

T-501-FMAL Programming languages, Practice class 11

Spring 2021

Model solutions

1. If `a` is a name, then the two are the same.

But if `a` is a pointer dereference or an array indexing accessor, then it may contain a side effect that is executed once in `++a`, but twice in `a = a + 1`.

E.g., `++(*(printi p))` or `++(a[++i])`.

2. `++a` can be equivalently rewritten as `plusplus(a)` where

```
int plusplus(int* p) {  
    return (*p = *p + 1);  
}
```

3. Instead of the new r-value, the old r-value of the left-hand accessor is returned by the assignment expression.

Here

```
printi x;          // 4 is printed (not 5!)  
printi y;          // 5 is printed  
printi z;          // 5 is printed
```

4.

```
int* p;  
int* q;  
int x;  
x = 3;  
p = &x;           // p becomes address of x  
printi *p;        // 3 is printed  
q = p;            // q is now the same address as p  
*p = *q * 5;      // 3*5=15 is stored at address p  
printi x;         // 15 is printed
```

5.

```
int* p;  
int* q;  
int x;  
int y;  
x = 5;  
y = 7;  
p = &x;           // p becomes address of x  
q = &y;           // q becomes address of y  
printi *q;        // y is printed  
*p = *q - 3;      // 7-3=4 stored at address p  
printi x;         // 4 is printed
```