Event Management Using QR Codes

ABSTRACT

Event Management is a very difficult task when it comes to paperwork, passes and security of the event However this web app helps in managing the event by the use of QR codes instead of physical passes The user is allotted a unique QR code for the event and the QR code can be used only once for an entry in a event which is registered by the user There are a lot of functionalities added in the web app such as event calendar along with registration forms for different events To add the required functionalities Python's Flask Framework is used which connects the SQL Database with the backend and also user authentication and unique QR Code generation is done in the Flask Framework File.

The Event passes generated by the app are verified at the entrance and only then the user is granted access

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INTRODUCTION

Event management using QR codes is an innovative approach that leverages the convenience and efficiency of QR code technology to streamline various aspects of event planning, organization, and execution. QR codes, or Quick Response codes, are two-dimensional barcodes that can store a wide range of information, including text, URLs, contact details, and more. By integrating QR codes into event management processes, organizers can enhance attendee experience, improve operational efficiency, and gather valuable data for analysis.

One of the primary benefits of using QR codes in event management is simplifying the check-in process. Instead of manually checking attendees' names off a list or scanning through printed guest lists, organizers can create personalized QR codes for each attendee and scan them upon arrival. This automated check-in system speeds up the entry process, reduces waiting times, and minimizes the potential for human error. Attendees can simply present their QR codes on their smartphones or printed tickets for quick verification, making the entry process smoother and more efficient.

QR codes can also be used to provide attendees with easy access to event information and resources. Organizers can include QR codes on event invitations, promotional materials, and signage that link to event websites, agendas, maps, or downloadable resources. This allows attendees to quickly access essential information about the event, such as schedules, speaker bios, session details, and venue maps, right from their smartphones. It eliminates the need for distributing bulky printed materials and ensures that attendees have up-to-date information at their fingertips.

In addition to enhancing the attendee experience, QR codes can also improve event security and monitoring. Organizers can generate unique QR codes for different access levels or ticket types, enabling them to control entry to specific areas or sessions within the event venue. This helps to prevent unauthorized access and ensures that attendees only have access to the areas or sessions that they are entitled to attend. Furthermore, organizers can track attendance and gather real-time data on attendance rates, popular sessions, and peak attendance times, which can be invaluable for future event planning and marketing efforts.

Another valuable application of QR codes in event management is for networking and engagement purposes. Organizers can create QR codes that link to attendee profiles on event networking platforms or social media channels, allowing attendees to easily connect with each other and expand their professional networks. Additionally, QR codes can be used to facilitate interactive sessions, workshops, or surveys during the event. For instance, presenters can display QR codes on slides that attendees can scan to access additional resources, submit questions, or participate in live polls, enhancing engagement and interaction throughout the event.

From a marketing and promotional perspective, QR codes offer a cost-effective and measurable way to track the effectiveness of marketing campaigns and promotional activities. Organizers can include QR codes in email campaigns, social media posts, or advertisements to drive traffic to event registration pages or promotional offers. By tracking QR code scans and conversions, organizers can gauge the success of their marketing efforts, identify which channels are most effective, and optimize future marketing strategies accordingly.

In conclusion, event management using QR codes offers a multitude of benefits for both organizers and attendees. By leveraging the power of QR code technology, organizers can streamline event operations, enhance attendee experience, improve security and monitoring, facilitate networking and engagement, and gain valuable insights for future event planning. As QR code technology continues to evolve and become more integrated into everyday life, its application in event management will undoubtedly become even more widespread, further revolutionizing the way events are planned, organized, and executed.

LITERATURE SURVEY

The history of QR (Quick Response) codes is a fascinating journey that exemplifies the transformative power of technology and innovation. Originating in the mid-1990s in Japan, QR codes were conceptualized as a solution to track automotive parts during the manufacturing process by Denso Wave, a subsidiary of Toyota. Little did they know that this invention would revolutionize various sectors and become an integral part of our daily lives.

Development and Early Adoption:

In 1994, Masahiro Hara from Denso Wave invented the QR code, introducing a groundbreaking technology that surpassed the limitations of traditional barcodes. While traditional barcodes could only store up to 20 alphanumeric characters, QR codes could accommodate significantly more data, including alphanumeric characters, binary data, and even kanji characters. This versatility made QR codes a game-changer, enabling a wide range of applications beyond initial expectations.

By 1999, Denso Wave released the QR code as an open standard, democratizing its use and allowing individuals, businesses, and organizations worldwide to create and utilize QR codes without requiring a license. This decision paved the way for the widespread adoption and proliferation of QR codes across various industries and sectors.

Rise in Popularity:

The rise of smartphones equipped with cameras and internet connectivity in the late 2000s and early 2010s played a pivotal role in the popularity of QR codes. Smartphones transformed into powerful tools that could scan QR codes, providing users with a convenient and efficient way to access information instantly. This technological convergence fueled the adoption of QR codes and laid the foundation for their integration into daily routines and business operations.

Businesses and marketers quickly recognized the potential of QR codes as a powerful marketing and advertising tool. QR codes became ubiquitous in promotional materials, product packaging, advertisements, and storefronts, enabling consumers to scan codes to access websites, promotions, product information, and more. This innovative approach to marketing enhanced engagement, provided valuable insights, and fostered interactive experiences between brands and consumers.

Diverse Applications:

The versatility of QR codes led to their adoption in diverse sectors and applications, transcending beyond marketing and advertising. In countries like China, QR codes played a pivotal role in the adoption of mobile payment systems like Alipay and WeChat Pay. Users could make payments seamlessly by scanning QR codes, transforming the way transactions were conducted and driving the digital payment revolution.

In the realm of event management, QR codes revolutionized ticketing systems. Electronic ticketing systems utilized QR codes to streamline entry processes for events, flights, and public transportation, eliminating the need for physical tickets and reducing operational costs. This digitization of ticketing systems enhanced efficiency, provided convenience to attendees, and offered organizers valuable data insights.

The healthcare sector also witnessed the integration of QR codes for various applications, including patient identification, accessing medical records, tracking medications, and facilitating contactless interactions. QR codes improved efficiency, accuracy, and patient experience by digitizing processes and reducing administrative burdens.

Modern Usage:

The COVID-19 pandemic accelerated the adoption and relevance of QR codes, emphasizing their role in facilitating contactless interactions and ensuring health and safety. Restaurants utilized QR codes to provide contactless menus, enabling customers to access menus, place orders, and make payments online. This contactless dining experience minimized physical contact, adhered to health guidelines, and provided a seamless dining experience for patrons.

Authentication and security emerged as key areas where QR codes were increasingly utilized. Two-factor authentication (2FA) systems integrated QR codes to enhance security measures and protect sensitive information. Secure login processes utilizing QR codes provided an additional layer of security, safeguarding user accounts and mitigating risks associated with unauthorized access and data breaches.

Future Prospects:

Looking ahead, QR codes are poised to play a pivotal role in the evolution of smart cities, where they could facilitate various applications, including public transportation, parking systems, accessing public services, and enhancing urban mobility. The integration of QR codes with augmented reality (AR) technology holds promise for delivering immersive experiences in sectors like tourism, education, and entertainment, offering interactive and personalized experiences to users.

In conclusion, the history of QR codes is a testament to their evolution from a tracking tool in automotive manufacturing to a ubiquitous technology that permeates various sectors and applications globally. As technology continues to advance and innovate, QR codes are expected to evolve further, unlocking new possibilities, driving innovation, and shaping the future of interconnected digital ecosystems.

Event management has undergone a significant transformation with the integration of QR codes, offering streamlined processes, enhanced engagement, and personalized experiences for attendees.

Ticketing and Registration: QR code-based tickets have replaced traditional paper tickets, allowing attendees to easily access and present their tickets by scanning QR codes, reducing waiting times and enhancing convenience. On-site registration processes have been simplified with QR codes, enabling attendees to check-in swiftly by scanning a code at the event venue.

Access Control: Security personnel can validate attendees' tickets efficiently by scanning QR codes, ensuring seamless entry to the event venue or specific sessions. QR codes also facilitate differentiated access, allowing VIP ticket holders exclusive entry to special areas or amenities.

Information and Engagement: QR codes provide attendees with easy access to event agendas, schedules, and session details, keeping them informed about timings and locations. Interactive sessions are enhanced with QR codes, enabling real-time participation in polls, surveys, or Q&A sessions, fostering engagement and interaction.

Networking and Connectivity: QR codes promote networking by facilitating digital exchange of contact information among attendees. Additionally, QR codes linking to event-specific social media pages or hashtags encourage attendees to engage, share experiences, and generate buzz online.

Marketing and Promotions: QR codes on promotional materials lead attendees to event-related content, videos, or special offers, amplifying marketing efforts. Sponsor engagement is enhanced through QR codes showcasing sponsor information, promotions, or interactive experiences, increasing visibility and value for sponsors.

Feedback and Surveys: Post-event feedback is collected efficiently using QR code-linked surveys, providing valuable insights to evaluate the event's success. Real-time feedback collection enables organizers to make immediate adjustments or improvements during the event.

Health and Safety: QR codes facilitate contactless experiences and health screenings, ensuring compliance with health guidelines and creating a safe event environment by minimizing physical contact and health risks.

In conclusion, QR codes have revolutionized event management by offering efficient, interactive, and personalized experiences for attendees, while simplifying organizational processes for event organizers. As technology continues to evolve, the integration of QR codes with innovative technologies such as augmented reality (AR), artificial intelligence (AI), and data analytics will further elevate the capabilities and possibilities in event management, driving innovation and excellence in the industry.

IMPLEMENATION OF QR IN PYTHON IN DETAIL

Sure! QR (Quick Response) code is a two-dimensional barcode that can store data in both vertical and horizontal directions, allowing for more information to be stored in a smaller space compared to traditional one-dimensional barcodes. QR codes are widely used for various purposes like website URLs, contact details, product information, and more.

In Python, there are several libraries available for generating and decoding QR codes. One of the most popular libraries is `qrcode`. Below, I'll explain the theory behind QR codes and then show you how to implement them using the `qrcode` library.

Theory of QR Code

A QR code consists of black squares arranged on a white background in a square grid. The data stored in a QR code is represented by the arrangement of these squares. The QR code comprises three main parts:

1. **Finder Patterns**: These are the three large squares (one at each corner and one at the top-left corner) that help the QR code reader locate and orient the QR code.

2. **Alignment Patterns**: These are smaller squares placed at regular intervals inside the QR code to improve the readability and accuracy of the code.

3. **Timing Patterns**: These are the alternating black and white pixels between the finder and alignment patterns that help the QR code reader distinguish between different modules.

4. **Data and Error Correction**: The actual data is stored in the QR code using various encoding methods. Additionally, QR codes include error correction codes to ensure that the data can still be read even if part of the code is damaged or obscured.

Generating QR Code in Python using `qrcode` Library

Here's a step-by-step guide to generating a QR code in Python using the `qrcode` library:

1. **Installation**

First, you need to install the `qrcode` library. You can install it using pip:

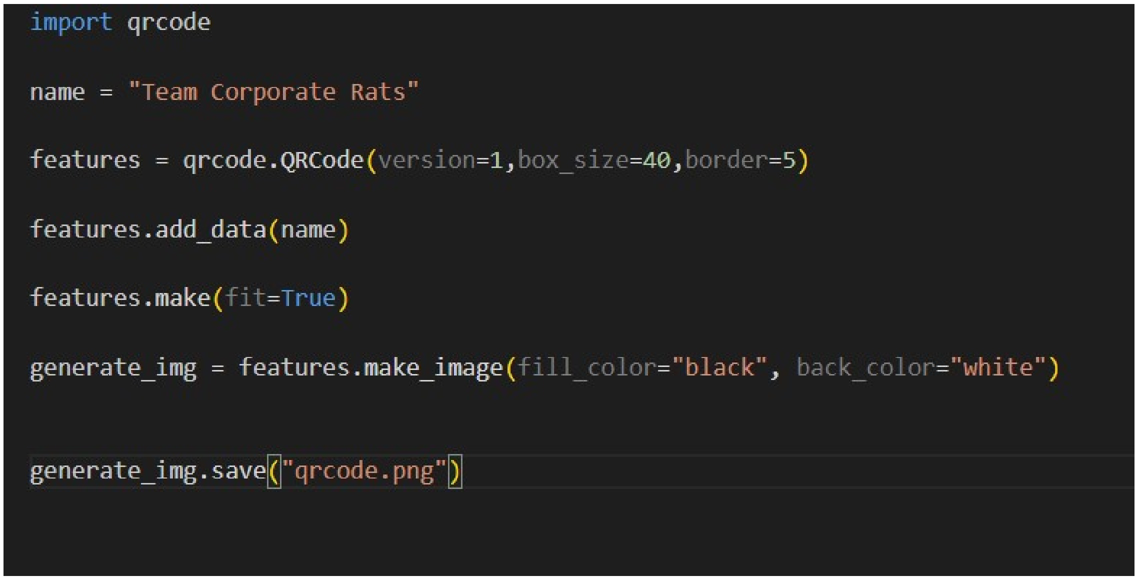
‘pip install qrcode’

Then we can use this library to generate QR Codes in Python

It is a in-built library so it reduces the work of mathematical algorithm to generate a QR Code using Matrices

2. **Basic QR Code Generation**

Here's a simple example to generate a QR code that encodes a URL:



```
import qrcode

name = "Team Corporate Rats"

features = qrcode.QRCode(version=1,box_size=40,border=5)

features.add_data(name)

features.make(fit=True)

generate_img = features.make_image(fill_color="black", back_color="white")


generate_img.save("qrcode.png")
```

In this example:

- `version`: Specifies the size of the QR code. The larger the version, the more data it can store.

- box size: Specifies the size of each "box" of the QR code in pixels.

- border: Specifies the thickness of the border around the QR code.

- add_data: Adds the data to the QR code.
- make: Generates the QR code.
- make_image: Converts the QR code instance into an image.

After scanning the QR Code you will get the text as:

“Team Corporate Rats”

3. **Displaying the QR Code**

We can display the QR Code by simply locating the QR code in the database and displaying it

This is a basic introduction to generating QR codes in Python using the `qrcode` library. You can customize the QR code further by changing its size, error correction level, colors, and more according to your requirements.

Implementing an event management system using QR codes can streamline various aspects of event planning, attendee management, and on-site operations. Below is a detailed explanation of how you can implement such a system using QR codes in Python.

Project Overview

The project will consist of the following components:

1. **Event Creation**: Creating new events with details such as event name, date, location, and schedule.

2. **Attendee Registration**: Registering attendees for the event by generating unique QR codes for each attendee.

3. **Check-in System**: Using QR codes to check-in attendees at the event venue.

4. **Data Management**: Storing and retrieving event and attendee data from a database.

Technologies Used

- **Python**: Programming language to develop the backend logic.
- **Flask**: Web framework to build the web application.
- **MYSQL Database **: Object-Relational Mapping (ORM) library to interact with the database.
- **qrcode**: Library to generate QR codes.

- **bcrypt **: Library to encrypt and decrypt passwords to enhance security

Implementation Steps

1. Setting Up the Environment

Install the required libraries:

Bcrypt

flask_mysqldb

flask_wtf

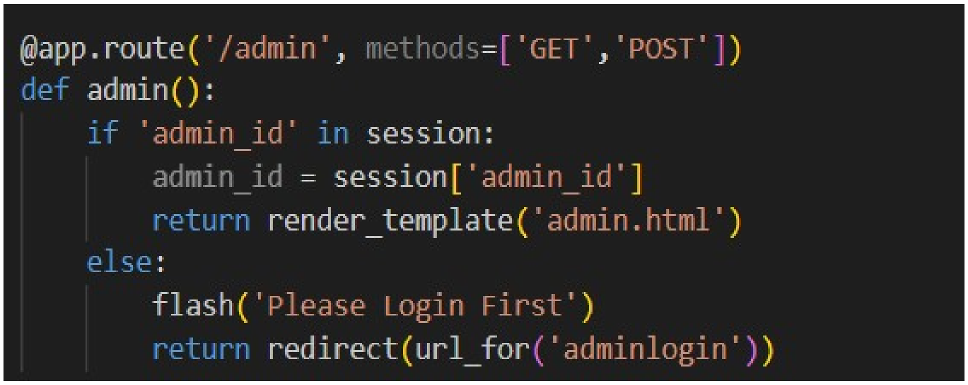
wtforms

qrcode

2. Creating the Flask Application

To create a Flask Application we need to first create a main app called main.py

Then we need to create an app route to redirect to pages we need as shown below



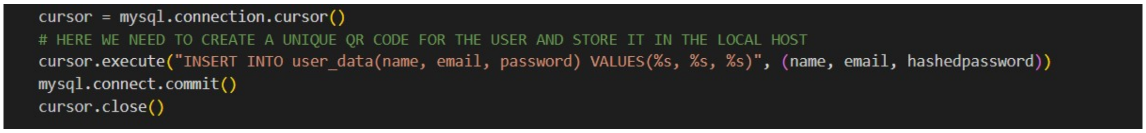
```
@app.route('/admin', methods=['GET','POST'])
def admin():
    if 'admin_id' in session:
        admin_id = session['admin_id']
        return render_template('admin.html')
    else:
        flash('Please Login First')
        return redirect(url_for('adminlogin'))
```

3. Defining the Database Models

To define a Database Model we need to use XAMPP Control Panel to first get the overview of database in mysql

To create a Database in MySQL we just need to establish connection with MySQL my first running the SQL server

To establish a connection with database we need to use the following syntax:



```
cursor = mysql.connection.cursor()
# HERE WE NEED TO CREATE A UNIQUE QR CODE FOR THE USER AND STORE IT IN THE LOCAL HOST
cursor.execute("INSERT INTO user_data(name, email, password) VALUES(%s, %s, %s)", (name, email, hashedpassword))
mysql.connect.commit()
cursor.close()
```

This code block is taken from the source code of this project as this block shows first we need to connect to the sql cursor

Then we can execute any command we like

Then we need to commit to the database to save the data

At last we need to close the cursor which is connected to establish connection

4. Creating Routes and Views

We need to create app routes to redirect to do various pages as all tasks cannot be performed on one page

The following app routes are created in this project:

- Admin
- Create event
- Delete event
- Landing
- About
- Home
- Login
- Sign up
- Event pass
- Logout
- Admin logout

- Admin profile
- Admin registration
- Admin login
- User profile
- Event1
- Events
- Facebook
- Twitter
- Instagram

5. HTML Templates

HTML Templates are easy to create

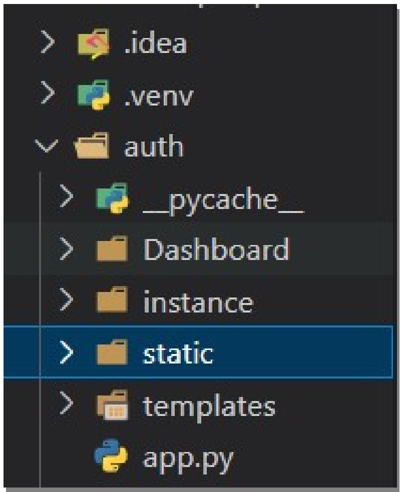
To create these templates we need to create a separate folder for these templates named as ‘template’

The need for this template folder is that it causes confusion while locating a template to edit its source code

In this folder we have to create a template **which exactly matches the name of template** we have redirected to on the webpage

The folder view looks as follows:

6. Running the Application



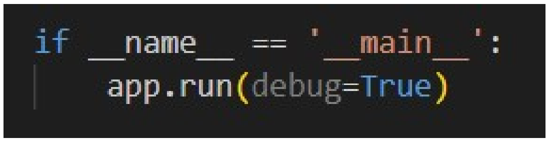
```
> .idea
> .venv
v auth
  > __pycache__
  > Dashboard
  > instance
  > static
  > templates
    app.py
```

To run this whole application we need to use the syntax

app.run(debug=True)

‘debug = True’ is only used when we are testing the program during final deployment we don’t have to use it

The code block looks as follows:



```python
if __name__ == '__main__':
    app.run(debug=True)
```

List of Templates Created in this Project:

1. About
2. Admin
3. Admin dashboard
4. Admin login
5. Admin profile
6. Admin registration
7. Landing page
8. Main page
9. Create event
10. Delete event
11. User Entry Pass
12. Events
13. User Login
14. User Registration

7. Using CSS in this project

To use CSS in this project we also need to arrange it like templates to reduce the confusion and increase the readability of code

CSS files are stored in a new folder named as ‘static’ and in this folder a new folder is created named as ‘style’ and the CSS files are stored in this folder

CSS files are used to design and style the web pages and make it look more attractive to users which increases the revenue

Using Bootstrap along with CSS

Bootstrap is a Framework of CSS which is used to reduce the work and strain of developing and using logic to style the web pages

It can be imported into the HTML template by using “href” tag in HTML template and import syntax in CSS file

The link to import the Bootstrap styles are as follows:

```
https://cdn.jsdelivr.net/npm/bootstrap@5.3.2/dist/css/bootstrap.min.css
https://cdn.jsdelivr.net/npm/popper.js@1.16.1/dist/umd/popper.min.js
https://cdn.jsdelivr.net/npm/bootstrap@4.6.2/dist/js/bootstrap.bundle.min.js
https://cdn.jsdelivr.net/npm/jquery@3.7.1/dist/jquery.slim.min.js
```

These links are used to import the bootstrap classes in templates

Bootstrap is used by giving the tag a class which is designated to a specific style

8. Saving Images and Static files

The process to store images in SQL Database is very costly

First Step is to convert the image file into BLOB (Binary Large Object)

Then the object is stored into the database

While retrieving the image stored the image i.e. BLOB is converted into image

This process takes a lot of time and leads to buffering in the Page

The Optimal Solution to tackle this problem was to store the images into user computer as there is no need to convert it into any form it is directly stored in form of PNG(Portable Network Graphics)

To store it in the computer we first need to manage it properly so to store it in we need to create a separate folder in the static folder

There are 3 types of images stored in the computer so 3 folders are required

Their names are as follows:

1. user_img
2. qrcode
3. admin_img

The user_img folder stored the profile picture of the user

The qrcode folder stores the QR Code of each user

NOTE: Each user gets a unique QR Code

The admin_img stores the profile picture of admin

Then other static content such as background images and other images are stored in the folder named as "images"

WORKING OF THE PROJECT:

The work of the project is as follows

- USER
  - ❖ Can create a new account on the website
  - ❖ Can register to any event desired
  - ❖ Will get a unique QR Code as a event pass for the registered event
  - ❖ Can register for multiple events
- ADMIN

    - Create a new event database and manage it
    - Delete an event from the database and website
    - Delete any user from the database due to violations of terms
    - View the records and revenue of the webpage

- SECURITY
    - Scan the QR Codes of the Attendees

Creating a QR Code Scanner

To create a QR Code Scanner the following libraries are required

- Cv2
- Pyzbar
- mysql.connector

These libraries are required to scan the QR Code and check whether the pass is valid for event or not

The uses of the Libraries are as follows:

Cv2: This library is used to create a GUI and capture video from the dashcam to detect QR Codes

Pyzbar: This library is used to decode the data stored in the QR Code

mysql.connector: This library is used to authenticate the QR Code is valid or not for the current event

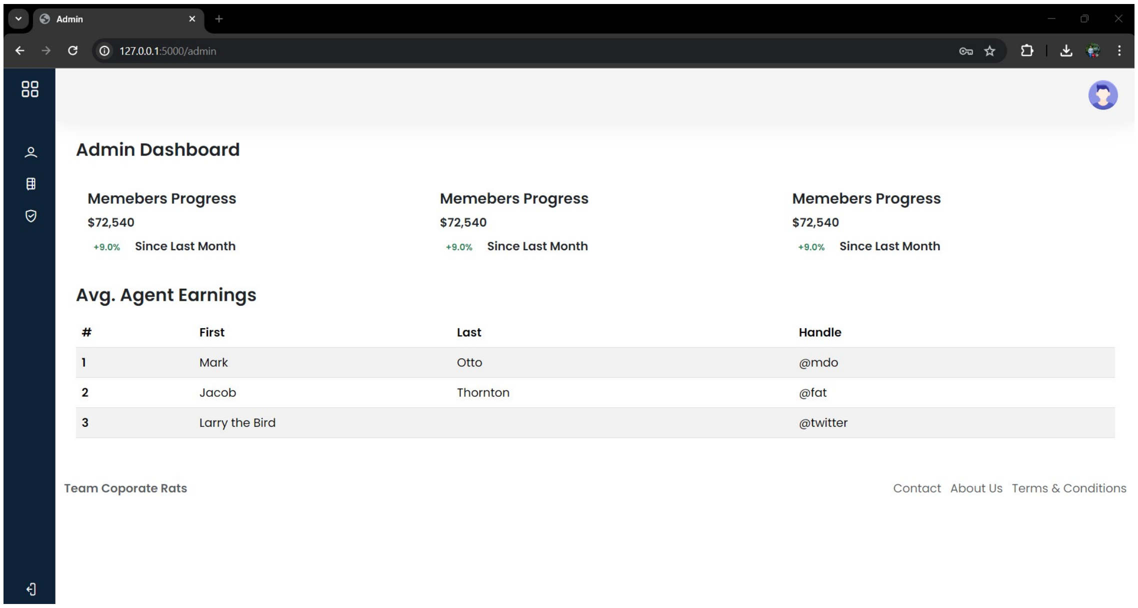
SECURITY ENHANCEMENT OF THE WEBPAGE

To enhance the security of the webpage we have used Object Oriented Concepts using Class to store the private data in the objects which cannot be viewed by external entities for the purpose of data stealing bcrypt library is used to encrypt the password of user to prevent the password leak from the admin who manages the database

It is used to increase the security protocol of the project

Also, **Session** is established for the user which will **store the login session** for some time for the user which will reduce the time to log in every time the user visits the webpage

SCREENSHOTS:



Admin Dashboard

Memebers Progress
$72,540
+9.0% Since Last Month

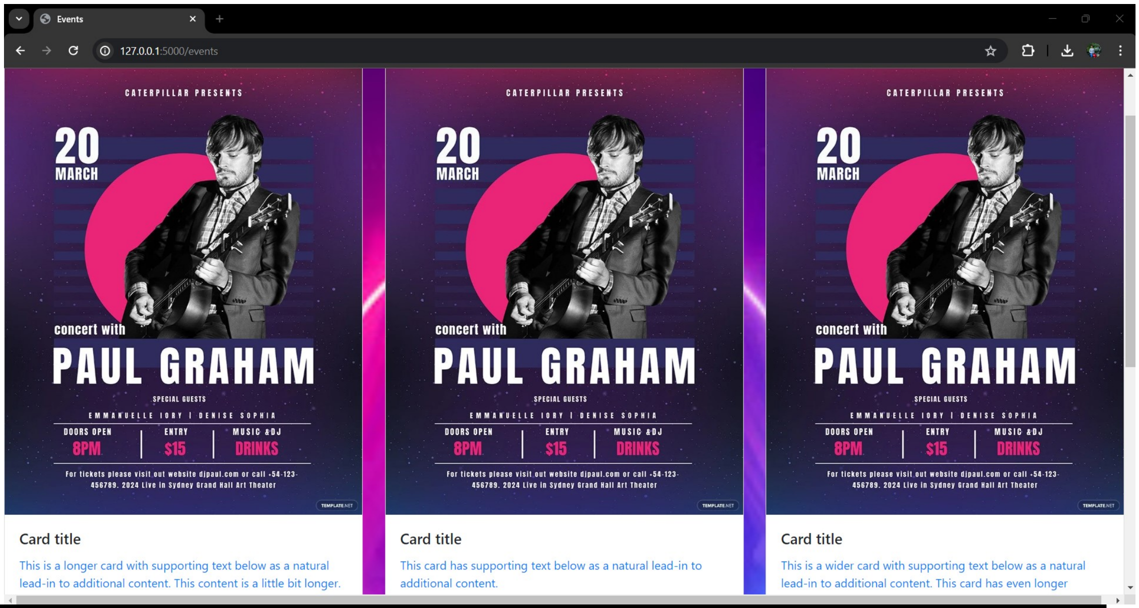
Memebers Progress
$72,540
+9.0% Since Last Month

Memebers Progress
$72,540
+9.0% Since Last Month

Avg. Agent Earnings

#	First	Last	Handle
1	Mark	Otto	@mdo
2	Jacob	Thornton	@fat
3	Larry the Bird		@twitter

Team Coporate Rats


Events
127.0.0.1:5000/events
CATERPILLAR PRESENTS
20
MARCH
concert with
PAUL GRAHAM
SPECIAL GUESTS
EMMANUELLE IORY | DENISE SOPHIA
DOORS OPEN
8PM
ENTRY
$15
MUSIC &DJ
DRINKS
For tickets please visit out website dipaul.com or call -54-123-456789. 2024 Live in Sydney Grand Hall Art Theater
TEMPLATE.NET

Card title

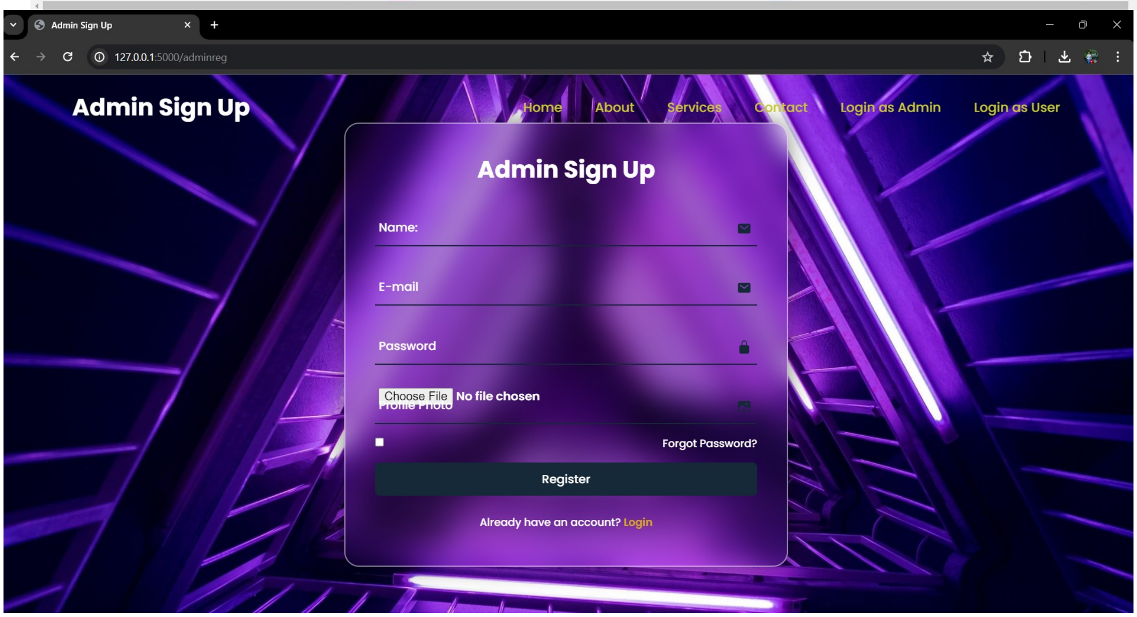
This is a longer card with supporting text below as a natural lead-in to additional content. This content is a little bit longer.

Card title

This card has supporting text below as a natural lead-in to additional content.

Card title

This is a wider card with supporting text below as a natural lead-in to additional content. This card has even longer



Admin Sign Up

Admin Sign Up

Name:

E-mail

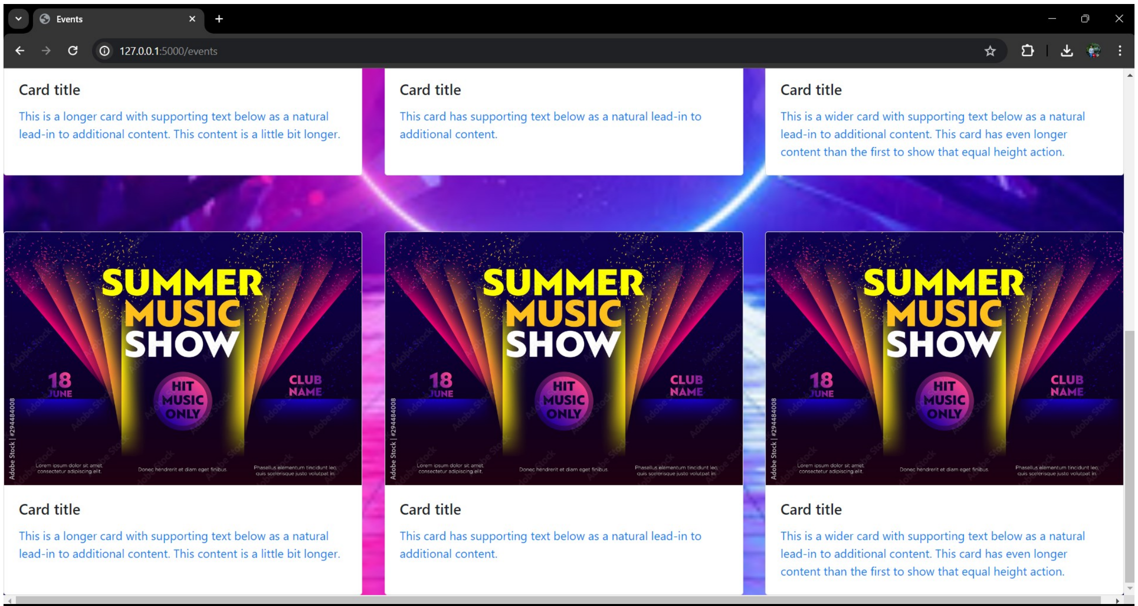
Password

Choose File No file chosen
Profile Photo

□ Forgot Password?

Register

Already have an account? Login



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This is a wider card with supporting text below as a natural lead-in to additional content. This card has even longer content than the first to show that equal height action.

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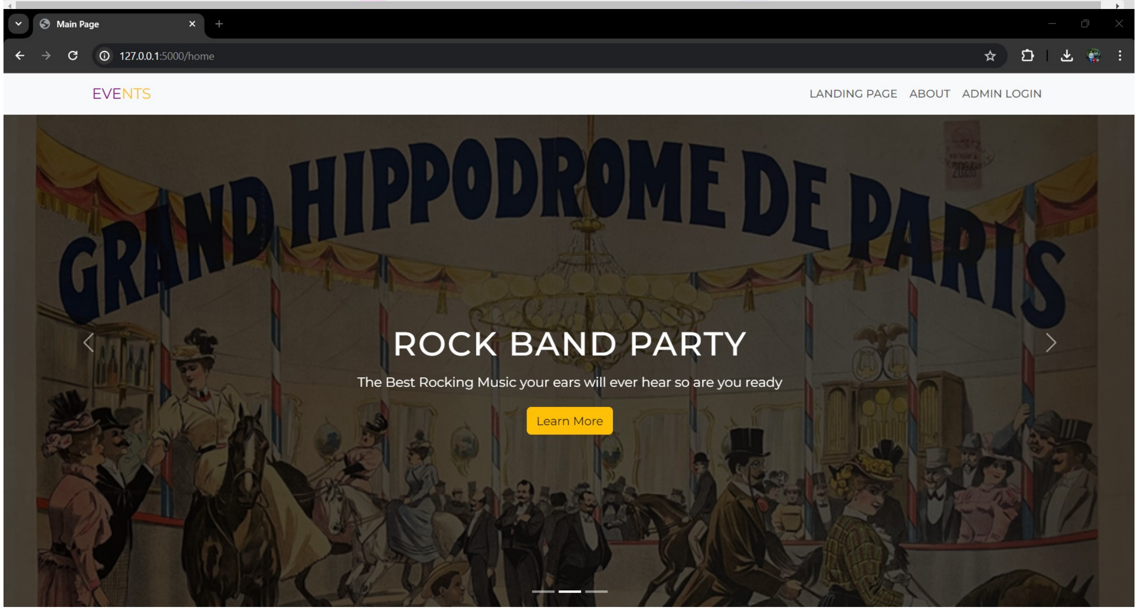
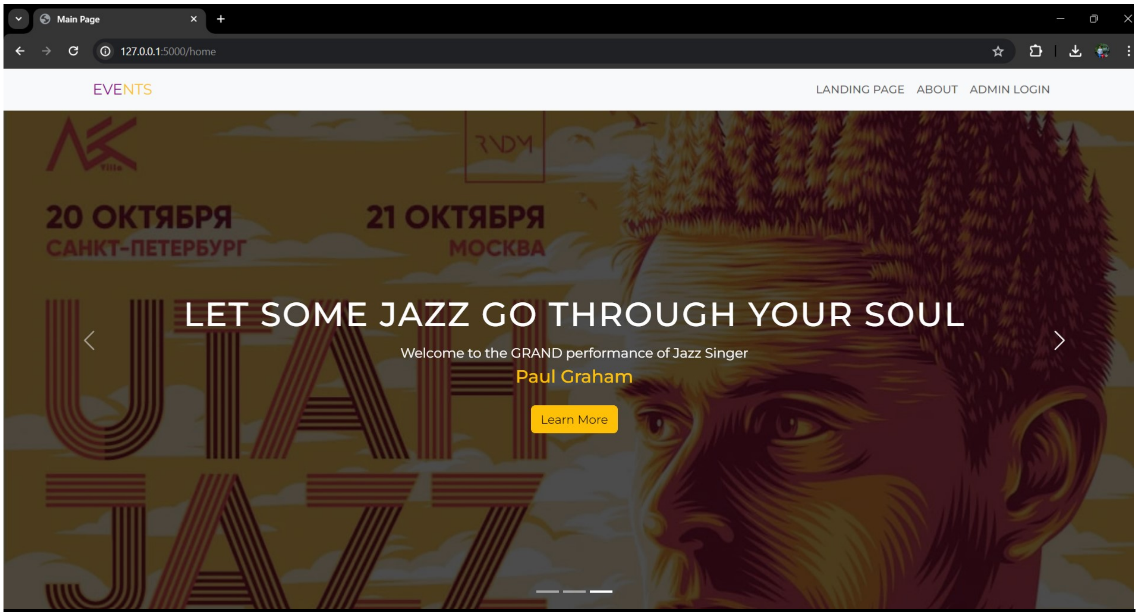


ROCK BAND PARTY

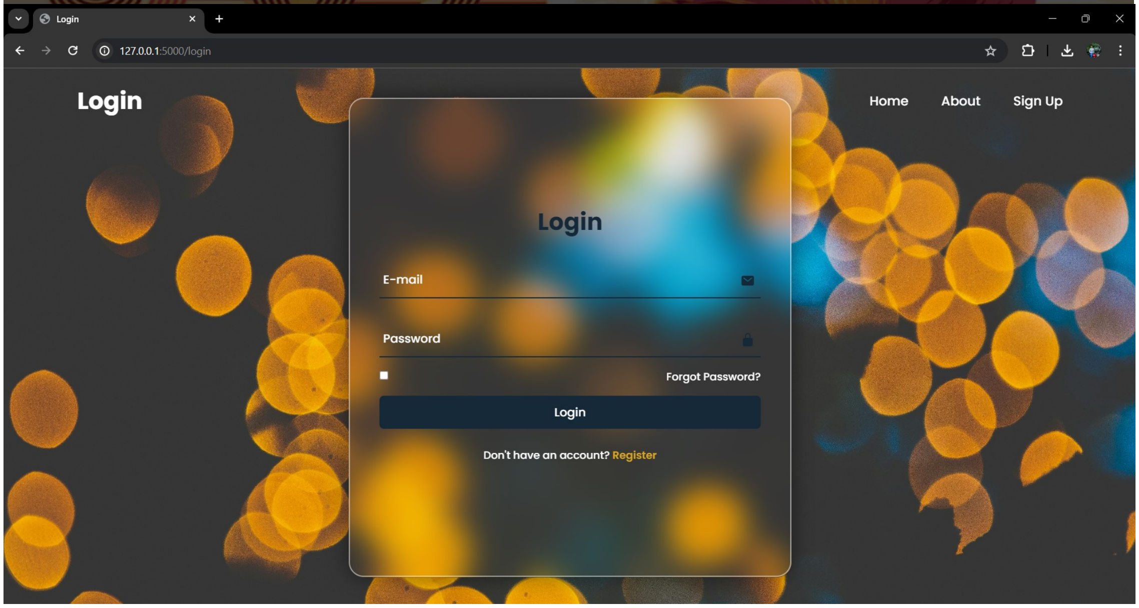
The Best Rocking Music your ears will ever hear so are you ready

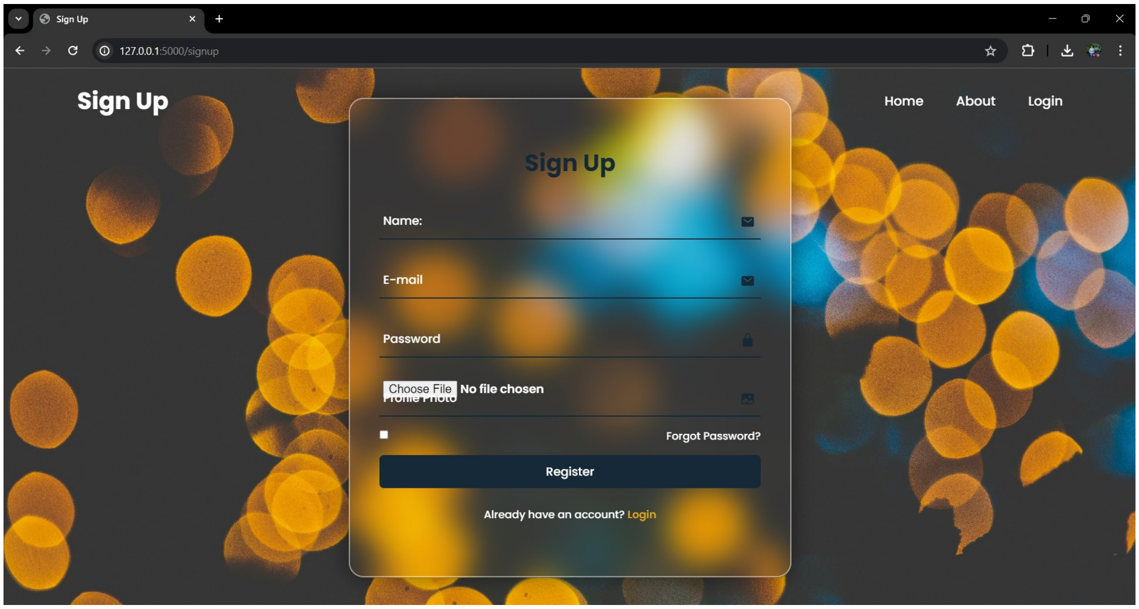


LET SOME JAZZ GO THROUGH YOUR SOUL

Welcome to the GRAND performance of Jazz Singer

Paul Graham





Sign Up
127.0.0.1:5000/signup
Sign Up
Home
About
Login
Sign Up
Name:
E-mail
Password
Choose File
No file chosen
Profile Photo
Forgot Password?
Register
Already have an account? Login