

# Programming Languages and Compilers: Quiz #8

Due on May 23, 2024 at 3:10pm

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## Problem 1

```
var x;
function sub1() {
    document.write("x = " + x + " ");
}
function sub2() {
    var x;
    x = 10;
    sub1();
}
x = 5;
sub2();
```

### Solution

- (a) Assume the following JavaScript program was interpreted using static-scoping rules. What value of `x` is displayed in function `sub1()`?

Under static scoping, the value of `x` displayed in `sub1()` is determined by the scope in which `sub1()` was defined. The `sub1()` function is defined in the global scope, where `x` is set to 5 before `sub2()` is called. Therefore, under static scoping, the value of `x` displayed in `sub1()` is:

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- (b) Under dynamic-scoping rules, what value of `x` is displayed in function `sub1()`?

Under dynamic scoping, the value of `x` is determined by the call chain at runtime. When `sub1()` is called within `sub2()`, the most recent binding of `x` in the call chain is the local `x` declared in `sub2()` and set to 10. Therefore, under dynamic scoping, the value of `x` displayed in `sub1()` is:

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