

भारतीय सूचना प्रौद्योगिकी संस्थान भागलपुर
Indian Institute of Information Technology
Bhagalpur

SOFTWARE ENGINEERING PROJECT

ON

EMPLOYEE LEAVE MANAGEMENT SYSTEM

Project 2

Submitted to

Department of Computer Science & Engineering

IIIT BHAGALPUR, BIHAR 813210, INDIA

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Certificate

This is to certify that the group of following students of 3rd year 5th semester in the Branch of Computer Science and Engineering has successfully completed a project entitled " EMPLOYEE LEAVE MANAGEMENT SYSTEM " under the guidance of Dr. Biswajit R. Bhowmik during the academic year 2019-2020. The project had been prescribed towards automation of the existing system at the Institute and for consideration in partial fulfilment of the Software Engineering course curriculum of the Institute leading to the award of semester examination of July - December 2019.

The project work is originally carried out by them, a bona fide work of them, and may be considered as their mark of proficiency at the beginning level in Software Development.

Project Members

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1. INTRODUCTION

In the existing paper work related to leave management, leaves are maintained using the attendance register for staff. The staff needs to submit their leaves manually to their respective authorities. This increases the paperwork & maintaining the records becomes tedious. Maintaining notices in the records also increases the paperwork. The main objective of the proposed system is to decrease the paperwork and help in easier record maintenance by having a centralized Database System, where Leaves and Notices are maintained. The proposed system automates the existing system. It decreases the paperwork and enables easier record maintenance. It also reduces chances of Data loss.

1.1 DOCUMENT SCOPE AND PURPOSE

This document provides a description of the technical design for Employee Leave Management System of Indian Institute of Information Technology. This document provides an architectural overview of the system to depict different aspects of the system. This document also functions as a foundational reference point for developers.

1.2 TARGET AUDIENCE

This document is targeted (but not limited) to technical stakeholders:

- Development Team
- Clients
- Support Staff

It is assumed that the reader has a technical background in software design and development.

2. REQUIREMENT ANALYSIS

2.1 SYSTEM REQUIREMENT

- Development: Python3 + HTML + CSS + JavaScript
- Unit Test: unittest(Python)
- Diagrams: Lucid Chart
- Database Management: Adminer
- Database: PostgreSQL
- Server: Python Server
- Discussion: WhatsApp Groups

2.2 SOFTWARE REQUIREMENTS

2.2.1 PYTHON3

Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. It was created by Guido van Rossum during 1985- 1990. Like Perl, Python source code is also available under the GNU General Public License (GPL). Python is named after a TV Show called "Monty Python's Flying Circus" and not after Python-the snake.

Python is a MUST for students and working professionals to become a great Software Engineer specially when they are working in Web Development Domain. Following are important characteristics of python –

- It supports functional and structured programming methods as well as OOP.
- It can be used as a scripting language or can be compiled to byte-code for building large applications.
- It provides very high-level dynamic data types and supports dynamic type checking.
- It supports automatic garbage collection.
- It can be easily integrated with C, C++, COM, ActiveX, CORBA, and Java.

2.2.2 PYTHON3 LIBRARIES

2.2.2.1 *Flask*:

Flask is a lightweight WSGI web application framework. It is designed to make getting started quick and easy, with the ability to scale up to complex applications. Flask offers suggestions but doesn't enforce any dependencies or project layout. It is up to the developer to choose the tools and libraries they want to use. There are many extensions provided by the community that make adding new functionality easy.

2.2.2.2 *SMTPLib*:

SMTPLib module of python defines an SMTP client session object that can be used to send mail to any Internet machine with an SMTP or ESMTP listener daemon. An SMTP object has an instance method called “SENDMAIL”, which is used to do the work of mailing a message.

2.2.2.3 *SQLAlchemy*:

SQLAlchemy is the Python SQL toolkit and Object Relational Mapper that gives application developers the full power and flexibility of SQL. SQLAlchemy provides a full suite of well-known enterprise-level persistence patterns, designed for efficient and high-performing database access, adapted into a simple and Pythonic domain language.

2.2.2.4 *Psycopg2*:

Psycopg is the most popular PostgreSQL database adapter for the Python programming language. Its main features are the complete implementation of the Python DB API 2.0 specification and the thread safety. It was designed for heavily multi-threaded applications that create and destroy lots of cursors and make a large number of concurrent “INSERT(s)” or “UPDATE(s)”.

2.2.3 HEROKU

Heroku is a container-based cloud Platform as a Service (PaaS). Developers use Heroku to deploy, manage, and scale modern apps. Its platform is elegant, flexible, and easy to use, offering developers the simplest path to getting their apps to market.

Heroku is fully managed, giving developers the freedom to focus on their core product without the distraction of maintaining servers, hardware, or infrastructure. The Heroku experience provides services, tools, workflows, and polyglot support—all designed to enhance developer productivity.

2.2.4 POSTGRESQL

PostgreSQL is a general purpose and object-relational database management system, the most advanced open source database system. It allows you to add custom functions developed using different programming languages such as C/C++, Java, etc.

PostgreSQL was designed to be extensible. In PostgreSQL, one can define his own data types, index types, functional languages, etc. It requires very minimum maintained efforts because of its stability. Therefore, if a person develop applications based on PostgreSQL, the total cost of ownership is low in comparison with other database management systems.

2.3 HOW TO INSTALL PYTHON3 AND ITS LIBRARIES

2.3.1 Installation In UBUNTU

- Open terminal via Ctrl+Alt+T or searching for “Terminal” from app launcher. When it opens, run command to add the PPA:
 - `sudo add-apt-repository ppa:jonathonf/python-3.6`
- Then check updates and install **Python 3.6** via commands:
 - `sudo apt-get update`
 - `sudo apt-get install python3.6`
- Use the following command to install **pip** for Python 3:
 - `sudo apt install python3-pip`
- Once the installation is complete, verify the installation by checking the pip version:
 - `pip3 --version`
- Now install the **python3-venv** package that creates a virtual environment using the following command:
 - `sudo apt install python3-venv`
- Start by navigating to the directory where you would like to store your Python 3 virtual environments. It can be your home directory or any other directory where your user has read and write permissions. Create a new directory for your Flask application and navigate into it:
 - `mkdir my_flask_app`
 - `cd my_flask_app`
- Once inside the directory, run the following command to create your new virtual environment:
 - `python3 -m venv venv`
- To start using this virtual environment, you need to activate it by running the **activate** script:
 - `source venv/bin/activate`
- Now that the virtual environment is activated, you can use the Python package manager pip to install **Flask**:
 - `pip install Flask`
- Verify the installation with the following command which will print the Flask version:
 - `python -m flask --version`
- Similarly install **SMPTLib**, **SQLAlchemy**, **Psycopg2** and the other basic python libraries required for the development of a web application.

2.3.2 Installation In WINDOWS

- Go to the <https://visualstudio.microsoft.com/downloads> page to install Visual Studios for free.
- In the installer, select the Python development workload.
- Open Visual Studio 2019.
- On the start screen, select **Create a new project**.
- In the **Create a new project** dialog box, enter "Python web" in the search field at the top, choose **Web Project** in the middle list, then select **Next**.
- If you don't see the Python project templates, run the **Visual Studio Installer**, select **More > Modify**, select the **Python development** workload, then choose **Modify**.
- In the **Configure your new project** dialog that follows, enter "HelloPython" for **Project name**, specify a location, and select **Create**. (The **Solution name** is automatically set to match the **Project name**.)
- The new project opens in **Solution Explorer** in the right pane. The project is empty at this point because it contains no other files.
- Expand the **Python Environments** node in the project to see the default environment for the project.
- Right-click the environment and select **Manage Python Packages...**. This command opens the **Python Environments** window on the **Packages (PyPI)** tab.
- Enter "flask" in the search field. If **Flask** appears below the search box, you can skip this step. Otherwise select **Run command: pip install flask**. Accept any prompts for administrator privileges and observe the **Output** window in Visual Studio for progress. (A prompt for elevation happens when the packages folder for the global environment is located within a protected area like *C:\Program Files*.)
- Similarly install **SMPTLib**, **SQLAlchemy**, **Psycopg2** and the other basic python libraries required for the development of a web application.
- Once installed, the library appears in the environment in **Solution Explorer**, which means that you can make use of it in Python code.

3. DESIGN

3.1 DESIGN APPROACH

The design approach used here is based on the following:

- I. **DATA FLOW DESIGN**: The data flow of the *Employee Leave Management System* is Internet-based.
- II. **ARCHITECHTURE DESIGN**: The *Employee Leave Management System* is developed with the help of Python3 using Flask, SMPTLib, SQLAlchemy and some other basic python libraries. The database used is PostgreSQL, and the web application is deployed through Heroku.
- III. **UI DESIGN**: The *Employee Leave Management System* uses HTML, CSS and JavaScript at the Front End. It has been made such that the web application is very user friendly and all the functions present will make the life of employees easier.

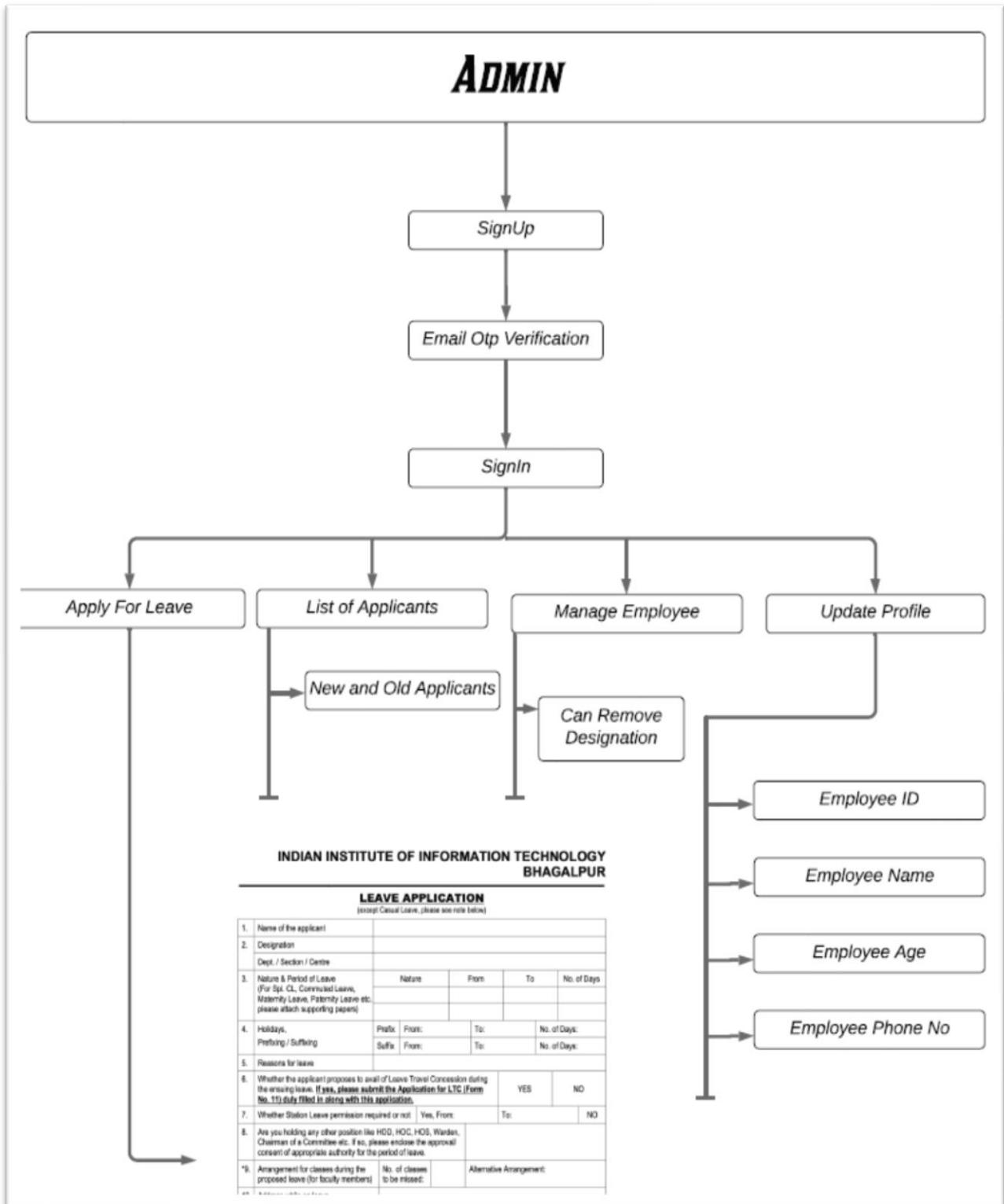
3.2 DESIGN PATTERNS

This application is designed as an object-oriented system for an Internet-based architecture by factoring application classes into the following layers:

- I. **THE PRESENTATION LAYER**: This is the layer where the physical window and widget objects live. Any new user interface widgets developed for this application are put in this layer.
- II. **THE DOMAIN MODE**: Most objects identified in the OO analysis and design will reside. To a great extent, the objects in this layer can be application-independent. Generic objects may be used in this application to reap the benefits of Object Oriented programming.
- III. **THE DATA LAYER**: The data is managed by PostgreSQL.

3.3 FLOW CHARTS

3.3.1 Activity Diagram for ADMINS



Date : _____
Remarks and/or recommendation of HOD/MOB/HOD/Registrar

Signature of the Applicant
Emp. No.: _____

Date : _____
Designation : _____
Dept./Section/Centre : _____

Signature

- Note: 1. All kinds of leave, except Casual Leave should be applied in the form and forwarded to Admin./Faculty Affairs after recommendation of the concerned HODs/MOBs/HODs. Casual Leave should be applied in the CC. Card maintained in the respective Dept./Section/Centre.
2. In case the leave is required for Project related work, please mention the Project No. at the top of the application and forward to Dean, R&D through the concerned HOD/MOB/HOD.
3. If the proposed leave is during the semester period, please furnish the details of alternate arrangement for the missed classes.

FOR OFFICE USE

Certified that the following leave is admissible to:

Name of the applicant	Dr. / Mr. / Ms. :		
Designation			
Dept. / Section / Centre			
Nature and period of leave admissible	Nature	From	To
Holidays Prefixing / Suffixing	Prefix		
	Suffix		
Station Leave	From :	To :	No. of Days :
Balance of leave as on	Vacation Leave	Days	
	Earned Leave	Days	
	Half Pay Leave	Days	
No. of Special Casual Leave already availed in	Days		

Leave as above may be approved:

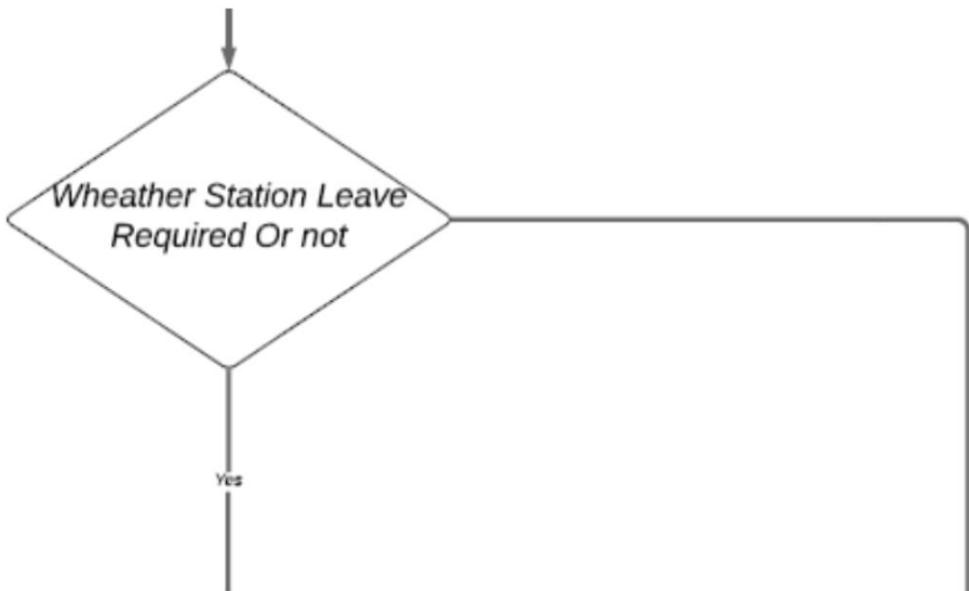
Signature of the dealing officer

Approval of Sanctioning Authority:

Signature of the Sanctioning Authority

Please return to HOS (Admn. / Faculty Affairs)

Wheather Station Leave
Required Or not



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STATION LEAVE PERMISSION

This is to inform you that I am proceeding on leave w.e.f. (FN / AN) and will be out of station till.....(FN/AN)

Address during leave:

Contact Phone No. (If any)

Date: Signature of the employee:

Name: Emp. No.:

Designation: Dept./Sec./Centre:

Recommended / Not Recommended
HOD / ADMINISTRATION / FACULTY AFFAIRS

Director

No

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Re-JOINING REPORT

This is to inform you that I have re-joined duty on (FN/ AN) after availing leave from to (FN / AN)

Date: Signature of the employee:

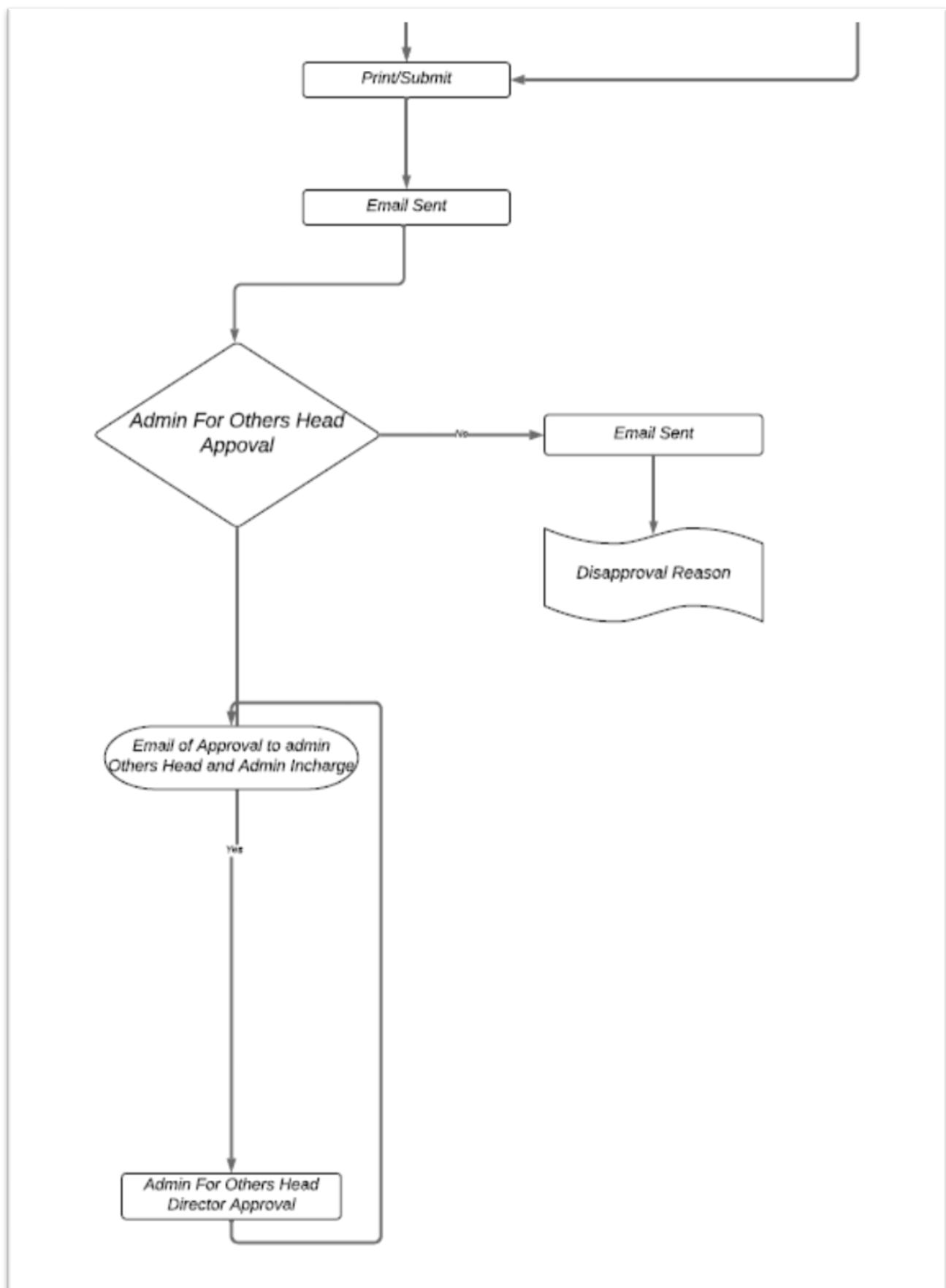
Name: Emp. No.:

Designation: Dept./Sec./Centre:

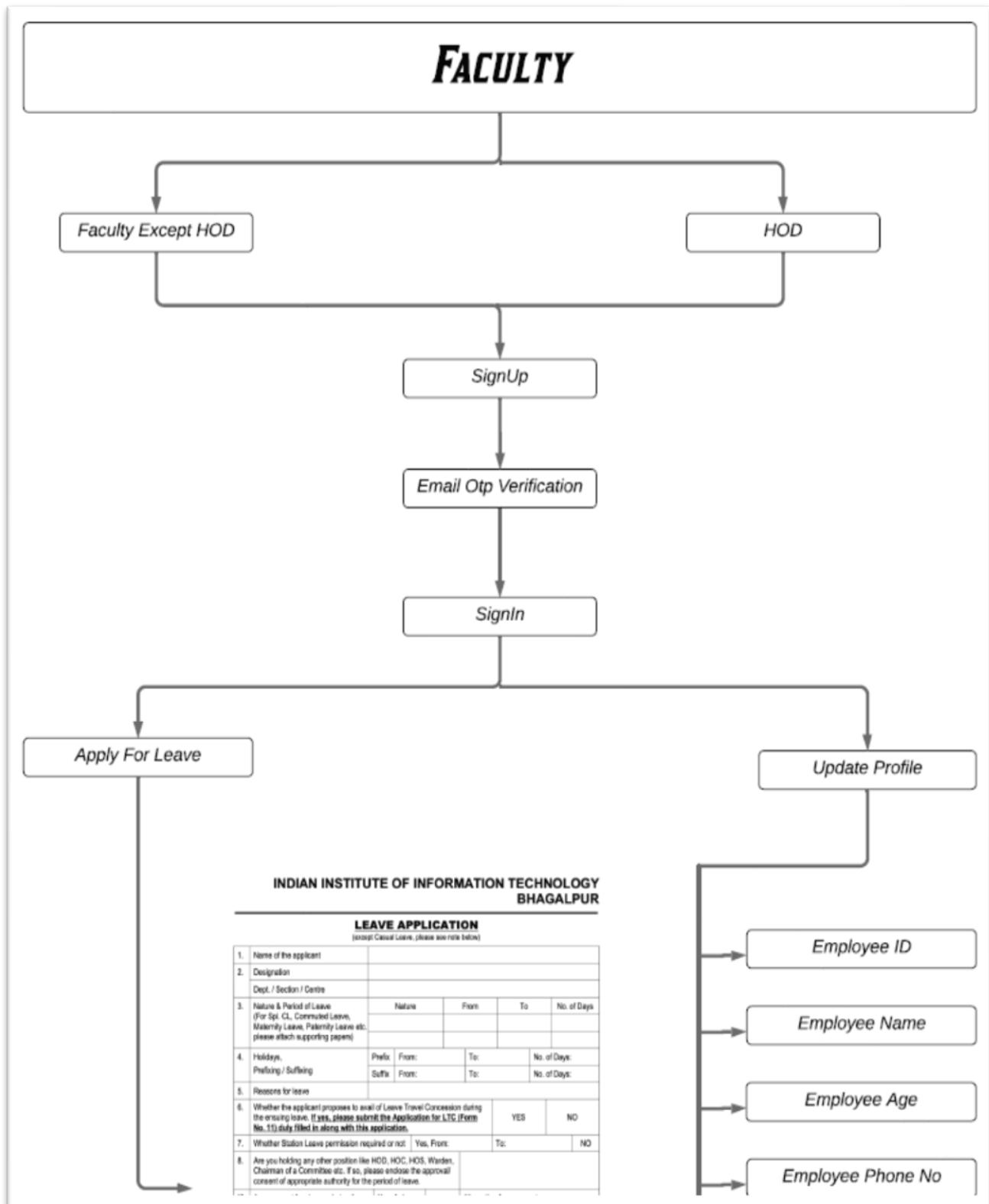
Recommended / Not Recommended
HOD / ADMINISTRATION / FACULTY AFFAIRS

Director

Print/Submit



3.3.2 Activity Diagram for FACULTIES



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Name of the applicant	Dr. / Mr. / Ms.:			
Designation				
Dept. / Section / Centre				
Nature and period of leave admissible	Nature	From	To	No. of Days
Holidays Prefixing / Suffixing	Prefix			
	Suffix			
Station Leave	From :	To :	No. of Days :	
Balance of leave as of	Vacation Leave		Days	
	Earned Leave		Days	
	Half Pay Leave		Days	
No. of Special Casual Leave already availed in	Days			

Leave as above may be approved:

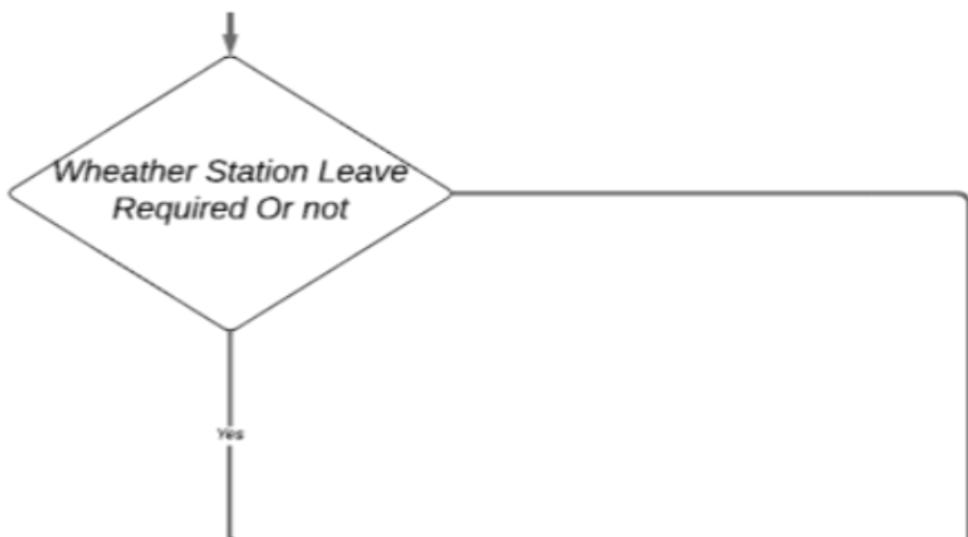
Signature of the dealing officials

Approval of Sanctioning Authority:

Signature of the Sanctioning Authority

Please return to HOS (Admin. / Faculty Affairs)

**Wheather Station Leave
Required Or not**



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This is to inform you that I am proceeding on leave w.e.f.(FN/AN) and will be out of station till.....(FN/AN)

Address during leave:

Contact Phone No. (If any)

Date: Signature of the employee:

Name: Emp. No.:

Designation: Dept./Sec.Centre:

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Director

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Date: Signature of the employee:

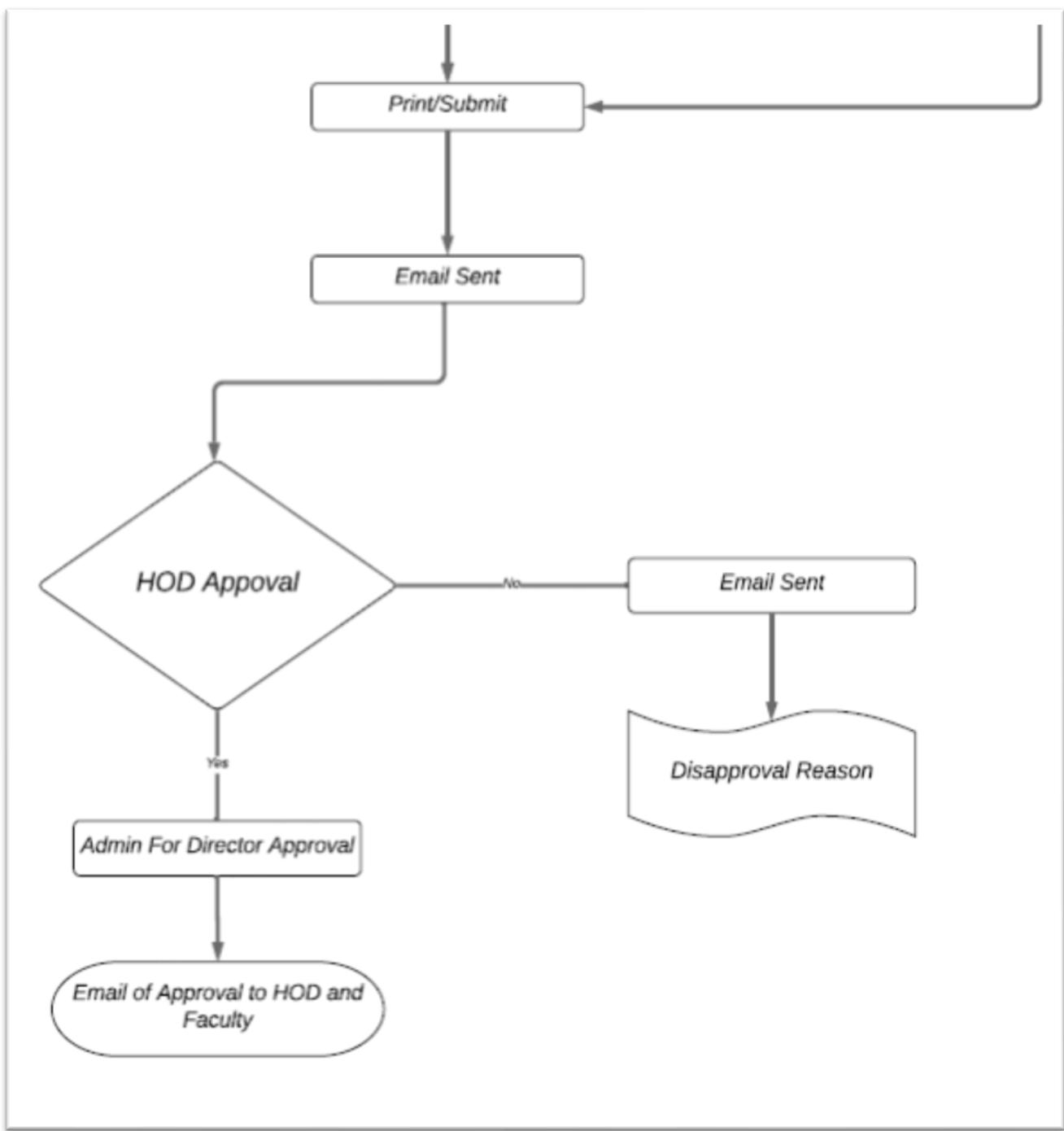
Name: Emp. No.:

Designation: Dept./Sec.Centre:

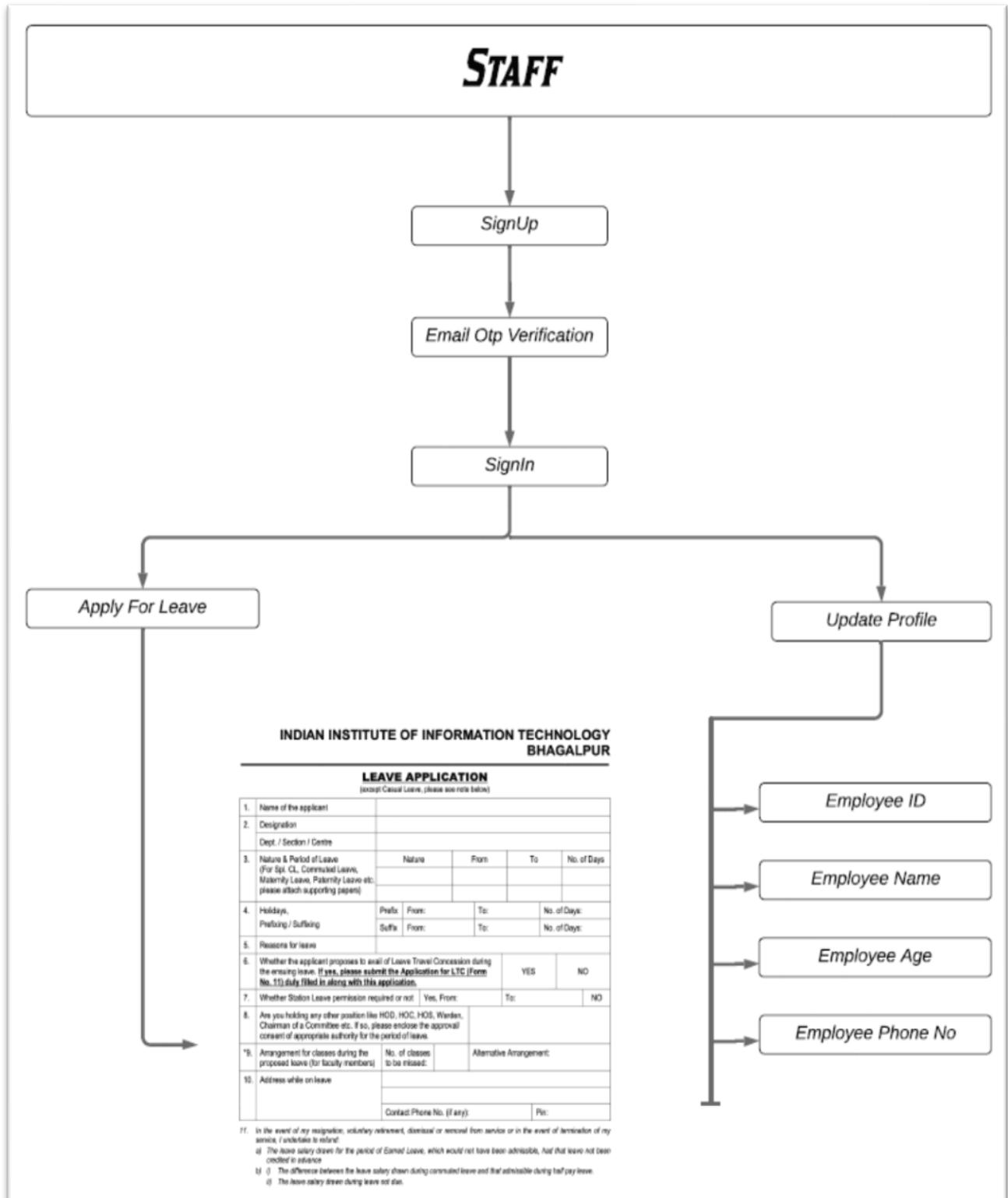
Recommended / Not Recommended
HOD / ADMINISTRATION / FACULTY AFFAIRS

Director

Print/Submit



3.3.3 Activity Diagram for STAFFS



Date : _____
Remarks and/or recommendation of HOD/HOB/HOC/Register

Signature of the Applicant
Emp. No.: _____

Date : _____
Designation : _____
Dept./Section/Centre : _____

Signature

- Note: 1. All kinds of leave, except Casual Leave should be applied in this form and forwarded to Admin. / Faculty Affairs after recommendation of the concerned HOD/HOB/HOCs. Casual Leaves should be applied in the CI Card maintained in the respective Dept./Section/Centre.
2. In case the leave is requested for Project related work, please mention the Project No. at the top of the application and forward to Dean R&D through the concerned HOD/HOB/HOCs.
*3. If the proposed leave is during the semester period, please furnish the details of alternate arrangement for the missed classes.

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Name of the applicant	Dr. / Mr. / Ms. :		
Designation			
Dept. / Section / Centre			
Nature and period of leave admissible	Nature	From	To
Holidays Prefix / Suffixing	Prefix		
	Suffix		
Station Leave	From :	To :	No. of Days :
Balance of leave as On	Vacation Leave	Days	
	Earned Leave	Days	
	Half Pay Leave	Days	
No. of Special Casual Leave already availed in	Days		

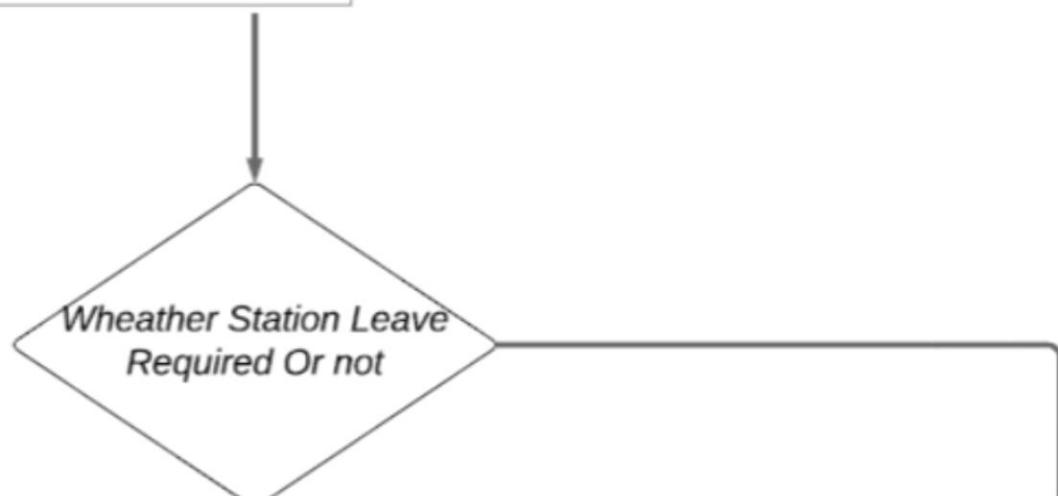
Leave as above may be approved:

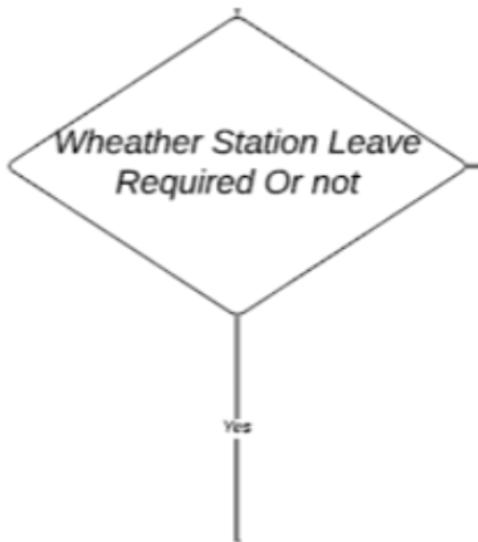
Signature of the dealing officials

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Signature of the Sanctioning Authority

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Address during leave:
Contact Phone No. (If any)

Date: Signature of the employee:
Name: Emp. No.:
Designation: Dept./Sec./Centre:

Recommended / Not Recommended
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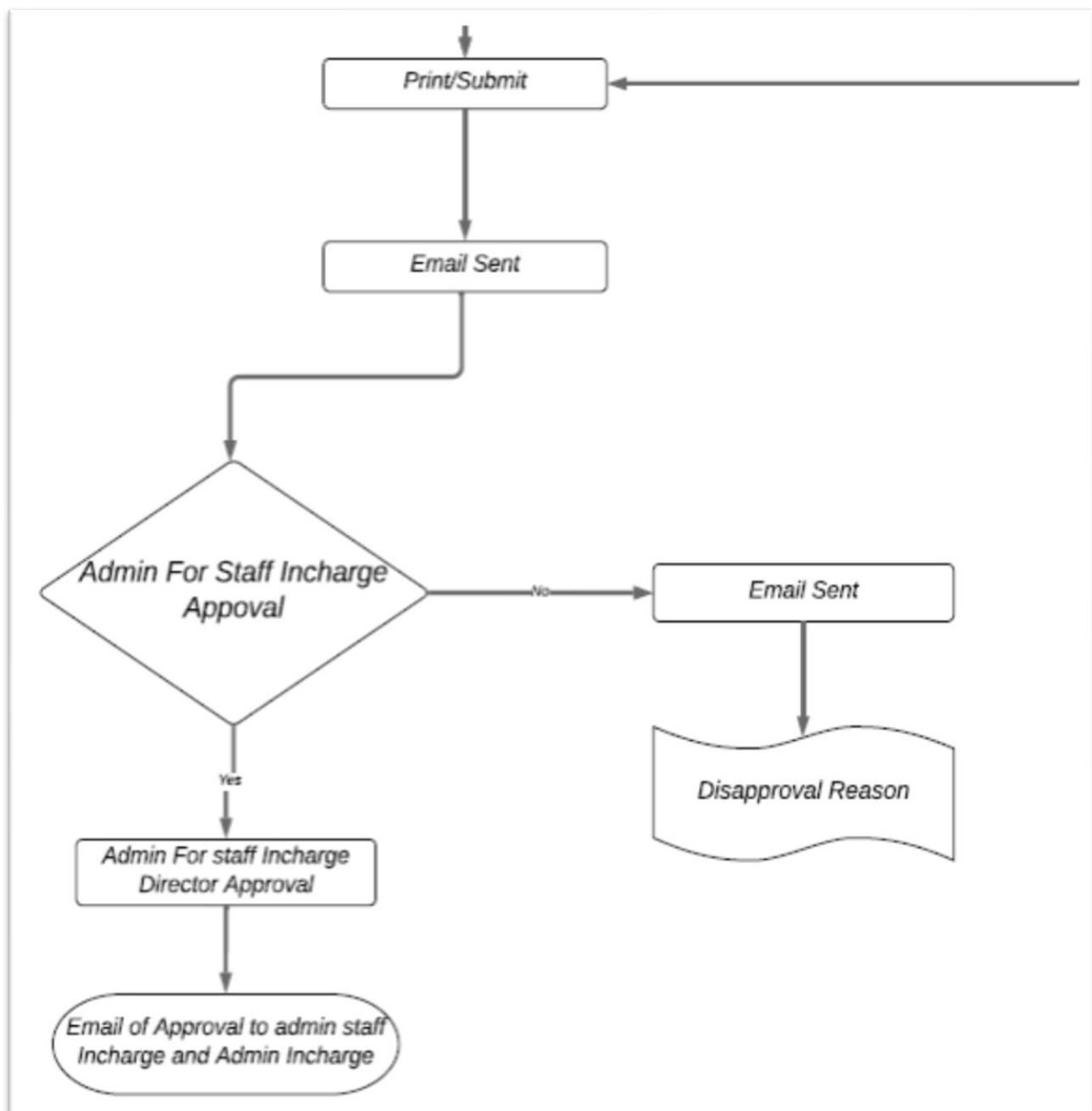
RE-JOINING REPORT

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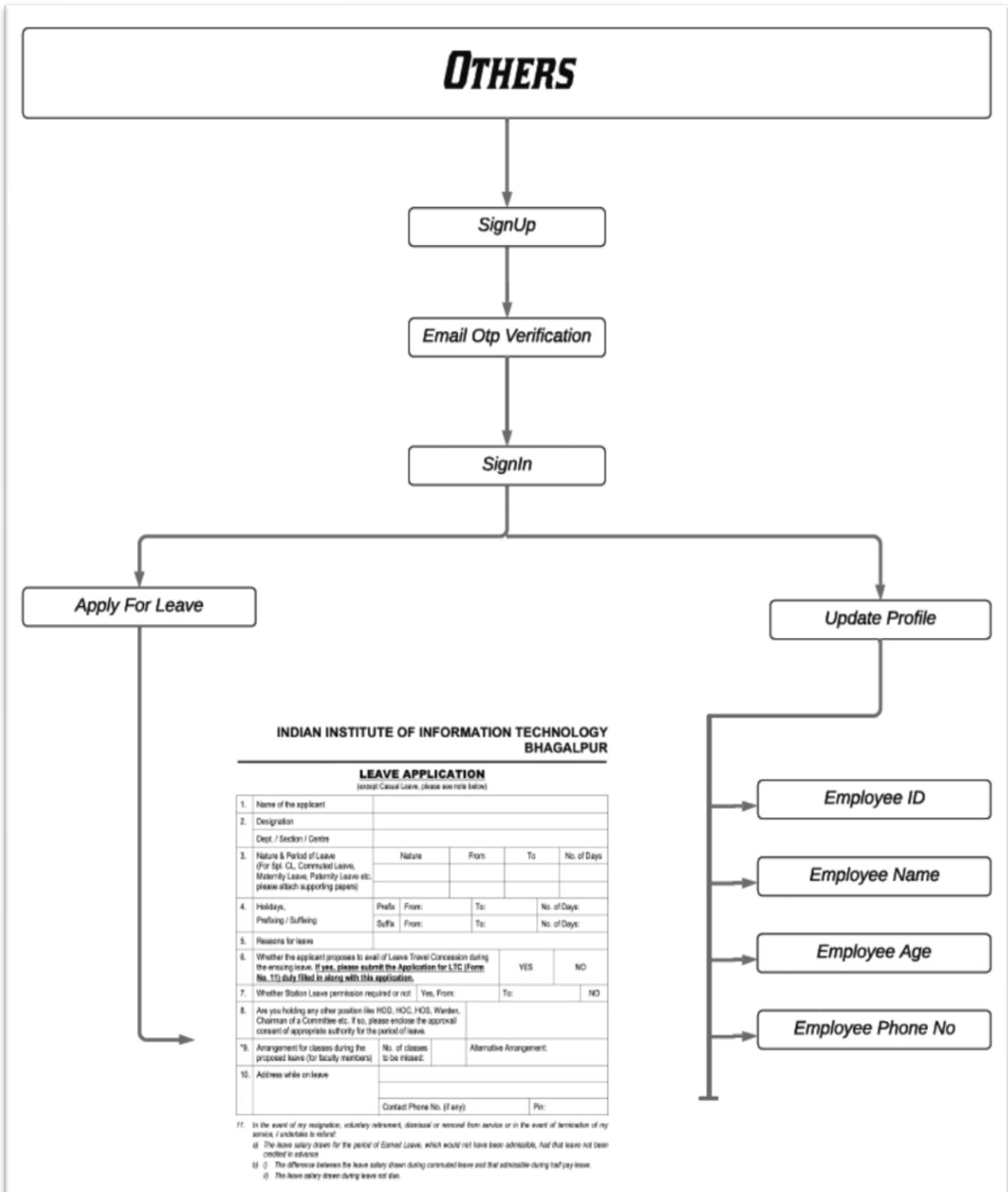
Date: Signature of the employee:
Name: Emp. No.:
Designation: Dept./Sec./Centre:

Recommended / Not Recommended
HOD / ADMINISTRATION / FACULTY AFFAIRS Director

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3.3.4 Activity Diagram for OTHERS



Date : _____

Signature of the Applicant

Eng. No.: _____

Remarks and/or recommendation of HOD/HO&HOC/Register

Signature

Designation : _____

Date : _____

Dept./Section/Centre : _____

- Note: 1. All kinds of leave, except Casual Leave should be applied in this form and forwarded to Admin. / Faculty Affairs after recommendation of the concerned HODs/HOs&HOCs. Casual Leave should be applied in the CL Card maintained in the respective Dept./Section/Centre.
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Dept. / Section / Centre			
Nature and period of leave admissible	Nature	From	To
Holidays Prefacing / Suffixing	Prefix		
	Suffix		
Station Leave	From :	To :	No. of Days :
Balance of leave as Off -----	Vacation Leave	Days	
	Earned Leaves	Days	
	Half Pay Leave	Days	
No. of Special Casual Leave already availed in			Days

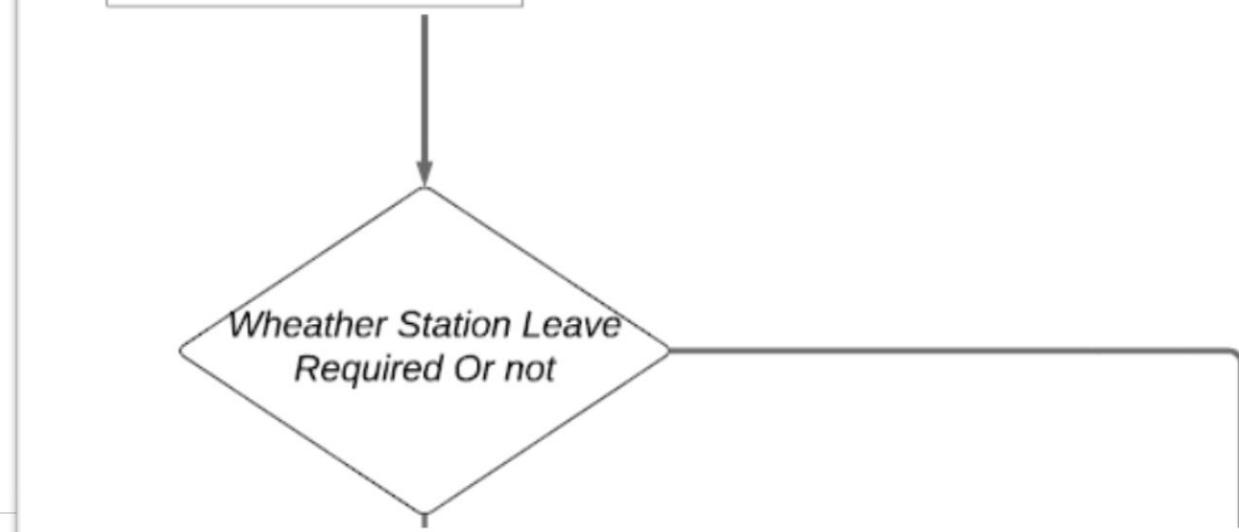
Leave as above may be approved:

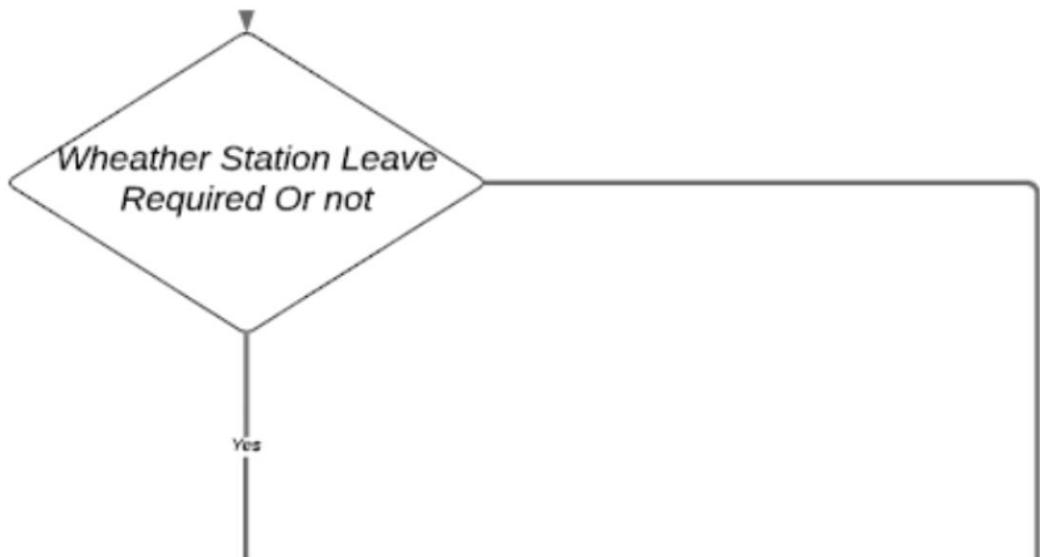
Signature of the dealing officials

Approval of Sanctioning Authority:

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Address during leave:
..... Contact Phone No. (if any)

Date: Signature of the employee:
Name: Emp. No.:
Designation: Dept./Sec./Centre:

Recommended / Not Recommended
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Re-JOINING REPORT

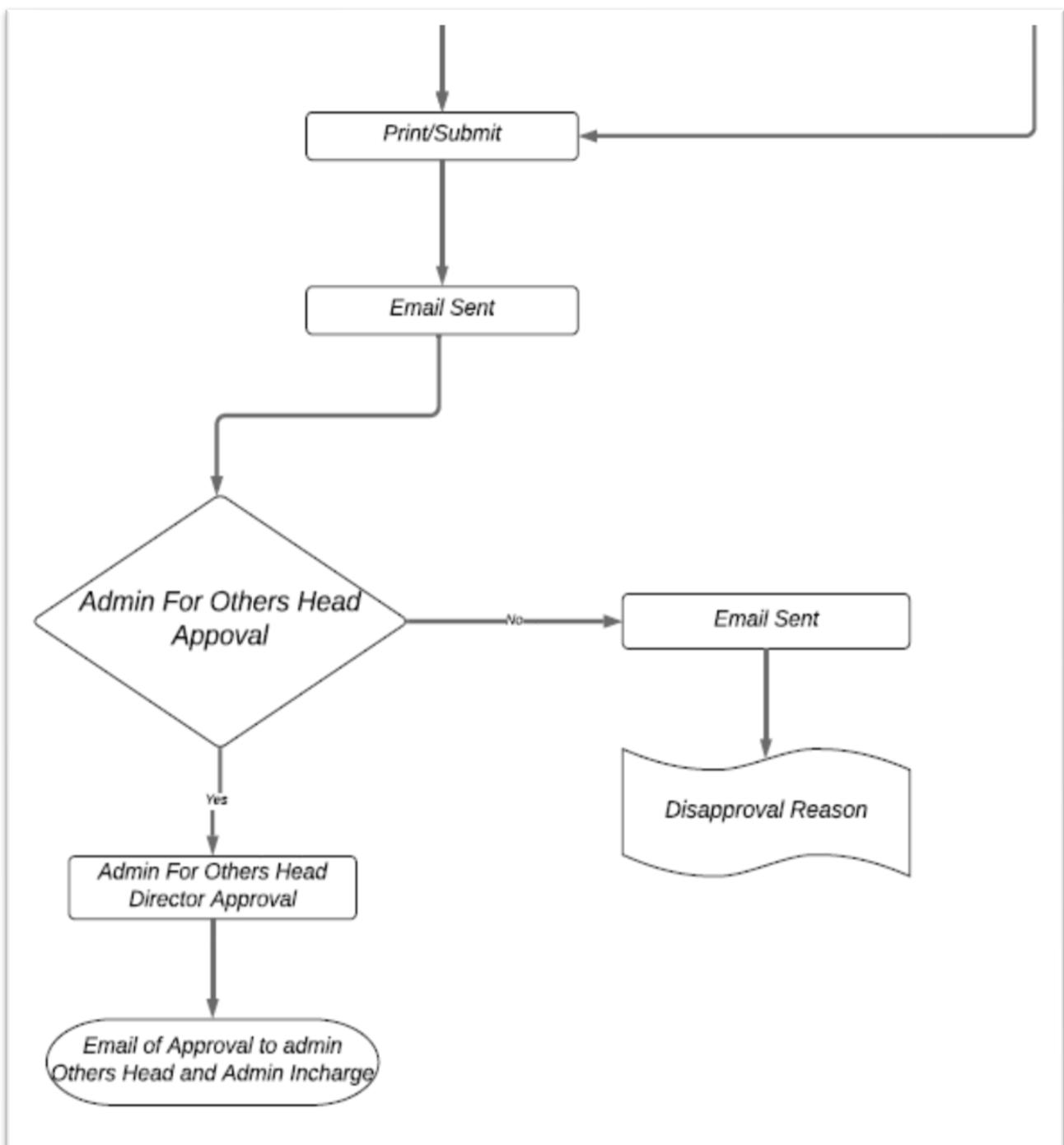
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Date: Signature of the employee:
Name: Emp. No.:
Designation: Dept./Sec./Centre:

Recommended / Not Recommended
HOD / ADMINISTRATION / FACULTY AFFAIRS

Director

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4. IMPLEMENTATION

4.1 DATA DICTIONARY

TABLE	COLUMN	TYPE
Admin	id	integer <i>Auto Increment</i> [<i>nextval('admin_id_seq')</i>]
	name	text
	userid	character varying
	password	character varying
	verify	integer <i>NULL</i> [0]
Admin_Info	id	integer
	name	text
	age	integer
	gender	character(20)
	position	text <i>NULL</i>
Admin_Leave	id	integer
	leave_from	date
	leave_upto	date
	approved	integer
	nature	text
	no_of_days	integer
	reason	text
	application_no	integer <i>NULL</i>
	prefix_from	date <i>NULL</i>
	prefix_upto	date <i>NULL</i>
	suffix_from	date <i>NULL</i>
	suffix_upto	date <i>NULL</i>
	sufix_days	integer <i>NULL</i>
	prefix_days	integer <i>NULL</i>
	travel_concession	text <i>NULL</i>
	station_leave_permission	text <i>NULL</i>
	position	text <i>NULL</i>
	missed_classes	integer <i>NULL</i>
	address	text <i>NULL</i>
	district	text <i>NULL</i>
	phone_no	integer <i>NULL</i>
	pin	integer <i>NULL</i>
	name	smallint
	status	integer <i>NULL</i> [0]
	cur_date	timestamp <i>NULL</i>
	comment	text <i>NULL</i>

Admin_Rejoin	rejoin_date	date
	id	integer
Faculty	id	integer Auto [nextval('employee_id_seq')]
	name	text
	userid	character varying
	password	character varying
	verify	integer NULL [0]
Faculty_Info	id	integer
	name	text
	age	integer
	department	character varying
	gender	character(20)
	position	text NULL
	available_cl	integer NULL [12]
	available_pl	smallint NULL [18]
	available_el	smallint NULL [15]
	available_vl	smallint [20]
Faculty_Leave		
	id	integer
	leave_from	date
	leave_upto	date
	approved	smallint [0]
	no_of_days	integer NULL
	reason	text NULL
	nature	text NULL
	application_no	integer NULL
	prefix_from	date NULL
	prefix_upto	date NULL
	suffix_from	date NULL
	suffix_upto	date NULL
	prefix_days	integer NULL
	suffix_days	integer NULL
	travel_conseesion	text NULL
	station_leave_permission	text NULL
	position	text NULL
	missed_classes	integer NULL
Faculty_Rejoin	rejoin_date	date
	id	smallint

Others	id	integer <i>Auto Increment</i> [<i>nextval('others_id_seq')</i>]
	name	text
	userid	character varying
	password	character varying
	verify	integer <i>NULL</i> [0]
Others_Info	id	integer
	name	text
	age	integer
	gender	character varying
	available_cl	smallint <i>NULL</i> [12]
	available_el	smallint <i>NULL</i> [18]
	available_pl	smallint <i>NULL</i> [15]
	available_vl	smallint <i>NULL</i> [20]
	department	character varying
	position	character varying
Others_Leave	id	integer
	leave_from	date
	leave_upto	date
	approved	smallint
	no_of_days	integer
	reason	text
	nature	text
	prefix_upto	date <i>NULL</i>
	prefix_from	date <i>NULL</i>
	suffix_upto	date <i>NULL</i>
	suffix_from	date <i>NULL</i>
	prefix_days	integer <i>NULL</i>
	suffix_days	integer <i>NULL</i>
	travel_conseesion	text <i>NULL</i>
	station_leave_permission	text <i>NULL</i>
	missed_classes	integer <i>NULL</i>
	position	text <i>NULL</i>
	address	text <i>NULL</i>
	district	text <i>NULL</i>
	phone_no	integer <i>NULL</i>
	pin	integer <i>NULL</i>
	name	text
	application_no	bigint
	department	character varying
	status	integer <i>NULL</i> [0]

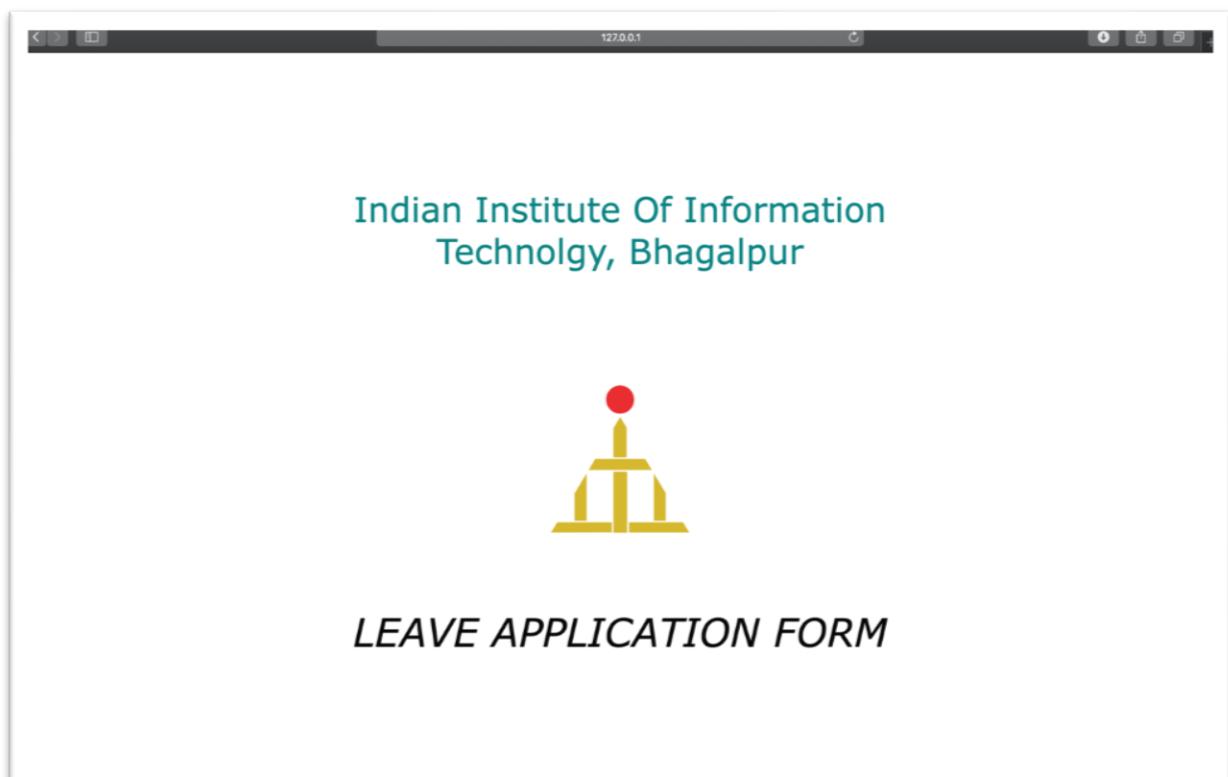
	cur_date	timestamp NULL
	comment	text NULL
Others_Rejoin	rejoin_date	date
	id	smallint
Staff	id	integer Auto Increment [nextval('staff_id_seq')]
	userid	text
	password	text
	name	text
	verify	integer [0]
Staff_Info	id	integer
	name	text
	age	integer
	gender	text
Staff_Leave	id	integer
	leave_from	date
	leave_upto	date
	nature	text
	no_of_days	integer
	reason	text
	application_no	integer NULL
	prefix_from	date NULL
	prefix_upto	date NULL
	suffix_from	date NULL
	suffix_upto	date NULL
	suffix_days	integer NULL
	prefix_days	integer NULL
	travel_concession	text NULL
	station_leave_permission	text NULL
	position	text NULL
	missed_classes	integer NULL
	address	text NULL
	district	text NULL
	phone_no	integer NULL
	pin	integer NULL
	name	text NULL
	approved	integer
	status	integer NULL [0]
	cur_date	timestamp NULL
	comment	text NULL

Staff_Rejoin	id	integer
	rejoin_date	date
Staff_Leave	id	integer
	from_date	date
	to_date	date
	from_time	time without time zone
	to_time	time without time zone
	from_type	character varying
	to_type	character varying
	category	character varying
Responsibility		
	id	integer
	assign_duty_to_name	character varying
	assign_duty_to_email	character varying
	assign_duty_to_contact_no	bigint NULL
	category	character varying

4.2 SNAPSHOT OF WORKING APPLICATION

4.2.1 Home Page

Any user inside the college campus can use the intranet connection and can access this web interface application using the address: 172.16.0.195/elms



4.2.2 Signup

The access to this application is restricted to authorized users only. Each user should register using an OTP verification via an email.

The OTP is sent to the provided Email Address after clicking the Submit Button.

The screenshot shows a web browser window titled "Sign up Page" with the URL "127.0.0.1:5000/register". The page header features the Indian Institute of Information Technology Bhagalpur logo and the text "भारतीय सूचना प्रौद्योगिकी संस्थान भागलपुर". The form fields include:

- Name: ashif
- Email: mdashif5@gmail.com
- Date of Birth: 19
- Gender: Male (selected)
- Address:
- Address:
- Category: FACULTY
- Department: CSE
- POSITION: None

A green "Submit" button is at the bottom, and a link "Already a member? Sign in" is also present.

After OTP Verification, the registration will be successful.



The image shows a web page titled "OTP". At the top right, there is a link "Check Your Mail". Below the title, there is a text input field labeled "One Time Password" with a placeholder icon. A green rectangular button labeled "Submit" is positioned below the input field. The entire form is contained within a light gray border.

4.2.3 Login

Each user should know his user name and password to access this Web Application and he must be authenticated to be able to use the application.

When you visit this application, Login Page is the first page displayed.



The image shows the login page of the Indian Institute of Information Technology, Bhagalpur. At the top, there is a logo and the text "भारतीय सूचना प्रौद्योगिकी संस्थान भागलपुर" and "Indian Institute of Information Technology Bhagalpur". The main form area contains fields for "User Name" (with value "aman.cse.1708@iitbh.ac.in") and "Password" (with value "....."). There are checkboxes for "Show Password" and "Remember Me". A dropdown menu "CATEGORY :-" is set to "FACULTY". A green rectangular "Submit" button is at the bottom. Below the button, there are links for "Not yet a member? [Sign up](#)" and "Forgot Password? [Reset Password](#)".

4.2.4 Reset Password



भारतीय सूचना प्रौद्योगिकी संस्थान भागलपुर
Indian Institute of Information Technology Bhagulpur

Password Recover

Enter your email address



भारतीय सूचना प्रौद्योगिकी संस्थान भागलपुर
Indian Institute of Information Technology Bhagulpur

Reset Password

Check Your Mail

OTP

One Time Password

After login page

Faculty, HOD, Staff and Others will get their profile page where applicants (faculty, staff) can apply for leave and can see their list of applied application till now and HOD can see list of applicants and approve or disapprove according to applicant left leave.

4.2.5 Profile of HOD

Here HOD can see details of applicants through the provided “DETAILS” tab and can approve or disapprove an applicant’s leave form.

HOD can also apply for leave and see his own history.

The screenshot shows a web-based employee leave system. At the top, there is a logo of the Indian Institute of Information Technology (IIIT) and its name in blue text. Below the logo, the title "Employee Leave System" is displayed. A navigation bar at the top includes links for "IIIT", "Home", "Apply for leave", and "List Of Applications". On the right side of the navigation bar are "Profile" and "Logout" links. The main content area displays two leave application cards. The first card, for Applicant ID 89 (Susheela), shows a leave period from November 6, 2019, to November 10, 2019. It features three buttons: "APPROVE", "DISAPPROVE", and "DETAILS". The second card, for Applicant ID 91 (AMAN MISHRA), is partially visible below it. Both cards include a small profile icon and the applicant's name.

4.2.6 History of Applicants(Faculty, staff, others)

Applicants can see their history of leaves by clicking their respective “name” tab on the top right.

The screenshot shows a web application interface for the Indian Institute of Information Technology Employee Leave System. At the top center is the institute's logo, which is a yellow stylized structure with a red dot on top. Below the logo, the text "Indian Institute of Information Technology" is written in blue, followed by "Employee Leave System" in black. Underneath this, the heading "My List" is displayed in bold black text. The main content area contains two rectangular boxes, each representing a leave application. The first box contains the following text:
⌚ Application No : 84325936 Leave_from : 2019-11-18 Leave_upto : 2019-11-21 Status : Disapproved Reason For Disapproval : De
The second box contains:
⌚ Application No : 67692038 Leave_from : 2019-11-22 Leave_upto : 2019-11-23 Status : Pending

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4.2.7 Profile of Admin

After HOD's approval, the leave application is forwarded to the admin where he is requested to fill the office side form and forward it to the director for the final approval or disapproval.

Admin also has the privilege to remove Faculties from their respective positions in the "Manage Employee" tab.

The screenshot shows the Indian Institute of Information Technology Employee Leave System interface. At the top, there is a logo of the institute and its name. Below the logo, the title "Employee Leave System" is displayed. A navigation bar at the top includes links for "IIIT", "Home", "Apply for leave", "List of Applicant", "Manage Employee" (which is highlighted in white), and user profile links for "Rashi Krishna" and "Logout". The main content area is titled "Manage Faculty". It lists two faculty members in green-bordered boxes:

ID	Name	Designation	Action
84	Rashi senior	HOD CSE	REMOVE FROM POSITION
96	reza	HOD CSE	REMOVE FROM POSITION

4.2.8 Leave Application Form

Applicant can fill the Leave Application Form by clicking on the “Apply for Leave” tab on the top left corner if their profile

127.0.0.1

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY BHAGALPUR

LEAVE APPLICATION

(except Casual Leave, please see note below)

1.	Name of the applicant	Md Ashif Reza	
2.	Designation	None	
	Dept. / Section / Centre	CSE	
3.	Nature & Period of Leave (For Spl. CL, Commuted Leave, Maternity Leave, Paternity Leave etc. please attach supporting papers)	Nature From _____ To _____	No. of Days Calculate
4.	Holidays, Prefixing / Suffixing	Prefix From _____ To _____	No. of Days Calculate
5.	Reasons for leave	_____	

4.2.9 Station Leave Form

If the applicant requires a station leave, they need to choose yes in the radio button which would pop the Station Leave Form.

[Print](#)

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY BHAGALPUR

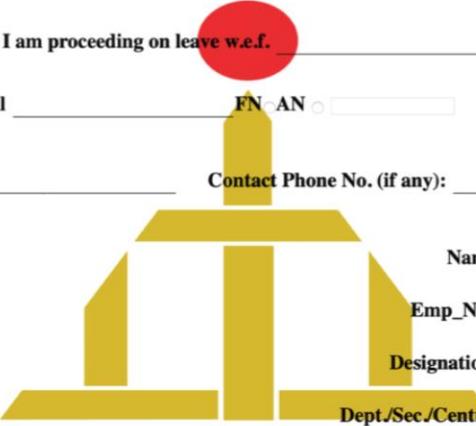
STATION LEAVE PERMISSION

This is to inform you that I am proceeding on leave w.e.f. _____ FN AN

and will be out of station till _____ FN AN

Address during leave: _____ Contact Phone No. (if any): _____

Date: _____



Name: _____
Emp_No.: _____
Designation: _____
Dept./Sec./Centre: _____

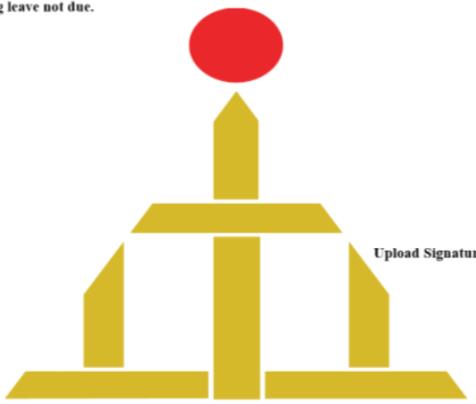
Upload Signature: no file selected
File Size should be less than 50KB
Only, JPG, JPEG

Applicant also need to upload their digit signature while submitting any form.

(a) The leave salary drawn for the period of Earned Leave, which would not have been admissible, had that leave not been credited in advance

(b) (i) The difference between the leave salary drawn during commuted leave and that admissible during half pay leave.

(ii) The leave salary drawn during leave not due.



Emp_No.: 76 _____
Designation : Professor _____

Upload Signature: No file selected.
File Size should be less than 50KB
Only, JPG, JPEG

Note:- 1. All kinds of leave, except Casual Leave should be applied in this form and forwarded to Admin./ Faculty Affairs after recommendation of the concerned HODs/HOSs/HOCs. Casual Leave should be applied in the CL Card maintained in the respective Dept./Section/Centre.

4.2.10 Extend Leave Application

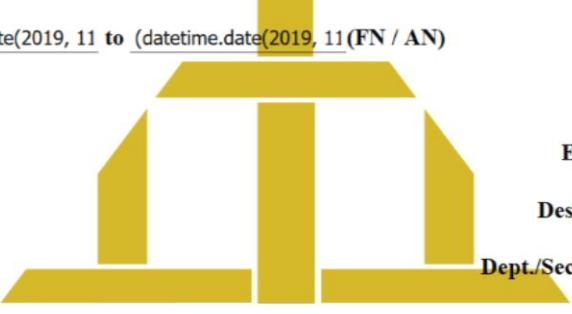
While applicants are on leave he/she can also request for extending their leave.

The screenshot shows the Employee Leave System interface. At the top, there is a logo of the Indian Institute of Information Technology (IIIT) and the text "Indian Institute of Information Technology" and "Employee Leave System". Below this is a navigation bar with links for "Home", "Print Leave", "Rejoin", and "Extend Leave". On the right side of the navigation bar are links for "Staff", "Rashi", and "Logout". The main content area is titled "Employee Profile" and features a user icon. Below the icon, it displays employee details: Employee Id : 76, Employee Name : Rashi, Employee Age : 44, No. of Available EL : 15, No. of Available CL : 5, No. of Available PL : 18, and Faculty Branch : CSE. A dark banner at the bottom contains the text "All rights reserved Property Of Group-2 CSE IIITBH". Below the banner, a message says "Kindly Keep Your profile Updated".

The screenshot shows a form titled "INDIAN INSTITUTE OF INFORMATION TECHNOLOGY BHAGALPUR". The main heading is "Extend Application". Below it, there is a statement: "I Have Been Granted Leave From mm / dd / yyyy To mm / dd / yyyy But, Due To Some Unavoidable Circumstances, I Want My Leave To Be Extended Upto mm / dd / yyyy So Please Grant My Leave". At the bottom of the form, there is a small "SUBMIT" button.

4.2.11 Re-joining Form

Once the applicants leave period is over they must fill the re-joining application form to notify the institute that he/she will be joining shortly.

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY BHAGALPUR	
<u>RE-JOINING REPORT</u>	
This is to inform you that I have re-joined duty on <u>mm / dd / yyyy</u> at FN○AN ○ <u>-- : -- --</u> after availing leave from <u>(datetime.date(2019, 11</u> to <u>(datetime.date(2019, 11(FN / AN)</u>	
	
Name:	Rashi _____
Emp_No.:	76 _____
Designation:	None
Dept./Sec./Centre:	CSE _____

4.2.12 The Use of Mail System

After submitting any form, the applicants get notified via an email.

Adding to that, the HOD or the person In-charge also receive an email regarding your request.

And finally, the applicant also gets notified whether his leave application got approved or rejected.

The screenshot shows an email inbox from the 'IITBH Employee Management System' with the following messages:

- software.engwkze@gmail.com** (to me) - Sent Nov 21, 2019, 3:04 PM (2 days ago). Message content: "6031".
- software.engwkze@gmail.com** (to me) - Sent Nov 21, 2019, 3:25 PM (2 days ago). Message content: "Dear User,
You've Successfully Applied for Leave.
Your Application no is : 01322261".
- software.engwkze@gmail.com** (to me) - Sent Nov 21, 2019, 3:25 PM (2 days ago). Message content: "New leave Application Received.
Applicant Name : AMAN MISHRA
Application No. :01322261".
- software.engwkze@gmail.com** (to me) - Sent Nov 21, 2019, 3:34 PM (2 days ago). Message content: "Your Application for leave has been disapproved!!".

5. TESTING

5.1 TESTING GOAL

The goal of Employee Leave Management System Testing is to ensure that the system performs as per the functional requirements specified by client. Most cases tested here are done manually per module.

5.2 FUNCTIONAL REQUIREMENTS TESTING (BLACK BOX TESTING)

5.2.1 Registration for New User

Description : This test will ensure registration of new user			
Data Requirements : Connectivity to database			
Steps #	Step Description	Expected Results	Remarks
1	Open sign Up page	Sign Up page opens	Pass
2	Fill Registration Form	All required information entered properly, no error encountered	Pass
3	Generate OTP	OTP sent through mail	Pass
4	Enter OTP and click on register	Successful registration	Pass
5	Login using credential entered on Sign Up page	Successfully Logged in	Pass

5.2.2 Apply for Leave (Faculty)

Description : This test will ensure successful application of leave			
Data Requirements : Connectivity to employee leave DB			
Steps #	Step Description	Expected Results	Remarks
1	Sign In using username and password	Home page for faculty opens	Pass
2	If no leave applied earlier, click on Apply Leave	Faculty Leave form opens	Pass
3	Upload Signature	Signature applied successfully	Pass
4	Submit form	PDF generated, email send to the respected faculty, HOD of the faculty and Admin	Pass

5.2.3 Approving / Disapproving Leave

Description : This test will check if leave can be successfully approved/disapproved			
Data Requirements : Connectivity to leave DB			
Steps #	Step Description	Expected Results	Remarks
1	Sign In using HOD/Admin username and password	Home page for HOD/Admin opens	Pass
2	Click on List of Applicant	List of application appears	Pass
3	Click on approve/Disapprove	If disapprove clicked, textbox appears asking for reason for disapproval, email sent to faculty	Pass

5.2.4 Test Case for Login Page

Description : This test will ensure secure login of user			
Sr No.	Input/Action	Expected Results	Remarks
1	Leave text field empty	Will show error message “Required Field”	Pass
2	Entered invalid username and password	Will show error message “Invalid username or password”	Pass
3	Entered valid username	Opens faculty home page	Pass

5.2.5 Test Case for Approve/Disapprove, Manage Faculty Page

Description : This test will ensure registration of new user			
Sr No.	Input/Action	Expected Results	Remarks
1	Click on View Details	Details of specific applicant opens	Pass
2	Click on approve	Leave application disappears from pending application	Pass
3	Click on disapprove	Text box appears for entering reason for disapproval	Pass
4	Click on Delete faculty	Remove a specific faculty from HOD list	Pass

5.2.6 Test Case for Leave Page

Description : This test will ensure meaningful leave form filling by user			
Sr No.	Input/Action	Expected Results	Remarks
1	Leave text field empty	Will show error message “Required Field”	Pass
2	Enter leave from and leave up to field	Automatically calculate duration of leave	Pass
3	Click on Yes radio button of station leave permission required or not	Station leave form opens	Pass
4	Upload Signature	Signature Uploaded	Pass
5	Enter nature of leave (e.g. Casual Leave, Half Pay Leave, Paternity Leave, Maternity Leave etc)	Check if given type of leave applicable for given applicant	Pass
6	Click on Yes radio button of responsibility undertaken	Responsibility handover form opens	Pass

5.3 Non- Functional Requirements Testing

5.3.1 Stability Testing

Stability testing checks to see if the software can continuously function well in or above an acceptable period. This activity of non-functional software testing is oftentimes referred to as load (or endurance) testing.

5.3.2 Usability

Usability testing is needed to check if the user interface is easy to use and understand. This test is used to verify if a user that never use the application can search and read result list within a reasonable time.

5.3.3 Security Testing

Security testing is essential for software which processes confidential data and to prevent system intrusion by hackers.

6. MAINTAINENCE

The Employee Leave Management System is developed using Flask, a lightweight python based WSGI web application framework and hence, it provides an easy Maintainability and Optimization.

Software maintenance in software engineering is the modification of a software product after delivery to correct faults or to improve performance and other attributes. Maintenance covers about 60% of the phase in Software Development Life Cycle.

The ELMS is the soul property of Group CS311-P2 and is developed for the Employees of Indian Institute of Information Technology, Bhagalpur. The group shall provide regular updates for the maintenance of the Employee Leave Management System.

The Maintenance of ELMS shall include:

- Error Correction
- Bug Fixes
- Enhancement of Capabilities
- Deletion of Obsolete Capabilities
- Optimization

The ELMS has been developed for simplifying the process of taking leave from the Institute and thus it is not affordable to have bugs in the Application but nonetheless some sneaky bugs may find its way to the users. The users are requested to report the bugs as soon as they encounter it so that it could be fixed in the next update.

7. CONCLUSION

The proposed Employee Leave Management System will make the whole leave management process efficient. Users will be able to know their leave status, ask for leave extension and re-join, all via the use of Intranet.

This will also help the admins and HODs as they will be able to approve or disapprove the leave application forms on their PCs or laptops with college intranet connection.

Ultimately, this project aims at reducing all the paperwork which must be done while applying for a leave. Moreover, this project will simplify the tedious process of applying for a leave and make it swift and reliable.