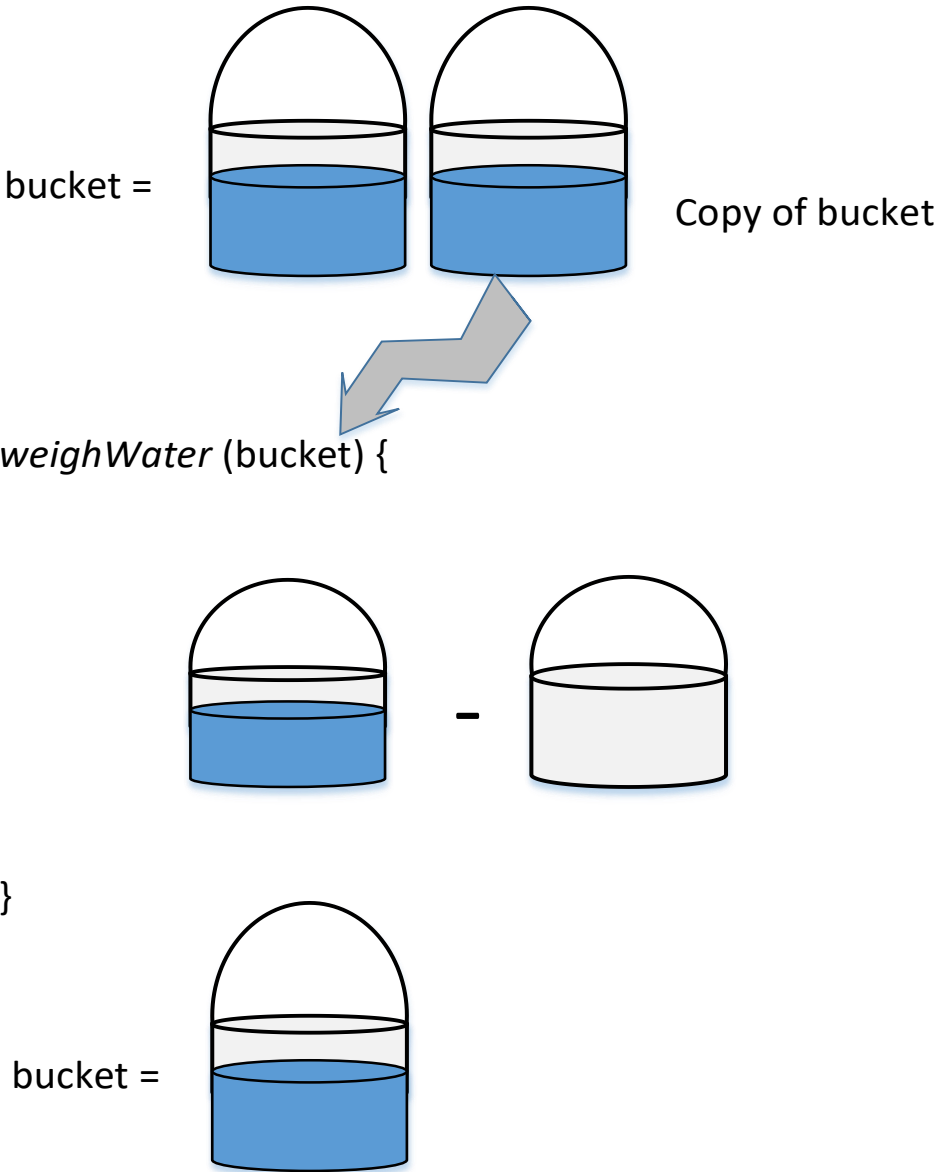


Illustration of Function Calls by Value and by Reference

Function Call by Value

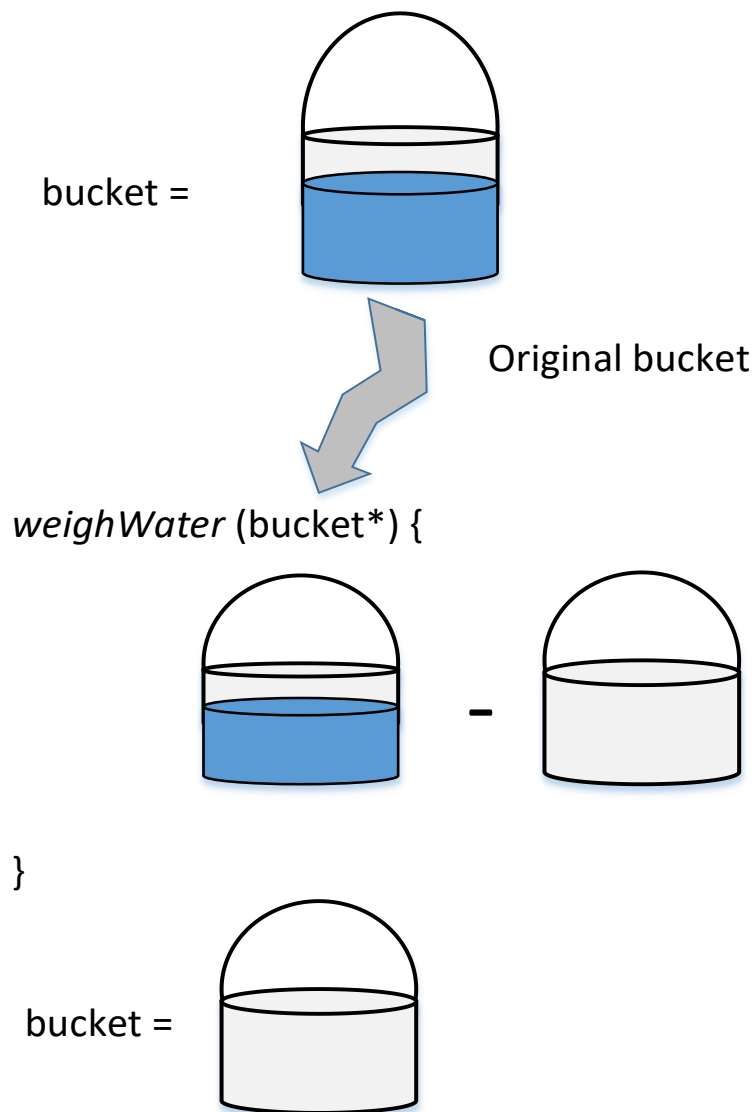


The bucket is **passed by value** into function *weighWater*(bucket) in above diagram. As a result a copy of the bucket is created and then the copy is passed into the function. In order to weigh the water, *weighWater*(bucket) function takes weight of the bucket with water, empties the water from the bucket, and then subtract the weight of the empty bucket. Although the bucket

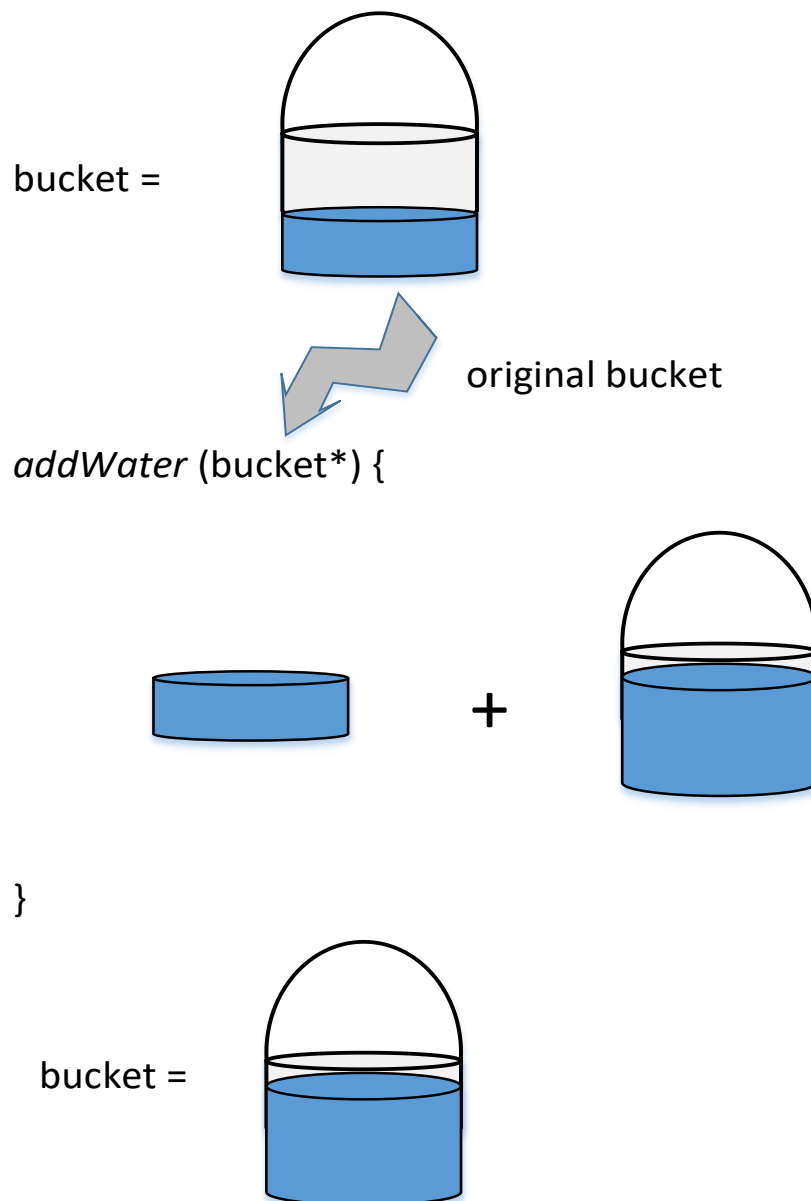
is emptied inside the function that does not affect the original bucket since the function empties the copy bucket not the original bucket. After returning from the function, the level of water in the original bucket remains the same.

Function Call by Reference

As an alternative the bucket is **passed by reference** (pointer) into ***weighWater***(bucket*) function in the next diagram. As a result the original bucket is passed into the function instead of a copy. The original bucket is emptied inside the function. After returning from the function, the original bucket becomes empty. This impact on the original bucket is not desired to weigh water of a bucket and for this reason this alternative of passing by reference into ***weighWater***() function is clearly not a better choice to weigh water of a bucket.



Let's see an example function `addWater(bucket*)` where **pass by reference** is clearly a better choice. Here, pass by reference is a better choice because we want the function to add more water into the original bucket and after returning from the function we want to retain the added water in the original bucket. The bucket is passed by reference (pointer) into `addWater(bucket*)` function in the next diagram. As a result, the original bucket is passed into the function instead of a copy.



Function `addWater(bucket*)` adds water into the original bucket, i.e., increases the level of water in the original bucket. Since this increase is happening on the original bucket, the increased level of water retains even after returning from the function.