

PASS BY VALUE, PASS BY REFERENCE



We will conduct a short Experi-moo-nt. There are 5 **Moos** to complete.

Start a new project in your IDE called **Experi-moo-nt-1**.

Create a Main.java file in the project area.

Moo-1 Prediction

Analyse the following code. What do you think we will see when we execute it?

```
public static void main(String[] args) {  
    int x = 3;  
    doubleIt(x);  
    System.out.println(x);  
}  
  
public static void doubleIt(int num) {  
    num = num*2;  
}
```

My Prediction

Moo-1 (contd) Code It

Code the program. Is your prediction correct?

When we pass an integer or double or a primitive data type to a function in Java, we pass a **copy** of the value to the function.

Moo-2 Prediction

Adapt the program as follows. What do you think we will see when we execute it?

```
public static void main(String[] args) {  
    int x = 3;  
    x = doubleIt(x);  
    System.out.println(x);  
}  
  
public static int doubleIt(int num) {  
    num = num*2;  
    return num;  
}
```

My Prediction

Moo-2 Code It

Code the program. Is your prediction correct?

Moo-3 Prediction

Adapt the program as follows. What do you think we will see when we execute it?

```
public static void main(String[] args) {  
    String name = new String("Michael Jackson");  
    changeIt(name);  
    display(name);  
}  
  
public static void changeIt(String word) {  
    word = word + "!";  
}  
  
public static void display(String info) {  
    System.out.println(info);  
}
```

My Prediction

Moo-3 Code It

Code the program. Is your prediction correct?

Moo-4 Prediction

Adapt the program as follows. What do you think we will see when we execute it?

```
public static void main(String[] args) {  
    String name = new String("Michael Jackson");  
    name = changeIt(name);  
    display(name);  
}  
  
public static String changeIt(String word) {  
    word = word + "!";  
    return word;  
}  
  
public static void display(String info) {  
    System.out.println(info);  
}
```

My Prediction

Moo-4 Code It

Code the program. Is your prediction correct? Can you see what is going on?

Moo-5 Prediction

Adapt the program as follows. What do you think we will see when we execute it?

```
public static void main(String[] args) {  
    int[] nums = {2,4,6};  
    doubleIt(nums);  
    display(nums);  
}  
  
public static void doubleIt(int[] values) {  
    for(int i = 0; i<values.length; i++) {  
        values[i] = values[i] * 2;  
    }  
}  
  
public static void display(int[] items) {  
    for(int i = 0; i<items.length; i++) {  
        System.out.println(items[i]);  
    }  
}
```

My Prediction



Moo-5 Code It

Code the program. Is your prediction correct?

Think back to moo1 and moo3. Now think again about moo5. What's going on? How would you explain this to someone who doesn't know anything about programming?

Chewing the Cud

Write your conclusions to this activity here:



So, what if we have an array and we want a function to process it, **but we want to keep an original copy of the array**? Is this possible in Java? Adapt your code one more time and see if you can figure this out.