Optical Marking Management System Design Proposal

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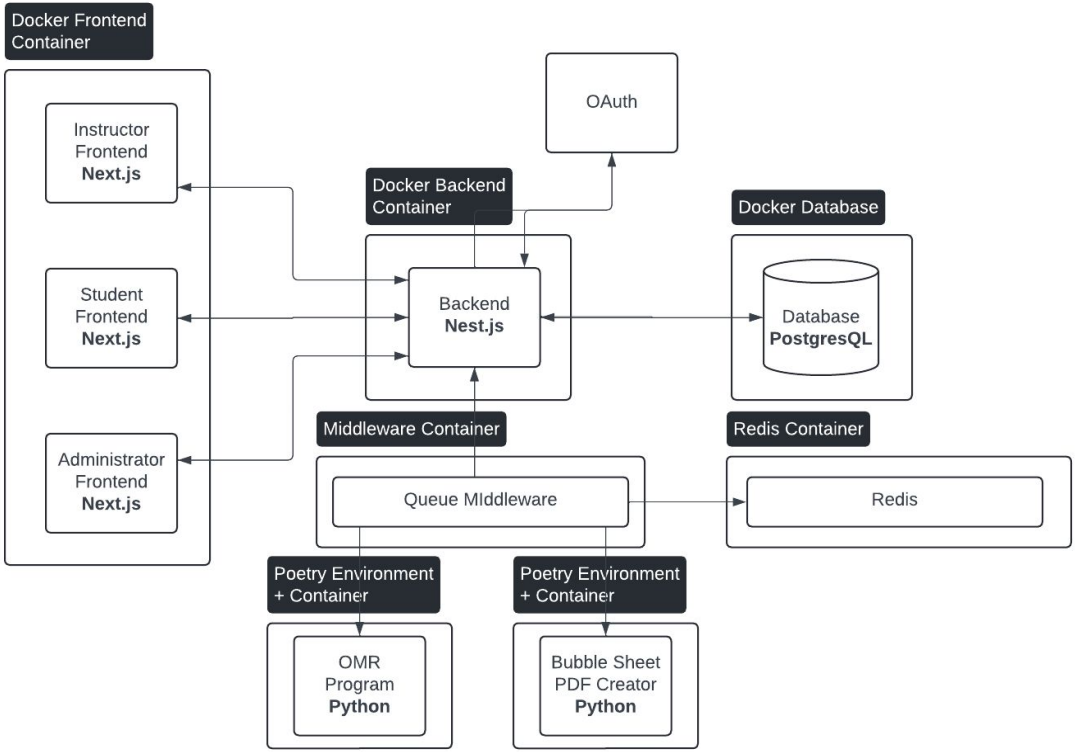
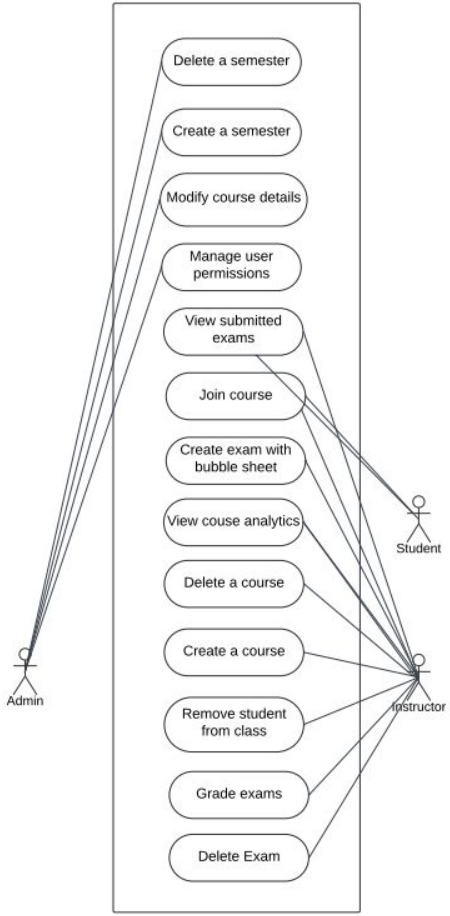
System Architecture



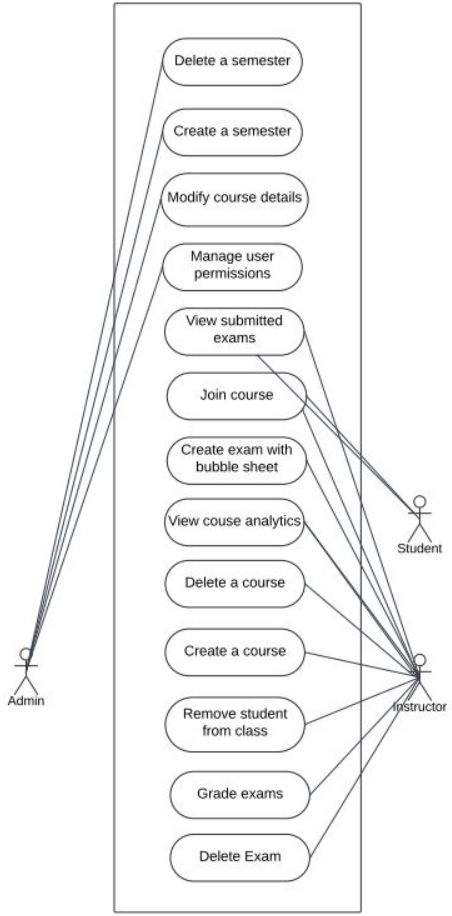
Use Cases (Grade Exams)

1. The instructor signs into the system
2. The instructor navigates to the “Course” page and clicks on the “Edit” button for the selected exam
3. The instructor clicks the button “Upload Submissions,” where they are presented with the window to select the PDF file with bubble-sheet exams
4. The system processes and grades uploaded PDF file and adds the list of graded students and their marks
5. The instructor validates all exams are marked correctly and clicks the button “Release Grades”



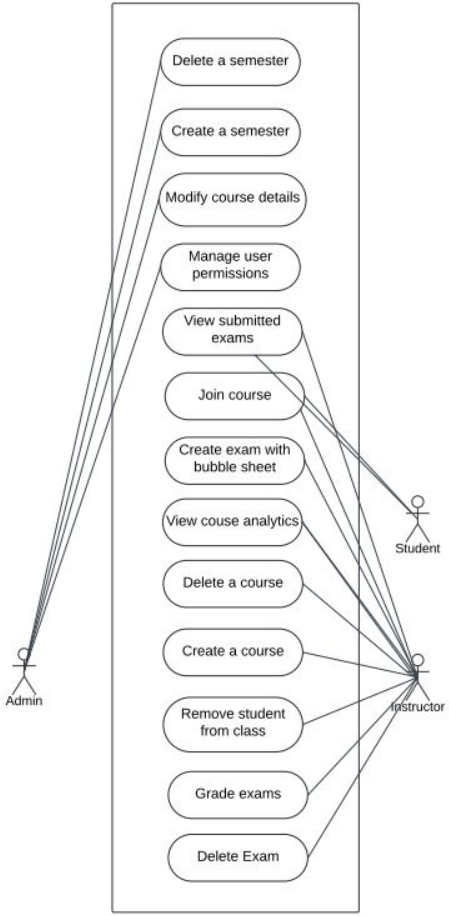
Use Cases (View Submitted Exams)

1. The instructor selects a course from their dashboard.
2. The instructor selects an exam.
3. The instructor selects a student.
    a. By manually searching for the user
    b. By searching the user with the search bar
4. The instructor views the student's exam.

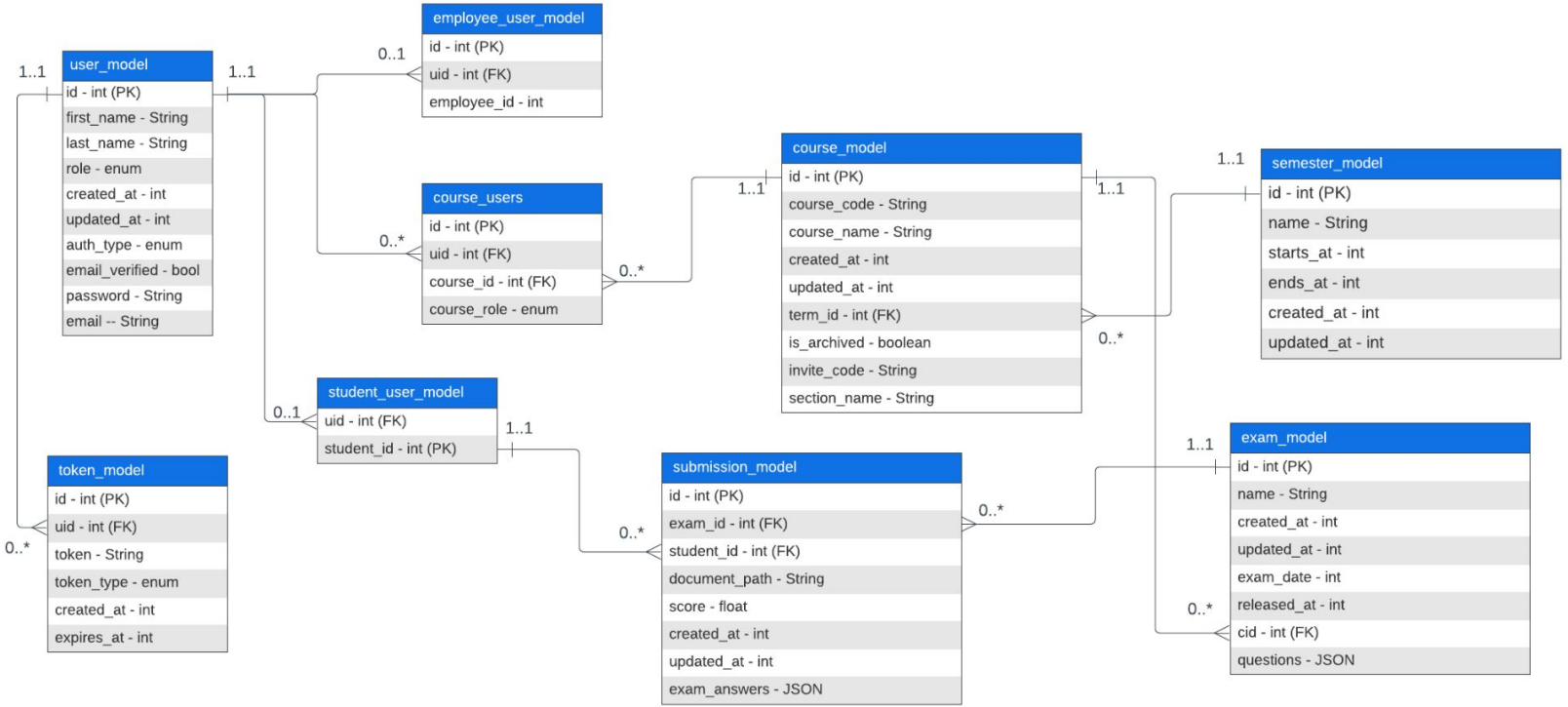


Use Cases (View Course Analytics)

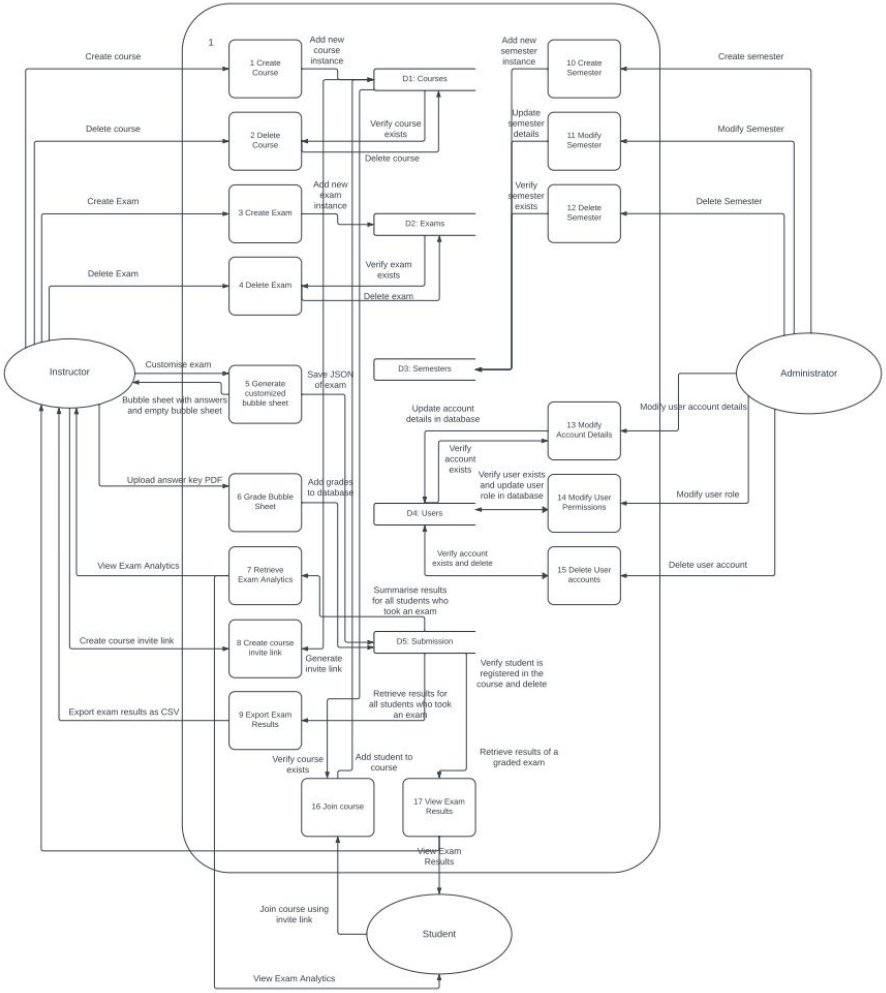
1. The instructor signs in to the system.
2. The instructor navigates to the course dashboard page
3. The instructor clicks the button “Analytics” and gets redirected to the page
4. The instructor is able to see graphs and charts related to the course average and historical average, class size, top-performing students, top challenging exams, and other charts that provide information about course performance



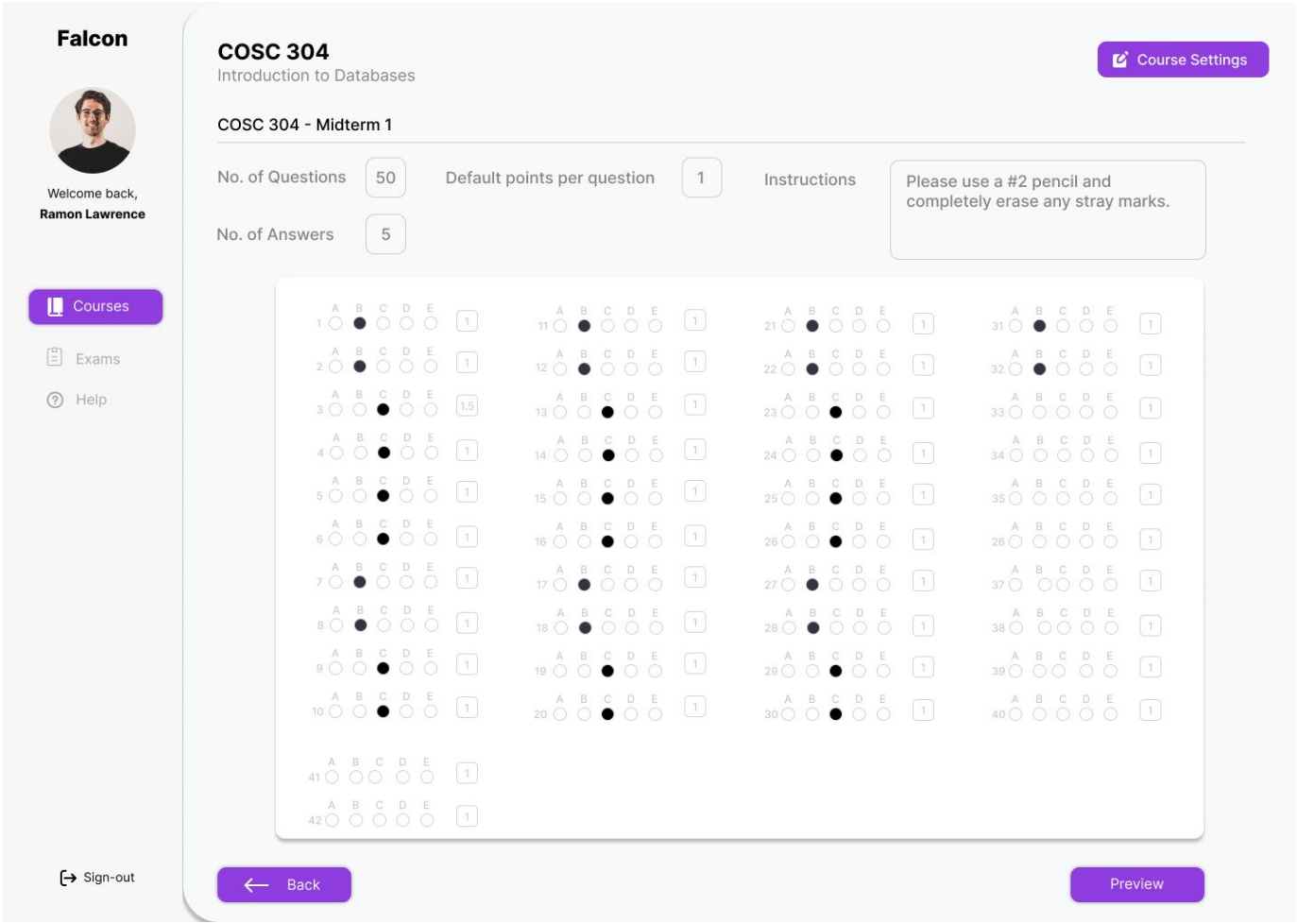
ER Model


user_model
id - int (PK)
first_name - String
last_name - String
role - enum
created_at - int
updated_at - int
auth_type - enum
email_verified - bool
password - String
email -- String
employee_user_model
id - int (PK)
uid - int (FK)
employee_id - int
course_users
id - int (PK)
uid - int (FK)
course_id - int (FK)
course_role - enum
course_model
id - int (PK)
course_code - String
course_name - String
created_at - int
updated_at - int
term_id - int (FK)
is_archived - boolean
invite_code - String
section_name - String
semester_model
id - int (PK)
name - String
starts_at - int
ends_at - int
created_at - int
updated_at - int
student_user_model
uid - int (FK)
student_id - int (PK)
token_model
id - int (PK)
uid - int (FK)
token - String
token_type - enum
created_at - int
expires_at - int
submission_model
id - int (PK)
exam_id - int (FK)
student_id - int (FK)
document_path - String
score - float
created_at - int
updated_at - int
exam_answers - JSON
exam_model
id - int (PK)
name - String
created_at - int
updated_at - int
exam_date - int
released_at - int
cid - int (FK)
questions - JSON
1..1
0..1
0..*

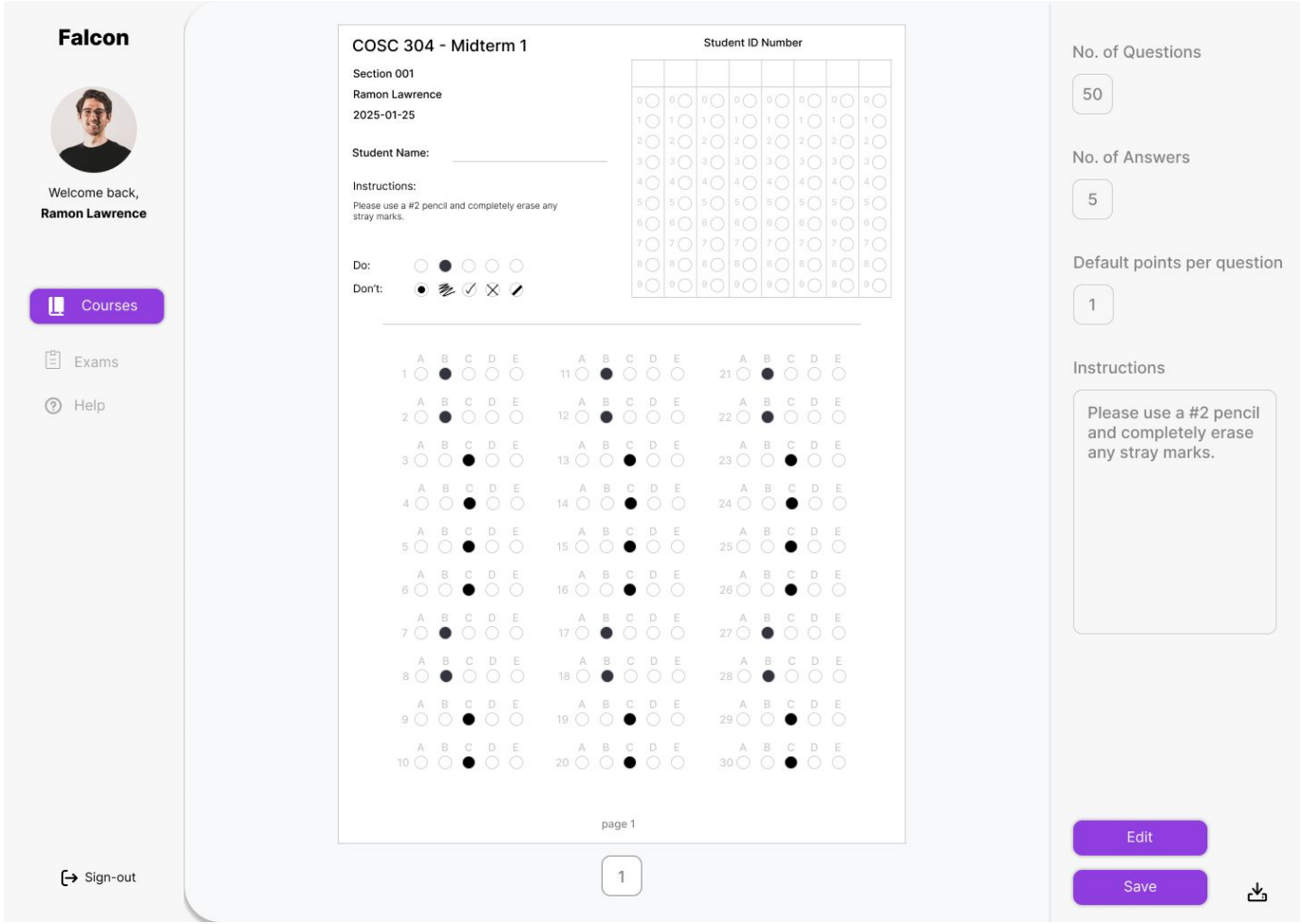
Level 1 DFD


1
1 Create Course
2 Delete Course
3 Create Exam
4 Delete Exam
5 Generate customized bubble sheet
6 Grade Bubble Sheet
7 Retrieve Exam Analytics
8 Create course invite link
9 Export Exam Results
10 Create Semester
11 Modify Semester
12 Delete Semester
13 Modify Account Details
14 Modify User Permissions
15 Delete User accounts
16 Join course
17 View Exam Results
D1: Courses
D2: Exams
D3: Semesters
D4: Users
D5: Submission
Add new course instance
Verify course exists
Delete course
Add new exam instance
Verify exam exists
Delete exam
Add new semester instance
Update semester details
Verify semester exists
Customise exam
Bubble sheet with answers and empty bubble sheet
Save JSON of exam
Upload answer key PDF
Add grades to database
Update account details in database
Verify account exists
Verify user exists and update user role in database
Verify account exists and delete
Summarise results for all students who took an exam
Generate invite link
Verify student is registered in the course and delete
Retrieve results for all students who took an exam
Retrieve results of a graded exam
Add student to course
View Exam Results
Join course using invite link
View Exam Analytics
Create course
Delete course
Create Exam
Delete Exam
Create semester
Modify Semester
Delete Semester
Modify user account details
Modify user role
Delete user account
View Exam Analytics
Export exam results as CSV
Instructor
Administrator
Student

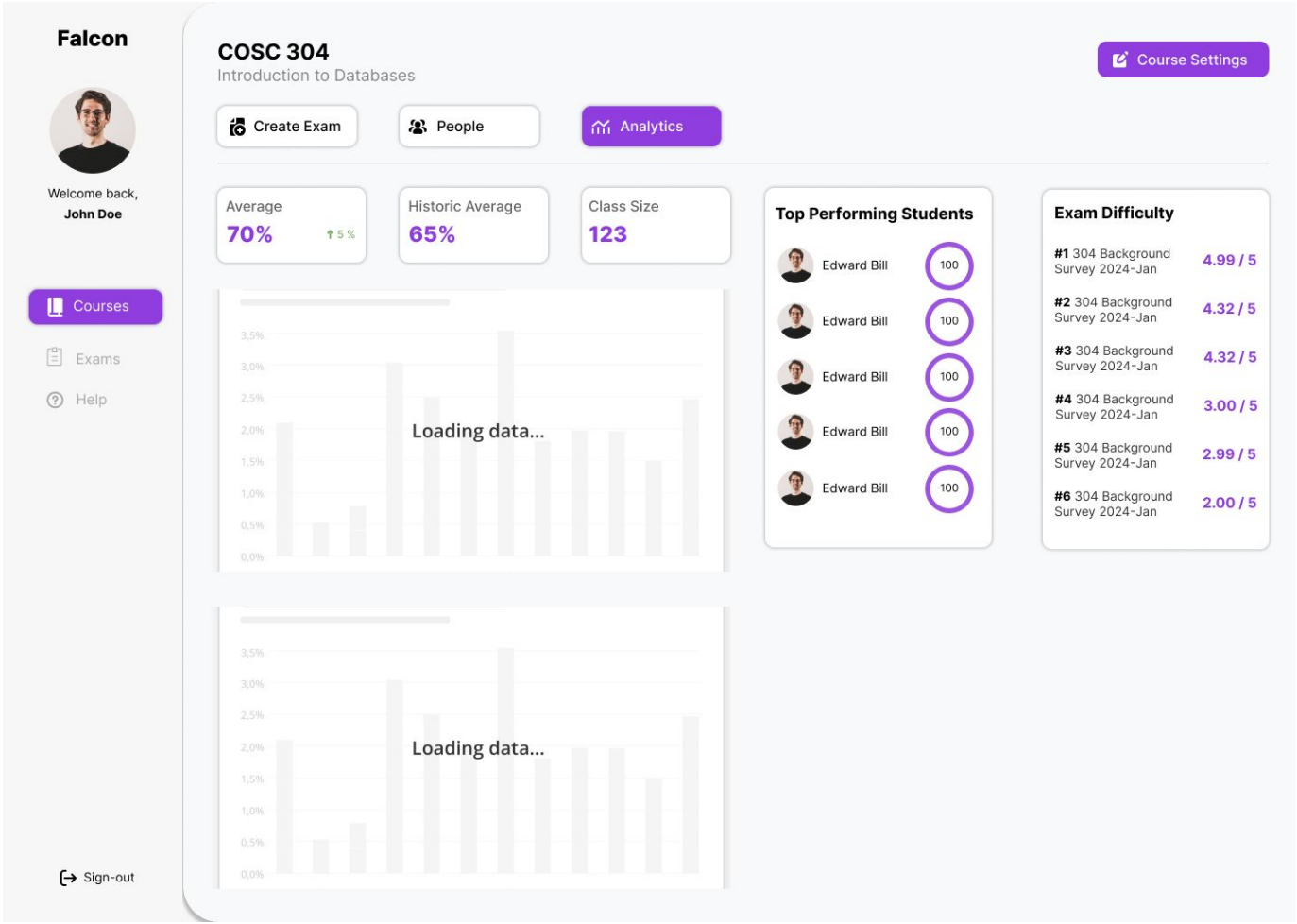
UI Mockups


Falcon
Welcome back,
Ramon Lawrence
Courses
Exams
Help
Sign-out
COSC 304
Introduction to Databases
Course Settings
COSC 304 - Midterm 1
No. of Questions
50
Default points per question
1
Instructions
Please use a #2 pencil and completely erase any stray marks.
No. of Answers
5
Back
Preview

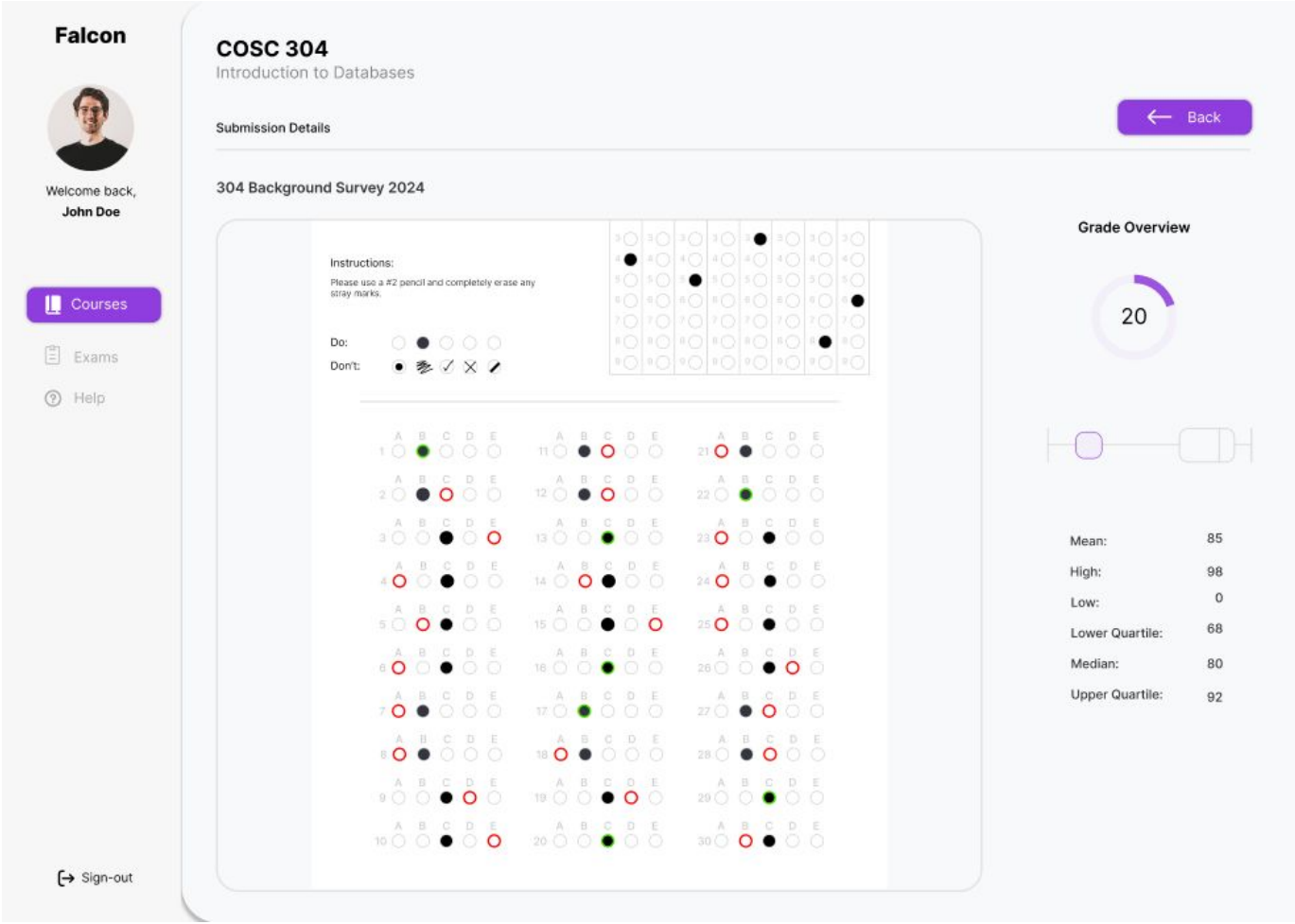
UI Mockups


Falcon
Welcome back,
Ramon Lawrence
Courses
Exams
Help
Sign-out
COSC 304 - Midterm 1
Section 001
Ramon Lawrence
2025-01-25
Student Name:
Instructions:
Please use a #2 pencil and completely erase any stray marks.
Do:
Don't:
Student ID Number
page 1
1
No. of Questions
50
No. of Answers
5
Default points per question
1
Instructions
Please use a #2 pencil and completely erase any stray marks.
Edit
Save

UI Mockups


Falcon
Welcome back,
John Doe
Courses
Exams
Help
Sign-out
COSC 304
Introduction to Databases
Course Settings
Create Exam
People
Analytics
Average
70%
5 %
Historic Average
65%
Class Size
123
Loading data...
Loading data...
Top Performing Students
Edward Bill 100
Edward Bill 100
Edward Bill 100
Edward Bill 100
Edward Bill 100
Exam Difficulty
#1 304 Background Survey 2024-Jan 4.99 / 5
#2 304 Background Survey 2024-Jan 4.32 / 5
#3 304 Background Survey 2024-Jan 4.32 / 5
#4 304 Background Survey 2024-Jan 3.00 / 5
#5 304 Background Survey 2024-Jan 2.99 / 5
#6 304 Background Survey 2024-Jan 2.00 / 5

UI Mockups


Falcon
Welcome back,
John Doe
Courses
Exams
Help
Sign-out
COSC 304
Introduction to Databases
Submission Details
Back
304 Background Survey 2024
Instructions:
Please use a #2 pencil and completely erase any stray marks.
Do:
Don't:
Grade Overview
20
Mean: 85
High: 98
Low: 0
Lower Quartile: 68
Median: 80
Upper Quartile: 92

Thank you ！