Certificate Generation System

Minor Project

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Abstract

The certificate generation system is flexible for generating progress reports of students. this application is mainly based on the database technology. the system is targeted to small enterprises, schools, colleges and universities. it can produce sophisticated ready-to-use Certificates, which could be created and will be ready to print.

Certificate Generation System is a portable application used to Generate Certificate for single candidate providing his/her details along with image.

As well as for Batch/Number of candidates by simply providing the CSV format file (containing details of every candidate) along with candidate images in a compressed (tar.gz or zip) folder.

This project aims at developing a certificate generation system which can be used in universities to automate the distribution of digitally verifiable student result mark sheets

These methods have been developed in previous work, but they were strongly dependent on particular programming and verification settings. This project provides a more general development in the setting of abstract interpretation, showing the scalability of certificate generation system.

Also, this project is completely open source and the entire code is available to the user as and when required. There is Complete developer's Documentation as well as User manual alongwith it that helps using it a lot easier.

Introduction

Figure 3.1: Sample Template

- This System is used to Generate Certificate for single candidate providing his/her details.
- This will also contain candidate's image.
- One can also give Batch/Number of candidates by simply providing the CSV format file (containing details of every candidate) along with candidate images in a compressed (tar.gz or zip) folder.
- Also used by many Organisations and other sectors for honouring individuals.
- This can generate the end output (i.e Certificate) in various graphic forms.
- This application is a portable application.
- This is a cross-platform application.
- This has an application in Award Functions etc.
- This project can be used in various Universities, schools etc.

3.1 Existing System

- Our project is having its USP i.e, it can provide output in more than one format. Certificates can be seen in .pdf or .odt formats.
- These methods have been developed in previous work, but they were strongly dependent on particular programming and verification settings.
- This project provides a more general development in the setting of abstract interpretation, showing the scalability of certificate generation system.
- It can deal with Csv format files.

3.2 User Requirement Analysis

1. Apache Web-Server
2. PHP Interpreter
3. unoconv
4. python3-uno

3.3 Feasibility Study

This study is made to see if the project on completion will serve the purpose of the organization for the amount of work, effort and the time that spend on it. Feasibility study lets the developer foresee the future of the project and the usefulness.
A feasibility study of a system proposal is according to its workability, which is the impact on the organization, ability to meet their user needs and effective use of resources. Carrying out a feasibility study involves information assessment, information collection and report writing. The information assessment phase identifies the information that is required to answer the three questions set out above.
Once the information has been identified, you should question information sources to discover the answers to these questions Thus when a new application is proposed it normally goes through a feasibility study before it is approved for development.

A feasibility study is designed to provide an overview of the primary issues related to a business idea. The purpose is to identify any make or break issues that would prevent your business from being successful in the marketplace. In other words, a feasibility study determines whether the business idea makes sense. A thorough feasibility analysis provides a lot of information necessary for the business plan. For example, a good market analysis is necessary in order to determine the project's feasibility. This information provides the basis for the market section of the business plan.

The objective of the feasibility study is to establish the reasons for developing the software that is acceptable to users, adaptable to change and conformable to established standards.
Objectives of feasibility study are listed below:

- To analyze whether the software will meet organizational requirements.
- To determine whether the software can be implemented using the current technology and within the specified budget and schedule.
- To determine whether the software can be integrated with other existing software.

3.4 Types of Feasibility

3.4.1 Technical Feasibility

Technical feasibility is one of the first studies that must be conducted after the project has been identified. In large engineering projects consulting agencies that have large staffs of engineers and technicians conduct technical studies dealing with the projects. In individual agricultural projects financed by local agricultural credit corporations, the technical staff composed of specialized agricultural engineers, irrigation and construction engineers, and other technicians are responsible for conducting such feasibility studies. The Technical feasibility assessment is focused on gaining an understanding of the present technical resources of the organization and their applicability to the expected needs of the proposed system. It is an evaluation of the hardware and software and how it meets the need of the proposed system. This assessment is based on an outline design of system requirements, to determine whether the company has the technical expertise to handle completion of the project. When writing a feasibility report, the following should be taken to consideration:

- A brief description of the business to assess more possible factors which could affect the study.
- The part of the business being examined.
- The human and economic factor.
- The possible solutions to the problem.

The system must be evaluated from the technical point of view first. The assessment of this feasibility must be based on an outline design of the system requirement in the terms of input, output, programs and procedures. Having identified an outline system, the investigation must go on to suggest the type of equipment, required method developing the system, of running the system once it has been designed. Technical feasibility assesses the current resources (such as hardware and software) and technology, which are required to accomplish user requirements in the software within the allocated time and budget. For this, the software development team ascertains whether the current resources and technology can be upgraded or added in the software to accomplish specified user requirements. A Technical feasibility also performs the following tasks.

- Analyzes the technical skills and capabilities of the software development team members.
- Determines whether the relevant technology is stable and established.
- Ascertains that the technology chosen for software development has a large number of users so that they can be consulted when problems arise or improvements are required.

Technical issues raised during the investigation are:

- Does the existing technology sufficient for the suggested one?
- Can the system expand if developed?

The project should be developed such that the necessary functions and performance are achieved within the constraints. The project is developed within latest technology. Through the technology may become obsolete after some period of time, due to the fact that never version of same software supports older versions, the system may still be used. So there are minimal constraints involved with this project. The system has been developed using PHP the project is technically feasible for development.

3.4.2 Economic Feasibility

The purpose of the economic feasibility assessment is to determine the positive economic benefits to the organization that the proposed system will provide. It includes quantification and identification of all the benefits expected. This assessment typically involves a cost/ benefits analysis.

Economic feasibility is the cost and logistical outlook for a business project or endeavor. Prior to embarking on a new venture, most businesses conduct an economic feasibility study, which is a study that analyzes data to determine whether the cost of the prospective new venture will ultimately be profitable to the company. Economic feasibility is sometimes determined within an organization, while other times companies hire an external company that specializes in conducting economic feasibility studies for them. The developing system must be justified by cost and benefit. Criteria to ensure that effort is concentrated on project, which will give best, return at the earliest. One of the factors, which affect the development of a new system, is the cost it would require. Economic feasibility determines whether the required software is capable of generating financial gains for an organization. In addition, it is necessary to consider the benefits that can be achieved by developing the software. Software is said to be economically feasible if it focuses on the issues listed below.

- Cost incurred on software development to produce long-term gains for an organization.
- Cost required to conduct full software investigation (such as requirements elicitation and requirements analysis).
- Cost of hardware, software, development team, and training.

The following are some of the important financial questions asked during preliminary investigation:

- The costs conduct a full system investigation.
- The cost of the hardware and software.
- The benefits in the form of reduced costs or fewer costly errors.

Since the system is developed as part of project work, there is no manual cost to spend for the proposed system. Economic analysis is the most frequently used method to determine the cost/benefit factor for evalu- ating the effectiveness of a new system. In this analysis we determine whether the benefit is gained 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:

- Development Cost
- Operation Cost

This System is Economically feasible with 0 Development and Operating Charges as it is developed in Qt Framework and Octave which is open source technology and is available free of cost on the internet.

3.4.3 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 satisfy all the requirements.

3.4.4 Technological 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. Automated Building Drawings is technically feasible as it is built up using various open source technologies and it can run on any platform.

3.4.5 Behavioral Feasibility

Behavioral feasibility assesses the extent to which the required software performs a series of steps to solve business problems and user requirements. It is a measure of how well the solution of problems or a specific alternative solution will work in the organization. It is also measure of how people feel about the system. If the system is not easy to operate, than operational process would be difficult. The operator of the system should be given proper training. The system should be made such that the user can interface the system without any problem.

Operational feasibility is a measure of how well a proposed system 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. The operational feasibility assessment focuses on the degree to which the proposed development projects fits in with the existing business environment and objectives with regard to development schedule, delivery date, corporate culture, and existing business processes.

To ensure success, desired operational outcomes must be imparted during design and development. These include such design-dependent parameters such as reliability, maintainability, supportability, usability, producibility, disposability, sustainability, affordability and others. These parameters are required to be considered at the early stages of design if desired operational behaviors are to be realized. A system design and development requires appropriate and timely application of engineering and management efforts to meet the previously mentioned parameters. A system may serve its intended purpose most effectively when its technical and operating characteristics are engineered into the design. Therefore, operational feasibility is a critical aspect of systems engineering that needs to be an integral part of the early design phasesThis feasibility is dependent on human resources (software development team) and involves visualizing whether the software will operate after it is developed and be operative once it is installed. Operational feasibility also performs the following tasks.

- Determines whether the problems anticipated in user requirements are of high priority.
- Determines whether the solution suggested by the software development team is acceptable.
- Analyzes whether users will adapt to a new software.
- Determines whether the organization is satisfied by the alternative solutions proposed by the software development team.

This includes the following questions:

- Is there sufficient support for the users?
- Will the proposed system cause harm?
- The project would be beneficial because it satisfies the objectives when developed and installed. All behavioral aspects are considered carefully and conclude that the project is behaviorally feasible.

3.5 Objectives of Project

- This project can be used in various Universities, schools etc.
- Accept inputs from the user and saves time.
- This can generate the end output (i.e Certificate) in various graphic forms.
- Also used by many Organisations and other sectors for honouring individuals.

Project Design

4.1 Software Requirement Analysis

Software requirement analysis is a process of gathering and interpreting facts, diagnosing problems and the information to recommend improvements on the system. It is a problem solving activity that requires intensive communication between the system users and system developers. System analysis or study is an important phase of any system development process. System analysis is concerned with becoming aware of the problem, identifying the relevant and decisional variables, analyzing and synthesizing the various factors and determining an optimal or at least a satisfactory solution or program of action.

A detailed study of the process must be made by various techniques like interviews, questionnaires etc. The data collected by these sources must be scrutinized to arrive to a conclusion. The conclusion is an understanding of how the system functions. The proposal is then weighed with the existing system analytically and the best one is selected. The proposal is presented to the user for an endorsement by the user. The proposal is reviewed on user request and suitable changes are made. This is loop that ends as soon as the user is satisfied with proposal.

4.1.1 Functional Requirements

- **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 describe the software and non-function requirements of the system.
- **Input Requirements of the System**
    1. Guess points
    2. Precision
    3. User can define his/her requirement.
- **Output Requirements of the System**
    1. Final output in form of Certificates.
    2. Taking bulk input values in form of Csv.

- **Software Requirements**

    1. Language: Libre-Office
    2. Web Languages: php
    3. Documentation: LaTeX
    4. Operating System: Any

4.1.2 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: Processing input should be done in reasonable time i.e. we can say maximum 24 hrs.

- **Users of the System**

    1. Client : Clients are the end users that benefit from this software. They just provide input and gets output.Client of this system:
        (a) Researcher or student

4.2 Flowchart

A flowchart is a type of diagram that represents an algorithm, work flow or process, showing the steps as boxes of various kinds, and their order by connecting them with arrows. Flowcharts are used in designing and documenting simple processes or programs. Like other types of diagrams, they help visualize what is going on and thereby help understand a process, and perhaps also find flaws, bottlenecks, and other less-obvious features within it. There are many different types of flowcharts, and each type has its own repertoire of boxes and notational conventions. The two most common types of boxes in a flowchart are:

1. A processing step, usually called activity, and denoted as a rectangular box.
2. A decision, usually denoted as a diamond.

Following is flowchart of system showing flow of control and Data in the software-:

4.3 DFDs

A data flow diagram (DFD) is a graphical representation of the "flow" of data through an information system, modeling its process aspects. A DFD is often used as a preliminary step to create an overview of the system, which can later be elaborated. DFDs of DoS is as following-:

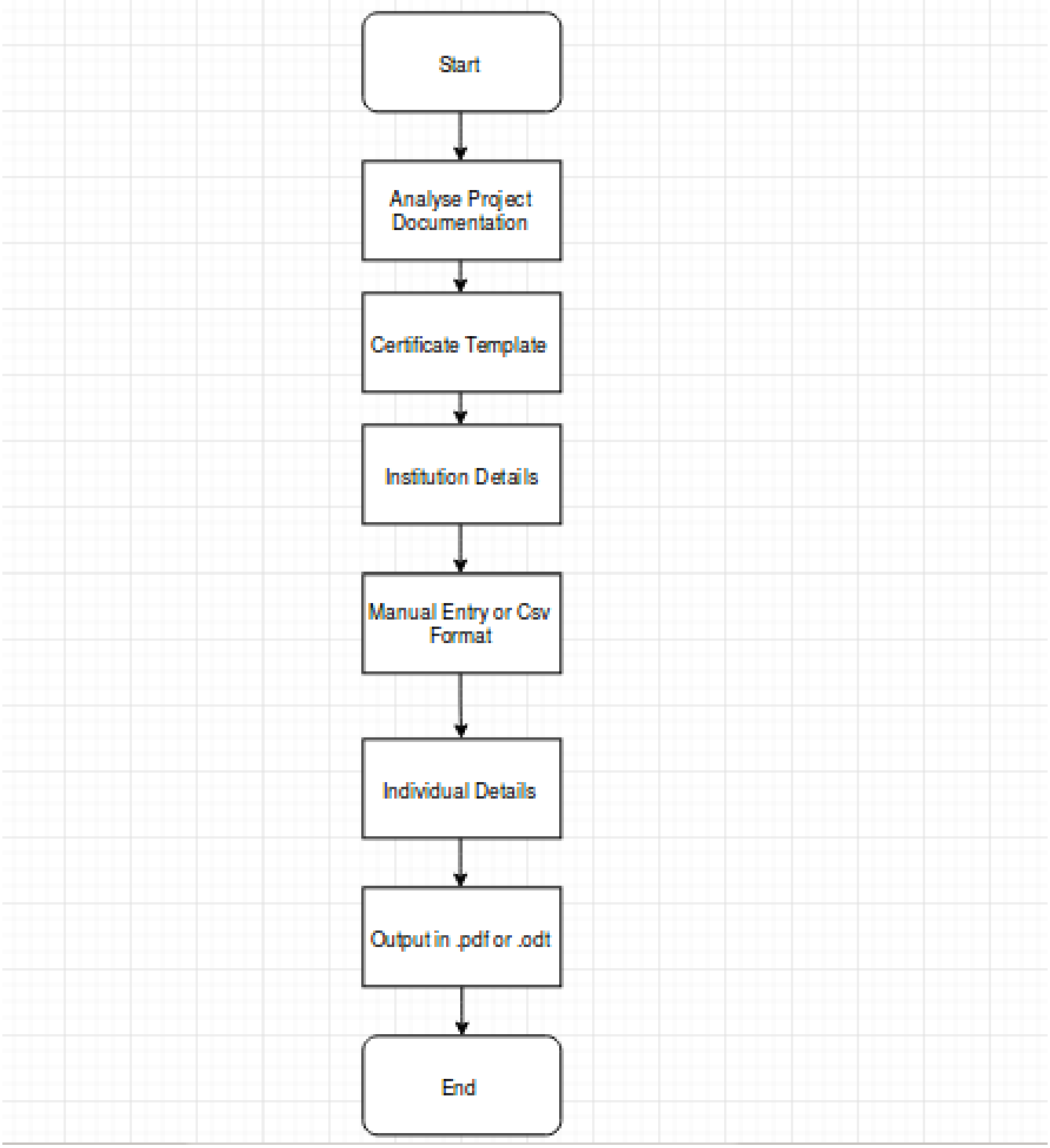

Figure 4.1: Flowchart of project

1. Data flow LEVEL 0 figure 4.2
2. Data flow LEVEL 1 figure 4.3
3. Data flow LEVEL 2 figure 4.4

Here, In figure 4.2 figure 4.3 and figure 4.4

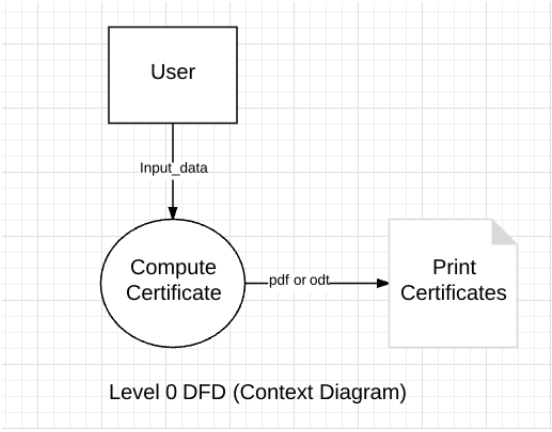

Figure 4.2: Data flow LEVEL 0

1. Institute details represent all initial input value
2. odt is the built-in file format in Ubuntu.
3. pdf is the portable document format.

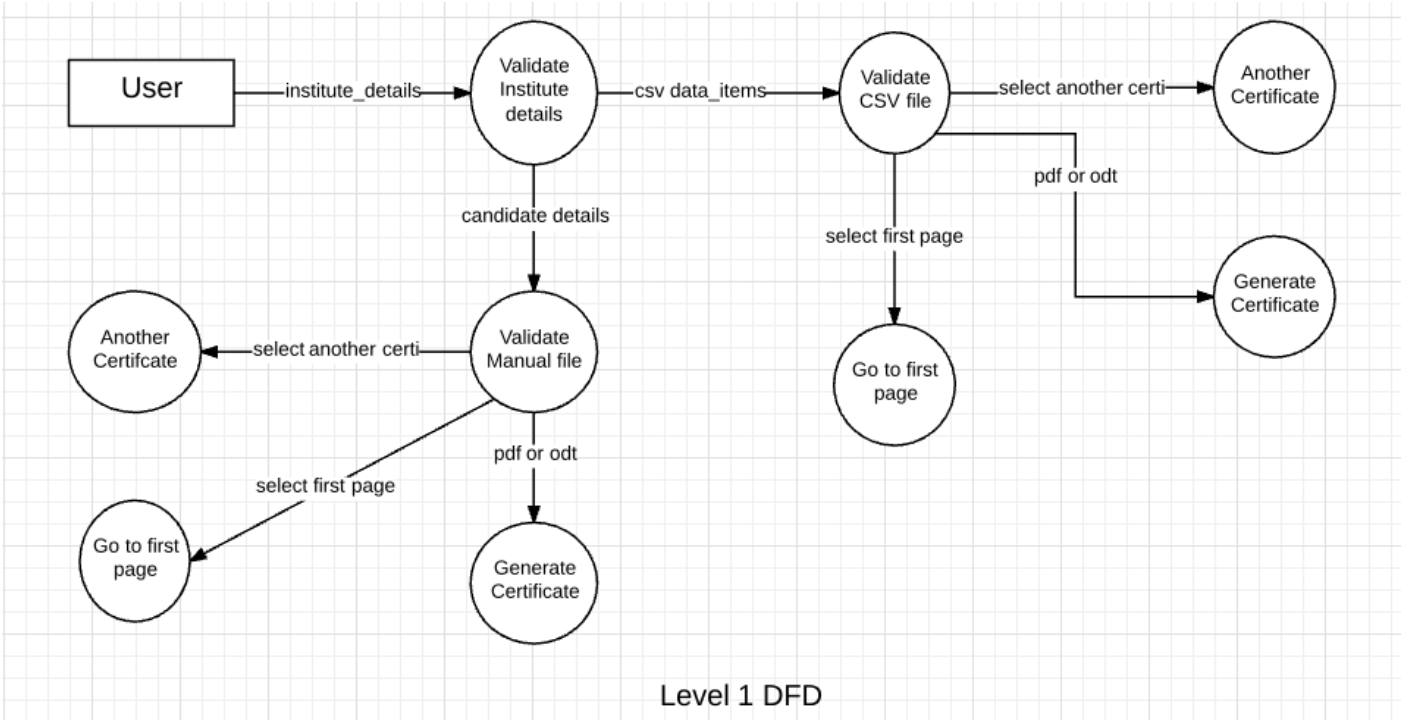

Figure 4.3: Data Flow LEVEL 1

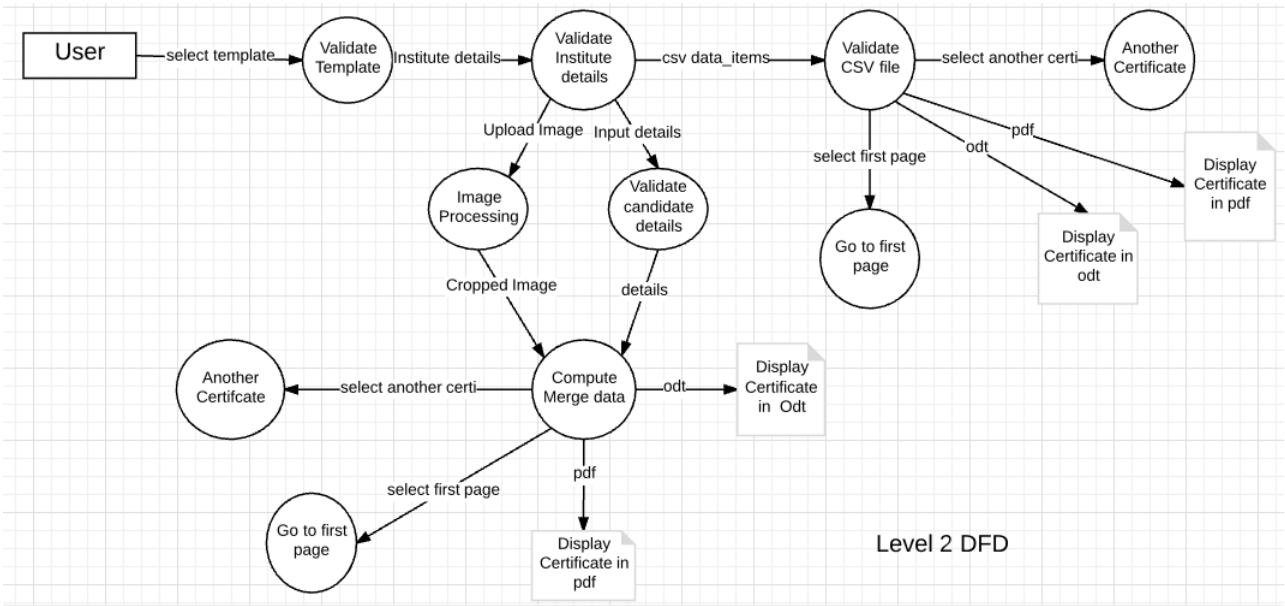

Figure 4.4: Data Flow LEVEL 2

Development and Implementation

5.1 Introduction to Languages

Front End languages are language that are used to give better user experince and user interface. These mainly include HTML, CSS, PHP. Some Frameworks like Bootstrap are also used with these basic languages.

5.1.1 HTML

Figure 5.1: HTML5 logo

HyperText Markup Language, commonly referred to as HTML, is the standard markup language used to create web pages. Along with CSS, and HTML is a cornerstone technology, used by most websites to create visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications.
Web browsers can read HTML files and render them into visible or audible web pages. HTML describes the structure of a website semantically along with cues for presentation, making it a markup language, rather than a programming language.
HTML elements form the building blocks of all websites. HTML allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items.

5.1.2 CSS

Cascading Style Sheets (CSS) is a style sheet language used for describing the presentation of a document written in a markup language.Although most often used to set the visual style of web pages and user interfaces written in HTML and XHTML, the language can be applied to any XML document, including plain XML, SVG and XUL, and is applicable to rendering in speech, or on other media.
Along with HTML and JavaScript, CSS is a cornerstone technology used by most websites to create

Figure 5.2: CSS logo

visually engaging webpages, user interfaces for web applications, and user interfaces for many mobile applications.
CSS is designed primarily to enable the separation of document content from document presentation, including aspects such as the layout, colors, and fonts.
This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple HTML pages to share formatting by specifying the relevant CSS in a separate .css file, and reduce complexity and repetition in the structural content, such as semantically insignificant tables that were widely used to format pages before consistent CSS rendering was available in all major browsers.
CSS makes it possible to separate presentation instructions from the HTML content in a separate file or style section of the HTML file. For each matching HTML element, it provides a list of formatting instructions

5.1.3 PHP

Figure 5.3: PHP logo

What is PHP?

- PHP is an acronym for "PHP: Hypertext Preprocessor"
- PHP is a widely-used, open source scripting language
- PHP scripts are executed on the server
- PHP is free to download and use

What is a PHP File?

- PHP files can contain text, HTML, CSS, JavaScript, and PHP code
- PHP code are executed on the server, and the result is returned to the browser as plain HTML
- PHP files have extension ".php"

What Can PHP Do?

- PHP can generate dynamic page content
- PHP can create, open, read, write, delete, and close files on the server
- PHP can collect form data
- PHP can send and receive cookies
- PHP can add, delete, modify data in your database
- PHP can be used to control user-access
- PHP can encrypt data

Why PHP?

- PHP runs on various platforms (Windows, Linux, Unix, Mac OS X, etc.)
- PHP is compatible with almost all servers used today (Apache, IIS, etc.)
- PHP supports a wide range of databases
- PHP is free. Download it from the official PHP resource: www.php.net
- PHP is easy to learn and runs efficiently on the server side

5.2 Introduction to CGS

User Manual

It could also deal with CSV Format. CSV(Character Separated File) is a simple file format used to store tabular data, such as a spreadsheet or database. Files in the CSV format can be imported to and exported from programs that store data in tables, such as Microsoft Excel or OpenOffice CAs the Name "Certificate Generation System" Implies this application is used to generate certificate in an automated manner in few steps:

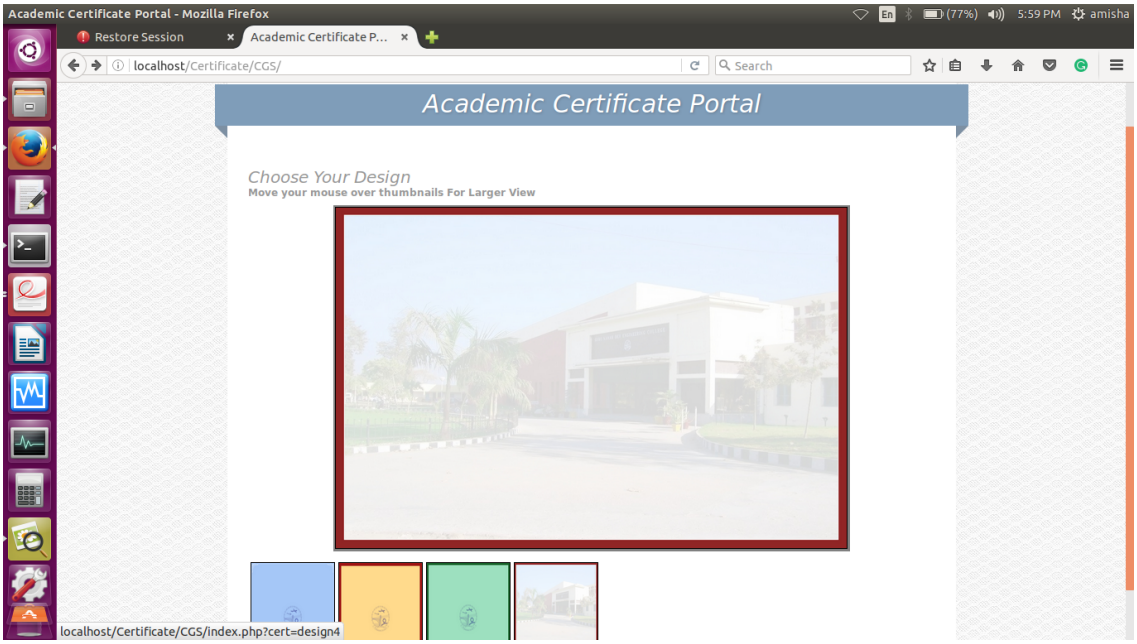

Figure 5.4: Academic Portal

1. Select Design from the images shown on the first page. (Put mouse pointer over the image to see larger view.)

2. Next Page will be page for entering College Details.

   - Fill in the details of institution for which the certificate(s) is to be made.

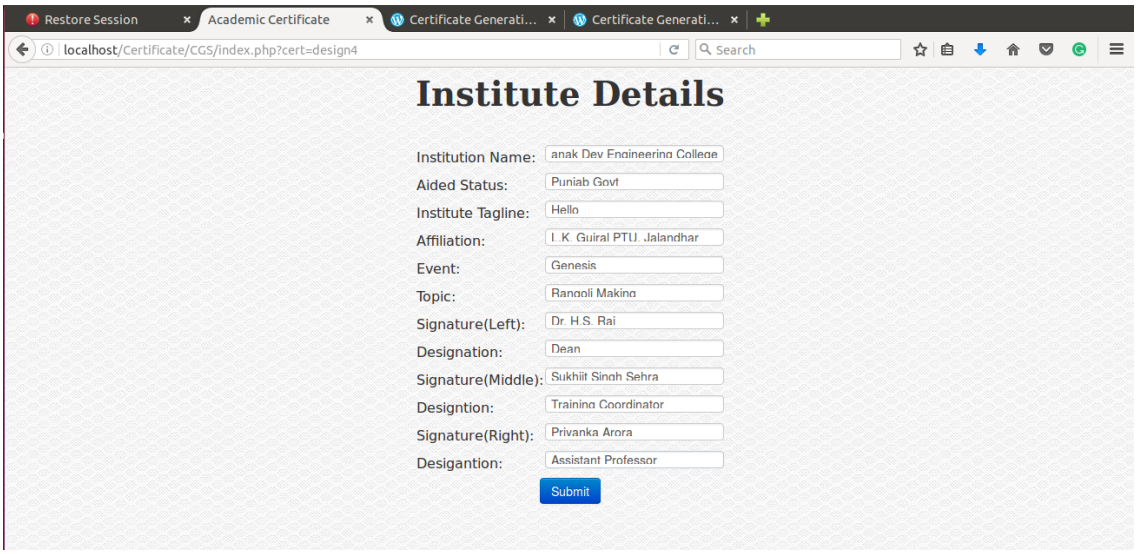

Figure 5.5: Institute Details

   - Place mouse pointer over Input box te see an example for that input.

3. Next page will show two options

- Manual Entry -> Select it for Generating Certificate for Single candidate.
- Upload Csv File -> Select it for Generating certificate for more than 1 candidate by providing their details in Csv file.

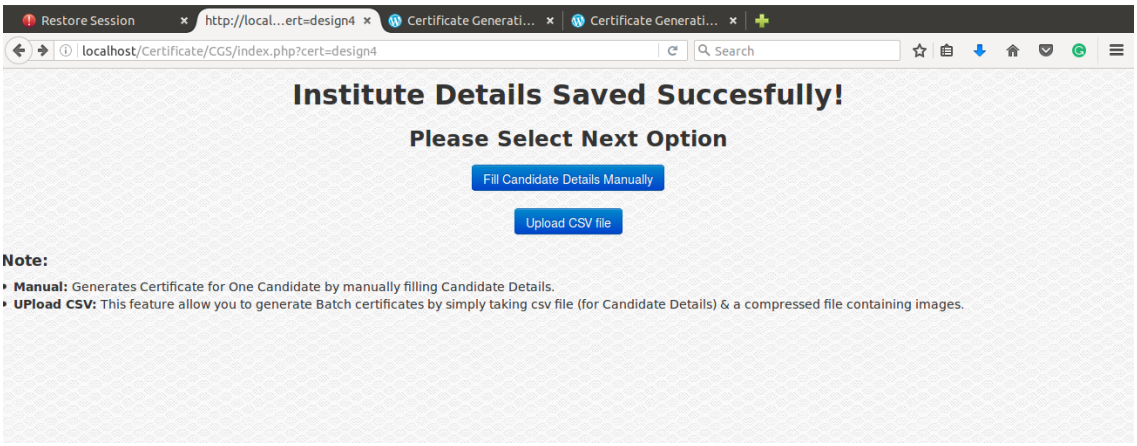

Figure 5.6: Select Manual Option

5.3 Installation and Setup

Manual Filling

- On Selecting Manual Entry Next page will open containing input boxes for candidate Details.
- Enter the details and select the image also.

Also by clicking on "Generate Another Ceritificate" you can generate another certificate with same design & institute details and different Candidate Details. And by clicking on "Goto First Page" you can again start from Design Selection Page.

- On Selecting Manual Entry Next page will open containing input boxes for candidate Details.
- Enter the details and select the image also.
- Live Image Selector
- Next you will be displayed your selected image and a selection box.
- Resize and move the selection box to desired position and size.

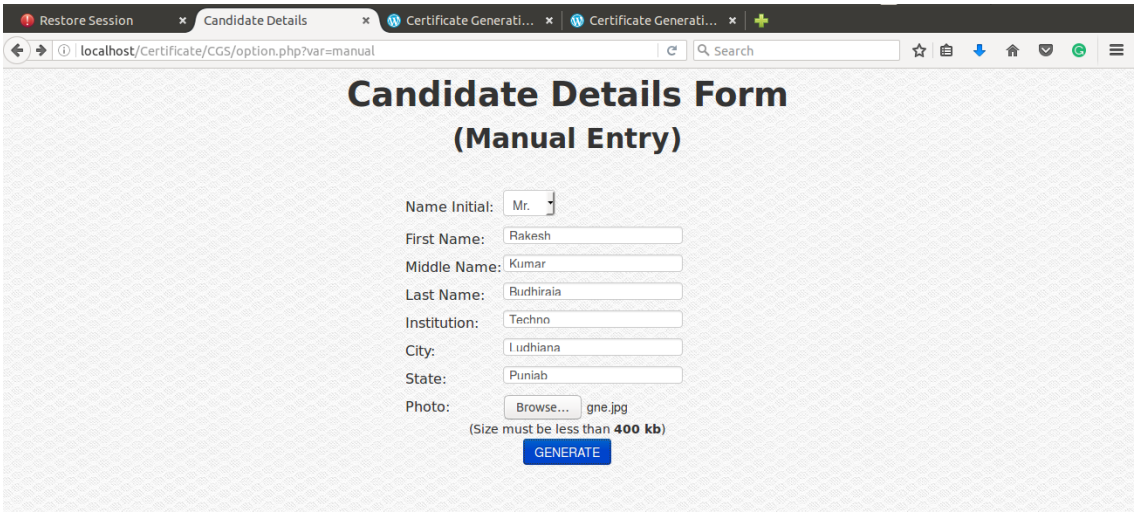

Figure 5.7: Candidate Details Form

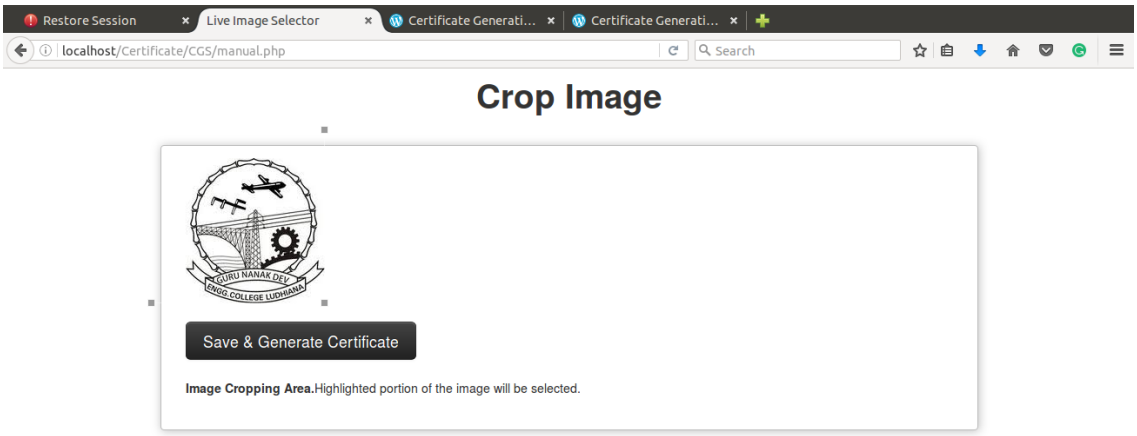

Figure 5.8: Crop Image

Csv Format

1. On selecting 'Upload csv File' Next page will open containing the conditions for the files to be uploaded for certificate generation.
2. A sample file can be downloaded from the link provided in the 'Note' in the instructions on page.
3. Sample file is a zip file named sample.zip containing the csv file and .zip file for images.
4. Extract it and then sample certificates can be produced using 'sample.csv' and 'images.zip' files.
5. That's it your certificate file is produced for all the candidates provided in the csv data file.

Download

That's it your certificate file is produced for all the candidates provided in the csv data file. The final result i.e Certificate can be saved in more than one format:

- pdf (portable document format)
- Any other format eg. odt etc.

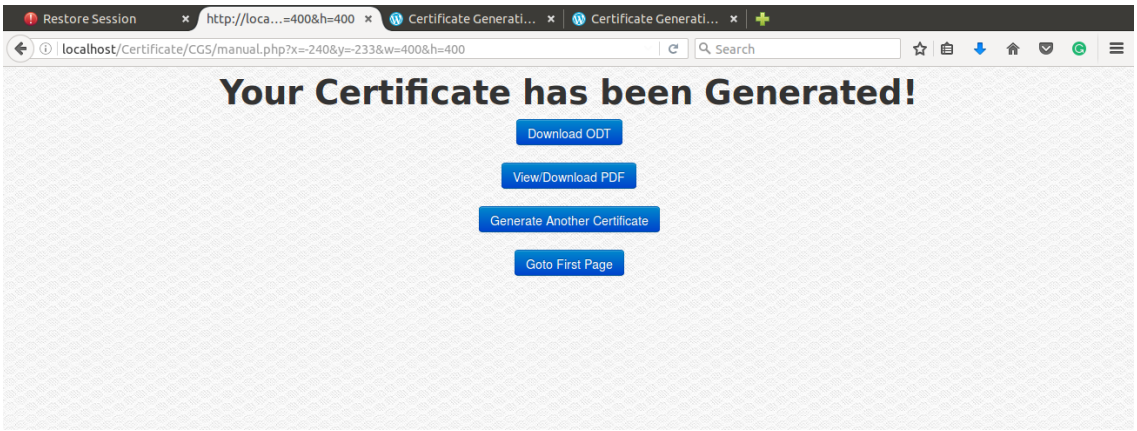

Figure 5.9: Download Certificate

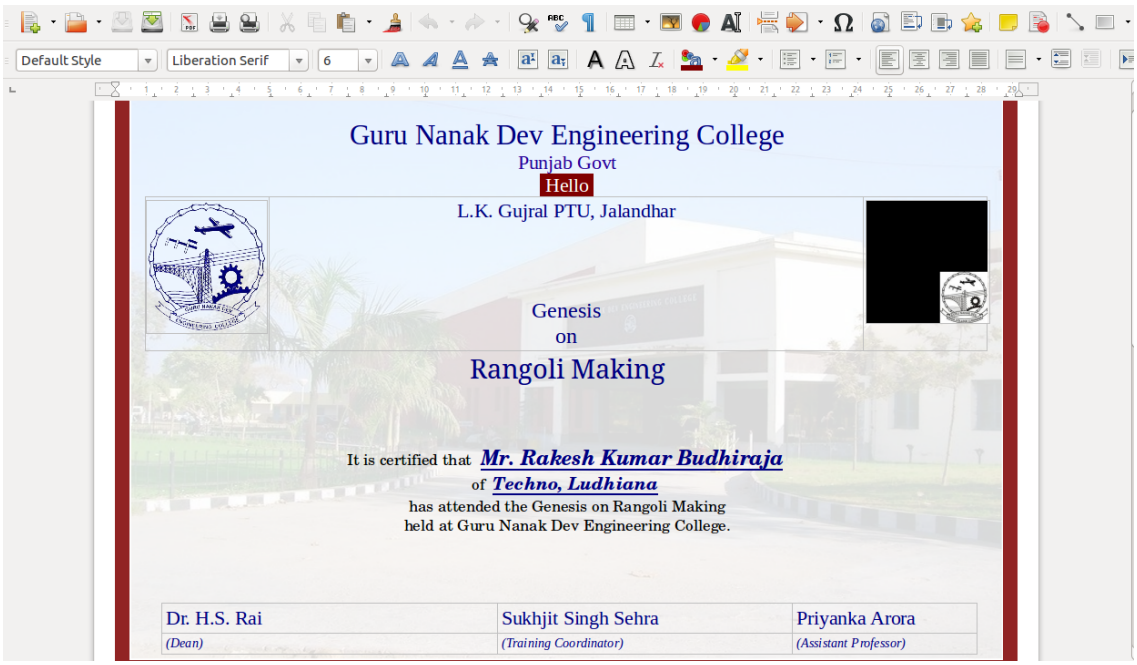

Figure 5.10: Certificate odt file

Next page will open containing the conditions for the files to be uploaded for certificate generation. A sample file can be downloaded from the link provided in the 'Note' in the instructions on page. Sample

Figure 5.11: Certificate pdf file

Figure 5.12: Choose csv Option

file is a zip file named sample.zip containing the csv file and tar.gz file for images.

Extract it and then sample certificates can be produced using 'sample.csv' and 'images.tar.gz' files.

-> odt ('O'penOffice 'D'ocument 'T'ext)

-> pdf ('P'ortable 'D'ocument 'F'ormat)

The result of the csv file certificates are like below:

These certificates sizes can be arranged accordingly.

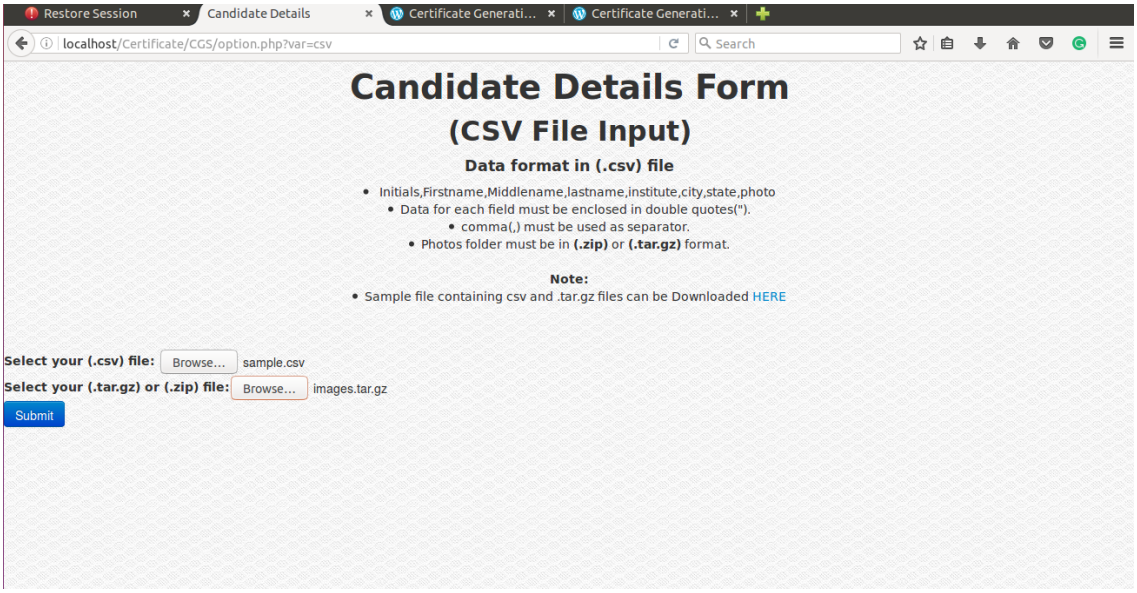

Figure 5.13: Candidate Details Form

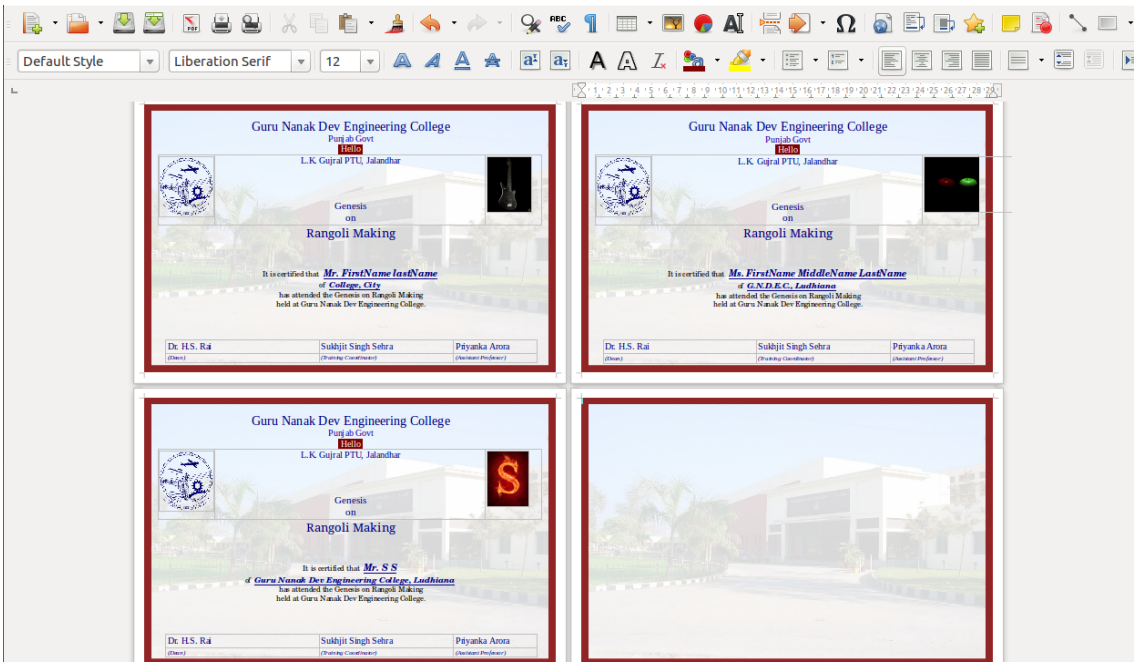

Figure 5.14: Odt file through csv

Testing

Testing a program consists of providing the program with a set of test inputs (or test cases) and observing if the program behaves as expected. If the program fails to behave as expected, then the conditions under which failure occurs are noted for later debugging and correction.

This software had been taken through rigorous test to fully found potential causes of error and system failure and full focus have been given to cover all possible exceptions that can occur and cause failure of the software. As this software is based on intensive background process it have been taken care that if correct input and email address are given then processing of user job can even continue or a least automatically restart even after server shuts down or even crash.

Test cases for main page(index.php)			
Input	Desired Output	Actual Output	Status
Any one or more field left empty	Alert user about range. Don't proceed	Alert user about range. Don't proceed	Pass
Enter Invalid characters(like numbers)	Alert user about Invalid Characters	Alert user about Invalid Characters Entered	Pass
All details entered	Show success message	Show success message	Pass
Click Submit button	Direct to manual or csv page	Direct to manual or csv page	Pass
Reload page	Empty all textfields	Empty all textfields	Pass
Parameters on URL	Template should be passed	Template should be passed	Pass

Table 6.1: Tests for Institution Details Page

Test cases for manual fill(option.php)			
Input	Desired Output	Actual Output	Status
Any one or more field left empty	Alert user about range. Don't proceed	Alert user about range. Don't proceed	Pass
Enter Invalid characters(like numbers)	Alert user about Invalid Characters	Alert user about Invalid Characters Entered	Pass
Parameters on URL	variable as manual	variable as manual	Pass
Autofilling of Name Initial	Show message, redirect to homepage	Show message, redirect to homepage	Pass
Input range exceeds or not filled	Show error message	Show error message	Pass
Select Image	Upload image of limited size	Upload image of limited size	Pass
Click Submit button	Resize image	Resize image	Pass
After Crop Image	Options to view certificates	Options to view Certificates	Pass
Generate Another Certificate: Yes	Direct to manual page	Direct to manual page	Pass
Go to first page: Yes	Direct to index.php	Direct to index.php	Pass

Table 6.2: Tests for manual fill

Test cases for csv fill(option.php)			
Input	Desired Output	Actual Output	Status
Browse CSV file	Upload file of particular format(like .csv)	Upload file of particular format(like .csv)	Pass
Images of receiptant	Upload compressed file	Upload compressed file	Pass
Input range exceeds or not filled	Show error message	Show error message	Pass
Wrongly formatted CSV file	Give error message with Possible errors	Give error message with Possible errors	Pass
Sample Available	Correct format sample compressed	Correct format sample compressed	Pass
Parameters on URL	variable as csv	variable as csv	Pass
Generate Another Certificate: Yes	Direct to manual page	Direct to manual page	Pass
Go to first page: Yes	Direct to index.php	Direct to index.php	Pass

Table 6.3: Tests for csv upload page

Test cases for possible source of problems			
Input	Desired Output	Actual Output	Status
URL refreshed	Send to homepage	Send to homepage	Pass
server stops or rebooted	Start processing interrupted requests	Start processing interrupted requests	Pass

Table 6.4: Test case (general)

Conclusion and Future Scope

7.1 Summary

Certificate Generation System is a portable application used to Generate Certificate for single candidate providing his/her details.This project provides a more general development in the setting of abstract interpretation, showing the scalability of CGS. This project is completely open source and the entire code is available to the user as and when required. There is Complete developerâĂŹs Documentation as well as User manual alongwith it that helps using it a lot easier.

7.2 Future Scope

This project aims at developing a certificate generation system which can be used in universities to automate the distribution of digitally verifiable student result mark sheets.
The certificate generation system is flexible for generating progress reports of students. this application is mainly based on the database technology. the system is targeted to small enterprises, schools, colleges and universities. it can produce sophisticated ready-to-use Certificates, which could be created and will be ready to print.

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