

CSE 3302/5307 Programming Language Concepts

Homework5 - Fall 2023

Due Date: Sep.30, 2023, 8:00p.m. Central Time

Problem1 - 30%

Consider the following program which is written in C syntax.

```
int x = 1;
```

```
void f1() {  
  int x = 2;  
  f2();  
  printf(x)  
}
```

```
void f2() {  
  int x = 3;  
  printf(x)  
}
```

```
int main() {  
  f1();  
  printf(x)  
}
```

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

Problem2 - 40%

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:
 - $a.id$
 - $b.salary$

Problem3 - 30%

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:

Please upload **.pdf** files to Canvas.

File name format: **HW_X_FirstName_10digitID.pdf**

Example: HW_5_Sinong_1001001000.pdf