STRATHMORE UNIVERSITY

SCHOOL OF COMPUTING & ENGINEERING SCIENCES

COURSE: Bachelor of Business Information Technology

CAT 1 (Open-Book)

BBT3101: Application Programming for The Internet

DATE: 07th Nov 2024   **TIME: 3 Days**

Instructions: All questions using the Python language for your solutions

Question 1: Library Management System (10 marks)

Scenario: You are building a basic library management system to track books and borrowers.

Task:

- Create a `Book` class with attributes for `title`, `author`, and `is_borrowed` (boolean).
- Create a `LibraryMember` class with attributes `name`, `member_id`, and a list for `borrowed_books`.
- Implement methods in `Book` to:
  a) Mark as borrowed.
  b) Mark as returned.
- Implement methods in `LibraryMember` to:
  a) Borrow a book (checks if the book is available).
  b) Return a book.
  c) List borrowed books.
- Write interactive code to allow a member to borrow and return books.

Question 2: Online Course Management (10 marks)

Scenario: You're designing a system to manage an online course, allowing instructors to manage students and assignments.

Task:

- Create a `Student` class with `name`, `student_id`, and `assignments` (a dictionary with assignment names as keys and grades as values).
- Create an `Instructor` class with `name`, `course_name`, and a list of `students`.
- Implement methods in `Student` to:
  a) Add an assignment and grade.
  b) Display grades.
- Implement methods in `Instructor` to:
  a) Add a student to the course.
  b) Assign a grade to a student.
  c) Display all students and their grades.
  d) Write code to allow an instructor to add students and assign grades interactively.

Question 3: Employee and Department Management (10 marks)

Scenario: You're designing a basic system to manage employees and departments in a company.

Task:

- Create an `Employee` class with attributes `name`, `employee_id`, and `salary`.
- Create a `Department` class with `department_name` and a list of `employees`.
- Implement methods in `Employee` to:
  a) Display details.
  b) Update salary.
- Implement methods in `Department` to:
  a) Add an employee to the department.
  b) Calculate and display the total salary expenditure for the department.
  c) Display all employees.
- Use interactive input to add employees to a department and display total expenditure.

<u>Notes</u>

1. Each question should be completed in a single source file. So, you should submit 3 solutions in three separate files

2. Name your files by combining your student number and question number (**e.g. 12345_q1.py, 12345_q2.py, 12345_q3.py**)

3. Upload your solutions in **personal GitHub repos**, then share a link to the repository (ensure repo is public for the duration of the semester)

4. As a best practice, you can have the three files in a directory and then push the directory to GitHub.

5. **Upload** the **link to the GitHub repository** containing your solutions on the provided upload section on eLearning portal.

6. Submit your work by the due date: **10/11/2024, 11:59PM**

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