

## Sample of Quiz 1 (theory)

### topics

name, scope, binding, control flow, types

#### 1) name scope

This language has static scope. What this program prints?

```
def fun1()  
    x = 10  
    def fun2(y)  
        x = 5  
        print(x+y)  
    print(x)  
    fun2(3)
```

*Handwritten notes:*   
- Blue arrow from `x = 10` to `print(x)`: `10`  
- Blue arrow from `x = 5` to `print(x+y)`: `8`  
- Text: "these two are not the same" with a bracket around the two `x` assignments.  
- Text: `5+3` in green below the `print(x+y)` line.

fun1()

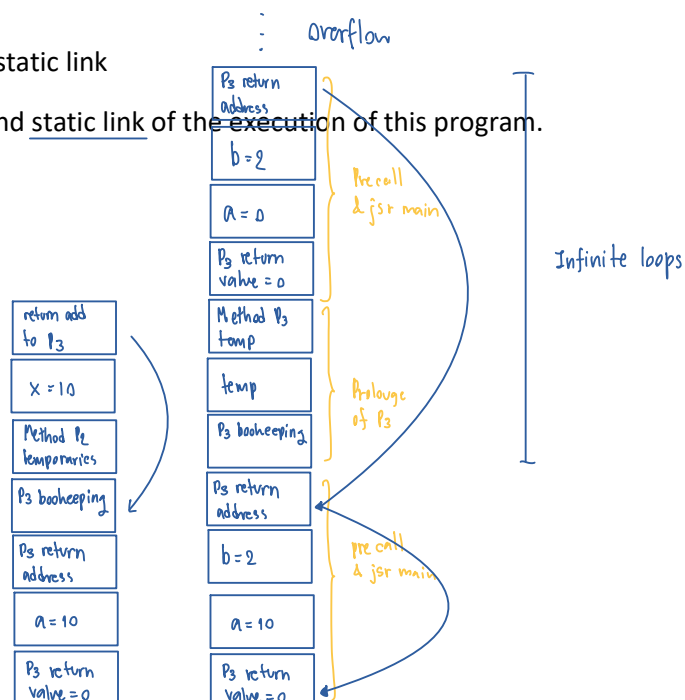
#### 2) Convert the following program into pseudo assembly language.

<code>a = 0</code>	<code>L1 let a = 0</code>	<code>a = 0</code>
<code>do</code>	<code>L2 a = a + 1</code>	<code>add a by 1</code>
<code>    a += 1</code>	<code>L3 if a &lt; 10 goto L2</code>	<code>if a &lt; 10 goto L2</code>
<code>while a &lt; 10</code>	<code>L4 terminate</code>	<code>terminate</code>

#### 3) stack frame and static link

draw stack frame and static link of the execution of this program.

```
def p1():  
    x = 10  
def p2(a):  
    print(x)  
def p3(b):  
    p2(b)  
    p3(2)  
p1()
```



4) assume the following language is "dynamic" scoping. When run this program, what does it print? ( of course, this program looks like C, and C has static scope. However, assume this program is "dynamic scope").

```
int x = 10;

int f() {
    return x;
}

int g() {
    int x = 20; ← dynamic scope, x is volatile
    return f();
}

main() {
    printf(g());
}
```

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