Calling functions

Call by Value:

- In the `swap()` function, parameters `int a` and `int b` are passed by value.
- Changes made to `a` and `b` inside the function do not affect the original variables `x` and `y` in `main()`.

cpp Copy code

```cpp
// Call by value
void swap(int a, int b) {
    int temp = a;
    a = b;
    b = temp;
}

int main() {
    int x = 4, y = 5;
    swap(x, y); // Values of x and y remain unchanged
}
```

Call by Pointer:

- In the `swapPointer()` function, pointers to `int` are used as parameters, receiving addresses of `x` and `y`.
- Changes made to `*a` and `*b` inside the function affect the original variables `x` and `y` in `main()`.

cpp Copy code

```cpp
// Call by pointer
void swapPointer(int* a, int* b) {
    int temp = *a;
    *a = *b;
    *b = temp;
}

int main() {
    int x = 4, y = 5;
    swapPointer(&x, &y); // x and y are swapped
}
```

What is reference variable/

- Giving another name to actual variable that points the original variable
- We can access the original variable using the actual name and reference named

Reference Variable

Reference variables can be defined as another name for an already existing variable. These are also called an alias. For example, let us say we have a variable with the name of "**sum**", but we also want to use the same variable with the name of "**add**", to do that we will make a reference variable with the name of "**add**". The example code for the reference variable is shown in figure 5.

```
float x = 455;
float & y = x;
cout<<x<<endl;
cout<<y<<endl;
```

Figure 5: Reference Variable Code

As shown in figure 5, we initialized a variable "**x**" with the value "**455**". Then we assigned the value of "**x**" to a reference variable "**y**". The ampersand "**&**" symbol is used with the "**y**" variable to make it reference variable. Now the variable "**y**" will start referring to the value of the variable "**x**". The output for variable "**x**" and "**y**" is shown in figure 6.

```
PS D:\Business\code playground\C++ course> c
455
455
PS D:\Business\code playground\C++ course>
```

Call by Reference:

- In the `swapReferenceVar()` function, references of `int` variables are used as parameters.
- Changes made to `a` and `b` inside the function affect the original variables `x` and `y` in `main()`.

cpp Copy code

```cpp
// Call by reference
void swapReferenceVar(int &a, int &b) {
    int temp = a;
    a = b;
    b = temp;
}

int main() {
    int x = 4, y = 5;
    swapReferenceVar(x, y); // x and y are swapped
}
```

Each method demonstrates a different way of passing arguments to functions, with varying effects on the original variables. Understanding these differences is crucial for writing efficient and maintainable code.