**PERSONAL EXPENSE TRACKER APPLICATION**

### IBM PROJECT REPORT

***Submitted by***

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### IN

**INFORMATION TECHNOLOGY**

# SRMVALLIAMMAI ENGINEERING COLLEGE, CHENGALPATTU

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# ABSTRACT:

### This Expense Tracker is a web application that facilitates the users to keep track and manage their personal as well as business expenses. This application helps the users to keep a digital diary. It will keep track of a user's income and expenses on a daily basis. The user will be able to add his/her expenditures instantly and can review them anywhere and anytime with the help of the internet. He/she can easily import transactions from his/her mobile wallets without risking his/her information and efficiently protecting his/her privacy. He can see the accurate duration for how long a particular product is being used by him. The monthly, and year-wise comparison of expenditures will be done by the app which will let the user know the area where he is spending the most. The user will be able to see the detailed analyses with the help of graphical visualizations. This project will provide a lot of benefits to the users with the help of which they will be surely able to keep track of each penny. It is time to stop using paper and excel sheets to keep track of your digital as well as cash payments. Using paper is not easy to manage. It is common to delete files accidentally or misplace files. This expense tracker provides a complete digital solution to this problem. Excel sheets do very little to help in tracking expenses. Furthermore, they don't have the advanced functionality of preparing graphical visuals automatically. Not only it will save the time of the people but also it will assure error-free calculations. The user just has to enter the income and expenditures and everything else will be performed by the system.

### Keywords: Expense Tracker, budget, planning, savings, graphical visualization of expenditure.

### INTRODUCTION:

In today's world financial well-being is the dream of every person and managing and keeping track of their expenses play a crucial role in this goal. If a person is not able to manage his expenses, he/she is likely to end up in a crisis. Money management is a necessary part of life. A proper balance between income and expense is a must for a comfortable livelihood. There must be some savings that can be used at a later point of life when needed. But in the absence of proper management of money, we left with no savings at all. Some people note down every single expense which is a good practice. Expense Management and Tracking is performed by noting down and analyzing the transactions of an individual or an organization over a particular period. Nowadays, everyone in the world is in some kind of hurry, so countless people are searching for competent ways of tracking and managing their expenses. In some recent years, research has been administered on household budgets (Access Consultants, 1998; Central Statistics Office, 2001; European Countries, 2004; Muellbauer, 2006; Redpath, 1986; Yemtsov, 2007). It was found that in most cases, people were performing expense management and tacking mentally and not writing any of it down on paper making the process more problematic. Perhaps this is because of the verity that most of the people do not know how to manage and keep track of their expenses. For budgeting, we have to foresee and establish some future goals. By determining a budget, an individual can set goals for attaining a certain level of income and check his/her expenses. Numerous proprietors of home-based and small-scale industries have observed that their profit margins did not increase until they had a written income goal and a process with which to oversee expenses (Central Statistics Office, 2001; Redpath, 1986). Similarly, personal finance management is an important aspect of people's lives. Then again, not everyone has the knowledge or time to track their expenses properly. Moreover, even if they have the time and familiarity with the process, they don't concern themselves with expense tracking and management as they find it tiresome. Today, people don't have to worry as there are numerous applications and techniques using which they can manage their expenses. Also called expense manager, an expense tracker is software that facilitates keeping a record of an individual's money inflow and outflow. Most of the people in the world live on a static revenue, and they discover that towards the end of the month they don't even have enough money to meet their essentials. Though this problem can be due to low salary, most of the time it is because of improper money management skills. Using an expense tracker can help you keep track of how much money you spend every day and on what. At the end of the month, you will have a clear picture of where your money is going. This is one among the simplest ways to urge your expenses in check.

LITERATURE SURVEY FOR **PERSONAL EXPENSE TRACKER APPLICATION**

**AUTHORS:** Muskaan Sharma, Ayush Bansal, Dr. Raju Ranjan, Shivam Sethi School of Computer Science and Engineering, Galgotias University A Novel Expense Tracker using Statistical Analysis

Daily Expense tracker is based on income and expense tracking system. This project offers some opportunities that will help user to sustain all financial activities like automated dairy. The main aim of the project is to create a faster, easier and smooth system between the expense and the income. So, for the better expense tracking we built Expense Tracker is very simple and attractive, Which makes it easy for the user to understand and use it. A daily expense tracker is best way to record your financial data. Most of the people cannot track their money. They find it difficult to save their money. On one way of thinking they face money crisis, in such case Daily Expense Tracker can help people to track their income and expense. Daily Expense Tracker also helps the user to avoid a fumble of their money. It helps the unnecessary expenses and bad financial situation. This project will save time and lead a healthy financial lifestyle

**AUTHORS :** ATIYA KAZI , PRAPHULLA S. KHERADE , RAJ S. VILANKAR3, PARAG M. SAWANT , Professor, Department of Information Technology, Expense Tracker Finolex Academy of Management and Technology

**YEAR :** 2011

In today’s world Information Technology (IT) has prospered in many fields and it has been viewed as having great potential for improving agriculture. In recent times e- Agriculture defines global community practice. Agriculture is still the only largest contributor to India's GDP. Agriculture also plays a significant role in the growth of the socio-economic sector in India. Now-a-days, mobile phones are the most used electronic gadget across the world and android is the primary operating system and most ofthe applications are free to download. In this paper and through the project, a try will be made to transform the traditional trading into electronic exchange wherein the farmers have the full-fledged help through application. The app will take up the opportunity and revolutionize the lives of farmers. The platform links the farmers and the consumers directly and also helps farmers for better farming with regional language support.

**AUTHOR:** Zhanqing

**YEAR :** 2001

We are building an android application named as “Expense Tracker”. As the name suggests, this project is an android app which is used to track the daily expenses of the user. It is like digital record keeping which keeps the records of expenses done by an user. The application keeps the track of the Income and Expenses both of user on a day-to-day basis. This application takes the income of an user and manage its daily expenses so that the user can save money. If you exceed daily expense allowed amount it will give you a warning, so that you don’t spend much and that specific day. If you spend less money than the daily expense allowed amount, the money left after spending is added into user’s savings. The application generates report of the expenses of each end of the month. The amount saved can be used for celebrating festivals, Birthdays or Anniversary.

**AUTHOR :** Cheng

**YEAR :** 2011

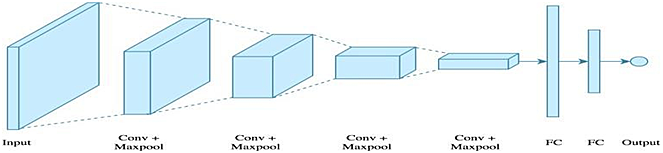
Expense Tracker is a day-to-day expense management system designed to easily and efficiently track the daily expenses of unpaid and unpaid staff through a computerized system that eliminates the need for manual paper tasks that systematically maintains records and easily accesses data stored by the user. We have tried to design the window application in such a way that the user does not have to bother using this application without much effort. End users with window running devices can use this software. The language databases we use to develop this system are Java (Apache Netbins 11.3) and MySQL Workbench 8.0 CE. This application is a GUI (Graphics User Interface) based application. If you are a window user, you can download the application and work accordingly. This system is used by any person to control his incomeexpenditure from daily to annual basics. And to keep an eye on their spending. This app is very easy to use and mutli-language. The main feature of this app is that you can track by day and category. You can use it according to your category.

# METHODOLOGY:

The CNN (Convolutional Neural Networks) model is the methodology used in this fire detection system. The image datasets are built by transforming fire images collected by videos into frames. Some images from the dataset have been added to it.These are copied from kaggle and GitHub. Images must be classified as fire as well as non-fire.The number of images in the fire and non-firehas a value of 755 and 244. There are 999 in total images. These images are resized to (300,300) before being processed.(-1,300,300,1) was reshaped and saved as a linear array.This is fed into the convolutional layer as an input. In these instances,Several kernels of various sizes are used in operations.the data used to create feature maps The concept of the model consists of 64 convolution filters, each measuring3x3.

The feature maps are activated using the ReLU activation function. This function updates the positive section of the feature map quickly. These feature maps are fed into the next phase, known as max pooling. A 3x3 kernel size convolution layer and a pooling layer are then applied to these feature maps. The flatten layer converts 2D feature maps into vectors that can then be used in a fully linked layer. For example, the convolution and fully connected layers

contain neurons whose weights are learned and altered throughout the training process in order to better reflect the input data. A dense layer represents matrix vector multiplication. The values in the matrix, which are updated during back propagation, are used to represent the trainable parameters. As a result, an m- dimensional vector is produced as the output. To discriminate between fire and non-fire outputs, we employ an activation function like Soft max. The Soft max function creates a probability distribution that maps output to a scale of 0–1. As a result,it's often used as the last layer in a classification model.The model is constructed usingan Adam optimizer, which determines each parameter's own learning rate using an adaptive learningrate. Because only one result may be legitimate in this categorization, the categorical cross entropy loss function is used.



CNN model

**FUNCTIONAL REQUIREMENTS**

In Software engineering and systems engineering, a functional requirement defines a function of a system or its component. A function is described as a set of inputs, the behavior, and outputs. This should be contrasted with non-functional requirements which specify overall characteristics such as cost and reliability.

**PRODUCT PERSPECTIVE**

The product is supposed to be an open source, under the GNU general Public License. It is a web based system implementing client-server model. The portal System provides simple mechanism for users to share and acquire knowledge.

**PRODUCT FEATURES**

The following are the main features

* Cross platform support:
* Offers operating support for most of the known and commercial operating systems. User account: The system allows the user to create their accounts in the system and provide features of updating and viewing profiles.
* Number of users being supported by the system:
* Though the number is precisely not mentioned but the system is able to support a large number of online users at a time. Search: search is simply local search engine based on key words.
* Discussion Forum:
* Provides users with a platform to discuss and help each other with their problems
* Ticketing system: Allows user to submit his issue to the admin in case his problems are not solved by FAQs and discussion forums.
* FAQs section: Frequently asked section contains answer of problem which tablet user frequently faced.

**USER CHARACTERISTICS**

It is considered that the user do have the basic knowledge of operating the internet and to have access to it. The administrator is expected to be familiar with the interface of the tech support system.

**ASSUMPTION AND DEPENDENCIES**

This software highly depends on type and version of browser being installed in the system i.e. browser version should be used which have HTML5 support.

**DOMAIN REQUIREMENT**

Domain requirement is the Requirement that comes from the application domain of the system that reflects the characteristics of that domain. Therefore, as our System is an inventory System, the domain requirement of this system should concern about the requirements that reflect characteristic of Inventory System.

**NON-FUNCTIONAL REQUIREMENTS:**

In systems engineering and **requirements** engineering, a **non**-**functional requirement** (NFR) is a **requirement** that specifies criteria that can be used to judge the operation of a system, rather than specific behaviors. They are contrasted with **functional requirements** that **define** specific behavior or functions.

**PRODUCT REQUIREMENTS**

**EFFICIENCY:**

**SPACE EFFICIENCY**

Storage **efficiency** is the ability to store and manage data that consumes the least amount of **space** with little to no impact on performance; resulting in a lower total operational cost. **Efficiency** addresses the real-world demands of managing costs, reducing complexity and limiting risk.

**TIME EFFICIENCY**

The state or quality of being **efficient**, or able to accomplish something with the least waste of **time** and effort is Time efficiency; competency in performance. And accomplishment of or ability to accomplish a job with a minimum expenditure of **time** and effort

**RELIABILITY**

Reliability Posted by: Margaret Rouse WhatIs.com Contributor(s): KajBackholm Word of the Day 5G is the coming fifth-generation wireless broadband technology based on the IEEE 802.11ac standard. An important goal of 5G is to erase the differences between wire line and wireless networking to accommodate the growing mobility of network users. Subscribe to the Word of the Day Word of the Day Archive 20 Newest and Updated Terms competitive advantage mobile application management (MAM) Avro (Apache Avro) quality assurance (QA) gross revenue voice recognition (speaker recognition) Amazon Pinpoint employee engagement software Microsoft Project Honolulu project scope unstructured data hands-off infrastructure management Microsoft Windows Insider Program for Business risk map (risk heat map) VMware vCenter Server (formerly VMware Virtual Center) Advanced Message Queuing Protocol (AMQP) network engineer cloud storage service Ensile cloud backup (online backup) Reliability is an attribute of any computer-related component (software, or hardware, or a network, for example) that consistently performs according to its specifications. It has long been considered one of three related attributes that must be considered when making, buying, or using a computer product or component.

.**PORTABILITY**

**Portability** is a characteristic attributed to a computer program if it can be used in an operating systems other than the one in which it was created without requiring major rework. Porting is the task of doing any work necessary to make the computer program run in the new environment.

**USABILITY**

**Usability** is the ease of use and learnability of a human-made object such as a tool or device. In **software engineering**, **usability** is the degree to which a **software**can be used by specified consumers to achieve quantified objectives with effectiveness, efficiency, and satisfaction in a quantified context of use.

**ORGANISATIONAL REQUIREMENTS:**

**IMPLEMENTATION REQUIREMENTS**

**LANGUAGE SPECIFICATIONS:**

**PYTHON:**

Python is an interpreter, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding; make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. Python supports modules and packages, which encourages program modularity and code reuse. The Python interpreter and the extensive standard library are available in source or binary form without charge for all major platforms, and can be freely distributed.

Often, programmers fall in love with Python because of the increased productivity it provides. Since there is no compilation step, the edit-test-debug cycle is incredibly fast. Debugging Python programs is easy: a bug or bad input will never cause a segmentation fault. Instead, when the interpreter discovers an error, it raises an exception. When the program doesn't catch the exception, the interpreter prints a stack trace. A source level debugger allows inspection of local and global variables, evaluation of arbitrary expressions, setting breakpoints, stepping through the code a line at a time, and so on. The debugger is written in Python itself, testifying to Python's introspective power. On the other hand, often the quickest way to debug a program is to add a few print statements to the source: the fast edit-test-debug cycle makes this simple approach very effective.It ranges from simple automation tasks to gaming, web development, and even complex enterprise systems. These are the areas where this technology is still the king with no or little competence: Machine learning as it has a plethora of libraries implementing machine learning algorithms.Python is a one-stop shop and relatively easy to learn, thus quite popular now. What other reasons exist for such universal popularity of this programming language and what companies have leveraged its opportunities to the max? Let’s talk about that. Python technology is quite popular among programmers, but the practice shows that business owners are also Python development believers and for good reason. Software developers love it for its straightforward syntax and reputation as one of the easiest programming languages to learn. Business owners or CTOs appreciate the fact that there’s a framework for pretty much anything – from web apps to machine learning. Moreover, it is not just a language but more a technology platform that has come together through a gigantic collaboration from thousands of individual professional developers forming a huge and peculiar community of aficionados. So what is python used for and what are the tangible benefits the language brings to those who decided to use it? Below we’re going to discover that. Productivity and Speed It is a widespread theory within development circles that developing Python applications is approximately up to 10 times faster than developing the same application in Java or C/C++. The impressive benefit in terms of time saving can be explained by the clean object-oriented design, enhanced process control capabilities, and strong integration and text processing capacities. Moreover, its own unit testing framework contributes substantially to its speed and productivity.

**PYCHARM**

PyCharm is a dedicated Python Integrated Development Environment (IDE) providing a wide range of essential tools for Python developers, tightly integrated to create a convenient environment for productive Python, web, and data science development.

Choose the best PyCharm for you﻿

**PyCharm is available in three editions:**

* Community (free and open-sourced): for smart and intelligent Python development, including code assistance, refactorings, visual debugging, and version control integration.
* Professional (paid) : for professional Python, web, and data science development, including code assistance, refactorings, visual debugging, version control integration, remote configurations, deployment, support for popular web frameworks, such as Django and Flask, database support, scientific tools (including Jupyter notebook support), big data tools.
* Edu (free and open-sourced): for learning programming languages and related technologies with integrated educational tools.
* For details, see the editions comparison matrix.

**Supported languages﻿**

To start developing in Python with PyCharm you need to download and install Python from python.org depending on your platform.

PyCharm supports the following versions of Python:

Python 2: version 2.7

Python 3: from the version 3.6 up to the version 3.10

Besides, in the Professional edition, one can develop Django, Flask, and Pyramid applications. Also, it fully supports HTML (including HTML5), CSS, JavaScript, and XML: these languages are bundled in the IDE via plugins and are switched on for you by default. Support for the other languages and frameworks can also be added via plugins (go to Settings | Plugins or PyCharm | Preferences | Plugins for macOS users, to find out more or set them up during the first IDE launch).

**4.6 SUPPORTED LANGUAGES﻿**

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**SPYDER**

**Spyder** is an open-source cross-platform integrated development environment (IDE) for scientific programming in the Python language. Spyder integrates with a number of prominent packages in the scientific Python stack, including NumPy, SciPy, Matplotlib, pandas, IPython, SymPy and Cython, as well as other open-source software. It is released under the MIT license.

Initially created and developed by Pierre Raybaut in 2009, since 2012 Spyder has been maintained and continuously improved by a team of scientific Python developers and the community.

Spyder is extensible with first-party and third-party plugins, includes support for interactive tools for data inspection and embeds Python-specific code quality assurance and introspection instruments, such as Pyflakes, Pylint and Rope. It is available cross-platform through Anaconda, on Windows, on macOS through MacPorts, and on major Linux distributions such as Arch Linux, Debian, Fedora, Gentoo Linux, openSUSE and Ubuntu.

Spyder uses Qt for its GUI and is designed to use either of the PyQt or PySide Python bindings. QtPy, a thin abstraction layer developed by the Spyder project and later adopted by multiple other packages, provides the flexibility to use either backend.

**FEATURES**

Features include:

* An editor with syntax highlighting, introspection, code completion
* Support for multiple IPython consoles
* The ability to explore and edit variables from a GUI
* A Help pane able to retrieve and render rich text documentation on functions, classes and methods automatically or on-demand
* A debugger linked to IPdb, for step-by-step execution
* Static code analysis, powered by Pylint
* A run-time Profiler, to benchmark code
* Project support, allowing work on multiple development efforts simultaneously
* A built-in file explorer, for interacting with the file system and managing projects
* A "Find in Files" feature, allowing full regular expression search over a specified scope
* An online help browser, allowing users to search and view Python and package documentation inside the IDE
* A history log, recording every user command entered in each console
* An internal console, allowing for introspection and control over Spyder's own operation

**PLUGINS**

* Available plugins include:
* Spyder-Unittest, which integrates the popular [unit testing](https://en.wikipedia.org/wiki/Unit_testing) frameworks Pytest, Unittest and Nose with Spyder
* Spyder-Notebook, allowing the viewing and editing of Jupyter Notebooks within the IDE
* Download Spyder Notebook
* Using conda: conda install spyder-notebook -c spyder-ide
* Using pip: pip install spyder-notebook
* Spyder-Reports, enabling use of literate programming techniques in Python
* Spyder-Terminal, adding the ability to open, control and manage cross-platform system shells within Spyder
* Download Spyder Terminal
* Using conda: conda install spyder-terminal -c spyder-ide
* Using pip: pip install spyder-terminal
* Spyder-Vim, containing commands and shortcuts emulating the [Vim text editor](https://en.wikipedia.org/wiki/Vim_(text_editor))
* Spyder-AutoPEP8, which can automatically conform code to the standard PEP 8 [code style](https://en.wikipedia.org/wiki/Programming_style)
* Spyder-Line-Profiler and Spyder-Memory-Profiler, extending the built-in profiling functionality to include testing an individual line, and measuring [memory](https://en.wikipedia.org/wiki/Random_access_memory) usage

**ANACONDA PYTHON**

Anaconda is a package manager, an environment manager, a Python/R data science distribution, and a collection of over 7,500+ open-source packages. Anaconda is free and easy to install, and it offers free community support.

Get the Anaconda Cheat Sheet and then download Anaconda.

Want to install conda and use conda to install just the packages you need? Get Miniconda.

**Anaconda Navigator or conda?**

After you install Anaconda or Miniconda, if you prefer a desktop graphical user interface (GUI) then use Navigator. If you prefer to use Anaconda prompt (or terminal on Linux or macOS), then use that and conda. You can also switch between them.

You can install, remove, or update any Anaconda package with a few clicks in Navigator, or with a single conda command in Anaconda Prompt (terminal on Linux or macOS).

* **To try Navigator**, after installing Anaconda, click the Navigator icon on your operating system’s program menu, or in Anaconda prompt (or terminal on Linux or macOS), run the command anaconda-navigator.
* **To try conda**, after installing Anaconda or Miniconda, take the 20-minute conda test drive and download a conda cheat sheet.

**Packages available in Anaconda**

* Over 250 packages are automatically installed with Anaconda.
* Over 7,500 additional open-source packages (including R) can be individually installed from the Anaconda repository with the conda install command.
* Thousands of other packages are available from Anaconda.org.
* You can download other packages using the pip install command that is installed with Anaconda. Pip packages provide many of the features of conda packages and in some cases they can work together. However, the preference should be to install the conda package if it is available.
* You can also make your own custom packages using the conda build command, and you can share them with others by uploading them to Anaconda.org, PyPI, or other repositories.

**Previous versions**

Previous versions of Anaconda are available in the archive. For a list of packages included in each previous version, see Old package lists.

Anaconda2 includes Python 2.7 and Anaconda3 includes Python 3.7. However, it does not matter which one you download, because you can create new environments that include any version of Python packaged with conda. See Managing Python with conda.

**Tkinter – Python**

Tk/Tcl has long been an integral part of Python. It provides a robust and platform independent windowing toolkit, that is available to Python programmers using the tkinter package, and its extension, the tkinter.tix and the tkinter.ttk modules.

The tkinter package is a thin object-oriented layer on top of Tcl/Tk. To use tkinter, you don’t need to write Tcl code, but you will need to consult the Tk documentation, and occasionally the Tcl documentation. tkinter is a set of wrappers that implement the Tk widgets as Python classes.

tkinter’s chief virtues are that it is fast, and that it usually comes bundled with Python. Although its standard documentation is weak, good material is available, which includes: references, tutorials, a book and others. tkinter is also famous for having an outdated look and feel, which has been vastly improved in Tk 8.5. Nevertheless, there are many other GUI libraries that you could be interested in. The Python wiki lists several alternative GUI frameworks and tools.

Python provides various options for developing graphical user interfaces (GUIs). Most important are listed below.

**Tkinter** − Tkinter is the Python interface to the Tk GUI toolkit shipped with Python. We would look this option in this chapter.

**wxPython** − This is an open-source Python interface for wxWindows

**JPython** − JPython is a Python port for Java which gives Python scripts seamless access to Java class libraries

* **Main tkinter module.**

tkinter.colorchooser

* **Dialog to let the user choose a color.**

tkinter.commondialog

* **Base class for the dialogs defined in the other modules listed here.**

tkinter.filedialog

* **Common dialogs to allow the user to specify a file to open or save.**

tkinter.font

* **Utilities to help work with fonts.**

tkinter.messagebox

* **Access to standard tk dialog boxes.**

tkinter.scrolledtext

* **Text widget with a vertical scroll bar built in.**

tkinter.simpledialog

* **Basic dialogs and convenience functions.**

tkinter.ttk

Themed widget set introduced in Tk 8.5, providing modern alternatives for many of the classic widgets in the main tkinter module.

**Additional modules:**

* **\_tkinter**

A binary module that contains the low-level interface to Tcl/Tk. It is automatically imported by the main tkinter module, and should never be used directly by application programmers. It is usually a shared library (or DLL), but might in some cases be statically linked with the Python interpreter.

* **idlelib**

Python’s Integrated Development and Learning Environment (IDLE).Based on tkinter constants.

Symbolic constants that can be used in place of strings when passing various parameters to Tkinter calls.Automatically imported by the main tkinter module.

* **tkinter.dnd**

(experimental) Drag-and-drop support for tkinter. This will become deprecated when it is replaced with the Tk DND.

* **tkinter.tix**

(deprecated) An older third-party Tcl/Tk package that adds several new widgets. Better alternatives for most can be found in tkinter.ttk.

turtle

Turtle graphics in a Tk window.

**TESTING SYSTEM TESTING AND MAINTENANCE:**

Testing is vital to the success of the system. System testing makes a logical assumption that if all parts of the system are correct, the goal will be successfully achieved. In the testing process we test the actual system in an organization and gather errors from the new system operates in full efficiency as stated. System testing is the stage of implementation, which is aimed to ensuring that the system works accurately and efficiently.

In the testing process we test the actual system in an organization and gather errors from the new system and take initiatives to correct the same. All the front-end and back-end connectivity are tested to be sure that the new system operates in full efficiency as stated. System testing is the stage of implementation, which is aimed at ensuring that the system works accurately and efficiently.

The main objective of testing is to uncover errors from the system. For the uncovering process we have to give proper input data to the system. So we should have more conscious to give input data. It is important to give correct inputs to efficient testing.

Testing is done for each module. After testing all the modules, the modules are integrated and testing of the final system is done with the test data, specially designed to show that the system will operate successfully in all its aspects conditions. Thus the system testing is a confirmation that all is correct and an opportunity to show the user that the system works. Inadequate testing or non-testing leads to errors that may appear few months later.

This will create two problems, Time delay between the cause and appearance of the problem. The effect of the system errors on files and records within the system. The purpose of the system testing is to consider all the likely variations to which it will be suggested and push the system to its limits.

Technology Foraging: CJTEC monitors trends and developments related to technologies, products, and practices in areas of interest to criminal justice. Its researchers use horizon scanning and market research techniques to identify, evaluate, and compare solutions for specific criminal justice needs.

Testing and Evaluation: CJTEC conducts testing and evaluation activities to produce objective, performance-related information about the technologies and practices in use by criminal justice agencies. The evaluations include testing in laboratories and environments similar to the real world, comparative evaluations, evaluations in collaboration with practitioner agency deployments, and technology landscape assessments.

Compliance Testing Program: CJTEC administers the NIJ Compliance Testing Program. Administration activities include coordinating initial compliance testing; coordinating follow-up inspections with independent testing laboratories and quality assurance organizations; and making recommendations to NIJ regarding compliance of products submitted to the program.

Equipment Standard: CJTEC supports the development, validation, and maintenance of criminal justice equipment standards to ensure the safety and efficacy of technologies bought and employed by the criminal justice community.

The testing process focuses on logical intervals of the software ensuring that all the statements have been tested and on the function intervals (i.e.,) conducting tests to uncover errors and ensure that defined inputs will produce actual results that agree with the required results. Testing has to be done using the two common steps Unit testing and Integration testing. In the project system testing is made as follows:

The procedure level testing is made first. By giving improper inputs, the errors occurred are noted and eliminated. This is the final step in system life cycle. Here we implement the tested error-free system into real-life environment and make necessary changes, which runs in an online fashion. Here system maintenance is done every month or year based on company policies, and is checked for errors like runtime errors, long run errors and other maintenances like table verification and reports.

Integration Testing is a level of software testing where individual units are combined and tested as a group.

The purpose of this level is to expose faults in the interaction between integrated units. Test drivers and test stubs are used to assist in Integration testing.

**METHOD**

Any of Black Box Testing, White Box Testing, and Gray Box Testing methods can be used. Normally, the method depends on your definition of ‘unit’.

TASKS

* Integration Test Plan
* Prepare
* Review
* Rework
* Baseline
* Integration Test Cases/Scripts
* Prepare
* Review
* Rework
* Baseline
* Integration Test
* Perform

**UNIT TESTING**:

Unit testing verification efforts on the smallest unit of software design, module. This is known as “Module Testing”. The modules are tested separately. This testing is carried out during programming stage itself. In these testing steps, each module is found to be working satisfactorily as regard to the expected output from the module.

**Unit Testing** is a type of software testing where individual units or components of a software are tested. The purpose is to validate that each unit of the software code performs as expected. Unit Testing is done during the development (coding phase) of an application by the developers. Unit Tests isolate a section of code and verify its correctness. A unit may be an individual function, method, procedure, module, or object.

In SDLC, STLC, V Model, Unit testing is first level of testing done before integration testing. Unit testing is a WhiteBox testing technique that is usually performed by the developer. Though, in a practical world due to time crunch or reluctance of developers to tests, QA engineers also do unit testing.

**BLACK BOX TESTING**

Black box testing, also known as Behavioral Testing, is a software testing method in which the internal structure/ design/ implementation of the item being tested is not known to the tester. These tests can be functional or non-functional, though usually functional.

Specific knowledge of the application's code, internal structure and programming knowledge in general is not required. The tester is aware of what the software is supposed to do but is not aware of how it does it. For instance, the tester is aware that a particular input returns a certain, invariable output but is not aware of how the software produces the output in the first place.

Test cases are built around specifications and requirements, i.e., what the application is supposed to do. Test cases are generally derived from external descriptions of the software, including specifications, requirements and design parameters. Although the tests used are primarily functional in nature,

non-functional tests may also be used. The test designer selects both valid and invalid inputs and determines the correct output, often with the help of a [test oracle](https://en.wikipedia.org/wiki/Test_oracle) or a previous result that is known to be good, without any knowledge of the test object's internal structure.

**WHITE-BOX TESTING**

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software that tests internal structures or workings of an application, as opposed to its functionality (i.e. black-box testing).

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of [software testing](https://en.wikipedia.org/wiki/Software_testing) that tests internal structures or workings of an application, as opposed to its functionality .In white-box testing, an internal perspective of the system is used to design test cases. The tester chooses inputs to exercise paths through the code and determine the expected outputs. This is analogous to testing nodes in a circuit, e.g. [in-circuit testing](https://en.wikipedia.org/wiki/In-circuit_test) (ICT). White-box testing can be applied at the [unit](https://en.wikipedia.org/wiki/Unit_testing), [integration](https://en.wikipedia.org/wiki/Integration_testing) and [system](https://en.wikipedia.org/wiki/System_testing) levels of the software testing process. Although traditional testers tended to think of white-box testing as being done at the unit level, it is used for integration and system testing more frequently today. It can test paths within a unit, paths between units during integration, and between subsystems during a system–level test. Though this method of test design can uncover many errors or problems, it has the potential to miss unimplemented parts of the specification or missing requirements. Where white-box testing is design-driven, that is, driven *exclusively* by agreed specifications of how each component of software is required to behave (as in [DO-178C](https://en.wikipedia.org/wiki/DO-178C) and [ISO 26262](https://en.wikipedia.org/wiki/ISO_26262) processes), white-box test techniques can accomplish assessment for unimplemented or missing requirements.

**GREY BOX TESTING**

Grey box testing is a technique to test the application with having a limited knowledge of the internal workings of an application. To test the Web Services application usually the Grey box testing is used. Grey box testing is performed by end-users and also by testers and developers.

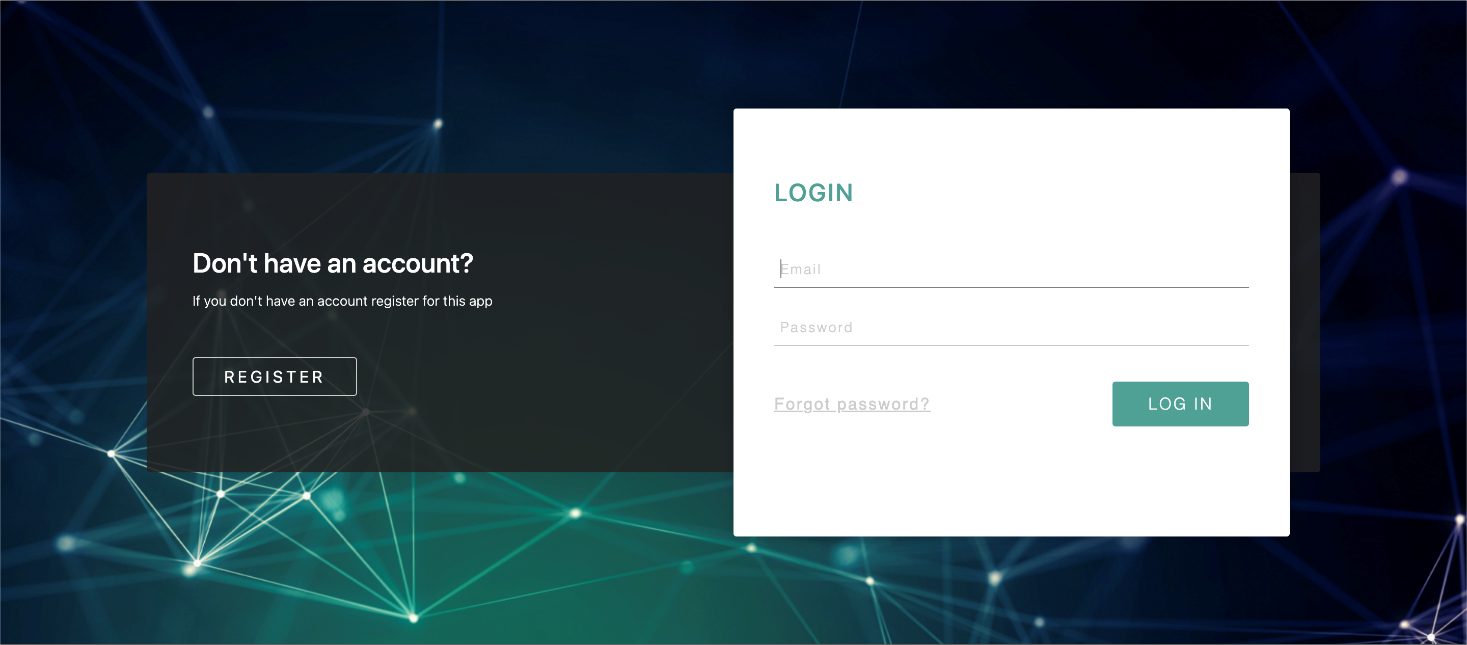
**Grey Box Testing** or Gray box testing is a software testing technique to test a software product or application with partial knowledge of internal structure of the application. The purpose of grey box testing is to search and identify the defects due to improper code structure or improper use of applications.

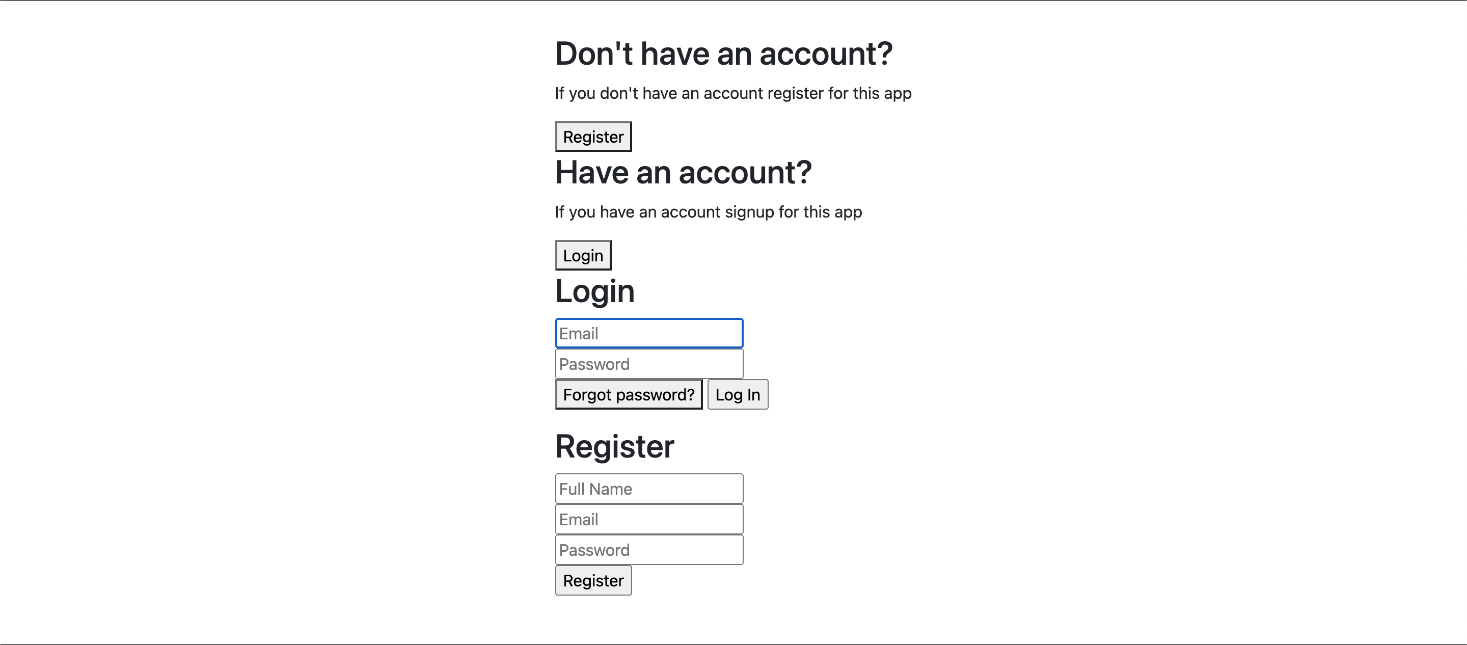
In this process, context-specific errors that are related to web systems are commonly identified. It increases the testing coverage by concentrating on all of the layers of any complex system.Gray Box Testing is a software testing method, which is a combination of both [White Box Testing](https://www.guru99.com/white-box-testing.html) and Black Box Testing method.In Software Engineering, Gray Box Testing gives the ability to test both sides of an application, presentation layer as well as the code part. It is primarily useful in [Integration Testing](https://www.guru99.com/integration-testing.html) and [Penetration Testing](https://www.guru99.com/learn-penetration-testing.html).

**BUILD THE TEST PLAN**

Any project can be divided into units that can be further performed for detailed processing. Then a testing strategy for each of this unit is carried out. Unit testing helps to identity the possible bugs in the individual component, so the component that has bugs can be identified and can be rectified from errors.

## RESULT :





## CONCLUSION :

Tracking your expenses daily can not only save your amount, but it can also assist you set financial goals for the longer term. If you know exactly where your amount goes every month, you will easily see where some cutbacks and compromises can be made. The project that we have developed is more efficient than the other income and expense trackers. The project successfully avoids the manual calculation which is performed usually in the absence of an expense tracker. The modules are developed efficiently and also in an attractive manner. The application will eliminate sticky notes, spreadsheets, and ledgers that cause confusion, data inconsistency problems while recording and splitting expenses. With our application users can manage their expenses more effectively and they will be better at managing the expenses.

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