Exercise 5:

Summary: This exercise deals with inheritance from abstract classes and an interface. The methods and variables of the abstract superclass **Employee** are inherited by the three subclasses **Boss**, **Clerk** and **Worker**, which differ in how they are paid. You load employees from a file, add some via a dialog box and sort them by their salary.

Task 1: Implement the class Employee and its subclasses (5 points)

Employee is the superclass of all classes of employees. It has the instance variables *firstName* and *secondName*, which are those of an employee. The constructor initializes both.

earnings() is implemented in the subclasses.

Employee
#firstName : String #secondName : String
+Employee(String, String) +*earnings() : double* +compareTo(Employee) : int +toString() : String

compareTo(arg) is used to sort the employees by their earnings.

toString() returns the first name of the employee followed by the second name as a formatted string. Both strings are aligned to the left and cover 8 and 12 characters, respectively.

The superclass has three concrete subclasses:

Boss
−salary : double
+Boss(String, String, double) +setSalary(double) : void +earnings() : double +toString() : String

Clerk
−wage : double −hours : double
+Clerk(String, String, double, double) +setWage(double) : void +setHours(double) : void +earnings() : double +toString() : String

Worker
−rate : double −quantity : int
+Worker(String, String, double, double) +setRate(double) : void +setQuantity(double) : void +earnings() : double +toString() : String

Instances of **Boss** have a monthly salary, which is initialized in the constructor. The two strings initialize the instance variables of the superclass.

setSalary(arg) sets the value of the instance variable. *earnings()* returns the earnings of the boss. *toString()* returns the string "Boss" (8 columns) followed by the return value of the method *toString()* of the superclass.

Instances of **Clerk** have a fixed hourly salary (*wage*). The class also constains the instance variable *hours* that corresponds to the number of hours the clerk worked during a month. The earnings are the product of both variables. Its *toString()* returns "Clerk" (Column width: 8) followed by the name.

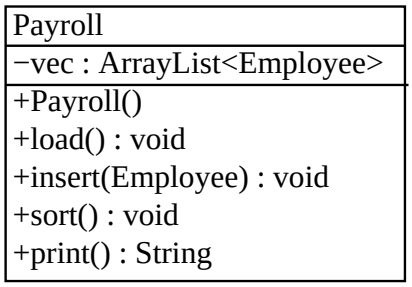
A **Worker** gets paid the fixed amount *rate* for every assembled item. The instance variable *quantity* determines how many items were assembled in that month. The earnings are the product of both variables. Its *toString()* returns "Worker" (Column width: 8) followed by the name.

Task 2: Implement Payroll (2 points)

The class **Payroll** contains a dynamic array for instances of **Employee**.

load() asks via the console for a filename and it loads a list of employees from this file (Source.txt).

insert(Employee arg) that adds an employee to the dynamic array.



Payroll has a method *sort()* that sorts the employees by the earnings. It has a method *void print()* that calls the methods *toString()* of the individual employees and appends to it the earnings. The earnings should be displayed using 8 digits, two of which are after the comma. The method *print()* should write the output directly to the console.

Task 3: Implement Exercise (3 points)

The method *main()* should load in the source file with the names and earnings of the employees. Additional employees should be loaded in with a loop that ends when "end" is typed. The employees and their earnings should be read in with a dialog window.

After all employees have been loaded and typed in the method *print()* should be called for the unsorted list of the employees and for the list that has been sorted by the earnings.