

Homework 5 - Extend

* If there is any problem, please contact TA.

Name:----- Student ID:----- Email: -----

Problem 1. (30 points) Consider the following program which is written in Java syntax.

```
public class test {
    int x = 1;
    public static void main(String args []) {
        test a = new test ();
        a.f1 ();
    }

    public void f1 () {
        int x = 2;
        f2 ();
        System.out.println(x);
    }

    public void f2 () {
        System.out.println(x);
    }
}
```

(a) What will be printed after running `main()` if it uses static scoping? dynamic scoping?

Problem 2. (40 points) Extend tuples to records, and write the (a) syntax and (b) semantic rules for records. Example usage:

- Elements are indexed by labels:
 - $\{y = 10\}$
 - $\{id = 1, salary = 50000, active = \mathbf{true}\}$
- The order of the record fields is insignificant:
 - $\{y = 10, x = 5\}$ is the same as $\{x = 5, y = 10\}$
- To access fields of a record:
 - $a.id$
 - $b.salary$

Problem 3. (30 points) Another way of defining **let** as derived form might be to desugar it by "executing" it immediately-i.e., to regard **Let $x=t_1$ in t_2** as an abbreviation for the substituted body $t_2[t_1/x]$. Is this a good idea ?

Remark: You just need to send your .pdf file to likaijian@sjtu.edu.cn. Email Subject line Format(also the pdf file name): **HW_X_Name_StudentID**