CSE 461: Programming Languages Concepts

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Homework 2: **Due on Feb 12th before class (12:20pm) in Canvas.**

Submission: Please submit your homework via Canvas. It's okay if you submit a scanned version of your on-paper answers, but 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.

```
1  int h, i;
2  void B(int w) {
3     int j, k;
4     i = 2*w;
5     w = w+1;
6     ...
7  }
8  void A (int x, int y) {
9    float i, j;
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 identifiers (including variables and function names) 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. Explain briefly how it works and its benefits.

3. (3 points) During the execution of a Java program, can a variable be visible but not allocated? Can a variable be allocated but not visible? Explain your answers.