

Class 14

Writing Functions / Reference Parameters

Void Functions

```
string fullName1 (string first, string last){
    string result = first + " " + last;
    return result;
}

int main(){
    string firstName = "Izuku";
    string lastName = "Midorya";
    // next line prints Izuku Midorya
    cout << fullName1(firstName, lastName);
    // next line stores result of function call in variable
    string fullName = fullName1(firstName, lastName);
    return 0;
}
```

```
void fullName2 (string first, string last){
    cout << first << " " << last;
}

int main(){
    string firstName = "Izuku";
    string lastName = "Midorya";
    // next line prints Izuku Midorya
    fullName2(firstName, lastName);
    // void functions cannot return a value that
    // can be stored in a variable
    return 0;
}
```

Writing Functions

- Before you code any function, plan how it will be used in a simple main function
- Doing that clarifies the name, inputs, and result type needed

Examples

1. Find the max of two numbers
2. Determine if input is divisible by 15
3. Calculate the area of a rectangle
4. Calculate the area and perimeter of a rectangle

Using Written Functions

- Need to include function definition before the main function

Call by value

- When passing values to a function, C++ creates a copy of the values stored in the variable
- The function operates on those copies of values

Example for discussion

```
void swap(int a, int b){
    int temp = a;
    a = b;
    b = temp;
}
int main(){
    int x = 5, y = 3;
    swap(x, y);
    cout << "x = " << x << "; y = " << y << endl;
    return 0;
}
```

Call by reference

- When you want to pass the actual variable to the function, you mark this in the title line by putting an & between the type and name of the parameter

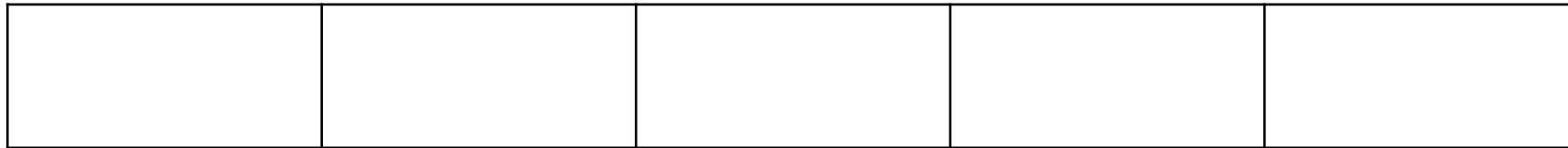
```
void swap(int &a, int &b){  
    int temp = a;  
    a = b;  
    b = temp;  
}
```


Call by value v. call by reference

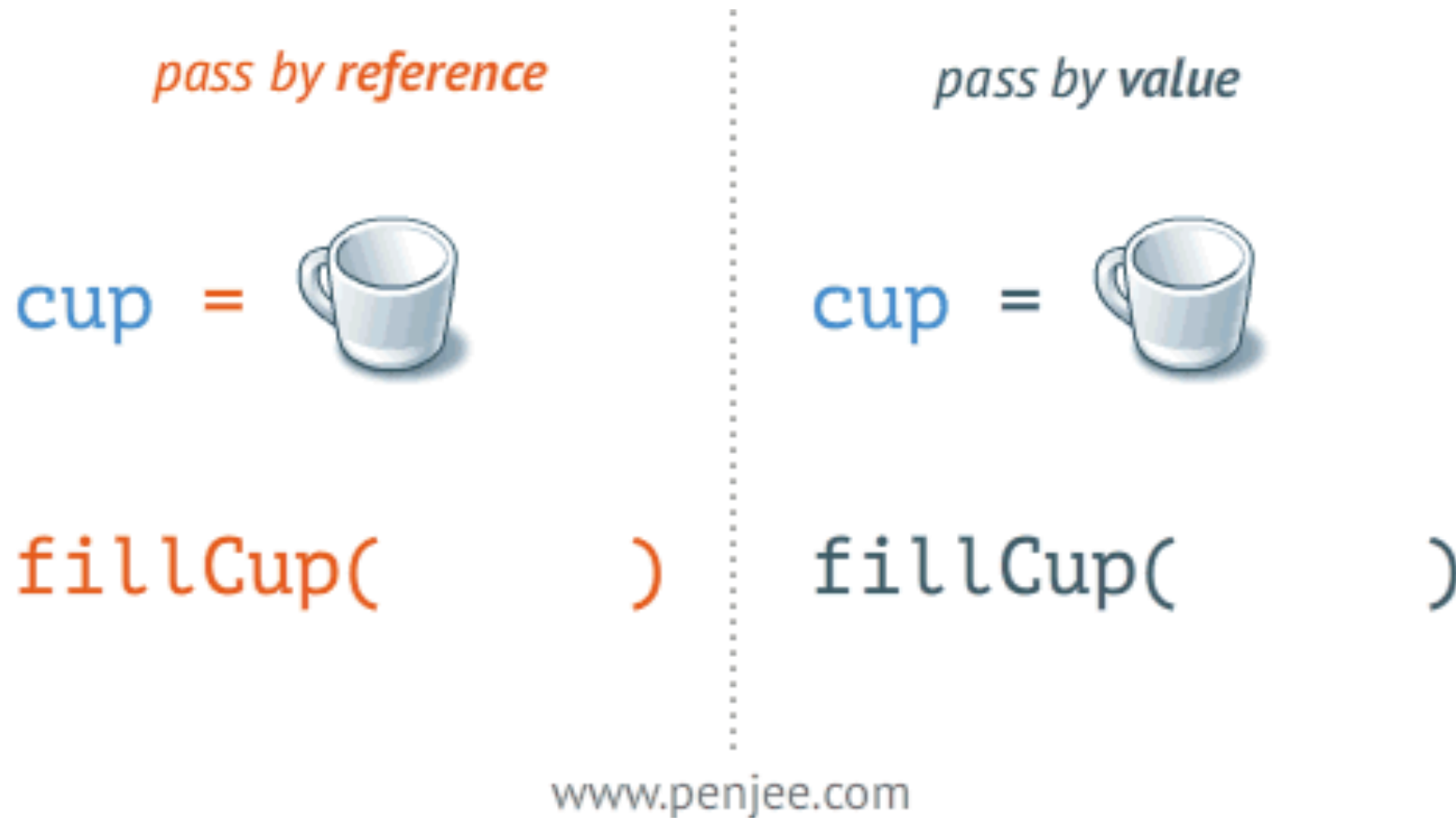
```
void swap(int a, int b){  
    int temp = a;  
    a = b;  
    b = temp;  
}
```

```
void swap(int &a, int &b){  
    int temp = a;  
    a = b;  
    b = temp;  
}
```

```
int main(){  
    int x = 5, y = 3;  
    swap(x, y);  
    cout << "x = " << x << endl;  
    cout << "y = " << y << endl;  
    return 0;  
}
```



Pass/call by reference v. Pass/call by value



Source: <https://blog.penjee.com/passing-by-value-vs-by-reference-java-graphical>