Principles of Programming Languages - Homework II

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1 Instructions

1. The homework is due on April 6, in class.
2. Each question is worth 3 points.
3. Attempt as many problems as you can. You will be given partial credit, as per the policy discussed in class.

2 Problems

1. Consider the following fragment of **C** code.

```
union{
   int x;
   float y;
   } a;

a.x = 7;
a.y = 8.3;
```

   Without implementing this code fragment, indicate, whether there are any errors. Now, implement this code fragment on your favorite **C** compiler and describe your observations.

2. Describe with examples the concepts of aliasing and side effects.
3. Explain with examples the concepts of static and dynamic scoping. What is the primary problem posed by dynamic scoping?
4. Consider the following declaration in **C** syntax:

```
struct CharTree {
    char data;
    struct CharTree left, right;
}
```

   Identify the principal problem with this declaration and rewrite it using the **union** technique described on Pages 213-214 of [Lou02]. How would you modify the fragment, so that it actually compiles?

5. What are the typical kinds of type equivalences that you would expect to see in a programming languages? Give one example of each.

References

[Lou02] Kennenth C. Louden. *Programming Languages: Principles and Practice*. Brooks/Cole, 2002.