

DIN61-222: Adv. Programming (Java)
Semester 1, 2019-2020

Exercises 2

Due in: Saturday, October 19th, 13:00 at the start of the class.

Worth: 10% of final grade. Marked out of 20.

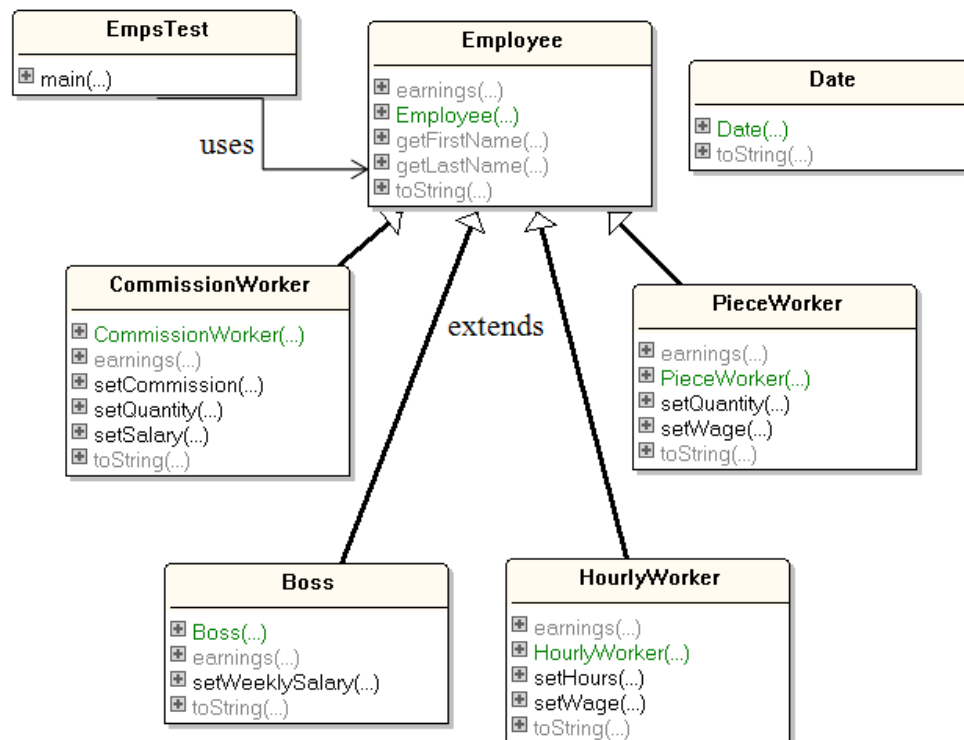
Write in English. Include your name, student number, and course name/number at the top of the front page. The pages should be stapled together at the top-left corner. Each page should be numbered. Do not use a plastic cover. Do not waste trees by including cover sheets. Do not write out the questions as part of your answer.

Late submissions will lose half marks immediately, and a further 10 marks for each hour after that. *Cheating will result in 0 marks for all those involved.*

If you have any questions, please come to see me. Good luck ☺.

- Andrew Davison

The following questions use the `Employee` classes found in the `Employees.zip` file in <http://fivedots.coe.psu.ac.th/~ad/teaching/AP222/Exercises/>. The class diagrams for these classes are:



- 1) Add a private variable `birthDate` to the `Employee` class, using the `Date` class to represent the employee's birthday. `Employee` output should now include the first and last names *and* birthday. Test this by modifying `EmpsTest.java`.

- 2) Add a new `Employee` subclass called `Ajarn` that represents an employee whose pay is based on the number of students in their class. The `Ajarn` class should contain private instance variables `wage` (to store the employee's wage per student) and `numStudents` (to store their number of students).

Implement `earnings()` in `Ajarn`, which calculates the employee's earnings by multiplying the number of students by the wage per student. Test this by modifying `EmpsTest.java`.

- 3) Create an `Employee` array to store references to all the employees (i.e. a *polymorphic* data structure). List all the employees and their earnings by using a loop to iterate through the array. Test this by modifying `EmpsTest.java`.

Aside from copies of your code (`Employee.java`, `EmpsTest.java`, and `Ajarn.java`), your answers must include screenshots showing code compilation and output generated by `EmpsTest.java` on your machine. If your work does not include **three screenshots** (one for each question), then you will lose half marks.

Do **not** hand in copies of the `CommissionWorker`, `Boss`, `HourlyWorker`, `PieceWorker`, or `Date` classes which you do not need to be changed for these exercises.