04-638 A: Programming for Data Analytics

Programming Assignment 2 [Group Assignment]

Title: Human Resource Management Information System (HRMIS) for a Startup
[**Points**: 200]

Release Date: 12-Oct-2023 **Due: 30-Oct-2023, 11:59PM CAT**

SUBMISSION GUIDELINES:

a) This is a group assignment. You will make one submission per group. However, the grading will be per student based on the individual reflection report. Each group is made up of two students.
b) Code Submission: Submit your Python code implementing the solution on Canvas. Submit source code (in .py) and output files as appropriate. All files should be zipped into a file named hw2.zip.
c) Documentation: Provide a README file that includes instructions on how to run your example code, a brief overview of the implemented solution and features, and any additional information required for running and evaluating the solution.
d) Testing: Include a separate document or section in the README that describes how to run the test cases and ensure the correctness of your program.
e) Individual reflection report: Submit in pdf. A submission link will be provided.

PURPOSE:

The objective of this assignment is to design, implement, and test a Human Resource Management Information System (HRMIS) for a startup company with a small number of employees. The HRMIS should efficiently manage employee records, track attendance, calculate salaries, and provide basic reporting capabilities using object-oriented programming (OOP) principles in the Python programming language. This assignment reinforces the knowledge and skills in OOP and enables you to apply them to solve a kind of real-life problem. You will also build hands-on skills in writing and using test cases. It is expected that you may use the knowledge and skills gained to solve complex real-life problems while in school or after you proceed to industry.

TASK DESCRIPTION:

1) Class Structure:

Create the following classes:

- *Employee*: Represents an employee with roles as per Programming Assignment 1. Please re-use the codes submitted in Programming Assignment 1.

- *Attendance*: Represents attendance records for each employee, including date, in-time, and out-time.
- *Salary*: Manages salary information for each employee, including the base salary and any deductions, allowances, or bonuses.
- *HRMIS*: Represents the HR management system, which manages employee records, attendance, and salary calculations.

2) Functionality:

Employee Management:

- Allow the HR manager to add, update, or remove employee records, including their personal and contact information.
- Implement validation to ensure that employee IDs are unique.

Attendance Tracking:

- Enable the HR manager to record attendance for employees by marking in-time and out-time for each workday.
- Display attendance records for individual employees and for the entire team.
- Calculate the total working hours for each employee for a specified time period.

Salary Calculation:

- Calculate monthly salaries for each employee based on their base annual salary, allowances (if any), bonuses (if any), and deductions (e.g., taxes). Provide details on taxation guidelines in the README file.
- Display the calculated salary for each employee, broken down by components (base), allowances (if any), bonuses (if any), deductions, and net pay).

Reporting:

- Generate and display basic reports, such as an employee list, attendance summary, and salary summary for a given month.

Data Persistence:

- Implement data persistence mechanisms (e.g., saving data to files or using a database) to store employee records, attendance data, and salary information.
- Produce a pay slip for each employee and store the pay slip in a text file. The text file should be named EMPLOYEE_ID.txt.

Exception Handling:

- Implement error handling to address potential issues, such as invalid inputs or data inconsistencies.

User Interface (Optional):

- Create a simple command-line interface (CLI) for the HR manager to interact with the system.

3) **Documentation:**
   - Provide clear and concise documentation for the codebase, including class descriptions, method explanations, and usage examples.
4) **Testing:**
   - Write test cases to ensure the correctness of your implementation. Consider using Python testing libraries like unittest or pytest.
5) **Comments and Coding Style:**
   - Follow PEP 8 coding standards and include comments to make the codebase understandable and maintainable.
6) **Individual reflection Report**
   - Each team member will submit a 300-word report in PDF describing his/her *contribution to the project*. In addition, the report should summarize *what you learned*, *the challenges you encountered*, and *how you overcame them*.

GRADING CRITERIA:

Your assignment will be evaluated based on the following criteria:

1.	Correctness and completeness of the implemented features.	[60 Pts]
2.	Proper use of object-oriented programming principles.	[15 Pts]
3.	Effective error handling and exception management.	[15 Pts]
4.	Data persistence implementation.	[15 Pts]
5.	Clear and concise documentation.	[25 Pts]
6.	Quality and completeness of test cases.	[25 Pts]
7.	Code organization, readability, and adherence to coding standards.	[15 Pts]
8.	Overall user experience if a user interface is provided.	[10 Pts]
9.	Individual reflection.	[20 Pts]

Note:

1. This assignment specification provides a basic outline of the requirements. You are encouraged to expand and enhance the system with additional features and functionalities as you see fit. If you decide to add features, justify the decision in the documentation.
2. Ensure that you clarify any specific requirements with your instructor if needed.
3. A detailed rubric will be provided based on the above grading criteria.