CS152 Project 4

Linked Lists

Design class **Employee** with id, name, department, and salary of data type String, String, String, and int, respectively. Employee salary is specified as integer in thousands of dollars. The constructor initializes instance variables with data passed via parameter list.

* String toString() // returns string representation of employee object ( data separated

// by tab and all data for each individual employee in one line)

* int getSalary() // returns salary

Design private class **Node** with two public instance variables: data of Employee type, and next of Node type. Class Node has constructor with parameter emp of Employee type. Constructor creates a Node with variables data and next being assigned emp and null, respectively. Class Node is inner class of class LLEmployee.

Class **LLEmployee** has one private instance variable list of Node type. It has constructor that creates an empty list. It assigns value null to variable list. Design the following iterative methods which should work properly for any linked list of Employee objects:

* void addRear(Employee emp) // inserts a new node with emp in it at the rear of the linked list.
* void printLinkedList() // traverses linked list and prints each employee as separate line.
* Node getList() // returns reference to the beginning of the linked list
* double sumSalaries() // returns sum of salaries for all employees
* boolean isSortedBySalaryRec(Node first) // returns true if employees in the linked list are

// sorted by their salary. Must be recursive method.

EXTRA CREDIT: Design the following recursive method:

// returns an Employee object with highest salary in linked list. In case when more than one

// employee has same highest salary return first such employee. Reference first refers to the

// first node in the linked list. Must be recursive method.

* Employee highestPaidEmpRec(Node first)

Class **TestList** has main method only. In the main method instantiate variables e1, e2, e3, e4 and e5 as the following five employee objects:

|  |  |
| --- | --- |
| list1 list2 | |
| 101 Lewis CS 76  103 Jones CS 80  107 Marcus BIO 59  108 Smith BIO 90  109 Zee CS 77 | 107 Marcus BIO 59  101 Lewis CS 76  109 Zee CS 77  103 Jones CS 80  108 Smith BIO 90 |

Perform the following steps for both lists:

* create two empty linked lists named list1 and list2,
* use method addRear to add five employees as specified to each linked list,
* print both lists by using printLinkedList method.
* invoke method sumSalaries and print the total of all salaries of all employees for both lists.
* invoke isSortedBySalaryRec for both lists.
* invoke highestPaidEmp for both lists if you did EXTRA CREDIT.

SUBMIT: One word or PDF document named **CS152P4yourLastName.**

Make sure that alignment, indentation and identifier naming conventions are is as in the textbook. Set paragraph with single line spacing and zero space before and after the paragraph.

**Include the following in your submission:**

* **Your first and last name, class, section, and date in the upper left corner.**
* **Code for classes Employee, LLEmployee with inner class Node, and TestList.**
* **If your program does not compile, or does not run as it should, must describe the status.**
* **Picture of program run from BlueJ**
* **UML diagram**