System RequirementsSpecification Index

For

Python Basics and NumPy, Pandas

Usecase No 6

1.0

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Use Case: Recipe Management System (recipe.py)

Dataset

```
recipes = {
   "Pasta": {"Flour": 200, "Eggs": 2, "Cheese": 50, "Milk": 100},
   "Pizza": {"Flour": 250, "Tomato": 100, "Cheese": 150, "Olives": 50},
   "Salad": {"Lettuce": 100, "Tomato": 150, "Cucumber": 100, "Cheese": 50},
   "Soup": {"Carrot": 200, "Potato": 150, "Onion": 100, "Garlic": 20},
   "Cake": {"Flour": 300, "Sugar": 200, "Butter": 150, "Eggs": 3}
}

ingredient_prices = {
   "Flour": 0.5, "Eggs": 5, "Cheese": 2, "Milk": 1,
   "Tomato": 1.5, "Olives": 3, "Lettuce": 1.2, "Cucumber": 2,
   "Carrot": 0.8, "Potato": 0.6, "Onion": 0.9, "Garlic": 4,
   "Sugar": 1.3, "Butter": 2.5
}
```

1)Write a Python function to calculate the total cost of each recipe.
Define calculate_total_cost()
The function should:

- Iterate through the recipe dictionary.
- Calculate the total cost based on ingredient quantities and their respective prices.
- Return a dictionary with the recipe name as the key and total cost as the value.

2)Write a Python function to normalize ingredient quantities.

- **Define normalize_quantities()**
  The function should:
- Convert the recipe data into a NumPy array.
- Scale ingredient quantities by a factor of 1.5.
- Return a Pandas DataFrame with updated ingredient values.

3)Write a Python function to identify unique ingredients used in all recipes.
Define unique_ingredients()
The function should:
Extract unique ingredient names from all recipes.
Return a **set** of unique ingredient names.

Use Case: Sports Score Prediction System (SportsScorePredictionSystem.py)

```
match_data = [
   {"team": "Team A", "prev_score": 65, "opp_strength": 70},
   {"team": "Team B", "prev_score": 80, "opp_strength": 60},
   {"team": "Team C", "prev_score": 55, "opp_strength": 75},
   {"team": "Team D", "prev_score": 90, "opp_strength": 50},
   {"team": "Team E", "prev_score": 70, "opp_strength": 65}
]
```

1)Write a Python function to predict the match score.
Define predict_score(prev_score, opp_strength)

The function should:

- Take the previous score and opponent strength as inputs.
- Predict the score using the formula: prev_score * 0.8 + opp_strength * 0.2.
- Return the predicted score as an integer.

2)Write a Python function to save match predictions.
Define save_predictions(match_data, filename="predictions.csv")
The function should:

- Iterate through the match data list.
- Calculate and add the predicted score for each match.
- Save the predictions to a CSV file.
- Return the list of predictions.

3)Write a Python function to analyze predictions and find the highest predicted scorer.
Define analyze_predictions(filename="predictions.csv")
The function should:

- Read the predictions from the CSV file.
- Identify the team with the highest predicted score.
- Print and return the team name along with its predicted score.

Use Case: Loan Management System (LoanManagementSystem.py)
1)Write a Python function to calculate the total repayment amount.
Define calculate_total_amount(principal, rate, tenure)

```
loan_data = np.array([
   [101, 5000, 5, 2],
   [102, 10000, 4, 5],
   [103, 7500, 6, 3],
   [104, 12000, 3, 4],
   [105, 3000, 7, 1]
])
```

The function should:

- Take principal amount, interest rate (in %), and tenure (in years) as inputs.
- Calculate the total repayment amount using the formula:
  Total Amount=Principal+(Principal×Rate100×Tenure)\text{Total Amount} = \text{Principal} + (\text{Principal} \times \frac{\text{Rate}}{100} \times \text{Tenure})Total Amount=Principal+(Principal×100Rate×Tenure)
- Return the total repayment amount.

2)Write a Python function to display loan details.
Define display_loans(loan_data)
The function should:

- Iterate through the loan dataset.
- Extract loan details including loan ID, principal, interest rate, and tenure.
- Calculate the total repayment amount for each loan.
- Print and return a list of formatted loan details.

3)Write a Python function to find the loan with the highest total repayment amount.
Define find_highest_repayment(loan_data)
The function should:

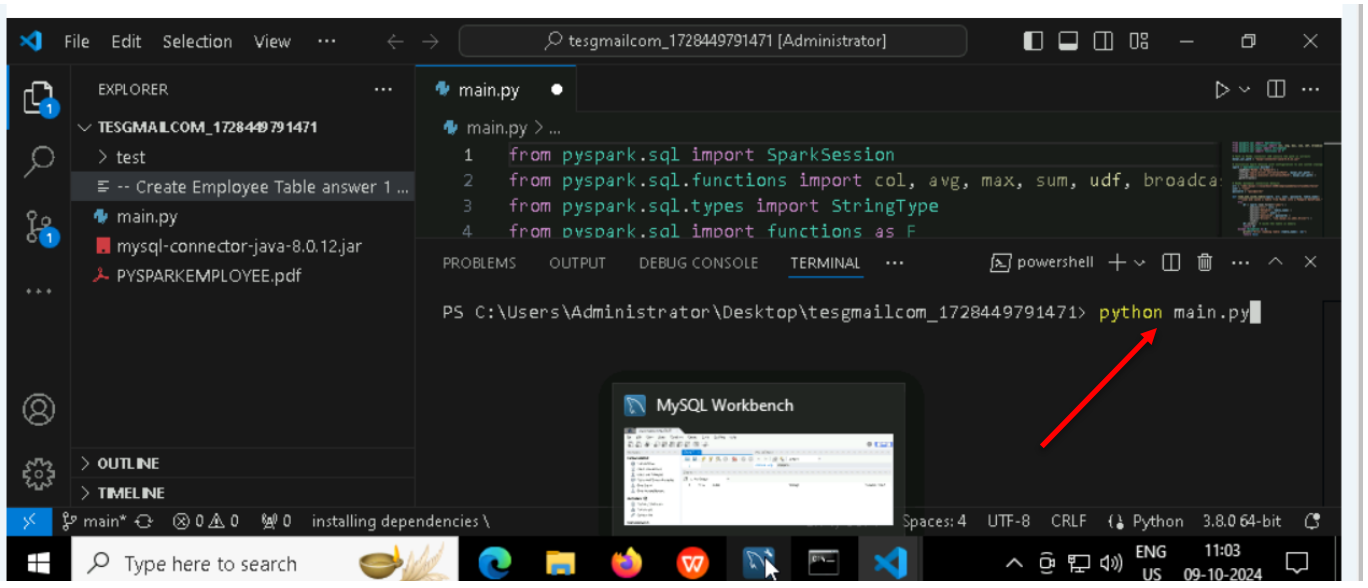
- Iterate through the loan dataset.
- Identify the loan with the highest total repayment amount.
- Return the loan details with the highest repayment.

Execution Steps to Follow:

- All actions like build, compile, running application,running test cases will bethrough Command Terminal.
- To open the command terminal the test takers, need to go to Application menu(Three horizontal lines at left top) -> Terminal -> New Terminal
- This editor Auto Saves the code
- If you want to exit(logout) and continue the coding later anytime (using Save & Exit option on Assessment Landing Page) then you need to use CTRL+Shift+B-command compulsorily on code IDE. This will push or save the updated contents in the
- internal git/repository. Else the code will not be available in the next login.
- These are time bound assessments the timer would stop if you logout and whilelogging in back using the same credentials the timer would resume from the sametime it was stopped from the previous logout.
- To setup environment:
- You can run the application without importing any packages
- To launch application:
  python3 recipe.py
  python3 SportsScorePredictionSystem.py
  python3 LoanManagementSystem.py
- To run Test cases:
  python3 -m unittest

Before Final Submission also, you need to use CTRL+Shift+B-command compulsorily on code IDE. This will push or save the updated contents in the internalgit/repository for code

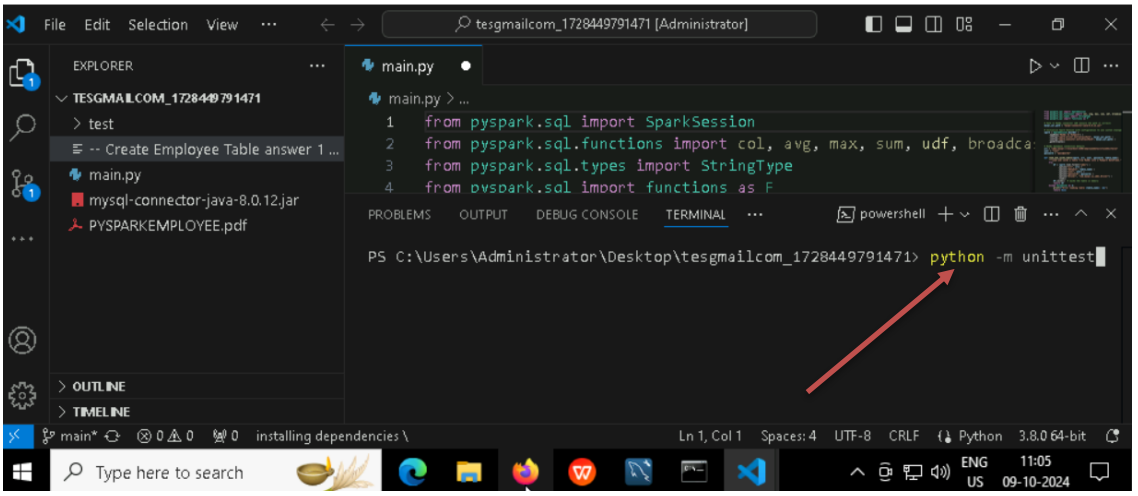
Screen shot to run the program



To run the application

python3 recipe.py

python3 SportsScorePredictionSystem.py
python3 LoanManagementSystem.py



To run the testcase

python3 -m unittest

Screenshot to push the application to github
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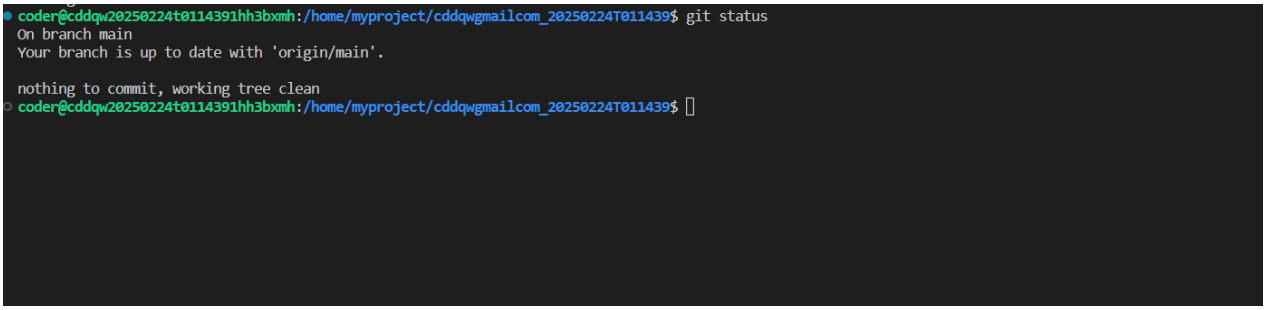
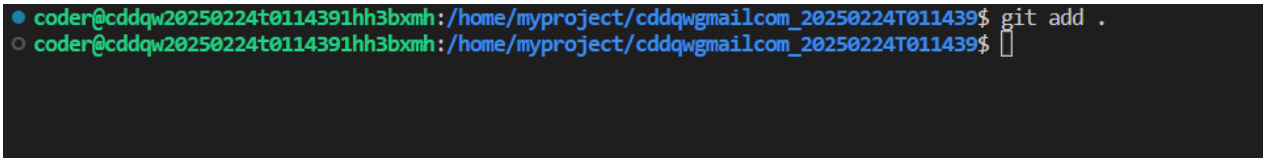
You can run test cases as many numbers of times and at any stage of Development, to check howmany test cases are passed/failed and accordingly refactor your code.
Make sure before final submission you commit all changes to git. For that

In the terminal use the command **git status**



git add .



git commit -m "First commit"
(You can provide any message every time you commit)

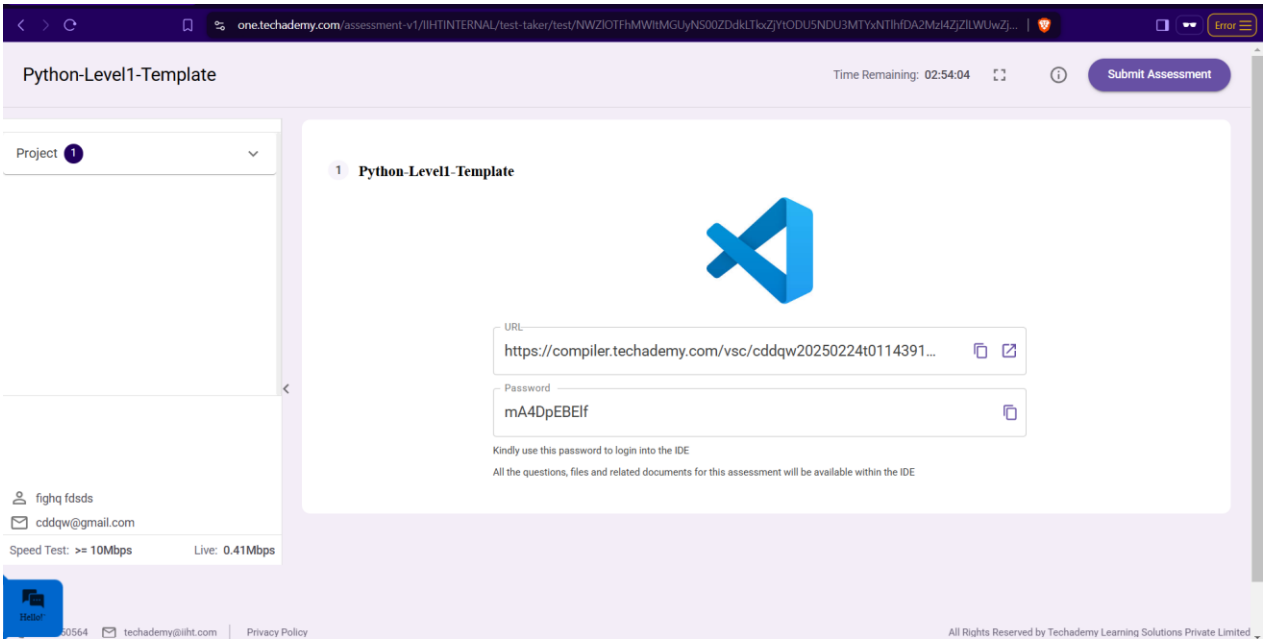
```
coder@cddqw20250224t0114391hh3bxmh:/home/myproject/cddqwgmailcom_20250224T011439$ git  commit -m "firstcommit"
On branch main
Your branch is up to date with 'origin/main'.

nothing to commit, working tree clean
```

git push

```
coder@cddqw20250224t0114391hh3bxmh:/home/myproject/cddqwgmailcom_20250224T011439$ git push
Everything up-to-date
coder@cddqw20250224t0114391hh3bxmh:/home/myproject/cddqwgmailcom_20250224T011439$
```

After you have pushed your code Finally click on the final submission button



Click on the submit assessment buttonafter you have pushed the code

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