

## CHAPTER-9

### APPENDICES

#### 9.1 APPENDIX-A: SAMPLE SOURCE CODE

##### Main.py

```
from django.http import HttpResponseRedirect
from django.shortcuts import get_object_or_404, render, redirect
from django.contrib.auth.models import User
from django.contrib.auth import login, authenticate, logout
from django.contrib.auth.decorators import login_required
from django.contrib import messages
from .models import EvaluationResult, ExamSubmission, Exam
from .evaluation.ocr import generate_ocr
from .evaluation.extract_question_answerkey import question_answer_content
from .evaluation.preprocess_ocr import preprocess_ocr_question_wise
from .evaluation.evaluation import evaluate_exam_with_ocr_to_json
from .evaluation.report import generate_report
from .evaluation.proper_json import parse_json_string
import json

def home(request):
    return render(request, 'home.html')

def signup_view(request):
    if request.method == "POST":
        username = request.POST['username']
        email = request.POST['email']
        password1 = request.POST['password1']
        password2 = request.POST['password2']

        if password1 != password2:
            messages.error(request, "Passwords do not match!")
            return redirect('signup')

        if User.objects.filter(username=username).exists():
            messages.error(request, "Username already taken!")
            return redirect('signup')

        if User.objects.filter(email=email).exists():
            messages.error(request, "Email is already in use!")
```

```

        return redirect('signup')

    user = User.objects.create_user(username=username, email=email,
password=password1)
    login(request, user)
    messages.success(request, "Account created successfully!")
    return redirect('login')

return render(request, 'authentication/signup.html')

def login_view(request):
    if request.method == "POST":
        username = request.POST['username']
        password = request.POST['password']
        user = authenticate(request, username=username, password=password)

        if user is not None:
            login(request, user)
            messages.success(request, "Login successful!")
            return redirect('student_dashboard')
        else:
            messages.error(request, "Invalid username or password!")

    return render(request, 'authentication/login.html')

def student_dashboard(request):
    exams = ExamSubmission.objects.filter(student=request.user) # Fetch exams
created by logged-in student
    return render(request, 'dashboard/student/student_dashboard.html', {'exams':
exams})

def logout_view(request):
    logout(request)
    messages.success(request, "Logged out successfully!")
    return redirect('login')

def student_exam_fill(request):
    if request.method == "POST":
        subject = request.POST.get("subject")
        exam_type = request.POST.get("exam_type")
        year = request.POST.get("year")
        staff_name = request.POST.get("staff_name")

        # Check if an exam exists with these details

```

```

        exam = Exam.objects.filter(year=year).first()

        if not exam:
            messages.error(request, "✗ No matching exam found. Please check the
details.")
            return redirect("student_exam_fill") # Prevent saving if exam
doesn't exist

        # Create a new submission linked to this exam
        submission = ExamSubmission.objects.create(
            exam=exam, # Assigning the required exam field
            student=request.user,
            subject=subject,
            exam_type=exam_type,
            year=year,
            staff_name=staff_name,
        )

        messages.success(request, "✓ Exam submission successful!")
        return redirect("student_dashboard")

    return render(request, "dashboard/student/exam_fill.html")

def teacher_login(request):
    if request.method == "POST":
        username = request.POST["username"]
        password = request.POST["password"]
        user = authenticate(request, username=username, password=password)

        if user is not None:
            if user.is_superuser: # Allow only superusers
                login(request, user)
                messages.success(request, "Welcome, Teacher!")
                return redirect("teacher_dashboard") # Redirect to teacher
dashboard
            else:
                messages.error(request, "Access Denied! Only teachers
(superusers) can log in.")
            else:
                messages.error(request, "Invalid Username or Password!")

        return render(request, "dashboard/teacher/teacher_login.html")

@login_required
def teacher_dashboard(request):

```

```

    if not request.user.is_superuser:
        return redirect("home") # Redirect unauthorized users

    exams = Exam.objects.all().order_by("-id") # Fetch all exams
    return render(request, "dashboard/teacher/teacher_dashboard.html", {"exams":
exams})

@login_required
def create_exam(request):
    if not request.user.is_superuser:
        messages.error(request, "✗ Unauthorized access!")
        return redirect("home")

    if request.method == "POST":
        subject = request.POST.get("subject")
        exam_type = request.POST.get("exam_type")
        year = request.POST.get("year")
        staff_name = request.POST.get("staff_name")
        question_paper = request.FILES.get("question_paper")
        answer_key = request.FILES.get("answer_key")

        if not all([subject, exam_type, year, staff_name, question_paper,
answer_key]):
            messages.error(request, "⚠ All fields are required!")
            return redirect("create_exam")

        Exam.objects.create(
            subject=subject,
            exam_type=exam_type,
            year=year,
            staff_name=staff_name,
            question_paper=question_paper,
            answer_key=answer_key
        )

        messages.success(request, "✔ Exam successfully created!")
        return redirect("teacher_dashboard")

    return render(request, "dashboard/teacher/create_exam.html")

@login_required
def view_submissions(request, exam_id):
    exam = get_object_or_404(Exam, id=exam_id)
    submissions = ExamSubmission.objects.filter(year=exam.year)

```

```

    if request.method == "POST":
        for submission in submissions:
            file_field_name = f"answer_sheet_{submission.id}"
            if file_field_name in request.FILES:
                if submission.answer_sheet:
                    messages.warning(request, f"⚠ Answer sheet for
{submission.student.username} already uploaded.")
                else:
                    submission.answer_sheet = request.FILES[file_field_name]
                    submission.save()
                    messages.success(request, f"✔ Answer sheet uploaded for
{submission.student.username}.")

            return redirect('view_submissions', exam_id=exam.id)

        return render(request, "dashboard/teacher/view_submissions.html", {"exam":
exam, "submissions": submissions})

def evaluate_submission_view(request, submission_id):
    submission = get_object_or_404(ExamSubmission, id=submission_id)

    # Q Check if the submission is already evaluated
    evaluation = EvaluationResult.objects.filter(submission=submission).first()

    if evaluation:
        messages.info(request, "This submission has already been evaluated.")
        formatted_report = parse_json_string(evaluation.formatted_report)

        total_score = evaluation.total_score
        max_score = evaluation.max_score
    else:
        # OCR text from uploaded answer sheet
        ocr_text = generate_ocr(submission.answer_sheet.path)

        # Extract question paper and answer key
        question_paper_text =
question_answer_content(submission.exam.question_paper.path)
        answer_key_text =
question_answer_content(submission.exam.answer_key.path)

        # Preprocess OCR text to align with question numbers
        structured_ocr_text = preprocess_ocr_question_wise(ocr_text,
question_paper_text)

```

```

    # Evaluate answers using Gemini API
    evaluation_result_json =
evaluate_exam_with_ocr_to_json(structured_ocr_text, answer_key_text)

    formatted_report = generate_report(evaluation_result_json)
    formatted_report = parse_json_string(formatted_report)
    print(formatted_report)
    total_score = formatted_report["summary"]["user_total_score"]
    max_score = formatted_report["summary"]["total_possible_score"]

    # Save the evaluation result in the database
    evaluation = EvaluationResult.objects.create(
        submission=submission,
        evaluated_by=request.user,
        formatted_report=json.dumps(formatted_report),
        total_score=total_score,
        max_score=max_score,
    )
    submission.is_graded = True
    submission.save()

    messages.success(request, "Evaluation completed successfully!")

    # Render the evaluation results page
    return render(request, 'dashboard/teacher/evaluate_submission.html', {
        'submission': submission,
        'formatted_report': formatted_report,
        'total_score': total_score,
        'max_score': max_score
    })

def view_results(request, exam_id):
    submission = get_object_or_404(ExamSubmission, id=exam_id)

    # Check if the submission is already evaluated
    evaluation = EvaluationResult.objects.filter(submission=submission).first()

    if evaluation:
        messages.info(request, "This submission has already been evaluated.")
        formatted_report = parse_json_string(evaluation.formatted_report)

        total_score = evaluation.total_score
        max_score = evaluation.max_score

```

```

return render(request, 'dashboard/teacher/evaluate_submission.html', {
    'submission': submission,
    'formatted_report': formatted_report,
    'total_score': total_score,
    'max_score': max_score
})

```

## Urls.py

```

from django.contrib import admin
from django.urls import path
from app import views
from django.conf import settings
from django.conf.urls.static import static

urlpatterns = [
    path("admin/", admin.site.urls),
    path('', views.home, name='home'),
    path('signup/', views.signup_view, name='signup'),
    path('login/', views.login_view, name='login'),
    path('logout/', views.logout_view, name='logout'),
    path('student_dashboard/', views.student_dashboard,
name='student_dashboard'),
    path('view-results/<int:exam_id>', views.view_results, name='view_results'),
    path('student_exam_fill/', views.student_exam_fill,
name='student_exam_fill'),
    path('teacher-login/', views.teacher_login, name='teacher_login'),
    path('teacher-dashboard/', views.teacher_dashboard,
name='teacher_dashboard'),
    path('create-exam/', views.create_exam, name='create_exam'),
    path('view-submissions/<int:exam_id>', views.view_submissions,
name='view_submissions'),
    path('evaluate/<int:submission_id>', views.evaluate_submission_view,
name='evaluate_submission'),
]+ static(settings.MEDIA_URL,document_root=settings.MEDIA_ROOT)

urlpatterns+= static(settings.STATIC_URL,document_root=settings.STATIC_ROOT)

```

## Models.py

```
from django.db import models
from django.contrib.auth.models import User

class Exam(models.Model):
    YEAR_CHOICES = [
        (1, "First Year"),
        (2, "Second Year"),
        (3, "Third Year"),
        (4, "Fourth Year"),
    ]

    EXAM_TYPE_CHOICES = [
        ("CAT1", "CAT 1"),
        ("CAT2", "CAT 2"),
    ]

    subject = models.CharField(max_length=255)
    exam_type = models.CharField(max_length=4, choices=EXAM_TYPE_CHOICES,
default="CAT1")
    year = models.IntegerField(choices=YEAR_CHOICES)
    staff_name = models.CharField(max_length=255)
    question_paper = models.FileField(upload_to='question_papers/')
    answer_key = models.FileField(upload_to='answer_keys/')
    created_at = models.DateTimeField(auto_now_add=True)

    def __str__(self):
        return f"{self.subject} - {dict(self.YEAR_CHOICES).get(self.year,
'Unknown')}" - {self.get_exam_type_display()}"

class ExamSubmission(models.Model):
    EXAM_TYPES = [
        ('CAT1', 'CAT 1'),
        ('CAT2', 'CAT 2'),
    ]

    YEARS = [
        (1, "First Year"),
        (2, "Second Year"),
```



```

        (3, "Third Year"),
        (4, "Fourth Year"),
    ]

    exam = models.ForeignKey(Exam, on_delete=models.CASCADE) # Remove null=True,
blank=True
    student = models.ForeignKey(User, on_delete=models.CASCADE)
    subject = models.CharField(max_length=100)
    exam_type = models.CharField(max_length=10, choices=EXAM_TYPES)
    year = models.CharField(max_length=1, choices=YEARS)
    staff_name = models.CharField(max_length=100)
    answer_sheet = models.FileField(upload_to='answer_sheets/', null=True,
blank=True)
    is_graded = models.BooleanField(default=False)

    def __str__(self):
        return f"{self.subject} - {self.exam_type} ({self.get_year_display()})"

class EvaluationResult(models.Model):
    submission = models.OneToOneField(
        ExamSubmission,
        on_delete=models.CASCADE,
        related_name="evaluation"
    )
    evaluated_by = models.ForeignKey(
        User,
        on_delete=models.SET_NULL,
        null=True,
        blank=True,
        related_name="evaluations"
    )
    formatted_report = models.TextField() # Stores only the human-readable
report
    total_score = models.FloatField(default=0.0)
    max_score = models.FloatField(default=0.0)
    created_at = models.DateTimeField(auto_now_add=True)

    def __str__(self):
        exam_subject = self.submission.exam.subject if self.submission.exam else
"Unknown Exam"
        return f"Evaluation for {self.submission.student.username}
{exam_subject}"

```

## admin.py

```
from django.contrib import admin
from .models import EvaluationResult, Exam

admin.site.register(EvaluationResult)

admin.site.register(Exam)
```

## Student-dashboard.html

```
{% extends 'base.html' %}

{% block content %}
<div class="container mt-5">
    <div class="card shadow-lg p-4">
        <h2 class="text-center text-primary fw-bold"><img alt="graduation cap icon" data-bbox="618 412 635 428"/> Welcome, {{
request.user.username }}!</h2>
        <hr>

        <div class="d-flex justify-content-between align-items-center mb-4">
            <h3 class="text-secondary fw-semibold"><img alt="document icon" data-bbox="230 502 247 518"/> Your Submitted Exams</h3>
            <a href="{% url 'student_exam_fill' %}" class="btn btn-success btn-lg
shadow-sm">
                + Fill Exam Details
            </a>
        </div>

        {% if exams %}
        <div class="table-responsive">
            <table class="table table-hover table-bordered text-center align-
middle">
                <thead class="table-dark">
                    <tr>
                        <th><img alt="book icon" data-bbox="378 738 395 754"/> Subject</th>
                        <th><img alt="exam icon" data-bbox="378 755 395 771"/> Exam Type</th>
                        <th><img alt="calendar icon" data-bbox="378 772 395 788"/> Year</th>
                        <th><img alt="people icon" data-bbox="378 789 395 805"/> Staff Name</th>
                        <th><img alt="status icon" data-bbox="378 806 395 822"/> Status</th>
                        <th><img alt="search icon" data-bbox="378 823 395 839"/> Actions</th>
                    </tr>
                </thead>
                <tbody>
```

```

        {% for exam in exams %}
        <tr>
            <td class="fw-bold">{{ exam.subject }}</td>
            <td>{{ exam.get_exam_type_display }}</td>
            <td>{{ exam.get_year_display }}</td>
            <td>{{ exam.staff_name }}</td>
            <td>
                {% if exam.is_graded %}
                <span class="badge bg-success px-3 py-
2">Graded</span>

                {% else %}
                <span class="badge bg-warning text-dark px-3 py-
2">Pending</span>

                {% endif %}
            </td>
            <td>
                {% if exam.is_graded %}
                <a href="{% url 'view_results' exam.id %}"
class="btn btn-primary btn-sm shadow-sm">
                    View Results
                </a>
                {% else %}
                <button class="btn btn-secondary btn-sm shadow-
sm" disabled>Awaiting Grading</button>
                {% endif %}
            </td>
        </tr>
        {% endfor %}
    </tbody>
</table>
</div>
{% else %}
<div class="alert alert-info text-center">
    <p class="mb-0">🔒 No exams submitted yet. Start by filling out your
first exam!</p>
</div>
{% endif %}

<div class="text-center mt-4">
    <a href="{% url 'logout' %}" class="btn btn-danger btn-lg px-4
shadow-sm">🔒 Logout</a>
</div>
</div>
</div>

```

```

<style>
  body {
    background-color: #f8f9fa;
  }
  .card {
    border-radius: 12px;
    border: none;
    box-shadow: 0 4px 10px rgba(0, 0, 0, 0.1);
  }
  .table th {
    background-color: #212529;
    color: white;
  }
  .table td {
    vertical-align: middle;
  }
  .btn {
    border-radius: 8px;
  }
  .btn-success {
    background-color: #28a745;
  }
</style>
{% endblock %}

```

## Teacher-dashboard.html

```

{% extends 'base.html' %}

{% block content %}
<div class="container-fluid">
  <div class="row">
    <!-- Sidebar -->
    <nav class="col-md-3 col-lg-2 d-md-block bg-dark sidebar vh-100 p-3">
      <h4 class="text-white text-center">👤 Teacher Panel</h4>
      <hr class="text-white">
      <ul class="nav flex-column">
        <li class="nav-item">
          <a class="nav-link text-white" href="{% url
'teacher_dashboard' %}"> Dashboard</a>
        </li>
        <li class="nav-item">
          <a class="nav-link text-white" href="{% url 'create_exam'
%}">📝 Create Exam</a>

```

```

        </li>
        <li class="nav-item">
            <a class="nav-link text-white" href="{% url 'logout' %}">
Logout</a>
        </li>
    </ul>
</nav>

<!-- Main Content -->
<main class="col-md-9 ms-sm-auto col-lg-10 px-md-4 mt-4">
    <div class="d-flex justify-content-between align-items-center">
        <h2 class="text-primary">👤📚 Welcome, {{ request.user.username }}</h2>
        <a href="{% url 'create_exam' %}" class="btn btn-success btn-lg shadow-sm">
            + Create Exam
        </a>
    </div>
    <hr>

    <h3 class="text-secondary">📁 Created Exams</h3>
    {% if exams %}
        <div class="table-responsive">
            <table class="table table-hover table-bordered text-center">
                <thead class="table-dark">
                    <tr>
                        <th>Subject</th>
                        <th>Exam Type</th>
                        <th>Year</th>
                        <th>Actions</th>
                    </tr>
                </thead>
                <tbody>
                    {% for exam in exams %}
                        <tr>
                            <td class="fw-bold">{{ exam.subject }}</td>
                            <td>{{ exam.get_exam_type_display }}</td>
                            <td>{{ exam.get_year_display }}</td>
                            <td>
                                <a href="{% url 'view_submissions' exam.id %}" class="btn btn-primary btn-sm">
                                    📁 View Submissions
                                </a>
                            </td>
                        </tr>
                    {% endfor %}
                </tbody>
            </table>
        </div>
    {% endif %}

```

```

        </tbody>
    </table>
</div>
{% else %}
    <div class="alert alert-info text-center">
        <p class="mb-0">No exams created yet.</p>
    </div>
{% endif %}
</main>
</div>
</div>

<style>
    /* Sidebar Styling */
    .sidebar {
        height: 100vh;
        position: fixed;
        left: 0;
        top: 0;
        width: 250px;
    }

    /* Adjust main content */
    main {
        margin-left: 260px;
    }

    /* Button Styling */
    .btn-sm {
        font-size: 0.9rem;
    }

    /* Responsive Design */
    @media (max-width: 768px) {
        .sidebar {
            position: relative;
            height: auto;
            width: 100%;
        }
        main {
            margin-left: 0;
        }
    }
</style>
{% endblock %}

```

## 9.2 APPENDIX-B: DEMO SCREENSHOTS

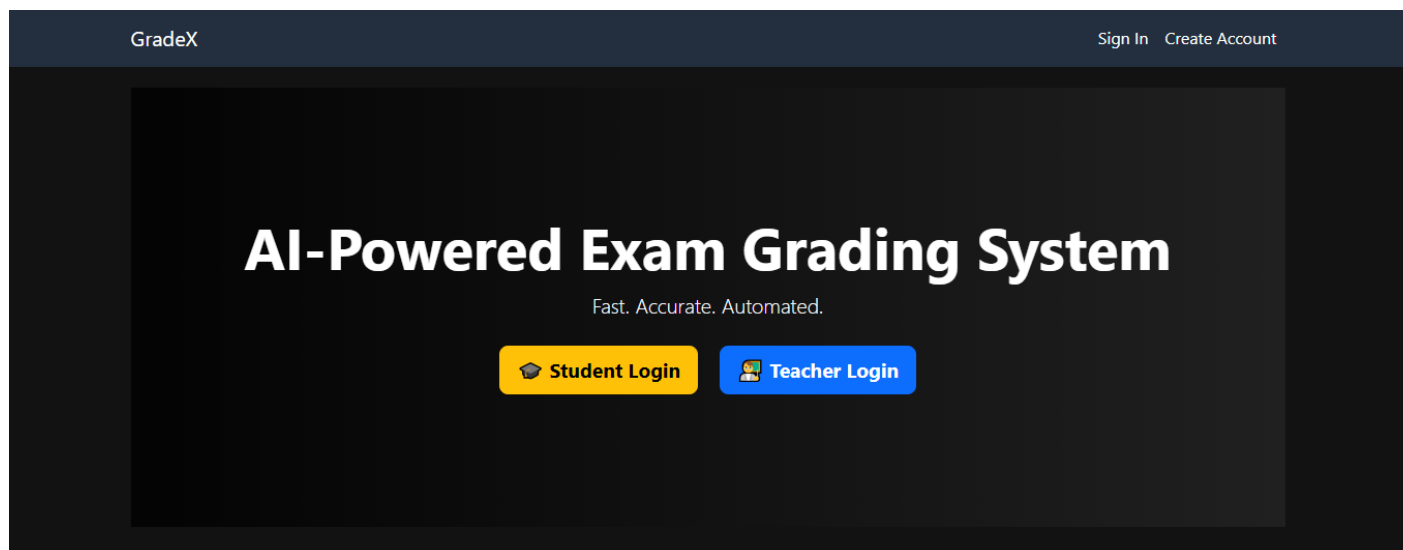


Fig: 9.1 GradeX Website

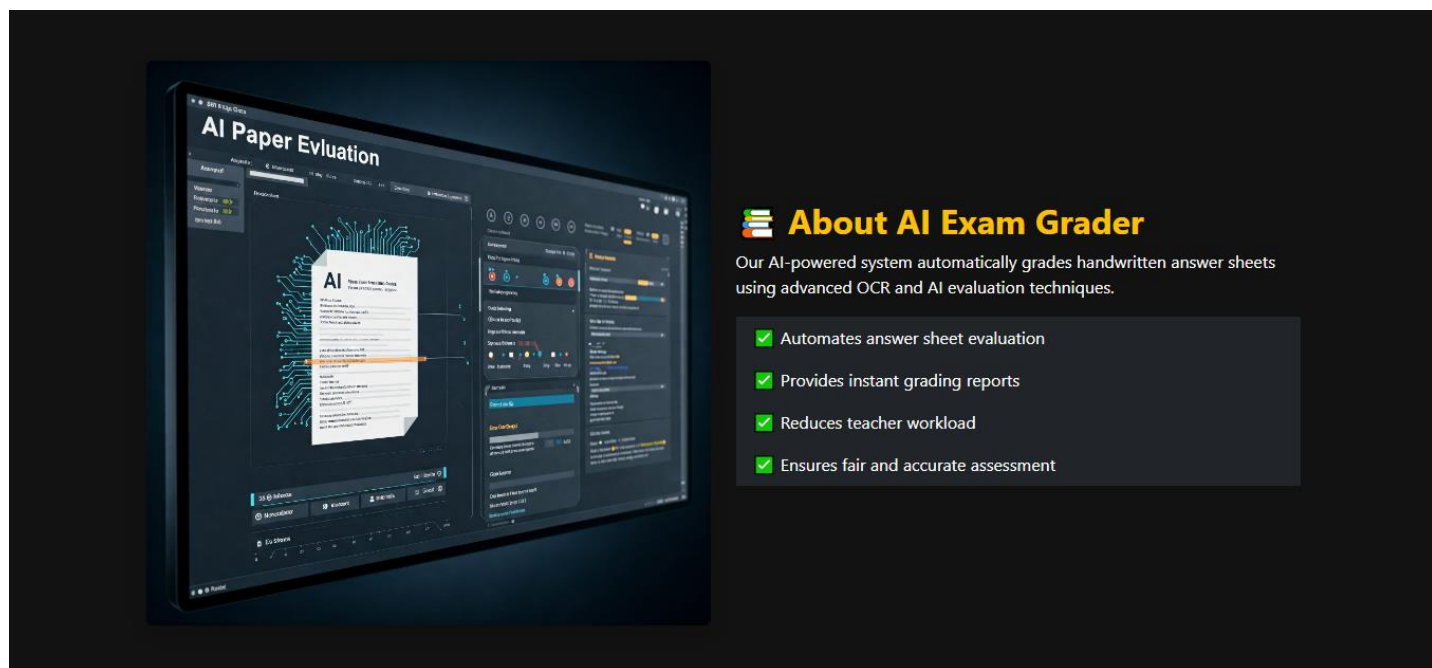
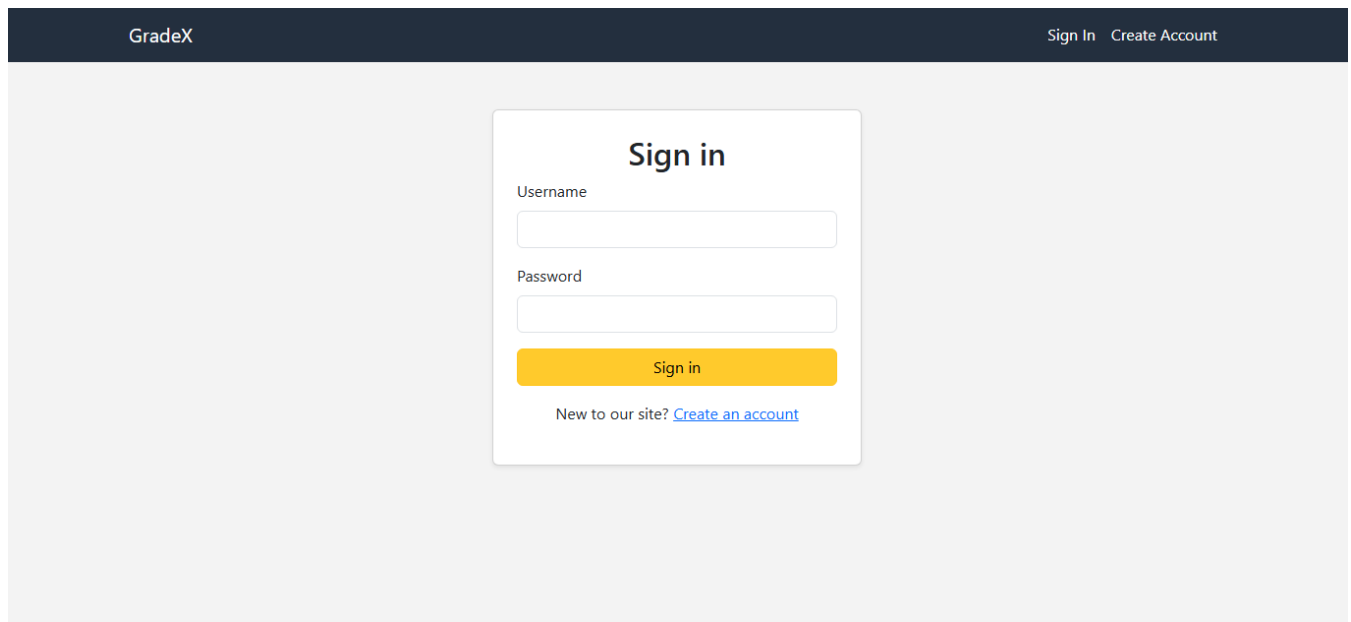
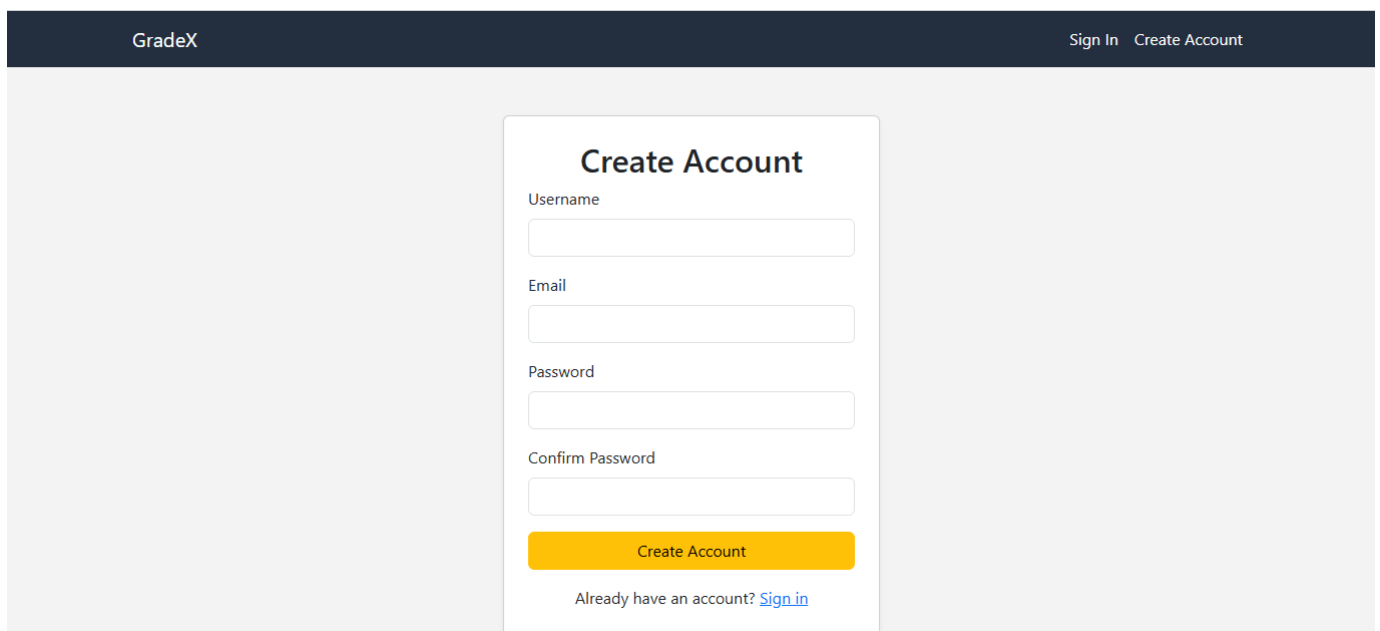


Fig: 9.2 GradeX Information



The image shows a web page for GradeX with a dark blue header. On the left of the header is the text "GradeX" and on the right are the links "Sign In" and "Create Account". The main content area is light gray and contains a white "Sign in" form. The form has a title "Sign in", a "Username" label with a text input field, a "Password" label with a text input field, a yellow "Sign in" button, and a link "New to our site? [Create an account](#)".

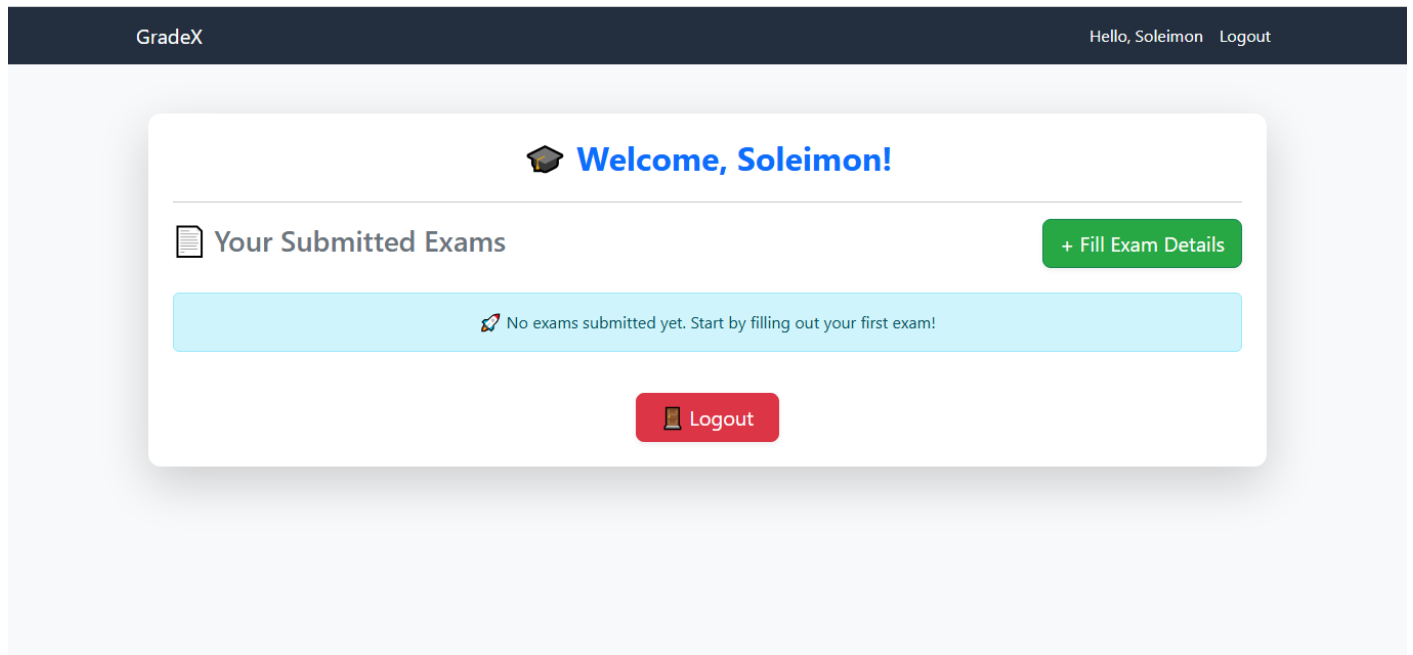
**Fig: 9.3 Gradex Student Signin**



The image shows a web page for GradeX with a dark blue header. On the left of the header is the text "GradeX" and on the right are the links "Sign In" and "Create Account". The main content area is light gray and contains a white "Create Account" form. The form has a title "Create Account", a "Username" label with a text input field, an "Email" label with a text input field, a "Password" label with a text input field, a "Confirm Password" label with a text input field, a yellow "Create Account" button, and a link "Already have an account? [Sign in](#)".

**Fig: 9.4 Gradex Student Sign up**

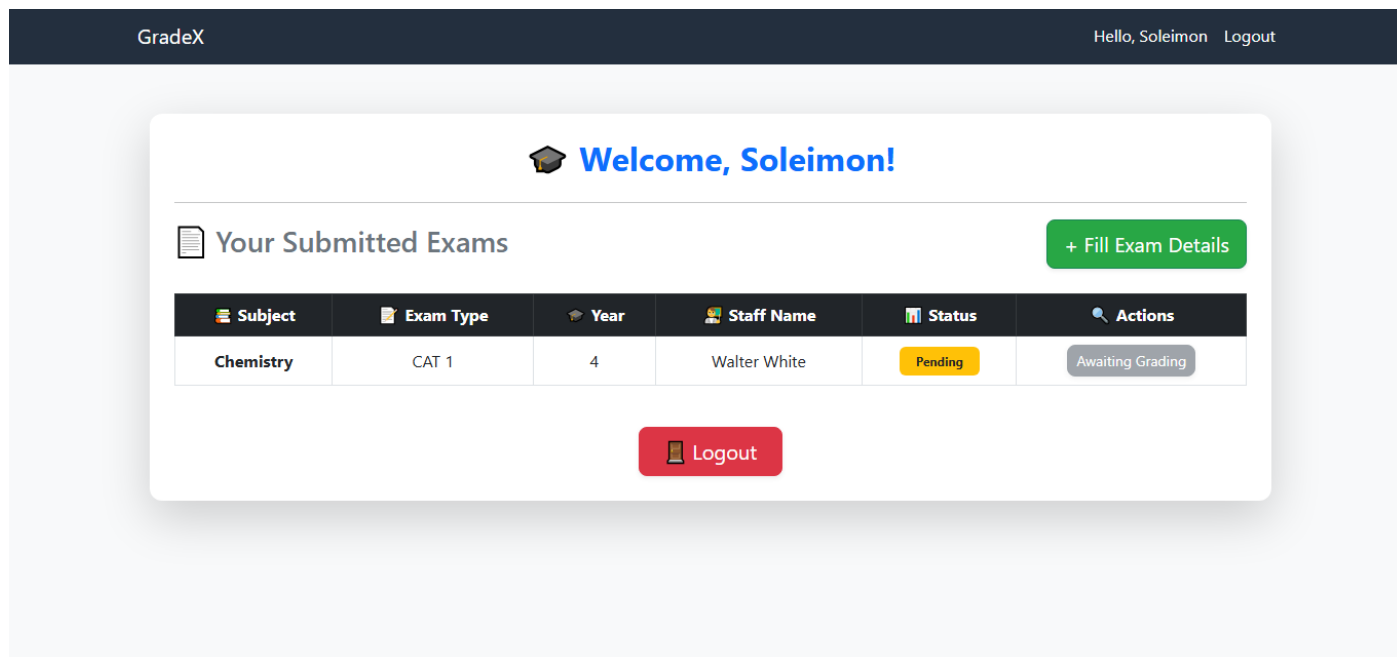




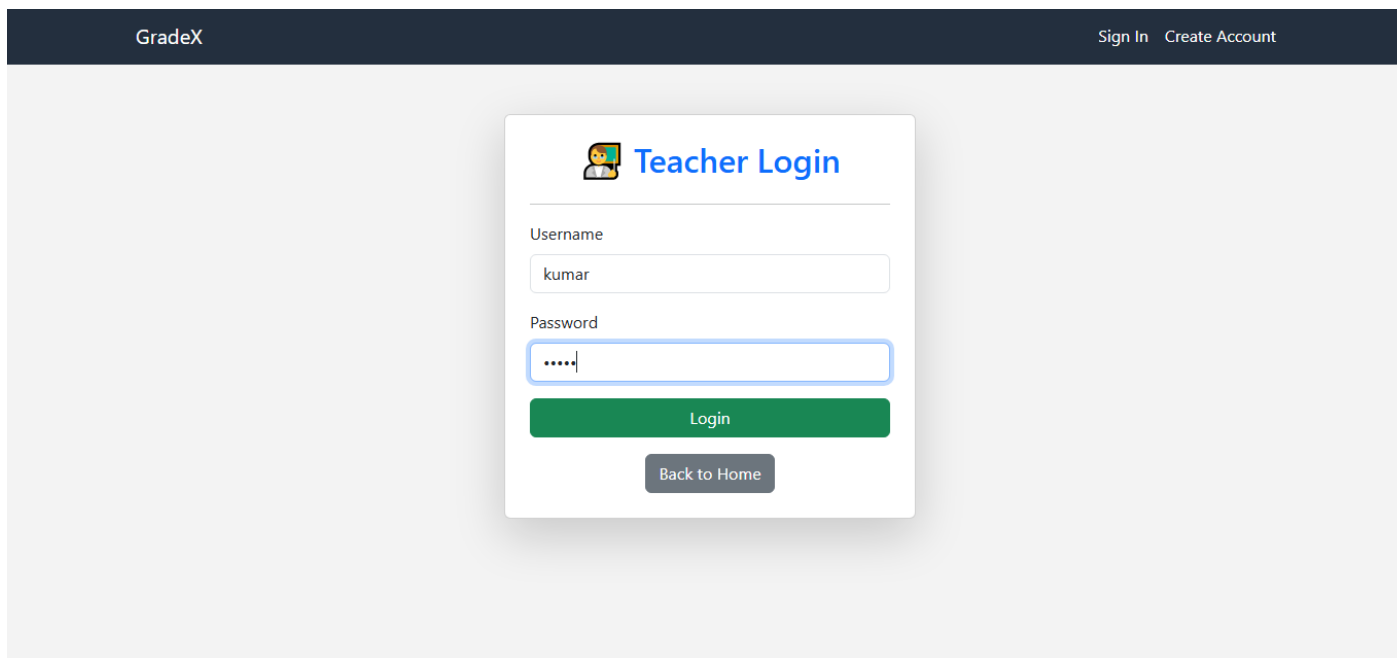
**Fig: 9.5 Gradex Student Dashboard**

The screenshot shows the GradeX Student Exam Fill form. At the top, a dark blue header contains the text "GradeX" on the left and "Hello, Soleimon Logout" on the right. The main content area is white and features a central card. The card has a blue header with a pencil icon and the text "Fill Exam Details". Below this, there's a green box with the message "Login successful!". The form contains four input fields: "Subject Name" with the value "Chemistry", "Exam Type" with a dropdown menu showing "CAT 1", "Year" with a dropdown menu showing "Fourth Year", and "Staff Name" with the value "Walter White". At the bottom of the card is a green button labeled "Submit Exam Details" with a checkmark icon.

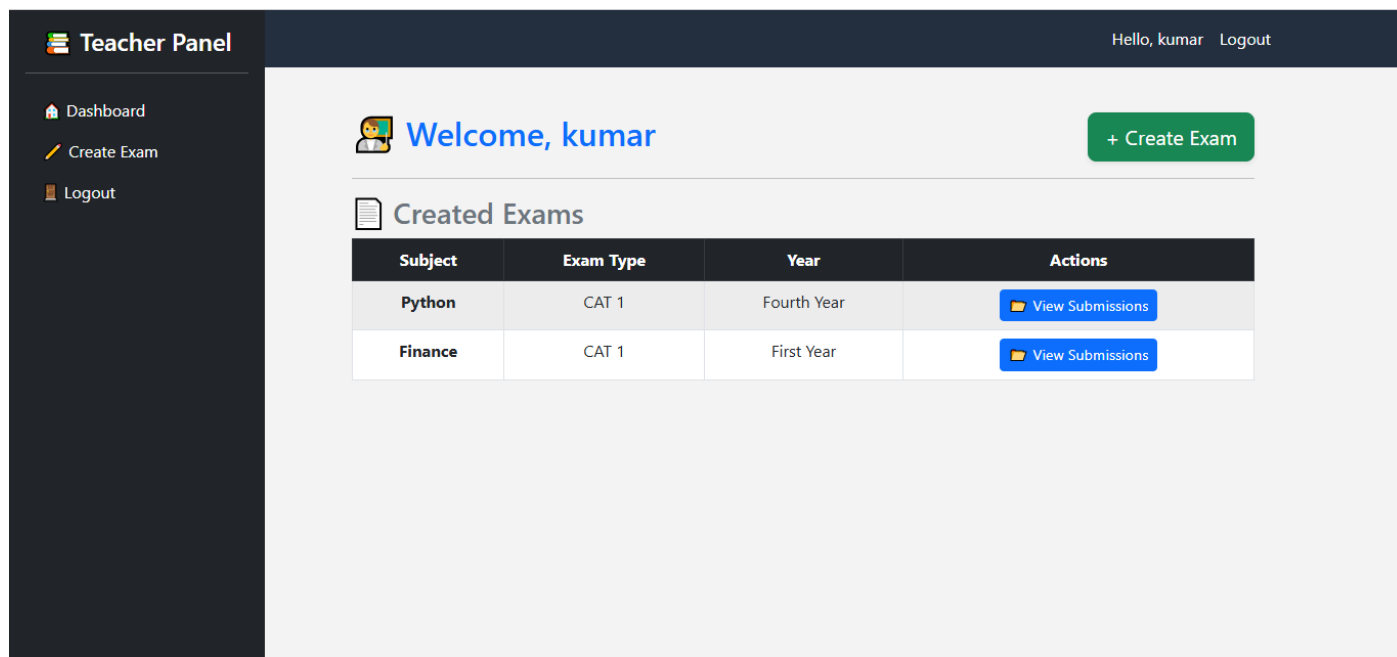
**Fig: 9.6 Gradex Student Exam Fill**



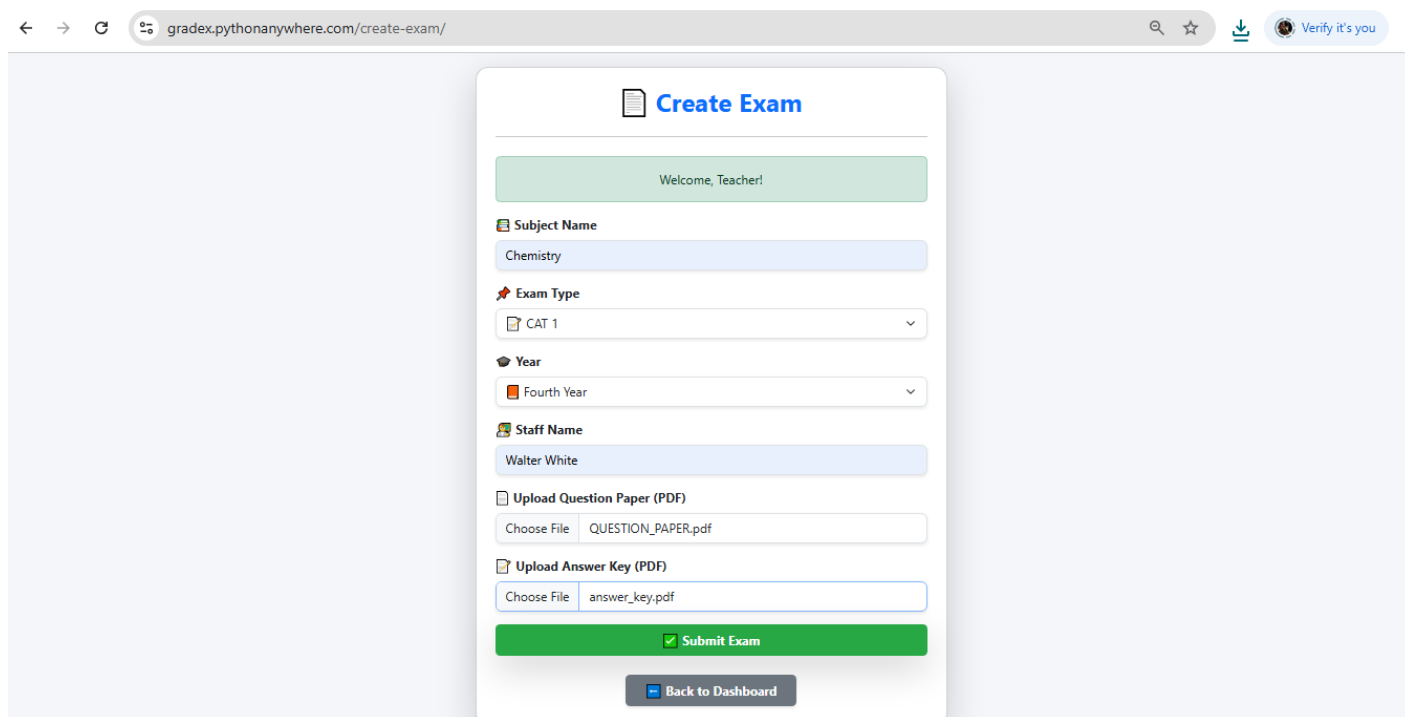
**Fig: 9.7 Gradex Student Awaiting Exam Status**



**Fig: 9.8 Gradex Teacher Login**



**Fig: 9.9 Gradex Teacher Dashboard**



**Fig: 9.10 Gradex Teacher Exam Creation**

Teacher Panel

GradeX

Hello, kumar Logout

Dashboard  
Create Exam  
Logout

Welcome, kumar

+ Create Exam

Created Exams

Subject	Exam Type	Year	Actions
Chemistry	CAT 1	Fourth Year	<a href="#">View Submissions</a>
Python	CAT 1	Fourth Year	<a href="#">View Submissions</a>
Finance	CAT 1	First Year	<a href="#">View Submissions</a>

**Fig: 9.11 Gradex Teacher Dashboard-Created Exams**

GradeX

Hello, kumar Logout

Submissions for Chemistry (CAT 1)

Exam successfully created!

Student Name	Year	Answer Sheet	Upload Answer Sheet	Evaluate
kumar	4	<a href="#">View</a>	<a href="#">Upload</a>	<a href="#">Evaluate</a>
kumaresan	4	Not Uploaded	<div>Choose File</div> <div>No file chosen</div>	No Answer Sheet
Lingesh	4	Not Uploaded	<div>Choose File</div> <div>No file chosen</div>	No Answer Sheet
Soleimon	4	Not Uploaded	<div>Choose File</div> <div>No file chosen</div>	No Answer Sheet

Upload Selected Files

Back to Dashboard

**Fig: 9.12 Gradex Teacher Dashboard-Exam Submissin List**

GradeX
Hello, kumar
Logout

Submissions for Chemistry (CAT 1)

Answer sheet uploaded for Soleimon.

Student Name	Year	Answer Sheet	Upload Answer Sheet	Evaluate
kumar	4	<a href="#">View</a>	<a href="#">Upload</a>	<a href="#">Evaluate</a>
kumaresan	4	Not Uploaded	Choose File No file chosen	No Answer Sheet
Lingesh	4	Not Uploaded	Choose File No file chosen	No Answer Sheet
Soleimon	4	<a href="#">View</a>	<a href="#">Upload</a>	<a href="#">Evaluate</a>

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**Fig: 9.13 Gradex Teacher Dashboard-Answer Sheet Upload**

GradeX
Hello, kumar
Logout

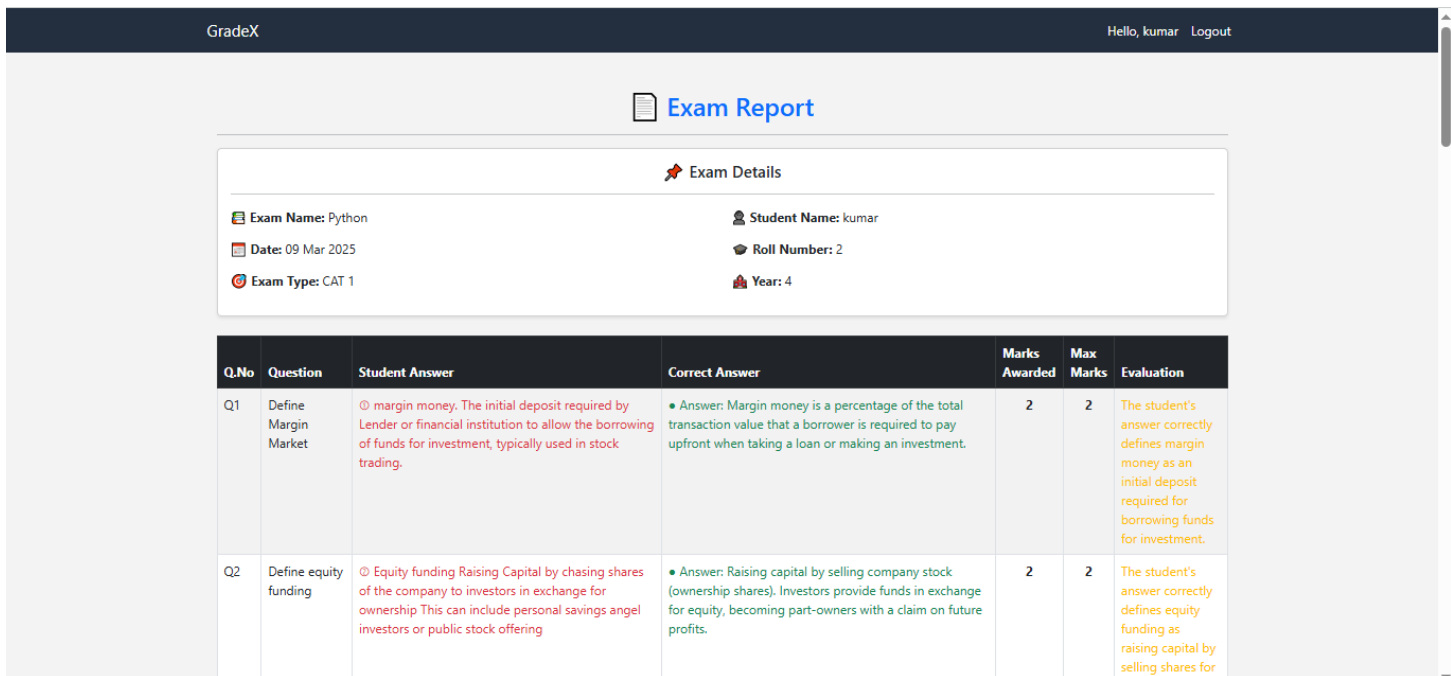
Submissions for Chemistry (CAT 1)

Answer sheet uploaded for Soleimon.

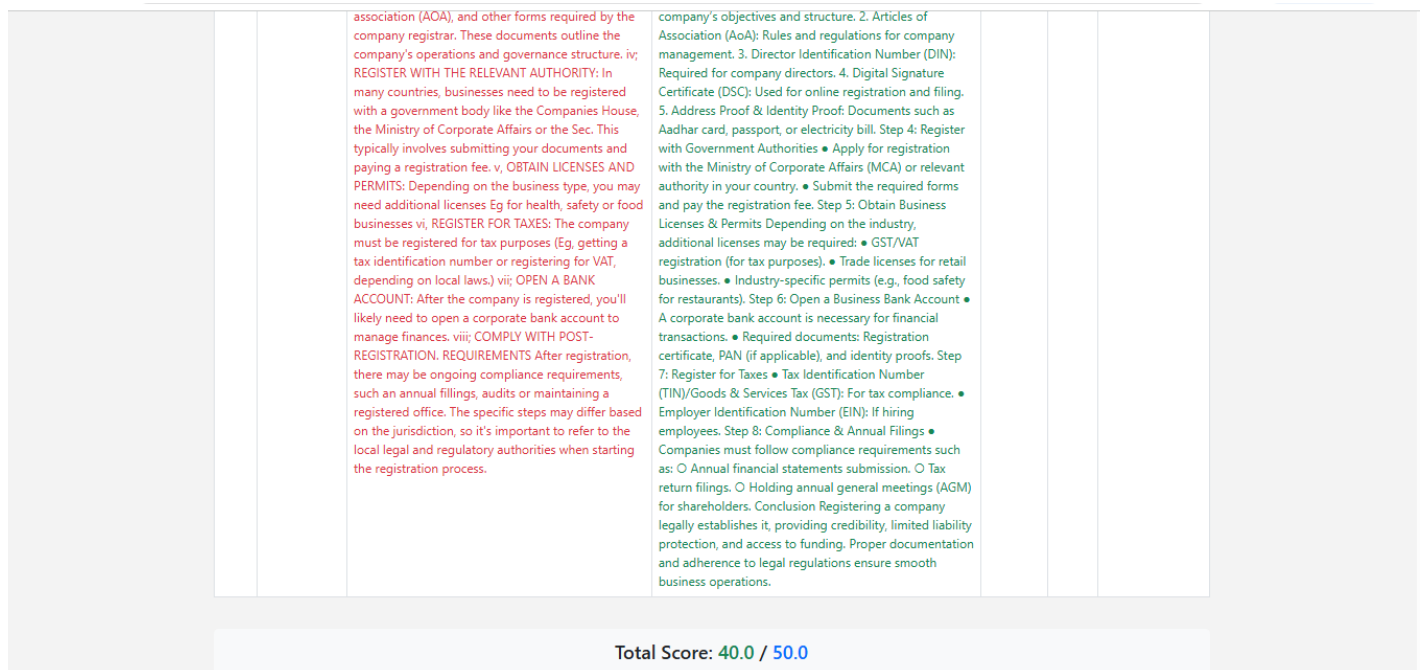
Student Name	Year	Answer Sheet	Upload Answer Sheet	Evaluate
kumar	4	<a href="#">View</a>	<a href="#">Upload</a>	<a href="#">Evaluate</a>
kumaresan	4	Not Uploaded	Choose File No file chosen	No Answer Sheet
Lingesh	4	Not Uploaded	Choose File No file chosen	No Answer Sheet
Soleimon	4	<a href="#">View</a>	<a href="#">Upload</a>	Processing Evaluation...

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**Fig: 9.14 Gradex Teacher Dashboard-Answer Sheet Evaluating**



**Fig: 9.15 Gradex Teacher Dashboard-Results-1**



**Fig: 9.16 Gradex Teacher Dashboard-Results-2**

## Chapter 10

### Future Enhancement

While the Gradex system has successfully streamlined the process of evaluating handwritten student answer sheets using OCR and AI, the current workflow still requires manual scanning or photographing of the answer sheets before processing. A major area for improvement lies in automating this input step to make the system more seamless and scalable.

The primary future enhancement will focus on digitizing the answer sheet collection process. Instead of manually scanning or converting student-written sheets into PDFs or image formats, the system can be integrated with school digital infrastructure to automatically ingest answer sheets directly from:

- **Smart exam papers** written on digital pads or tablets with stylus input
- **Mobile app-based capture systems** where teachers simply click pictures, and the app auto-converts and uploads them to the backend
- **Scanner integration APIs** that trigger evaluation as soon as papers are scanned

This would eliminate delays, reduce human effort, and improve the overall efficiency of the system from input to evaluation.

In addition to this, several other enhancements are planned for the Gradex platform:

- **Multilingual Answer Sheet Support**  
Expanding OCR and NLP capabilities to evaluate responses written in regional languages.
- **Real-time Evaluation via Digital Input Devices**  
Supporting direct writing on tablets to allow instant feedback and auto-evaluation.
- **Learning Feedback Loop for Scoring Adjustment**  
Using machine learning models to learn from teacher corrections and adapt future scoring.
- **Advanced Student Performance Analytics**  
Generating detailed reports with topic-wise analytics, progress tracking, and feedback suggestions.

- **Plagiarism Detection**

Adding modules to detect similar or copied content between students' answers.

- **LMS and Mobile Integration**

Integrating with Learning Management Systems (LMS) and offering mobile apps for easy access by both students and teachers.

By focusing on automating the initial input step, Gradex will not only become more efficient but also truly scalable for large-scale educational deployments.



## REFERENCES

- [1] Y. LeCun, Y. Bengio, and G. Hinton, "Deep learning," *Nature*, vol. 521, no. 7553, pp. 436–444, 2015.
- [2] A. Graves, S. Fernández, M. Liwicki, H. Bunke, and J. Schmidhuber, "Unconstrained online handwriting recognition with recurrent neural networks," in *Proc. 20th Int. Conf. Neural Inf. Process. Syst. (NIPS)*, 2008, pp. 577–584.
- [3] S. Hochreiter and J. Schmidhuber, "Long short-term memory," *Neural Computation*, vol. 9, no. 8, pp. 1735–1780, 1997.
- [4] M. D. Zeiler and R. Fergus, "Visualizing and understanding convolutional networks," in *Proc. European Conf. Computer Vision (ECCV)*, 2014, pp. 818–833.
- [5] R. Smith, "An overview of the Tesseract OCR engine," in *Proc. Int. Conf. Document Anal. Recognit. (ICDAR)*, 2007, pp. 629–633.
- [6] OpenAI, "GPT-4 technical report," *arXiv preprint arXiv:2303.08774*, 2023.
- [7] R. S. Sutton and A. G. Barto, *Reinforcement Learning: An Introduction*, 2nd ed. Cambridge, MA, USA: MIT Press, 2018.
- [8] N. Dalal and B. Triggs, "Histograms of oriented gradients for human detection," in *Proc. IEEE Comput. Soc. Conf. Comput. Vis. Pattern Recognit. (CVPR)*, 2005, vol. 1, pp. 886–893.
- [9] D. Bahdanau, K. Cho, and Y. Bengio, "Neural machine translation by jointly learning to align and translate," in *Proc. Int. Conf. Learn. Represent. (ICLR)*, 2015.
- [10] K. He, X. Zhang, S. Ren, and J. Sun, "Deep residual learning for image recognition," in *Proc. IEEE Conf. Comput. Vis. Pattern Recognit. (CVPR)*, 2016, pp. 770–778.

## CONFERENCE CERTIFICATES





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**Mohamed Asick A**

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Length **19 total hours**