CSE 461: Programming Languages Concepts

Prof. G. Tan, Spring 2022

Homework 2: Due on **Feb 13th at 6pm**. **Only one-day late submission will be allowed for this assignment**, since I want to release the answer key early for you to prepare for midterm 1. Total: 13 points.

Submission: If you submit a scanned version of your on-paper answers, please make sure your scanned version is legible.

1. (8 points) Consider the C program given below. You will be asked to determine which variables are visible in a number of different situations. In each case, identify each variable by its name and the line number of its declaration. Note: for this problem, only list visible variable names, not function names.

```
1  int j, i, h;
2  void B(int w) {
3     int j;
4     i = 2*w;
5     w = w+1;
6     ...
7  }
8  void A (int x, int y) {
9     float i;
10    B(h);
11    i = 3;
12    ...
13 }
14 void main() {
15    int a, b;
16    h = 5; a = 3; b = 2;
17    A(a, b);
18    B(h);
19    ...
20 }
```

(a) C uses static scoping. Say which variables are visible in the bodies of each of the functions: main, A, B.

(b) If C used dynamic scoping and the calling sequence is main calls B. Say which identifiers would be visible in B.

(c) If C used dynamic scoping and the calling sequence is main calls A. Say which identifiers would be visible in A.

(d) If C used dynamic scoping and the calling sequence is main calls A; A calls B. Say which identifiers would be visible in B.

2. (3 points) Find some online material to learn C#'s namespace mechanism (cite your source). Explain briefly how it works and its benefits.

3. (2 points) Answer the following questions. If necessary, consult a reference on C (and cite your source).

(a) What is the scope and what is the lifetime of a static local variable?

(b) What is the scope and what is the lifetime of a static global variable?