspence Report: This report keep record of all the suspence jobs that has been registered.
- Suspence-Clearance Report: This report is used to get all te suspence registered jobs whose dues have been cleared out.
- T.A./D.A. Bill: This is report for Transport Allowance and Daily Allowance bill.
- Performa Bill: It give the
- Job Register: It keep record of all the jobs registered.
- Yearly/Monthly Income Report: It gives the yearly and monthly record of income to the institute.
- Transport Bill: It gives all the information related to transportation.
- Other charge Bill: It gives the report of all the other charges like service tax, education tax, etc.

- Daily report: It gives the information of job registered in the number of days selected. It also makes the difference between the types of payments made like cheque, cash.
- Faculty Income distribution: It keeps the record of the income distribution to the faculty members.
- Main Register: It is the main register keeping the record of all the report types.
- Receipt: It keeps the record of all the receipts. One only need to know the job no. and then can easily get the receipt.
- Department/lab Report: It carries all the information of various labs and thus gives the record for the lab selected.
- Govt./Semi-Govt./Private Report: It keeps the record for the type of work selected i.e Govt./Semi-Govt./Private Report.
- Clearance Report: It gives the clearance report.
- General Bill: It keeps record of all the general reports.

Main Register of December, 2012										
S.No	Ref.No	Date	Receipt	Address	Type of Material	College Income %	Admin Charges %	Consultancy	Dev. Fund	Total
1	12	Dec. 3, 2012	6	Sandeep kaur	Fine Aggregate (Soil)	240	80	384	896	1600
2	13	Dec. 6, 2012	7	Mazvir singh	Pavers/Beams	90	30	144	336	600
3	15	Dec. 6, 2012	8	Sandeep kaur	Cubes	75	25	160	240	500
4	16	Dec. 6, 2012	9	sahib	Fine Aggregate (Soil)	360	120	576	1344	2400
5	33	Dec. 10, 2012	16	sahib	Fine Aggregate (Soil)	360	120	576	1344	2400
6	35	Dec. 10, 2012	17	Sandeep kaur	Coarse Aggregate (Soil)	720	240	1536	2304	4800
7	46	Dec. 13, 2012	22	Sandeep kaur	Bricks	360	120	576	1344	2400
8	52	Dec. 13, 2012	25	Sandeep kaur	Fine Aggregate (Soil)	240	80	384	896	1600
9	57	Dec. 13, 2012	26	Mazvir singh	Fine Aggregate (Soil)	240	80	384	896	1600
10	58	Dec. 13, 2012	27	sahib	Fine Aggregate (Soil)	240	80	384	896	1600
11	59	Dec. 13, 2012	28	sahib	Pavers/Beams	90	30	144	336	600
12	60	Dec. 17, 2012	29	Sandeep kaur	Fine Aggregate (Soil)	240	80	384	896	1600
13	61	Dec. 17, 2012	30	sahib	Fine Aggregate (Soil)	360	120	576	1344	2400
14	62	Dec. 19, 2012	31	S. Jagir Singh, govt. contr.	Bricks	360	120	576	1344	2400

Figure 23: Output Register

Report Generation

Report Generation module include generating the complete report for the field work. This gives the detailed information about the work done, staff members involved in doing the work, calculations done etc. Multiple Reports are generated for a work done from different labs. Once the report is generated one can download it too. Now the basic requirement of the project is to produce the report from the data which were submitted by the user or client in the office for the testing purpose. So, for that we require the generic views for the software to display the data from the models of the report and to display that data to the user we also need the templates for the different types of the reports. It is necessary for the report application that the templates for the report application must be different from the other application templates so that it is easily distinguished from the tcc application which was another application in the project. So, for this purpose the different template inside the templates of the project was made to distinguish the different template. This template is known as “report”.

The reports are generated from the models which are predefined in the models of the report application, In the models field, there are different types of field which are responsible for storing the data in the different datatypes. The good thing is that we can distinguish between the tables of the two applications very easily, as the prefix for the different applications are set by default by the syncdb process. And in this case, the models are made with the prefix “report”.

SELECTING THE TYPE OF REPORT FROM THE GIVEN MATERIAL :

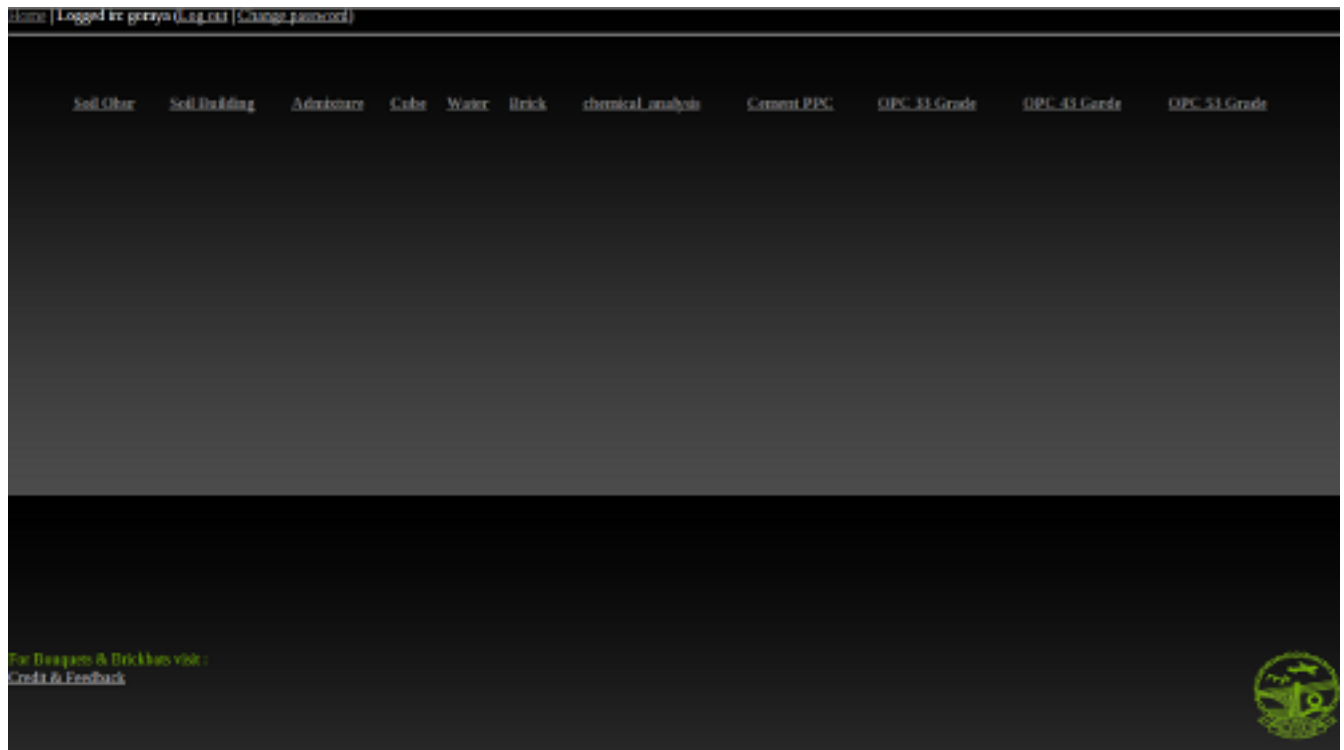


Figure 24: Types of Report

To make the report one should need to select the type of report which the user want to pro-

duce, so for this purpose the report type has to be chosen from the list of the available report in the software. The report formats are directly called from the models via views and a common form.html is responsible for displaying the form.

On clicking any of the report the specific report is selected and we can proceed further to fill the entries into that report.

SELECTING AND MAKING A SPECIFIC REPORT TYPE

At this step, the selected report form is displayed in front of the user and now the user can fill the data which he can attain from the lab after testing the different material, there might be the different samples of the same material, at the top of the form a column for specifying the sample no is given in the form, the form then contains the different fields according to the requirement of the material and test. All the fields are predefined according to the different tests, so the user only have to fill the test values in the form.

FINAL REPORT

The final report is produced by clicking on the submit button on the form in the report type to be added. The sample of the report is attached below:

1/7/13

GNDEC

GURU NANAK DEV ENGINEERING COLLEGE

GILL PARK LUDHIANA
An Autonomous College Under UGC Act

e-mail:gndec@gndec.com

Fax: 0000000000

Phone: 0161 2490339

No.GNDEC/TCC/R/

Dated

To,

Subject:**Refrence:** Your letter No. dated

The material is fragile and need water

All the tests are conducted under the natural conditions.

Sir,

The result of sent by you on are as under:

S No	Physical state	Specific_Gravity	PH Value	Dry Material Content	Ash Content	Chloride Content 1.10% Admixture	ControlMix
1	good	78	7.4	20%	12%	16%	nil
2	fragile	39	7.9	18%	19%	15%	nil

This is not to be used for any type of evidence

Conditions:

1. This test report refers only to the samples submitted for the test.
2. This test report not be used for any sales promotions or advertisements without permission.
3. This test report is not to be used for legal purpose and will not be produce in the Court of Law.

(Co-Ordinator)

Dean Testing & Consultancy
Guru Nanak Dev Engg College
Ludhiana

PDF

localhost/automation/report/result_Admixture/

1/1

Figure 25: Report Generated

Distribution of money

- College Income
- Administrative
- Development Funds
- Consultatancy Asst.
- Service Tax
- Education Tax
- Higher-Education Tax

4.16 Testing

Project testing is an investigation conducted to determine the quality of the project and the services provided by the project. Testing is the process of analyzing a project to detect the differences between existing and required conditions (that is defects/errors/bugs) and to evaluate the features of the project. After complete development of the project it is mandatory to test the project. The main motive of the project testing is to identify whether project is able to meet user requirements or not. To know the better performance of project we have to develop various Test Cases. Now, designing good test cases is a complex art. The complexity comes from three sources:

1. Test cases help us discover information. Different types of tests are more effective for different classes of information.
2. Test cases can be good in a variety of ways. No test case will be good in all of them.
3. Our tend to create test cases according to certain testing styles, such as domain testing or risk-based testing. Good domain tests are different from good risk-based tests.

4.17 Implementation

Implementation is the process of converting a new or revised system design into an operational one. At the present time there is no system as Imperial Finance which work online and provide information via web. So this is the replacement of the manual financial system. In Imperial Finance most of the finance related task will be performed online.

Types of Implementation:

1. Implementation of a computer system to replace a manual system.
2. Implementation of a new computer system to replace an existing one.
3. Implementation of a modified application to replace an existing one.

Aspects of Implementation:

1. Conversion
2. Post Implementation and review
3. Software maintenance

Implementation of the Project :

TCC Automation Software is the implementation of the with the new one. The current software is offline without any registration module thus making the management of clients and there data difficult. There is no search module. Thus when there is a need to search a client or a job, the employee need to go to the backend and see the database. This process is very time consuming and irritating. The project implementation of Imperial Finance starts with the Administrator. Administrator will be the super user of the application who will configure system information such as new services, lab, employees and new clients. There will be a different interface for the employees and clients from where they can manage and view the TCC related information which they allowed to view.

It is a web based application, so it is distributed and data centric. In this application, MySQL database is used to store data related to employees, users offered by system, clients, etc. Since database is on Server, so any number of users can work simultaneously and can share their data with each other.

Conversion Plan:

Conversion is the process of changing from one system to another. This plan involves:

1. Creating computer-compatible files.
2. Training the operating staff.
3. Installing terminals and hardware.

Conversion Processes :

1. File Conversion.
2. Data Entry.
3. User Training.

Elements of User training :

1. The initial training period.
2. At the time of Installation.
3. If required, during Maintenance Phase.

4.18 Post-Implementation and Software Maintenance

implementation review is an evaluation of a system in terms of the extent to which the system accomplishes stated objectives and actual project costs exceeds initial estimates.

Review Plan: An overall plan covers,

1. Administrative plan.
2. Personnel requirements plan.
3. Hardware plan.
4. Documentation review plan.

After the implementation of this project, the team will see the post implementation phase. If there will be any concerns, those will be solved based on the user feedback.

Maintenance : In order for a software system to remain useful in its environment it may be necessary to carry out a wide range of maintenance activities upon it. There are bugs to fix, enhancement to add and optimization to make, changes has to be done in older version to make it application for current use of current version to cater the need of future. Maintenance can be of three types: -

1. **Corrective Maintenance:** Changes necessitated by actual errors (defects or residual "bugs") in a system are termed corrective maintenance. These defects manifest themselves when the system does not operate as it was designed or advertised to do. A defect or bug can result from design errors, logic errors and coding errors. Design errors occur when for example changes made to the software are incorrect, incomplete, wrongly communicated or the change request misunderstood. In the event of a system failure due to an error, actions are taken to restore operation of the software system. The approach here is to locate the original specifications in order to determine what the system was originally designed to do.
2. **Adaptive Maintenance:** Any effort that is initiated as a result of changes in the environment in which a software system must operate is termed adaptive change. Adaptive change is a change driven by the need to accommodate modifications in the environment of the software system, without which the system would become increasingly less useful until it became obsolete. The term environment in this context refers to all the conditions and influences which act from outside upon the system, for example business rules, government policies, work patterns, software and hardware operating platforms. A change to the whole or part of this environment will warrant a corresponding modification of the software.
3. **Perfective Maintenance:** This is actually the most common type of maintenance encompassing enhancements both to the function and the efficiency of the code and includes all changes, insertions, deletions, modifications, extensions, and enhancements made to a system to meet the evolving and/or expanding needs of the user. A successful piece of software tends to be subjected to a succession of changes resulting in an increase in its requirements. This is

based on the premise that as the software becomes useful, the users tend to experiment with new cases beyond the scope for which it was initially developed. Expansion in requirements can take the form of enhancement of existing system functionality or improvement in computational efficiency. Though efforts have been made to develop error free systems, but no system is perfect, room for improvement is always there. Thus proper documentation for the system has been done so that it will be easy to handle any breakdown or any other type of system maintenance activity.

5 My Others Work

5.1 IGS Ludhiana Website

Introduction to IGS Ludhiana

IGS stands for Indian Geotechnical Society which is a great society whose aim is to promote cooperation amongst engineers and scientists for the advancement and dissemination of knowledge in the fields of Soil Mechanics, Foundation Engineering, Soil Dynamics, Engineering Geology, Rock Mechanics, Snow and Ice Mechanics and any allied fields related to Geotechnical Engineering and their practical applications. Indian Geotechnical Society, New Delhi (IGS) has opened its 35th Chapter in Ludhiana with an aim to address the local problems faced by the people of Punjab in general and civil engineering community in particular. It will provide a platform to the engineers, scientists, industrialists and others who are actively associated with the geotechnical works to come together to interact, collect, synthesize and collate valuable information on geotechnical engineering aspect of Civil Engineering for betterment of the community.

Our college got a chance to make a website for this. Inauguration of this website was also in our college. It was a great achievement for our college.

Along with me this task was given to four more students: Jaspreet Kaur, Navdeep Bagga, Damanpreet Singh and Vigasdeep. We divided all the work so that we make this website up in a short period (two days). The Website is developed in Wordpress, an Open Source Web Framework. Different works were given to each student. The website can be found at :

<http://gndec.ac.in/igs/ldh/>

Selected the theme: Twenty eleven [A ver stable theme and easy to configure]

Plugin Installed : News announcement scroll [This plugin create a vertical scroll news or Announcement for your wordpress site, we can embed this in sidebar, Multi language support.

My Contribution

Tweaked CSS & Header Files.

Handled all the graphics of the website. Made the banner of the Website in Gimp.

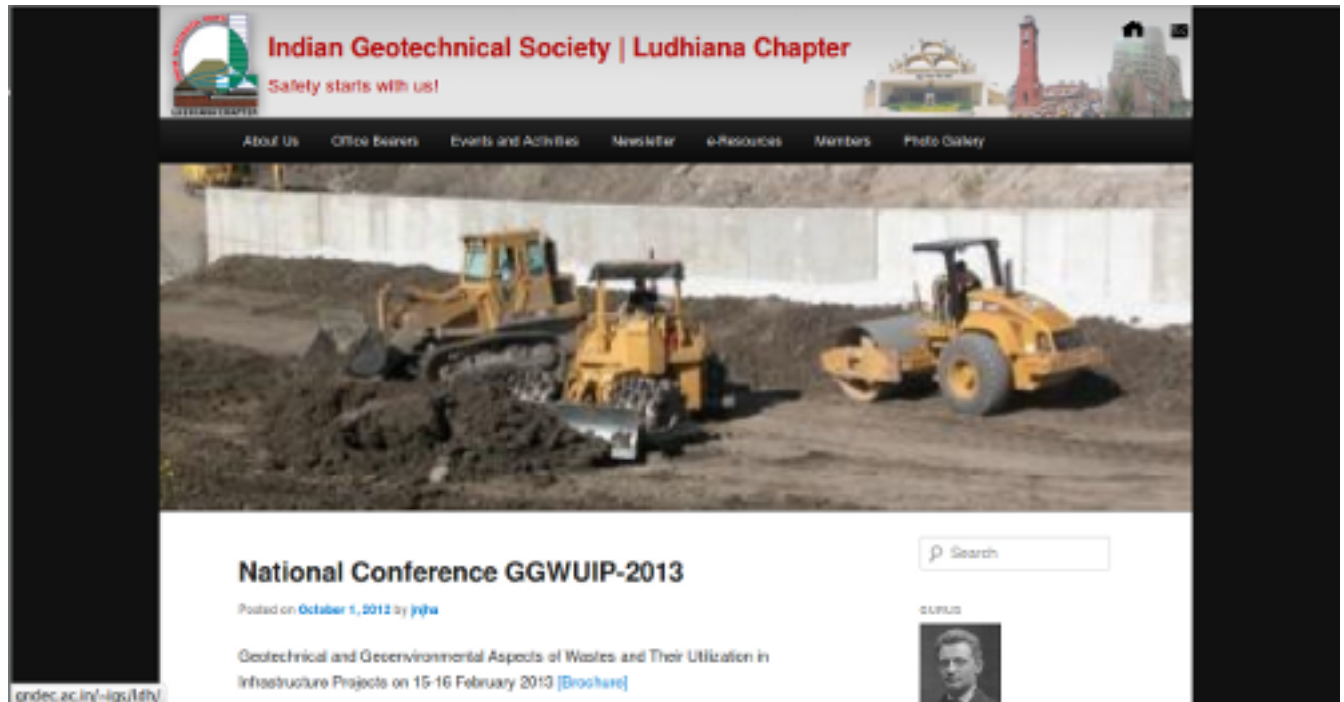


Figure 26: IGS Website

TECHNOLOGIES USED

Wordpress

WordPress is a free and open source blogging tool and a content management system (CMS) based on PHP and MySQL. It has many features including a plug-in architecture and a template system. WordPress is used by over 16.7% of all new websites. WordPress is currently the most popular blogging system in use on the Web.

Its Features are :

- Themes : WordPress users may install and switch between themes. Themes allow users to change the look and functionality of a WordPress website or installation without altering the information content or structure.
- Plugins : One very popular feature of WordPress is its rich plugin architecture which allows users and developers to extend its abilities beyond the features that are part of the base install.
- Widgets : Widgets are small modules that offer users drag-and-drop sidebar content placement and implementation of many plugins' extended abilities. Widgets allow WordPress developers to add functionality to their sites.
- Multi-user and multi-blogging



Figure 27: Wordpress

GIMP

GIMP (GNU Image Manipulation Program) is an image retouching and editing tool and is released under the GPLv3 license as free and open-source software. There are versions of GIMP tailored for most operating systems including Microsoft Windows, Mac OS X and Linux.

GIMP has tools used for image retouching and editing, free-form drawing, resizing, cropping, photo-montages, converting between different image formats, and more specialised tasks. Animated images such as GIF and MPEG files can be created using an animation plugin.



Figure 28: Wordpress

5.2 Operating UDF Disks

Introduction to UDF

Universal Disk Format (UDF) is a profile of the specification known as ISO/IEC 13346 and ECMA-167 and is an open vendor-neutral file system for computer data storage for a broad range of media. In practice, it has been most widely used for DVDs and newer optical disc formats, supplanting ISO 9660. Due to its design, it is very well suited for incremental updates on both recordable or (re)writable optical media. UDF is developed and maintained by the Optical Storage Technology Association (OSTA).

Different between UDF and ISO Disks

The ISO File System ISO is the original method, and the one used in pressed CD-ROMs, such as the Windows XP CD-ROM. In this system, all the files to be written are selected, and then written to the disc as continuous tracks, together with a Table of Contents (TOC) which defines where the data of a file is to be found in the track. Together, these files and TOC form a session. If the disc has not been filled, it can be put back into the writer, and a further session written. The TOC for the new session will link back to the previous TOC, so that all the files on the disc appear as being on a single CD.

Because of this method of writing, the files cannot be individually changed or deleted. If on a CD-RW disc, they can only be erased as a whole. The ISO file system is mostly used, therefore, with CD-R media.

Every session has an overhead of about 14 MB, so this is a very wasteful method if used to write files individually rather than in batches.

The resulting burned disc can be read in any PC CD-ROM drive (except, perhaps, some very obsolete ones) using only the normal software of any version of Windows.

The UDF File System is a quite different approach, in which a CD-RW disc is first formatted into packets which then behave very much like the sectors of a hard disc. While the file system can be used in discs organised in tracks, as with the ISO system, and is also used on DVD discs, the term UDF will be used here in the sense of it using this packet writing base on CD-RW discs. Files can be written to a series of packets as an individual operation, and, later, those of a file can be selectively erased or updated. Therefore, such a CD is described as behaving as a giant floppy (or very slow, small hard disc). When UDF is implemented, files can be dragged and dropped to and from the CD in Windows Explorer, just as to and from a hard disc; or, to give another example, the CD can be selected as the drive to use in a Save As dialog in a program. The UDF file system was often used in earlier versions of Windows through third party packages such as Direct CD.

Reading such discs needs special software in earlier versions of Windows, and may not be possible with all CD drives, even when that software is present.

While there is a variant of the UDF method that can be used to write to CD-R media, it is rarely used. Thus when using UDF DVDs, one can come accross problem where either it does not mount in the system or if get mounted shows empty disks. I came accross one such situation, where I had following experience.

My Experience with UDF Disk

After getting the DVD, first of all I tried to mount it on ubuntu. After creating a lot of sounds, it popped out a message “could not mount due wrong fs type, bad option, bad superblock”. Even manual mount through command line, did not helped. After searching for the error, I found that there is a command for installing udf library or something. It solved someone’s problem on stackflow, but even that was not useful for me. Some links said that this error is not usual, as of most the DVDs are udf format and they are easily mounted in ubuntu. So problem might be with the software in which they were burned. The solution for this: a patch for the kernel(limited on versions like 2.6 etc) is available, apply it, compile it, this may help. I was pretty doubtful on this solution as I am running the latest kernel.

Then I moved on to windows. I have windows 7. There, upon mounting the drive, I could just see that CD was almost full, but on opening it appeared to be blank. I searched for some UDF reader in windows. I found IsoBuster software. Downloaded trial version. With this I could detect that something was within the CD. I could neither extract it, as that required getting the paid version (I hate windows for this only. when you start knowing about something, it flashes back “GET PAID VERSION” :-X) nor I could copy them. Then I installed some other CD burner softwares like Nero, adptec udf reader, but to no avail. Upon searching I found, those suffering from this problem can run these type of CD’s on window xp. I tried even on that. That was even worse. Windows showed a CD with 63 (or something) Mb and totally empty. So our case appeared to be totally different. Then I found that CD can found empty even when it is corrupted. So then I searched for CD recovery tool in window. Found one and then I was even able to recover data and then I got to know that in trial version, I can recover only 1 GB data. Somehow I managed to recover all the data.

Thus from all this experience I get accross a conclusion :

- Never use a third party Software to burn the CD or DVD.
- Don’t burn the DVD as UDF unless you want a large data to be burned.
- Always chech whether the CD or DVD burned is compatible with all the platforms.

6 Project legacy

6.1 Technical and Managerial Lesson Learnt

I learned a lot by doing this project . During the six months period I got to learn a vast number of technologies. These are listed below :

- Operating system:
Ubuntu
- Languages used:
Python, Html, CSS, JavaScript, PHP, Bash Scripting
- Framework:
Django
- Database:
MySQL
- Typesetting by:
LaTeX
- Designing:
Gimp, Inkscape
- Documenter:
Doxygen
- Code Maintenance:
Github
- ERP System:
WebERP

So during this project I learned all the above things. Above all I got to know how Softwares are developed from the scratch. Planning, designing, developing code, working in a team, testing etc. These are all very precious things I got to learn during the training period If I talk about the project, Automation project reduce lot of manual work . It has automated all the office work of TCC.

6.2 Current status

TCC Automation software is currently running in Testing and Consultancy Cell of our college and also on the experimental server of our college. I has automated all the manual work of TCC. Software has following applications in it:

- Login and registration
- Register new client.
- Search the client and add jobs for him or see the status.
- Get different records of jobs based on type of work, type of report, payment type, type of lab etc.
- Amounts get automatically summed up taking in account the sevice charges, income tax, sevice tax, education cess etc.
- Online management.
- As the database server is online so multiple clients can work on it.
- Catalog feature.

6.3 Future Scope

Automation software reduces the manual work and save the money. It also reduces the man power and reduces the burden of handling lots of data. It keeps the backup of the record stored. As the project is complete but still there are many more things or areas which can be added to the project to make that more reliable. These remaining areas may be:

- (a) Recieve the payment online through e-billing.
- (b) Managing the labs work through software, thus when there is any job that is to be done in a lab, they get email automatically.
- (c) Making it work like an ERP system i.e merge connect other departments also with, thus making it a big one.
- (d) SMS Service: When the work of a client is complete, the client and the employee should automaticlly receive a message regarding this.
- (e) Report Fax: There may be an option through which the reports will be automatically faxed to the Clients/Employee.

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