

# **PROCTORAI:**

The Future of Secure and Intelligent Exam  
Supervision

# ABSTRACT

The proposed project presents an advanced online exam proctoring system designed to ensure the integrity of online exams. Students register and log in to the system, where administrators generate unique exam codes for each student. Upon entering the exam, the system employs JavaScript-based algorithms to monitor eye and head movements through the user's camera. If irregular movements are detected, the system records a strike, and if a student accumulates three strikes, they are automatically disqualified from the exam. All incidents are securely stored in a database for later review. The underlying algorithm for behavioural analysis is Support Vector Regression (SVR), providing robust detection capabilities. This intelligent proctoring system aims to enhance the reliability of online exams by actively monitoring and mitigating potential cheating behaviours.

# INTRODUCTION

With the rise of online learning, ensuring the fairness of online exams has become a major challenge. Many existing proctoring systems rely on basic monitoring techniques that fail to detect subtle cheating behaviors. To address this issue, this project presents an **Intelligent Online Exam Proctoring System** that uses advanced behavioral analysis for real-time cheating detection and prevention.

Our system leverages **JavaScript-based algorithms** and the **Support Vector Regression (SVR)** model to track **eye and head movements** accurately. By integrating the **dlib library** and **shape\_predictor\_68\_face\_landmarks**, it enhances precision in identifying suspicious behavior. Unlike traditional proctoring systems, this approach not only monitors users but also actively responds to irregularities, ensuring a **secure and reliable** online examination environment.

# EXISTING SYSTEM

The current landscape of online exam proctoring systems often relies on basic user authentication and static monitoring, lacking the sophistication needed to detect subtle cheating behaviors. Existing systems may employ simple webcam monitoring but often struggle to discern and respond to specific actions like eye and head movements. Furthermore, their capabilities for real-time intervention and recording of suspicious activities are often limited. Traditional proctoring solutions may not employ advanced algorithms for behavior analysis, making them susceptible to evasion techniques. In the absence of comprehensive features, current systems may fail to provide a secure and reliable environment for online exams, potentially compromising the integrity of assessments.

## **Disadvantage:**

- The existing online exam proctoring systems lack sophisticated behaviour analysis, making them vulnerable to subtle cheating methods and compromising the overall integrity of assessments.

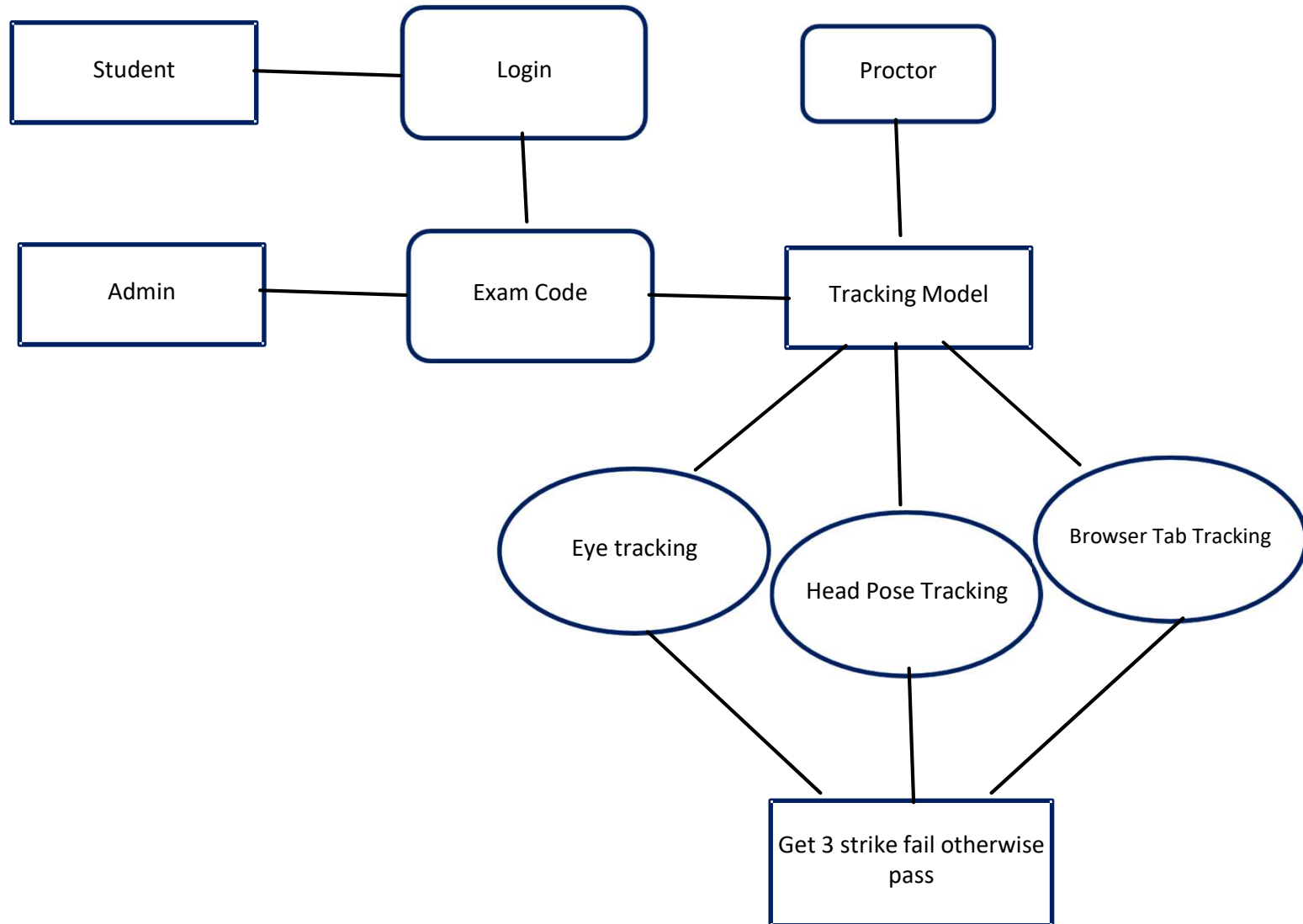
# PROPOSED SYSTEM

The proposed system revolutionizes online exam proctoring by introducing cutting-edge technology and advanced behavioural analysis for enhanced security. Students register and log in, receiving unique exam codes generated by administrators. Once in the exam, the system utilizes JavaScript-based algorithms to monitor eye and head movements through the user's camera in real-time. Any irregularities trigger instant intervention, and if a student accumulates three strikes, they are automatically disqualified, with all incidents securely logged in a database for further scrutiny. The core innovation lies in the integration of Support Vector Regression (SVR) algorithm for robust behaviour analysis, allowing the system to detect subtle cheating behaviours with precision. This intelligent proctoring system sets a new standard, actively deterring and responding to potential malpractices, ensuring the integrity of online exams in a more comprehensive and proactive manner.

## **Advantage:**

- The proposed online exam proctoring system leverages advanced behavioural analysis through Support Vector Regression (SVR), providing a more sophisticated and accurate method for detecting and preventing cheating behaviours, thus ensuring a higher level of exam integrity.

# SYSTEM ARCHITECTURE



# MODULES DESCRIPTION

## **1.User Authentication Module:**

- Description: Allows students to register and log in to the system securely. User authentication ensures that only authorized individuals can access the exam-related functionalities.

## **2.Admin Module:**

- Description: Admins log in to the system to manage exams. They can publish exam codes, monitor exam activities, and access the database for reviewing incidents and performance.

## **3.Exam Code Generation Module:**

- Description: Admins generate unique exam codes for each exam session. These codes serve as entry points for students to access the exam environment.

#### **4.Exam Attendance Module:**

- Description: Students enter the exam by inputting the generated exam code. The system validates the code, granting access to the exam interface upon successful verification.

#### **5.Camera Activation Module:**

- Description: Upon entering the exam, the user's camera is activated for real-time monitoring. This module initiates the process of capturing and analyzing the user's actions during the exam.

#### **6.Head Pose Detection Module (SVR Model):**

- Description: Utilizes the Support Vector Regression (SVR) algorithm to detect and analyze the user's head pose. If the user turns their head excessively in any direction (top, left, or right), the system records a strike.

#### **7.Eye Tracking Module (shape\_predictor\_68\_face\_landmarks):**

- Description: Implements the shape\_predictor\_68\_face\_landmarks file to track the user's eye movements during the exam. If irregular eye tracking is detected, the system records a strike.



## **8. Behavioural Analysis Module:**

- Description: Integrate the information from head pose detection and eye tracking modules to perform comprehensive behavioural analysis. The module assess whether the user's actions significantly from the expected behaviour during exam

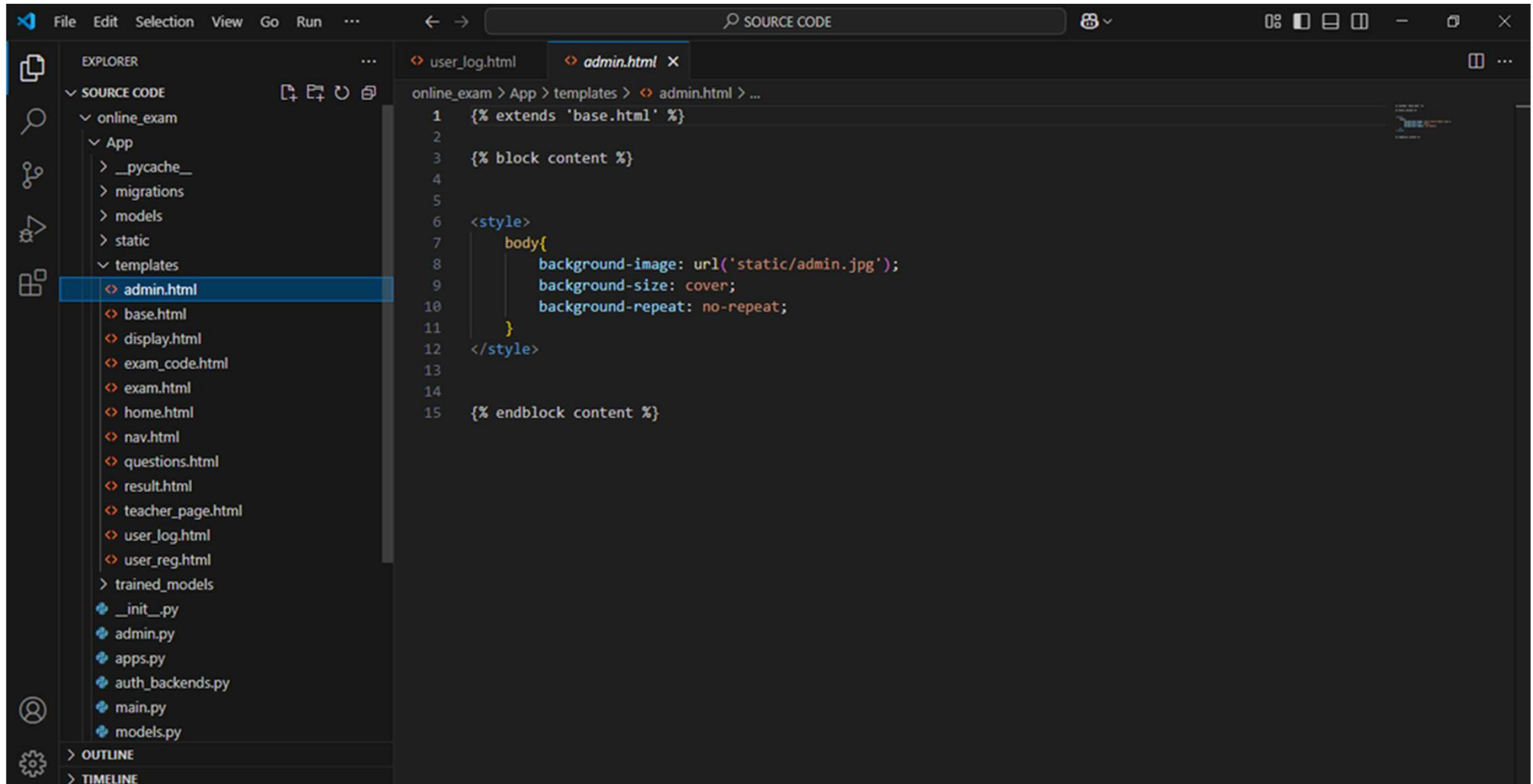
## **9. Strike Accumulation Module:**

- Description: Tracks the number of strikes accumulated by the user during the exam. If the user exceeds the specified limit (eg., 3 Strikes), the system disqualifies the user from the exam and records the incident in the database.

## **10. Exam Code Generation Module:**

- Description: Monitors tab changes during the exam using JavaScript. If the user attempts to navigate away from the exam tab, the system registers the action and adds to the strike count

# SAMPLE CODE



The image shows a screenshot of a code editor interface, likely Visual Studio Code, with a dark theme. The Explorer panel on the left shows a project structure for 'online\_exam'. The 'templates' directory is expanded, and 'admin.html' is selected. The main editor area displays the content of 'admin.html', which is a Jinja2 template. The code includes a base template extension, a block content placeholder, a CSS style block for the body background, and an endblock content placeholder.

```
1 {% extends 'base.html' %}
2
3 {% block content %}
4
5
6 <style>
7     body{
8         background-image: url('static/admin.jpg');
9         background-size: cover;
10        background-repeat: no-repeat;
11    }
12 </style>
13
14
15 {% endblock content %}
```

File Edit Selection View Go Run ...

EXPLORER

- SOURCE CODE
  - online\_exam
    - App
      - \_\_pycache\_\_
      - migrations
      - models
      - static
      - templates
        - admin.html
        - base.html
        - display.html
        - exam\_code.html
        - exam.html
        - home.html
        - nav.html
        - questions.html
        - result.html
        - teacher\_page.html
        - user\_log.html
        - user\_reg.html
      - trained\_models
    - \_\_init\_\_.py
    - admin.py
    - apps.py
    - auth\_backends.py
    - main.py
    - models.py
  - OUTLINE
  - TIMELINE

teacher\_page.html

```
1 {% extends 'base.html' %}
2
3 {% block content %}
4
5
6 <style>
7     body{
8         background-image: url('static/teac.jpg');
9         background-size: cover;
10        background-repeat: no-repeat;
11    }
12
13    /* .nav-link{
14        color: black !important;
15    } */
16 </style>
17
18
19 {% endblock content %}
```

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF HTML

Type here to search

35°C Haze 12:54 05-05-2025

File Edit Selection View Go Run ...

EXPLORER

- SOURCE CODE
  - online\_exam
    - App
      - \_\_pycache\_\_
      - migrations
      - models
      - static
      - templates
        - admin.html
        - base.html
        - display.html
        - exam\_code.html
        - exam.html
        - home.html
        - nav.html
        - question.html
        - result.html
        - teacher\_page.html
        - user\_log.html
        - user\_reg.html
        - trained\_models
      - \_\_init\_\_.py
      - admin.py
      - apps.py
      - auth\_backends.py
      - main.py
      - models.py
    - OUTLINE
    - TIMELINE

nav.html

```
1 {% block content %}
2
3 <nav class="navbar navbar-expand-lg navbar-dark shadow-5-strong">
4   <div class="container-fluid">
5     <a class="navbar-brand" href="#" style="font-family: Lobster, serif; font-size: 25px;">Online Exam Pr
6     <button onclick="right()" class="navbar-toggler" type="button" data-bs-toggle="collapse" data-bs-targ
7       <span class="navbar-toggler-icon"></span>
8   </button>
9   <div class="collapse navbar-collapse justify-content-end" id="collapsibleNavbar">
10     <ul class="navbar-nav">
11       <li class="nav-item">
12         <a href="http://127.0.0.1:8000/" class="nav-link active">Home</a>
13       </li>
14       {% if user.is_staff %}
15       <li class="nav-item">
16         <a href="exam_code" class="nav-link active">Announce Exam code</a>
17       </li>
18       <li class="nav-item">
19         <a href="exam_result" class="nav-link active">Exam Details</a>
20       </li>
21       <li class="nav-item">
22         <a href="logout" class="nav-link active">Log out</a>
23       </li>
24       {% elif user.reg_type == 'teacher' %}
25       <li class="nav-item">
26         <a href="question" class="nav-link active">Add Questions</a>
27       </li>
28       <!-- <li class="nav-item">
29         <a href="exam" class="nav-link active">Online Exam</a>
30       </li>
31     </ul>
32   </div>
33 </div>
34 </nav>
```

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Type here to search

12:53 05-05-2025

File Edit Selection View Go Run ... SOURCE CODE

EXPLORER

- SOURCE CODE
  - online\_exam
    - App
      - \_\_pycache\_\_
      - migrations
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      - static
      - templates
        - admin.html
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      - apps.py
      - auth\_backends.py
      - main.py
      - models.py
    - OUTLINE
    - TIMELINE

user\_log.html questions.html X

online\_exam > App > templates > questions.html > ...

```
6 <style>
7   body{
8
9     background-size: cover;
10    background-repeat: no-repeat;
11  }
12
13  /* .nav-link{
14    color: black !important;
15  } */
16
17 </style>
18
19 <form action="question" method="post">
20   {% csrf_token %}
21   <div class="container mt-5">
22     <div class="row">
23       <div class="col-4 mb-5 " style="background-color: #rgb(255, 255, 255, 0.4);">
24         <div class="d-flex row" style="padding: 15px">
25           <input required type="text" name="quest1" placeholder="question 1" class="form-control" style="width: 60%; margin-right: 10px;">
26           <input required type="text" name="q1p1" placeholder="Option 1" class="form-control" style="width: 20%; margin-right: 10px;">
27           <input required type="text" name="q1p2" placeholder="Option 2" class="form-control" style="width: 20%; margin-right: 10px;">
28           <input required type="text" name="q1p3" placeholder="Option 3" class="form-control" style="width: 20%; margin-right: 10px;">
29           <input required type="text" name="q1p4" placeholder="Option 4" class="form-control" style="width: 20%; margin-right: 10px;">
30         </div>
31       </div>
32       <div class="col-4 mb-5 " style="background-color: #rgb(255, 255, 255, 0.4);">
33         <div class="d-flex row" style="padding: 15px">
34           <input required type="text" name="quest2" placeholder="question 2" class="form-control" style="width: 60%; margin-right: 10px;">
35           <input required type="text" name="q2p1" placeholder="Option 1" class="form-control" style="width: 20%; margin-right: 10px;">
36           <input required type="text" name="q2p2" placeholder="Option 2" class="form-control" style="width: 20%; margin-right: 10px;">
37           <input required type="text" name="q2p3" placeholder="Option 3" class="form-control" style="width: 20%; margin-right: 10px;">
38           <input required type="text" name="q2p4" placeholder="Option 4" class="form-control" style="width: 20%; margin-right: 10px;">
39         </div>
40       </div>
41     </div>
42   </div>
43 </form>
```

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35°C Haze 12:54 05-05-2025



File Edit Selection View Go Run ... SOURCE CODE

EXPLORER

- SOURCE CODE
  - online\_exam
    - App
      - \_\_pycache\_\_
      - migrations
      - models
      - static
      - templates
        - admin.html
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        - display.html
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        - teacher\_page.html
        - user\_log.html
        - user\_reg.html
      - trained\_models
    - \_\_init\_\_.py
    - admin.py
    - apps.py
    - auth\_backends.py
    - main.py
    - models.py
  - OUTLINE
  - TIMELINE

user\_log.html result.html X

online\_exam > App > templates > result.html > div.container.mt-md-5

```
1 {% extends 'base.html' %}
2
3 {% block content %}
4
5 <style>
6     body{
7         background-image: url('static/result.jpg');
8         background-size: cover;
9         background-repeat: no-repeat;
10    }
11
12 </style>
13
14 <div class="container mt-md-5">
15     {% if data %}
16     <table id="example" class="table table-dark table-striped bg-dark" style="width:100%">
17         <thead>
18             <tr>
19                 <th class="text-center">User ID</th>
20                 <th class="text-center">User Name</th>
21                 <th class="text-center">Result</th>
22                 <th class="text-center">Strike</th>
23                 <th class="text-center">Tab Strike</th>
24             </tr>
25         </thead>
26         <tbody>
27             {% for i in data %}
28             <tr>
29                 <td class="text-center" style="padding-top: 2%;">{{i.stu_id.id}}</td>
30                 <td class="text-center" style="padding-top: 2%;">{{i.stu_id.username}}</td>
31                 <td class="text-center" style="padding-top: 2%;">{{i.result}}</td>
32                 <td class="text-center" style="padding-top: 2%;">{{i.strike}}</td>
```

Ln 14, Col 32 Spaces: 4 UTF-8 CRLF {} HTML

35°C Haze 12:54 05-05-2025

File Edit Selection View Go Run ...

EXPLORER

- SOURCE CODE
  - online\_exam
    - App
      - \_\_pycache\_\_
      - migrations
      - models
      - static
      - templates
        - admin.html
        - base.html
        - display.html
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        - home.html
        - nav.html
        - questions.html
        - result.html
        - teacher\_page.html
        - user\_log.html
        - user\_reg.html**
        - trained\_models
      - \_\_init\_\_.py
      - admin.py
      - apps.py
      - auth\_backends.py
      - main.py
      - models.py
    - OUTLINE
    - TIMELINE

user\_log.html user\_reg.html X

online\_exam > App > templates > user\_reg.html > ...

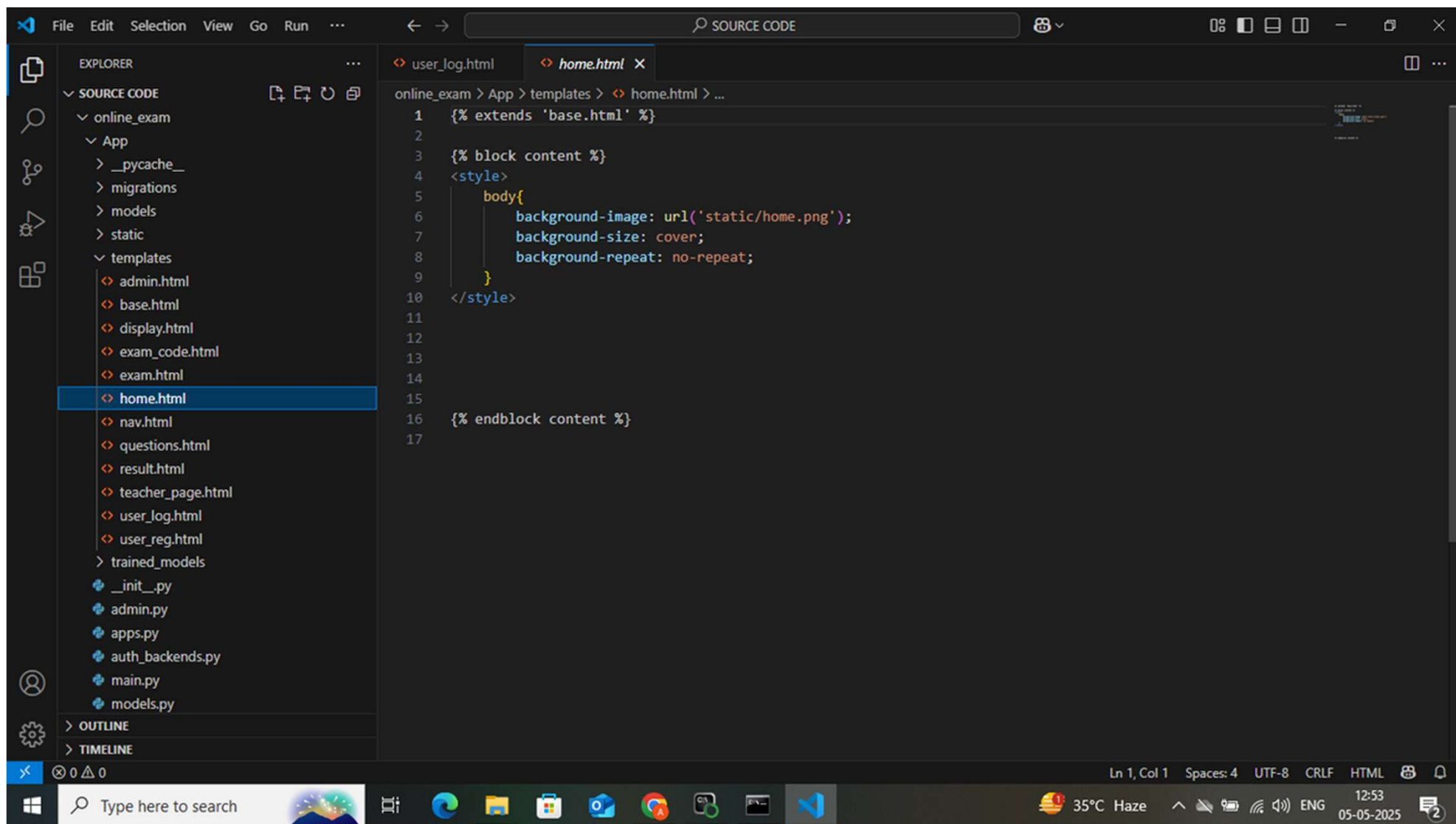
```
2 <html>
59 <body>
60 <div class="container">
61 <div class="row m-5 no-gutters shadow-lg">
62 <div class="col-md-6 d-none d-md-block">
63 
65 <div class="col-md-6 bg-white p-5">
66 <h3 class="pb-3">Registration Form</h3>
67 <div class="form-style">
68 <form action="#" method="post">
69 {% csrf_token %}
70 <div class="form-group pb-3">
71 <input type="text" name="name" placeholder="Name" class="form-control" id=""
72 </div>
73 <div class="form-group pb-3">
74 <input type="email" name="email" placeholder="Email" class="form-control" id=""
75 </div>
76 <div class="form-group pb-3">
77 <input type="password" name="password" placeholder="Password" class="form-control" id=""
78 </div>
79 <div class="form-group pb-3">
80 <input type="number" name="mobile" placeholder="Mobile No" class="form-control" id=""
81 </div>
82 <div class="form-group pb-3">
83 <!-- <input type="number" name="dept" placeholder="Department" class="form-control" id=""
84 <select name="dept" class="form-control" id="" id="exampleInputPassword1">
85 <option value="computer">Computer Science</option>
86 <option value="biology">Biology</option>
87 </select>
88 </div>
89 <div class="form-group pb-3">
```

Ln 1, Col 1 Spaces: 4 UTF-8 CRLF HTML

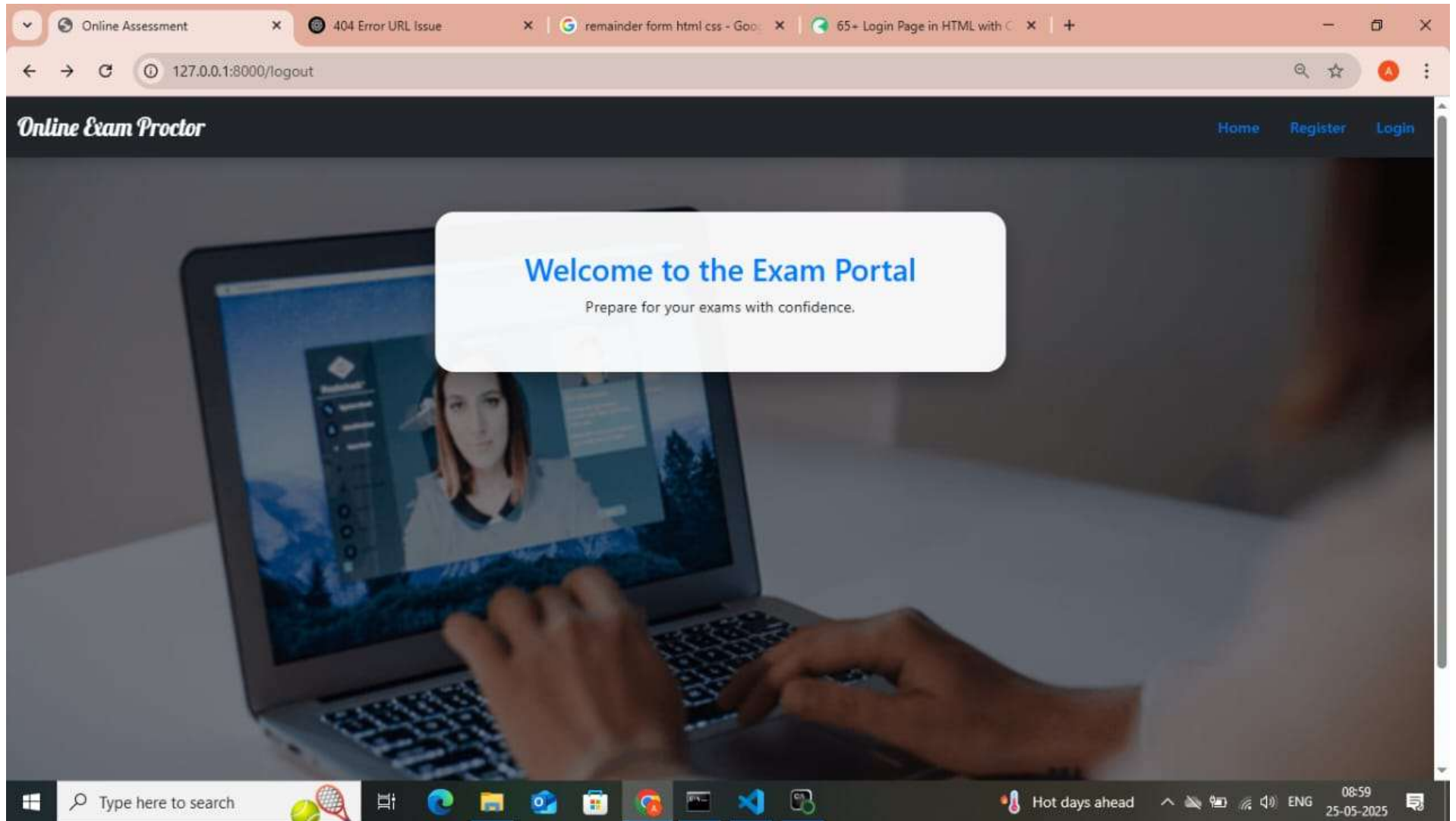
35°C Haze 12:54 05-05-2025



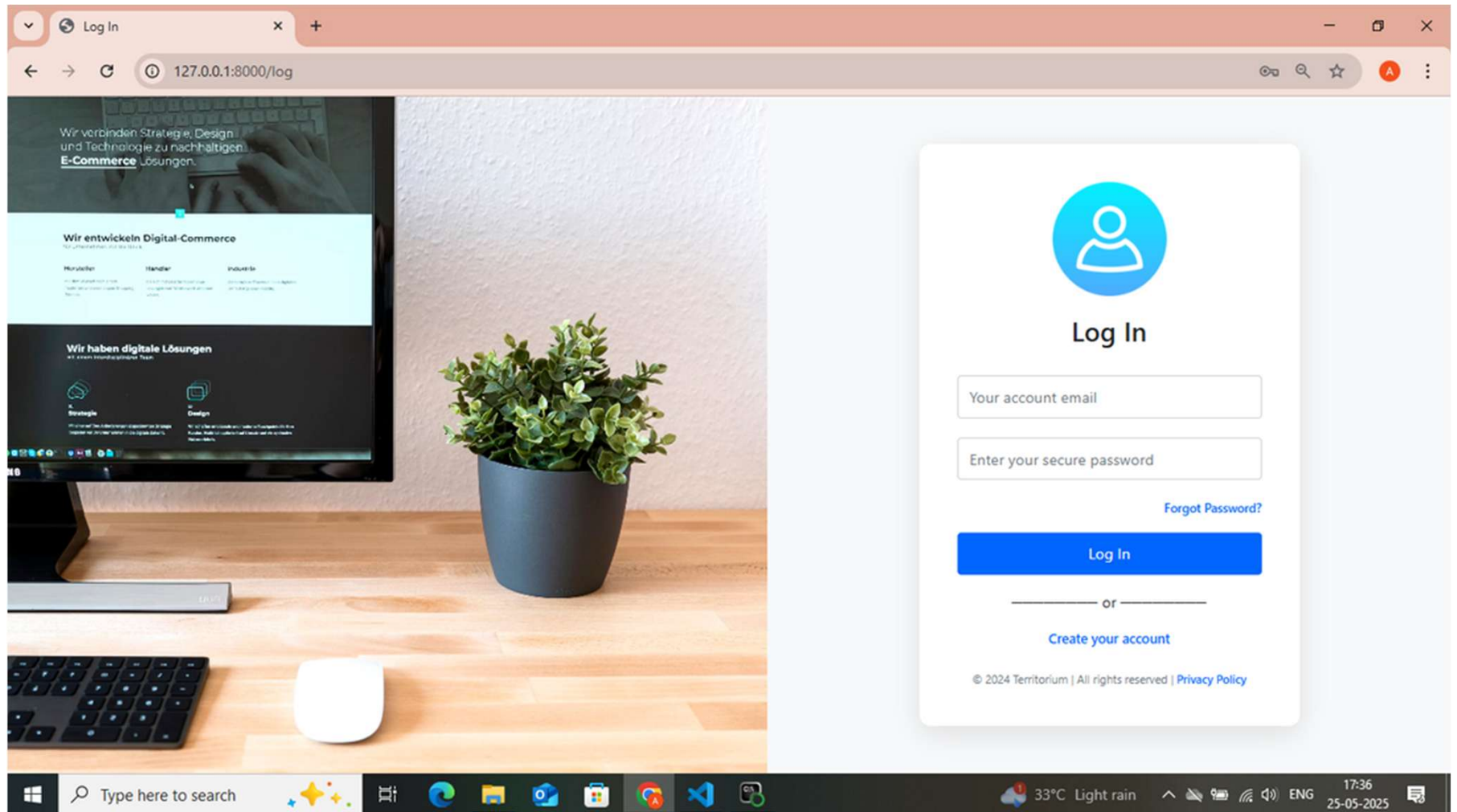




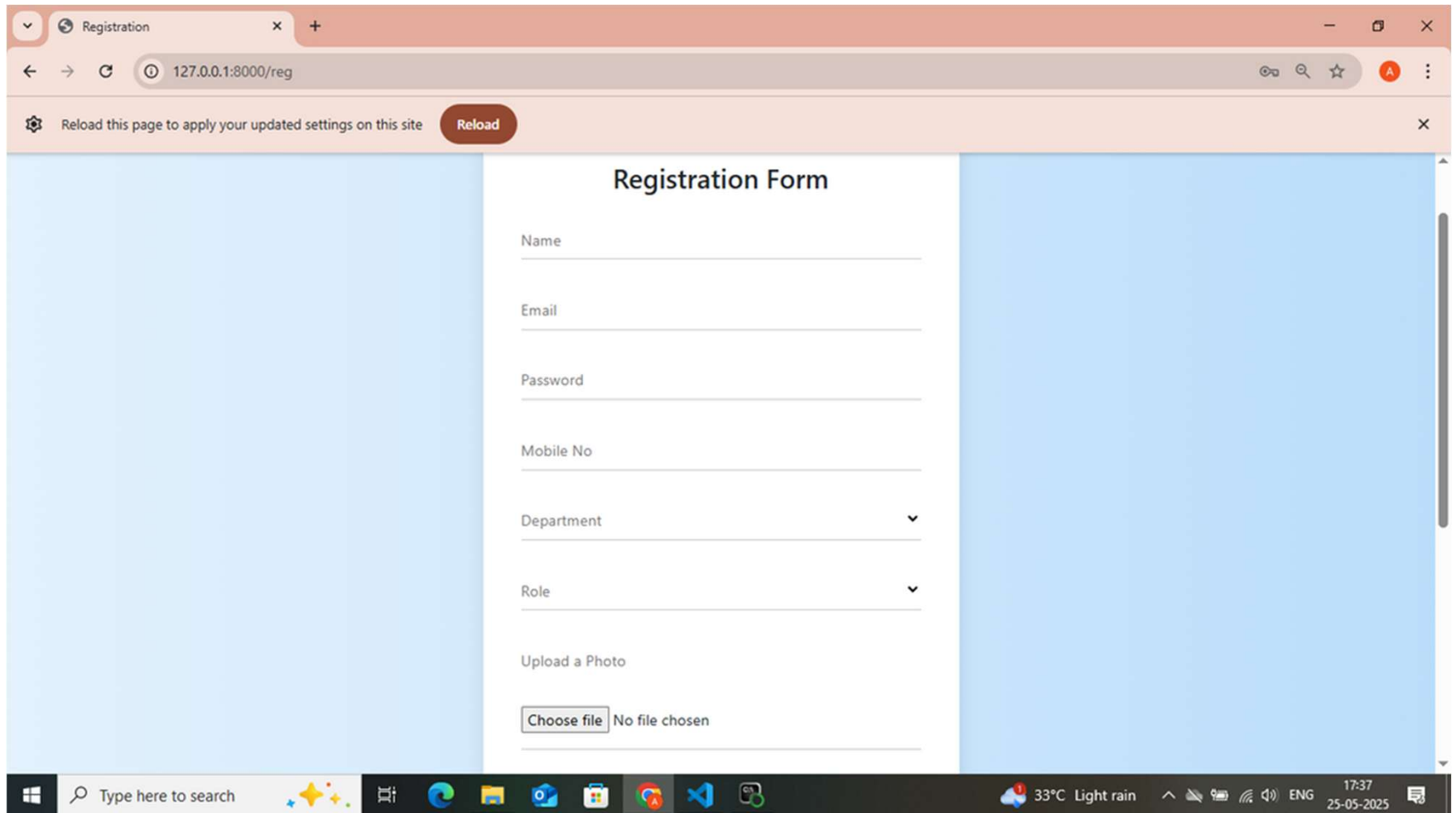
# HOME PAGE



# LOGIN PAGE



# REGISTER PAGE



The image shows a web browser window with a single tab titled "Registration". The address bar displays the URL "127.0.0.1:8000/reg". A notification bar at the top of the browser indicates a settings update and includes a "Reload" button. The main content area features a "Registration Form" with the following fields: "Name", "Email", "Password", "Mobile No", "Department" (a dropdown menu), "Role" (a dropdown menu), and "Upload a Photo". The "Upload a Photo" section includes a "Choose file" button and the text "No file chosen". The browser's taskbar at the bottom shows the Windows Start button, a search bar, and several application icons. The system tray on the right displays the temperature as 33°C, weather as "Light rain", and the date and time as 17:37 on 25-05-2025.

Registration

127.0.0.1:8000/reg

Reload this page to apply your updated settings on this site **Reload**

### Registration Form

Name

Email

Password

Mobile No

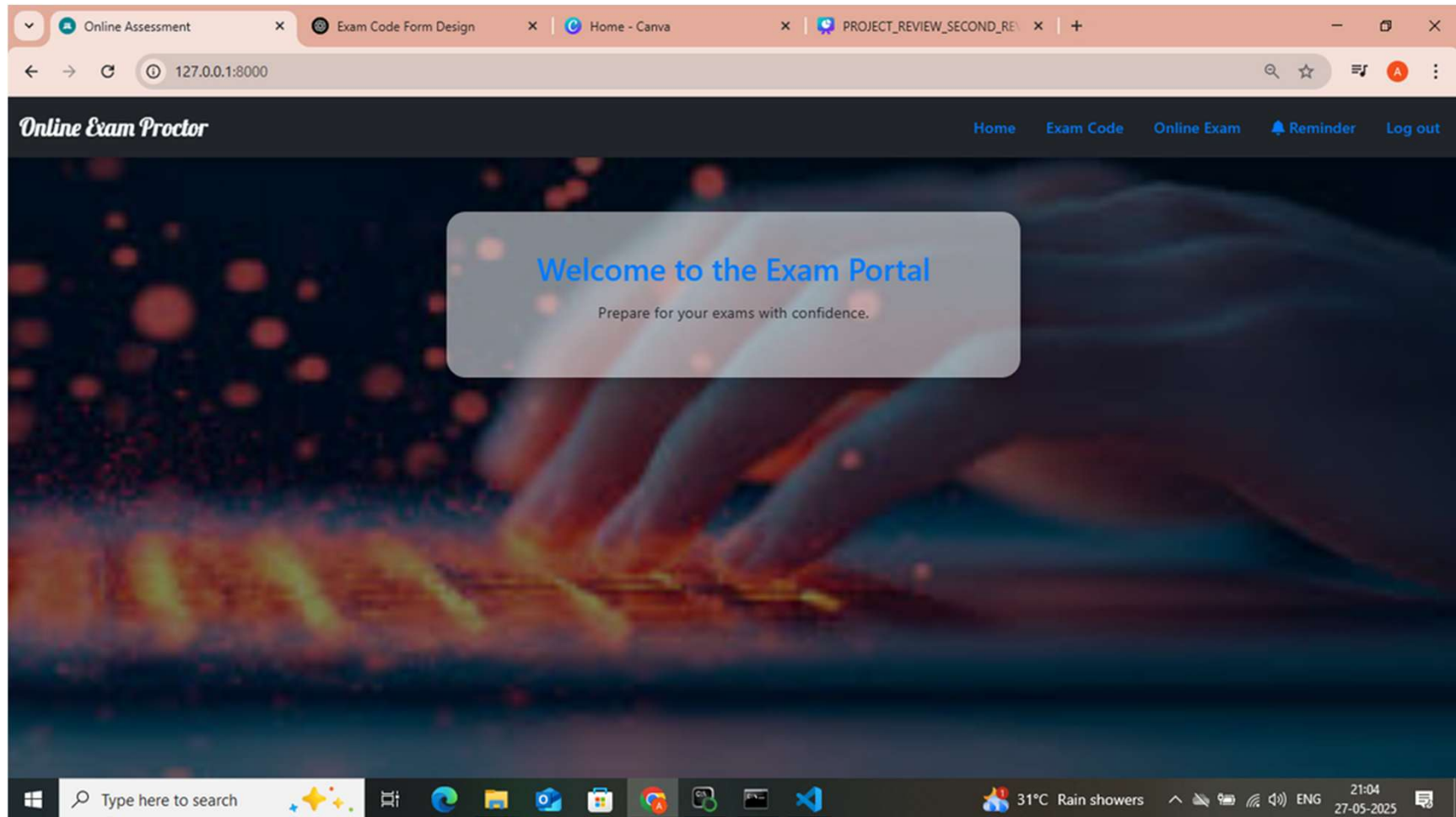
Department

Role

Upload a Photo

No file chosen

# STUDENT LOGIN HOME PAGE



# EXAM-CODE PAGE

The screenshot shows a web browser window with a single tab titled "Online Assessment". The address bar displays the URL "127.0.0.1:8000/code\_show". The website's header features the logo "Online Exam Proctor" on the left and navigation links "Home", "Exam Code", "Online Exam", "Reminder", and "Log out" on the right. The main content area has a dark teal background with a pattern of yellow sticky notes, some of which have question marks. A white rounded rectangle in the center contains the text "Your Exam Code" followed by the code "12345" in blue. The Windows taskbar at the bottom includes a search bar, several application icons, and system status information showing "33°C Light rain", "ENG", and the date "25-05-2025".

Online Assessment

127.0.0.1:8000/code\_show

Online Exam Proctor

Home Exam Code Online Exam Reminder Log out

Your Exam Code

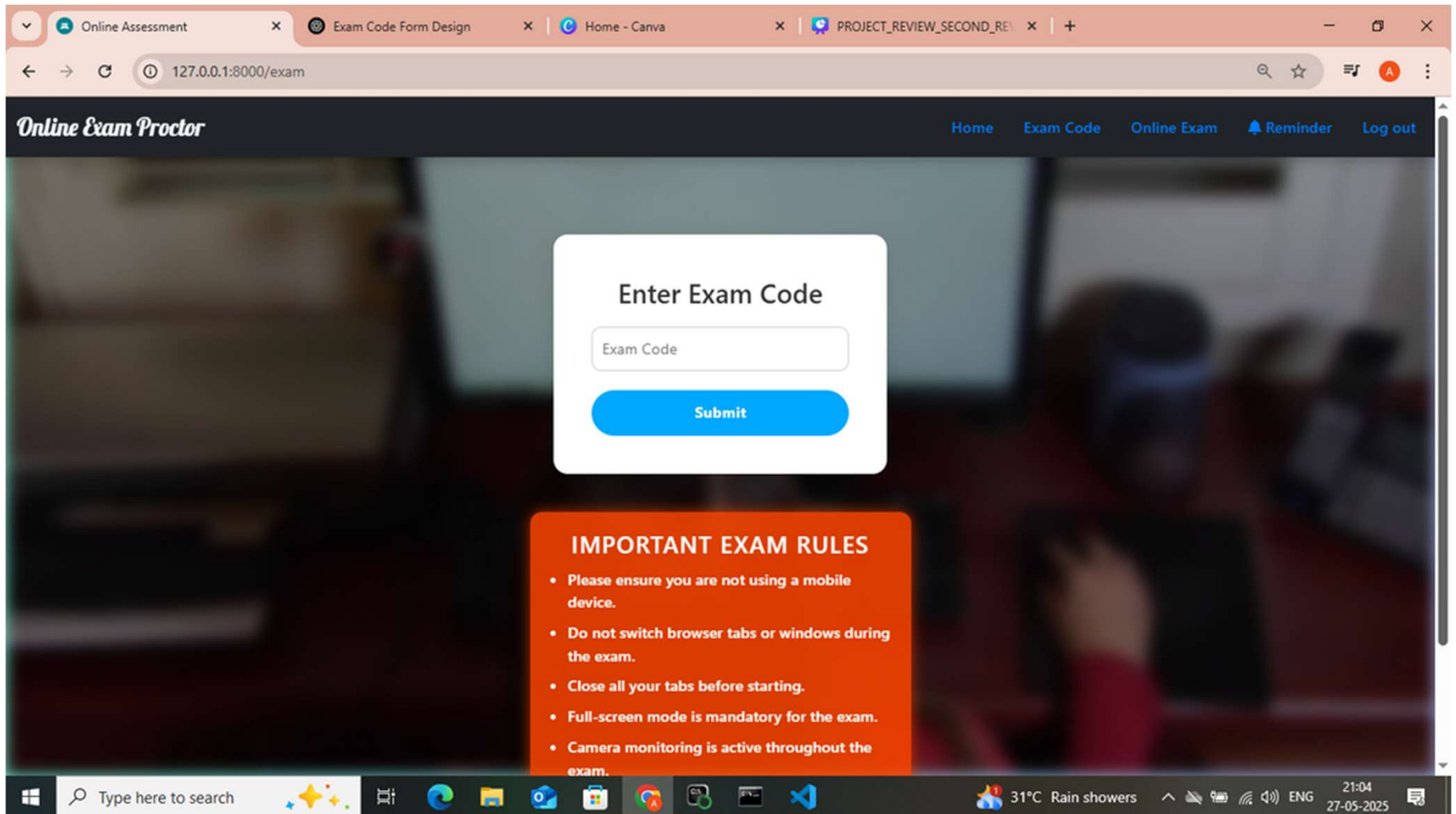
12345

Type here to search

33°C Light rain ENG 17:35 25-05-2025



# EXAM PAGE



Online Assessment x Exam Code Form Design x Home - Canva x PROJECT\_REVIEW\_SECOND\_REVIEW x +

127.0.0.1:8000/exam

Online Exam Proctor

Home Exam Code Online Exam Reminder Log out

Enter Exam Code

Exam Code

Submit

**IMPORTANT EXAM RULES**

- Please ensure you are not using a mobile device.
- Do not switch browser tabs or windows during the exam.
- Close all your tabs before starting.
- Full-screen mode is mandatory for the exam.
- Camera monitoring is active throughout the exam.

Type here to search

31°C Rain showers ENG 21:04 27-05-2025

Online Assessment x Exam Code Form Design x Home - Canva x PROJECT\_REVIEW\_SECOND\_REVIEW x +

127.0.0.1:8000/exam

Exit Exam

What is the term used for describing the judgmental or commonsense part of problem solving?

- ☐ Heuristic
- ☐ Critical
- ☐ Value based
- ☐ Analytical

Submit

Type here to search

21:05 27-05-2025



Document x +

127.0.0.1:8000/exam

Online Exam Proctor

Home Exam code Online Exam Log out

Head: Forward Eye: Center

You Get 3 Strike

SQL stands for

- ☐ Structured Query Language
- ☐ Standard Query Language
- ☐ Simple Query Language
- ☐ Structured Query Level

Submit

Type here to search

35°C Haze 13:08 05-05-2025 ENG

# RESULT PAGE

The screenshot shows a web browser window with the address bar displaying '127.0.0.1:8000/exam\_result'. The page title is 'Online Exam Proctor'. The navigation bar includes links for 'Home', 'Announce Exam Code', 'Exam Details', and 'Log out'. The main content area features a dark overlay with the title 'Exam Results' and a table showing the exam results for a user.

| User ID | User Name            | Result | Strike | Tab Strike |
|---------|----------------------|--------|--------|------------|
| 7       | Mohammed Asraf Ali S | Fail   | 0      | 6          |

The background of the page shows a desk with a laptop, a yellow paper ball, and a yellow pencil. The Windows taskbar at the bottom displays the search bar, taskbar icons, system tray, and date/time (17:38, 25-05-2025).

# ADD QUESTION PAGE

The screenshot displays a web browser window with the address bar showing '127.0.0.1:8000/question'. The page title is 'Online Exam Proctor'. The navigation bar includes links for 'Home', 'Add Questions', and 'Log out'. The main content area features three identical question templates, each with a title, a question input field, four option input fields, and a dropdown for the correct answer. At the bottom, there are buttons for 'Add Question' and 'Submit Questions', and a 'Total Questions: 0' counter.

**Question 1**

Enter question

Option 1

Option 2

Option 3

Option 4

Correct Answer

Option 1

**Question 2**

Enter question

Option 1

Option 2

Option 3

Option 4

Correct Answer

Option 1

**Question 3**

Enter question

Option 1

Option 2

Option 3

Option 4

Correct Answer

Option 1

**Buttons:**

+ Add Question

✓ Submit Questions

**Total Questions: 0**

# CONCLUSION:

In summary, the development of the Intelligent Online Exam Proctoring System, featuring SVR-based behavioural analysis, represents a significant advancement in ensuring the integrity of online exams. The meticulous implementation of SVR, coupled with eye tracking and JavaScript-based monitoring, enables real-time detection of irregularities in user behaviour. With a robust strike accumulation mechanism and secure database storage, the system provides an effective means of evaluating and responding to potential malpractices. The commitment to user authentication, admin functionalities, and comprehensive documentation underscores the project's holistic approach, promising a transformative impact on the landscape of online assessments. As the system moves towards deployment, it stands poised to set a new standard for secure and trustworthy online exams.

THANK YOU