ASSIGNMENT-5.3

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Batch: **37**

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Task 1: Privacy and Data Security in AI-Generated Code

Scenario: AI tools can sometimes generate insecure authentication logic.

Task Description:

Use an AI tool to generate a simple login system in Python.

Analyse the generated code to check:

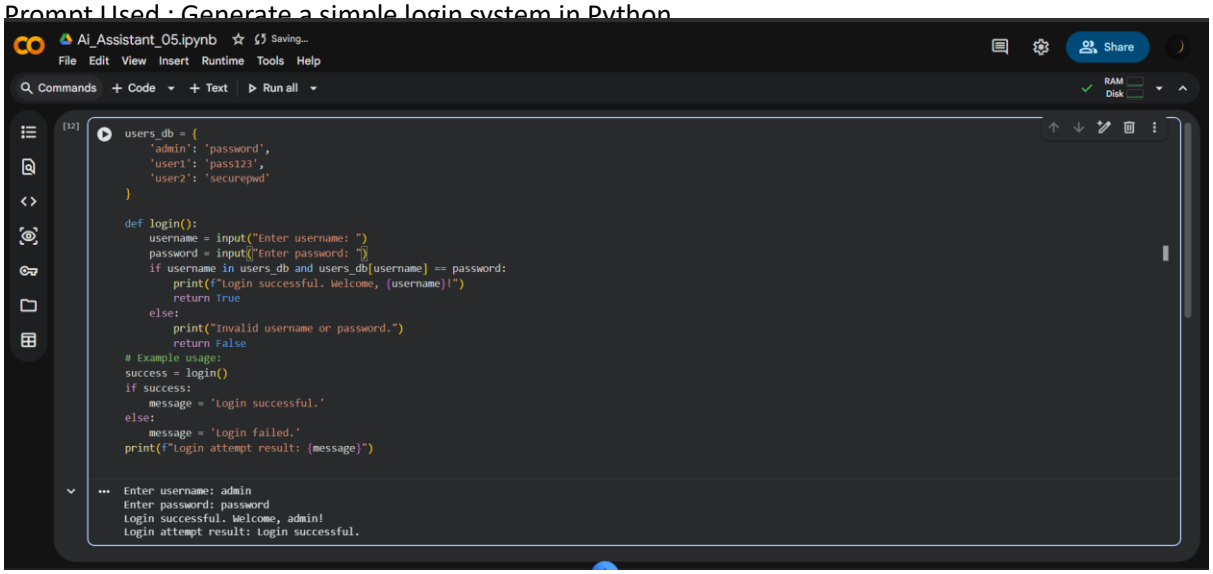
• Whether credentials are hardcoded

• Whether passwords are stored or compared in plain text

• Whether insecure logic is used

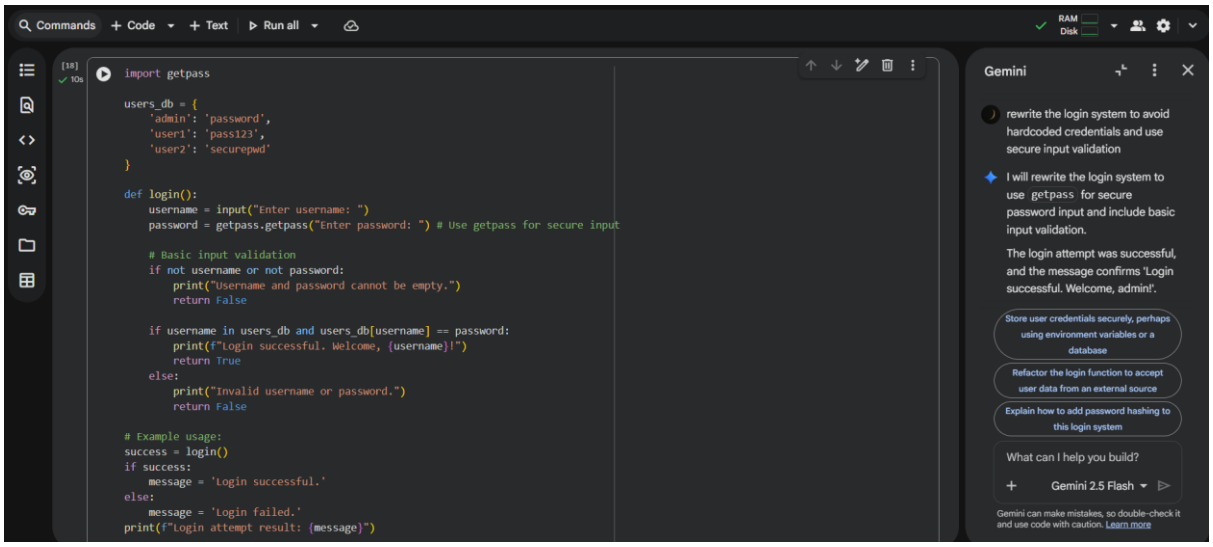
Then, revise the code to improve security (e.g., avoid hardcoding, use input validation).

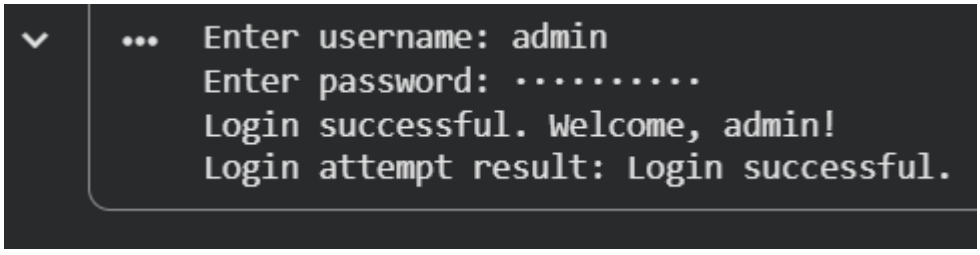
Prompt Used : Generate a simple login system in Python



Analysis: The system has **hardcoded credentials**, uses **plain text passwords** (both stored and compared), and implements **insecure logic** (no hashing, no rate limiting). These are significant security flaws for a real-world application.

Revise the code to improve security





Explanation:

To add password hashing:

1. **Install a hashing library** (e.g., passlib with bcrypt).
2. **Hash passwords** using the library before storing them (e.g., pwd_context.hash('password')).
3. **Update the login function** to use the library's verification method (pwd_context.verify(entered_password, stored_hash)), which compares the entered password's hash with the stored hash.

Task 2: Bias Detection in AI-Generated Decision Systems

Scenario

AI systems may unintentionally introduce bias.

Task Description

Use AI prompts such as:

• “Create a loan approval system”

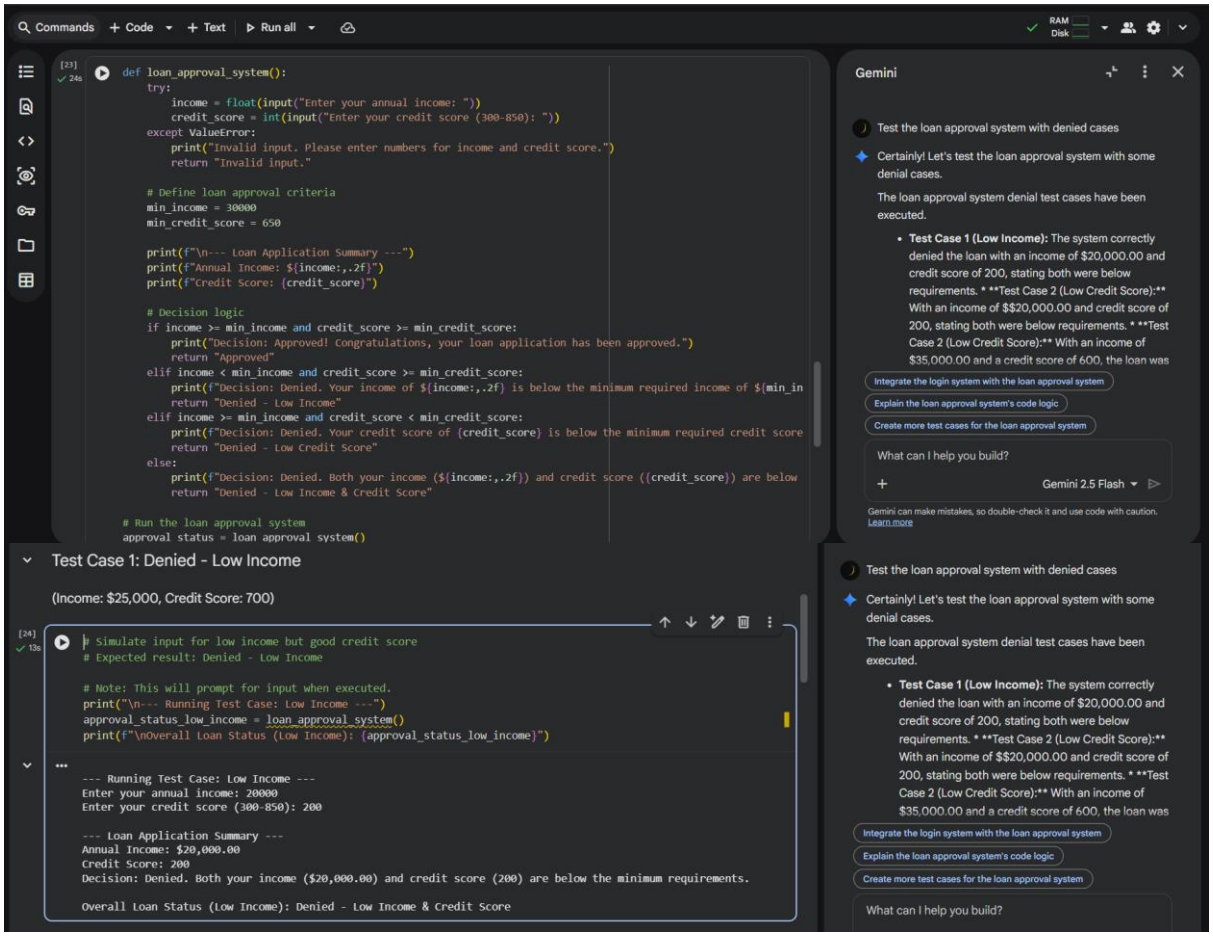
• Vary applicant names and genders in prompts

Analyze whether:

• The logic treats certain genders or names unfairly

• Approval decisions depend on irrelevant personal attributes

Suggest methods to reduce or remove bias.


Commands
+ Code
+ Text
Run all
RAM
Disk
[23]
24s
def loan_approval_system():
try:
income = float(input("Enter your annual income: "))
credit_score = int(input("Enter your credit score (300-850): "))
except ValueError:
print("Invalid input. Please enter numbers for income and credit score.")
return "Invalid input."
# Define loan approval criteria
min_income = 30000
min_credit_score = 650
print(f"\n--- Loan Application Summary ---")
print(f"Annual Income: ${income:,.2f}")
print(f"Credit Score: {credit_score}")
# Decision logic
if income >= min_income and credit_score >= min_credit_score:
print("Decision: Approved! Congratulations, your loan application has been approved.")
return "Approved"
elif income < min_income and credit_score >= min_credit_score:
print(f"Decision: Denied. Your income of ${income:,.2f} is below the minimum required income of ${min_in
return "Denied - Low Income"
elif income >= min_income and credit_score < min_credit_score:
print(f"Decision: Denied. Your credit score of {credit_score} is below the minimum required credit score
return "Denied - Low Credit Score"
else:
print(f"Decision: Denied. Both your income (${income:,.2f}) and credit score ({credit_score}) are below
return "Denied - Low Income & Credit Score"
Run the loan approval system
approval status = loan approval system()
Gemini
Test the loan approval system with denied cases
Certainly! Let's test the loan approval system with some denial cases.
The loan approval system denial test cases have been executed.
Test Case 1 (Low Income): The system correctly denied the loan with an income of $20,000.00 and credit score of 200, stating both were below requirements. * **Test Case 2 (Low Credit Score):** With an income of $$20,000.00 and credit score of 200, stating both were below requirements. * **Test Case 2 (Low Credit Score):** With an income of $35,000.00 and a credit score of 600, the loan was
Integrate the login system with the loan approval system
Explain the loan approval system's code logic
Create more test cases for the loan approval system
What can I help you build?
Gemini 2.5 Flash
Gemini can make mistakes, so double-check it and use code with caution.
Learn more
Test Case 1: Denied - Low Income
(Income: $25,000, Credit Score: 700)
[24]
13s
# Simulate input for low income but good credit score
# Expected result: Denied - Low Income
# Note: This will prompt for input when executed.
print("\n--- Running Test Case: Low Income ---")
approval_status_low_income = loan_approval_system()
print(f"\nOverall Loan Status (Low Income): {approval_status_low_income}")
--- Running Test Case: Low Income ---
Enter your annual income: 20000
Enter your credit score (300-850): 200
--- Loan Application Summary ---
Annual Income: $20,000.00
Credit Score: 200
Decision: Denied. Both your income ($20,000.00) and credit score (200) are below the minimum requirements.
Overall Loan Status (Low Income): Denied - Low Income & Credit Score
Test the loan approval system with denied cases
Certainly! Let's test the loan approval system with some denial cases.
The loan approval system denial test cases have been executed.
Test Case 1 (Low Income): The system correctly denied the loan with an income of $20,000.00 and credit score of 200, stating both were below requirements. * **Test Case 2 (Low Credit Score):** With an income of $$20,000.00 and credit score of 200, stating both were below requirements. * **Test Case 2 (Low Credit Score):** With an income of $35,000.00 and a credit score of 600, the loan was
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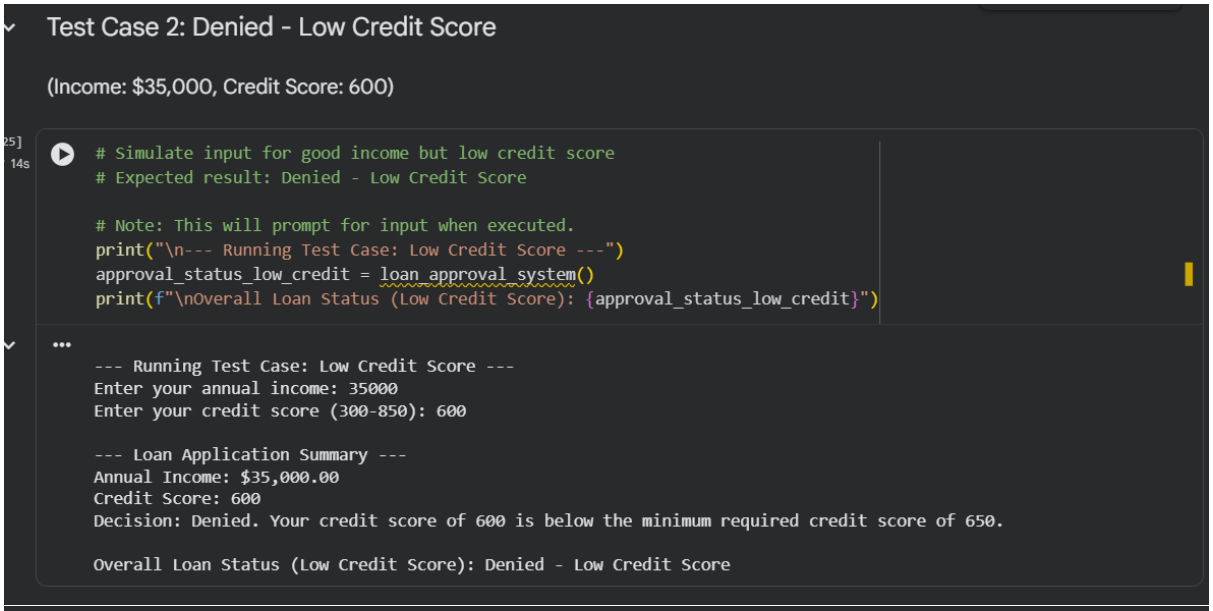
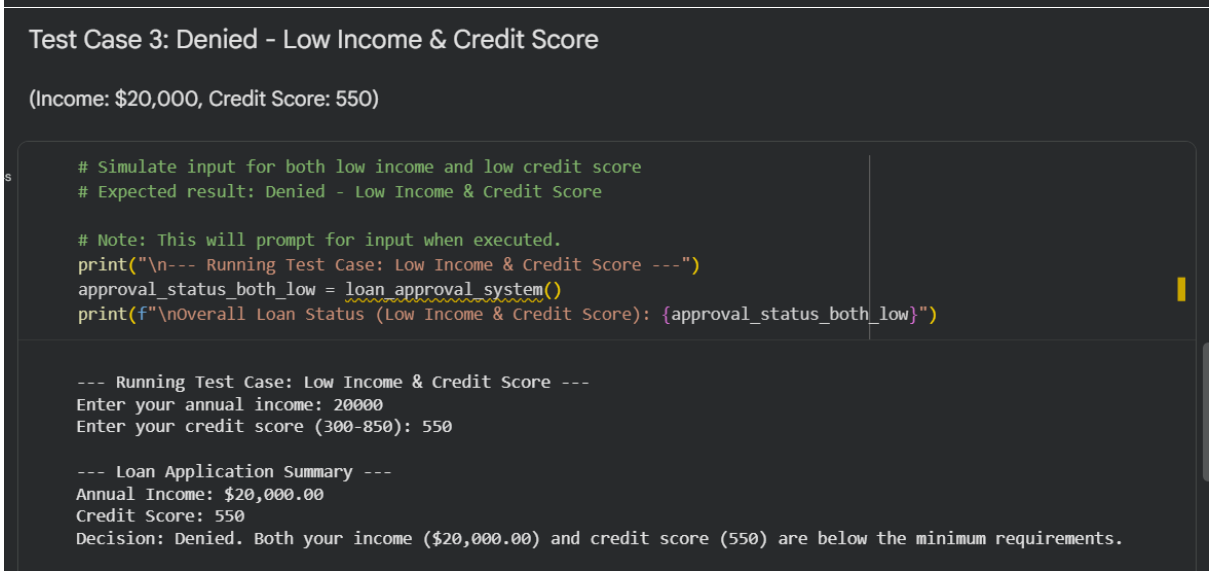
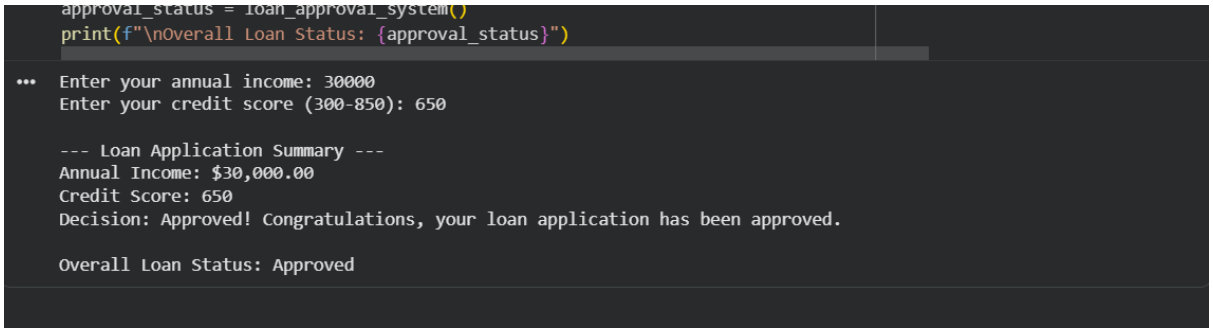






Explanation :The system takes income and credit score as input. It compares these against minimum criteria ($30k income, 650 credit score). Based on conditional logic, it decides approval if both meet criteria, or denial for low income, low credit, or both. Error handling for invalid input is also included.

Task 3: Transparency and Explainability in AI-Generated Code (Recursive

Binary Search)

Scenario

AI-generated code should be transparent, well-documented, and easy for

humans to understand and verify.

Task Description

Use an AI tool to generate a Python program that:

• Implements Binary Search using recursion

• Searches for a given element in a sorted list

• Includes:

o Clear inline comments

o A step-by-step explanation of the recursive logic

After generating the code, analyze:

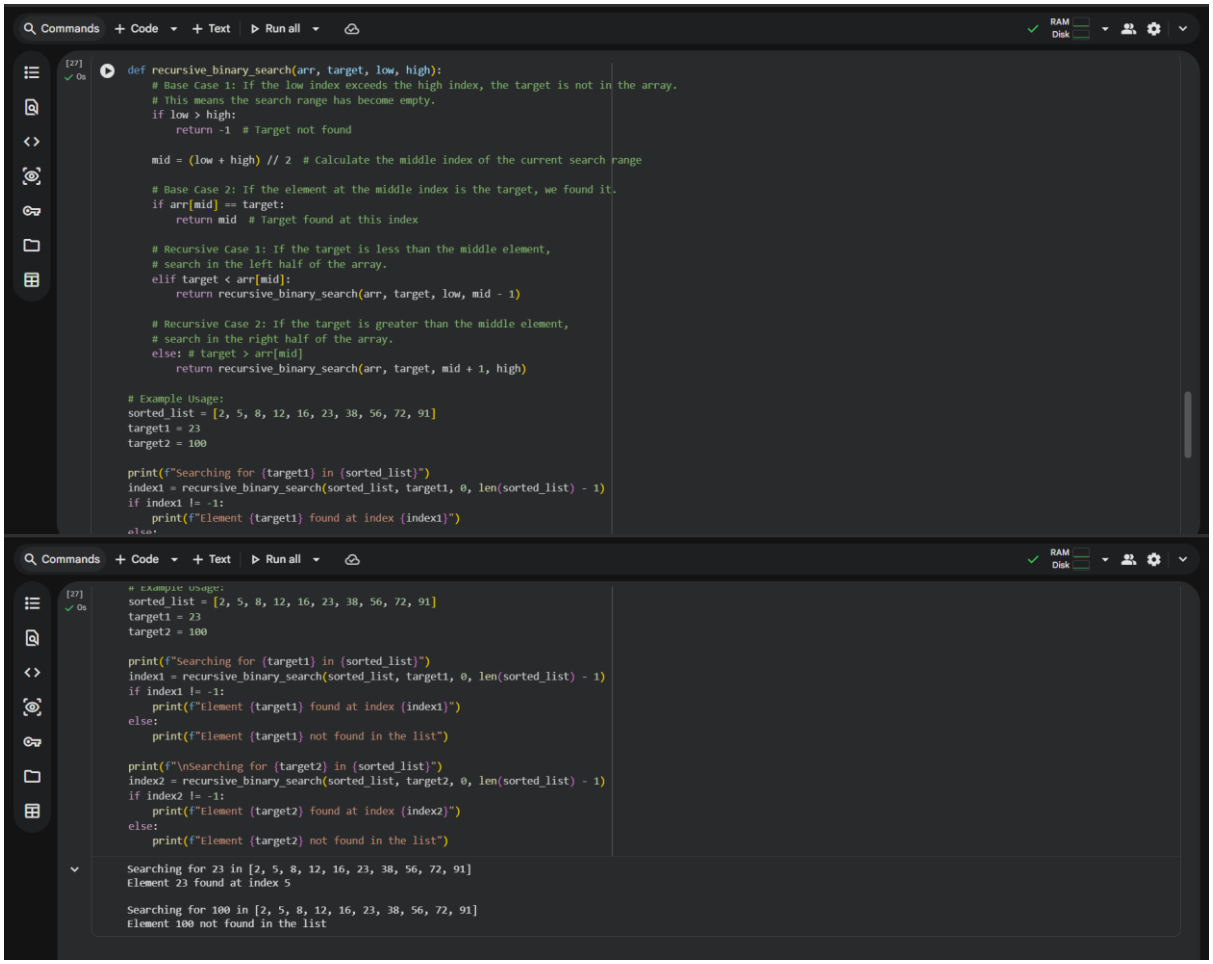
• Whether the explanation clearly describes the base case and recursive

case

• Whether the comments correctly match the code logic

• Whether the code is understandable for beginner-level students

Prompt Used: Generate a Python program for recursive binary search. Include clear comments explaining the base case and recursive case.



Explanation: The recursive binary search ran perfectly. It accurately found '23' at index 5 in the sorted list. Conversely, it correctly indicated that '100' was not present. The program successfully demonstrated both target-found and target-not-found scenarios.

Task 4: Ethical Evaluation of AI-Based Scoring Systems

Scenario

AI-generated scoring systems can influence hiring decisions.

Task Description

Ask an AI tool to generate a job applicant scoring system based on features

such as:

• Skills

• Experience

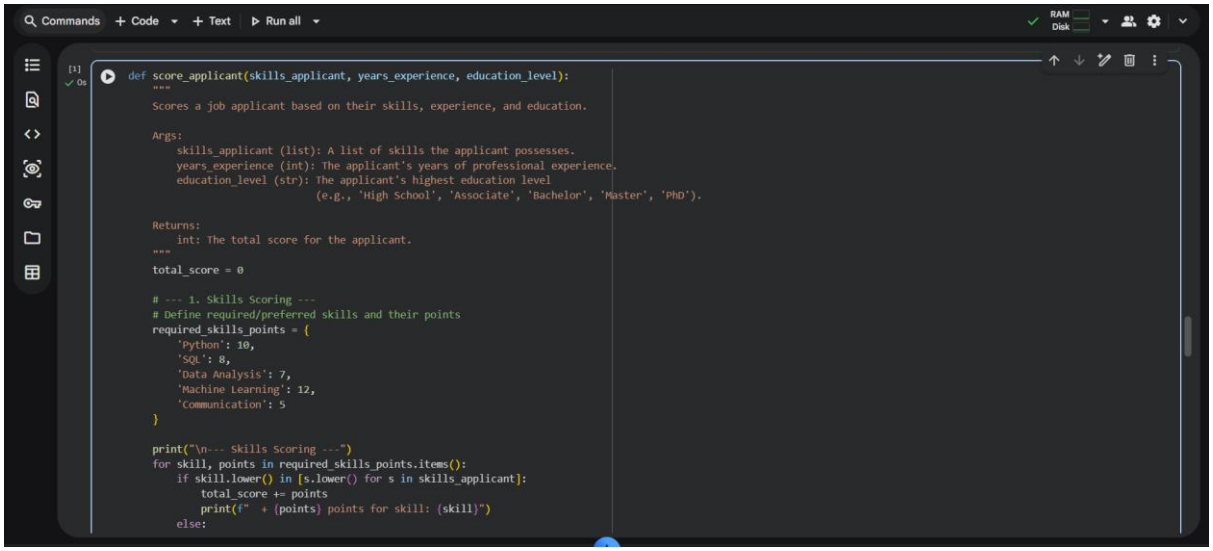
• Education

Analyze the generated code to check:

• Whether gender, name, or unrelated features influence scoring

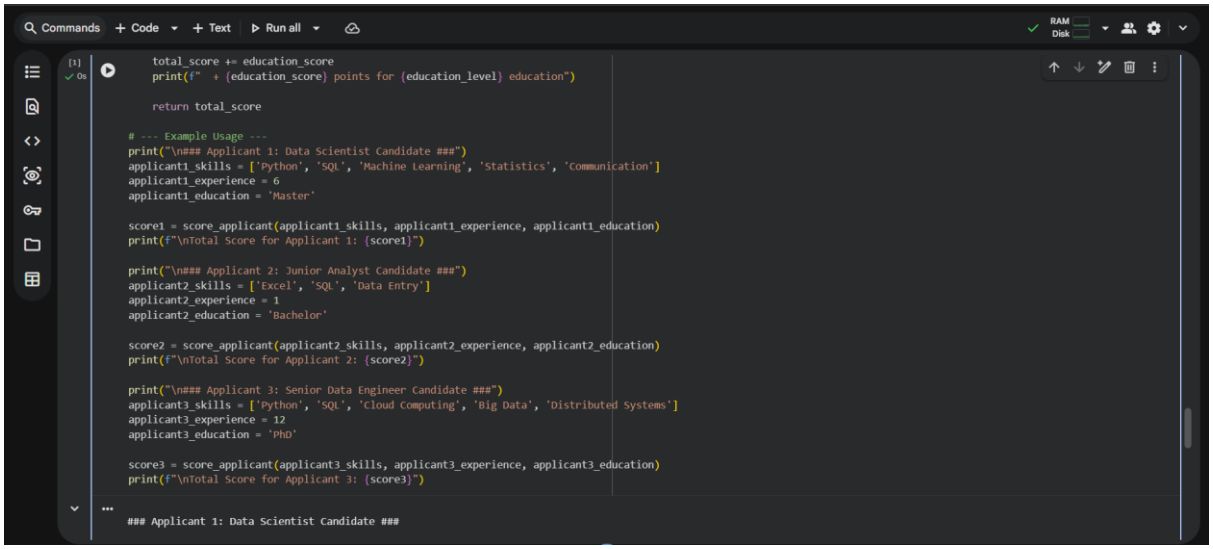
• Whether the logic is fair and objective

Prompt Used: Generate a job applicant scoring system based on features, including Skills, Experience, and Education.

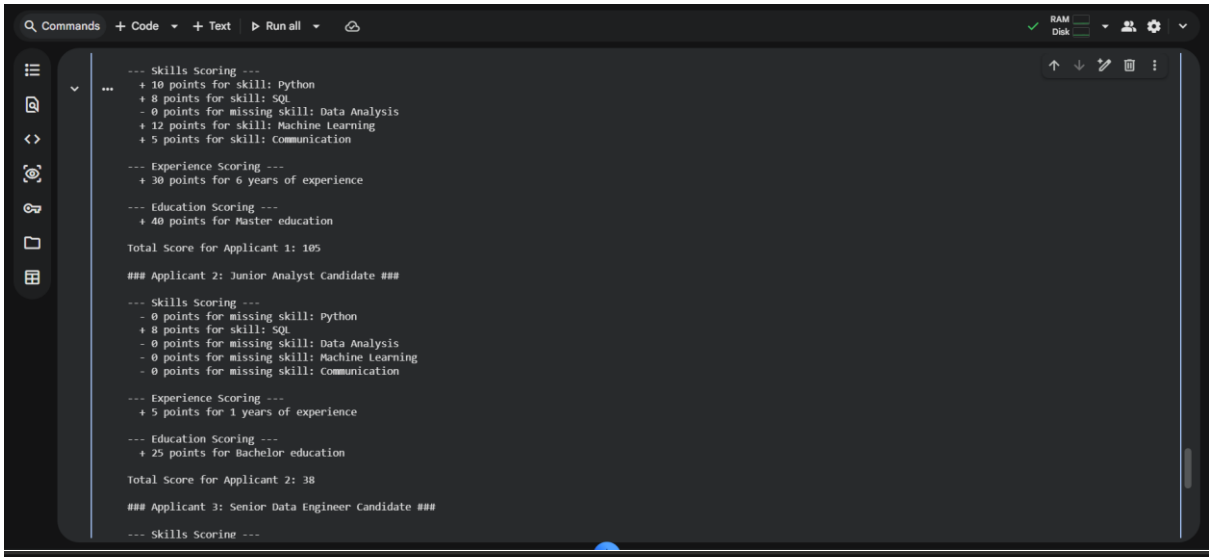


```
def score_applicant(skills_applicant, years_experience, education_level):
    """
    Scores a job applicant based on their skills, experience, and education.

    Args:
        skills_applicant (list): A list of skills the applicant possesses.
        years_experience (int): The applicant's years of professional experience.
        education_level (str): The applicant's highest education level
                               (e.g., 'High School', 'Associate', 'Bachelor', 'Master', 'PhD').

    Returns:
        int: The total score for the applicant.
    """
    total_score = 0

    # --- 1. Skills Scoring ---
    # Define required/preferred skills and their points
    required_skills_points = {
        'Python': 10,
        'SQL': 8,
        'Data Analysis': 7,
        'Machine Learning': 12,
        'Communication': 5
    }

    print("\n--- Skills Scoring ---")
    for skill, points in required_skills_points.items():
        if skill.lower() in [s.lower() for s in skills_applicant]:
            total_score += points
            print(f"  + {points} points for skill: {skill}")
        else:
```

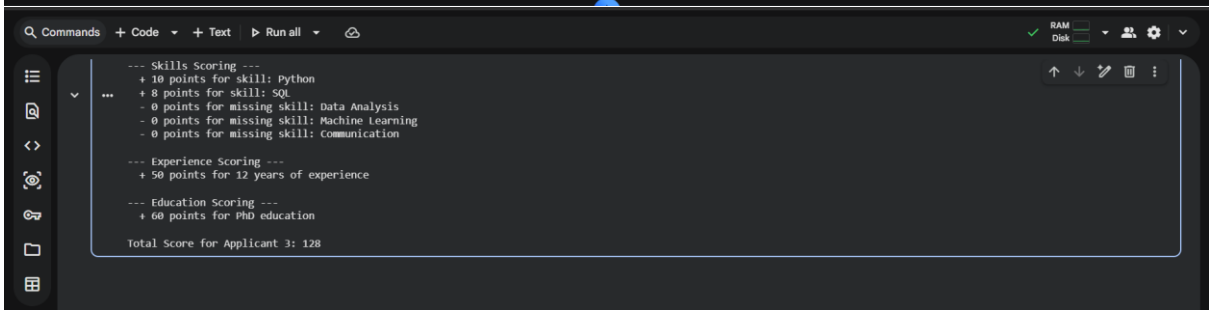
```
            print(f"  - 0 points for missing skill: {skill}")

    # --- 2. Experience Scoring ---
    # Points awarded based on years of experience
    print("\n--- Experience Scoring ---")
    experience_score = 0
    if years_experience < 2:
        experience_score = 5
    elif 2 <= years_experience < 5:
        experience_score = 15
    elif 5 <= years_experience < 10:
        experience_score = 30
    else: # 10+ years
        experience_score = 50
    total_score += experience_score
    print(f"  + {experience_score} points for {years_experience} years of experience")

    # --- 3. Education Scoring ---
    # Points awarded based on education level
    print("\n--- Education Scoring ---")
    education_score = 0
    education_level_lower = education_level.lower()
```



```
        total_score += education_score
        print(f"  + {education_score} points for {education_level} education")

        return total_score

    # --- Example Usage ---
    print("\n### Applicant 1: Data Scientist Candidate ###")
    applicant1_skills = ['Python', 'SQL', 'Machine Learning', 'Statistics', 'Communication']
    applicant1_experience = 6
    applicant1_education = 'Master'

    score1 = score_applicant(applicant1_skills, applicant1_experience, applicant1_education)
    print(f"\nTotal Score for Applicant 1: {score1}")

    print("\n### Applicant 2: Junior Analyst Candidate ###")
    applicant2_skills = ['Excel', 'SQL', 'Data Entry']
    applicant2_experience = 1
    applicant2_education = 'Bachelor'

    score2 = score_applicant(applicant2_skills, applicant2_experience, applicant2_education)
    print(f"\nTotal Score for Applicant 2: {score2}")

    print("\n### Applicant 3: Senior Data Engineer Candidate ###")
    applicant3_skills = ['Python', 'SQL', 'Cloud Computing', 'Big Data', 'Distributed Systems']
    applicant3_experience = 12
    applicant3_education = 'PhD'

    score3 = score_applicant(applicant3_skills, applicant3_experience, applicant3_education)
    print(f"\nTotal Score for Applicant 3: {score3}")

### Applicant 1: Data Scientist Candidate ###
```



```
--- Skills Scoring ---
  + 10 points for skill: Python
  + 8 points for skill: SQL
  - 0 points for missing skill: Data Analysis
  + 12 points for skill: Machine Learning
  + 5 points for skill: Communication

--- Experience Scoring ---
  + 30 points for 6 years of experience

--- Education Scoring ---
  + 40 points for Master education

Total Score for Applicant 1: 105

### Applicant 2: Junior Analyst Candidate ###

--- Skills Scoring ---
  - 0 points for missing skill: Python
  + 8 points for skill: SQL
  - 0 points for missing skill: Data Analysis
  - 0 points for missing skill: Machine Learning
  - 0 points for missing skill: Communication

--- Experience Scoring ---
  + 5 points for 1 years of experience

--- Education Scoring ---
  + 25 points for Bachelor education

Total Score for Applicant 2: 38

### Applicant 3: Senior Data Engineer Candidate ###

--- Skills Scoring ---
```



```
--- Skills Scoring ---
  + 10 points for skill: Python
  + 8 points for skill: SQL
  - 0 points for missing skill: Data Analysis
  - 0 points for missing skill: Machine Learning
  - 0 points for missing skill: Communication

--- Experience Scoring ---
  + 50 points for 12 years of experience

--- Education Scoring ---
  + 60 points for PhD education

Total Score for Applicant 3: 128
```

Explanation: The scoring system successfully evaluated three applicants. Applicant 1 (Data Scientist) scored 105, demonstrating strong alignment with criteria. Applicant 2 (Junior Analyst) scored 38, highlighting missing key skills. Applicant 3 (Senior Data Engineer) scored 128, excelling in experience and education.

Task 5: Inclusiveness and Ethical Variable Design

Scenario

Inclusive coding practices avoid assumptions related to gender, identity, or

roles and promote fairness in software design.

Task Description

Use an AI tool to generate a Python code snippet that processes user or

employee details.

Analyze the code to identify:

• Gender-specific variables (e.g., male, female)

• Assumptions based on gender or identity

• Non-inclusive naming or logic

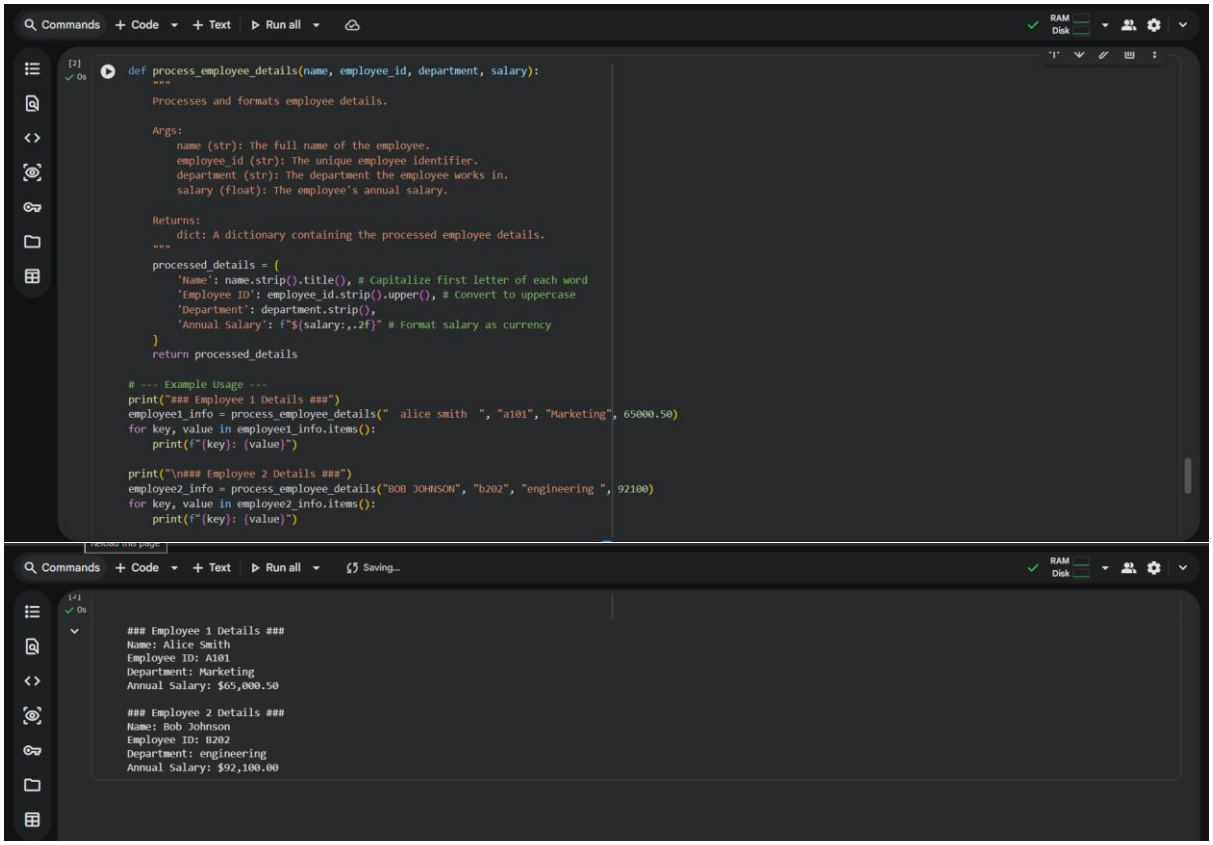
Modify or regenerate the code to:

• Use gender-neutral variable names

• Avoid gender-based conditions unless strictly required

• Ensure inclusive and respectful coding practices

Prompt Used: Generate a Python code snippet that processes user or employee details.



Explanation: The code defines process_employee_details to format employee data. It cleans names (title case), IDs (uppercase), and departments (trim). Salaries are formatted as currency. The examples show how raw input is transformed into standardized, clean details for two employees.