

# Reference Type Variables

```
Car a = new Car("BMW 456", 400);  
Car b = a;  
b.speed = 300;  
System.out.println(a.speed);
```

```
/*
```

```
Output:
```

```
300
```

```
*/
```

```
Car a = new Car("BMW 456", 400);  
int b = a.speed;  
b = 300;  
System.out.println(a.speed);
```

```
/*
```

Output:

400

```
*/
```

```
Car a = new Car("BMW 456", 400);  
Car b = a;  
Car c = b;  
c.speed = 300;  
System.out.println(a.speed);
```

```
/*
```

```
Output:
```

```
300
```

```
*/
```

```
Car a = new Car("BMW 456", 400);  
Car b = a;  
Car c = new Car("Ford 123", 300);  
b = c;  
b.speed = 100  
System.out.println(a.speed);
```

```
/*
```

```
Output:
```

```
400
```

```
*/
```

```
public static void main(String[] args)
{
    Car a = new Car("BMW 456", 400);
    changeSpeed(a.speed);
    System.out.println(a.speed);
}

private static void changeSpeed(int speed)
{
    speed = 100;
}

/*
Output:
400
*/
```

```
public static void main(String[] args)
{
    Car a = new Car("BMW 456", 400);
    changeSpeed(a);
    System.out.println(a.speed);
}

private static void changeSpeed(Car car)
{
    car.speed = 100;
}

/*
Output:
100
*/
```

```
public static void main(String[] args)
{
    Car a = new Car("BMW 256", 200);
    changeCar(a);
    System.out.println(a.speed);
}
```

```
private static void changeCar(Car car)
{
    car = new Car("Ford 123", 400);
}
```

```
/*
Output:
200
*/
```



```
public static void main(String[] args)
{
    int[] myArray = { 30, 30, 30, 50 };
    makeAllElementsZero(myArray);
    System.out.println(myArray[0]);
}

private static void makeAllElementsZero(int[] arr)
{
    for (int i = 0; i < arr.length; i++)
        arr[i] = 0;
}

/*
Output:
0
*/
```

```
public static void main(String[] args)
{
    Car[] arr = { new Car("BMW 456", 400), new Car("Ford 123", 300) };
    Car a = arr[0];
    changeSpeed(arr);
    Car b = arr[1];
    System.out.println(a.speed);
    System.out.println(b.speed);
}
```

```
private static void changeSpeed(Car[] cars)
{
    cars[0].speed = 300;
}
```

```
/*
Output:
300
300
*/
```

```
public static void main(String[] args)    /*
{                                           Runtime Error
    Car[] arr = new Car[2];              */
    Car a = arr[0];
    initialize(arr);
    Car b = arr[1];
    System.out.println(a.speed);
    System.out.println(b.speed);
}

private static void initialize(Car[] cars)
{
    cars[0] = new Car("BMW 456", 400);
    cars[1] = new Car("Ford 123", 300);
}
```

```
public static void main(String[] args)
{
    Car[] arr = { new Car("BMW 456", 400), new Car("Ford 123", 300) };
    Car a = arr[0];
    Car[] arr2 = copyArray(arr);
    System.out.println(arr2[0].speed++);
    a = null;
    System.out.println(arr[0].speed);
}
```

```
private static Car[] copyArray(Car[] cars)
{
    return Arrays.copyOf(cars, cars.length);
}
```

```
/*
Output:
400
401
*/
```

```
public static void main(String[] args)
{
    int[] numbers = new int[10];
    for (int number : numbers)
        number = 20;
    System.out.println(numbers[0]);
}
```

```
/*
```

```
Output:
```

```
0
```

```
*/
```

```
public static void main(String[] args)
{
    Car[] arr = { new Car("BMW 456", 400), new Car("Ford 123", 300) };
    Car a = arr[0];
    for (Car car : arr)
        car.speed = 100;
    System.out.println(a.speed);
}
```

```
/*
```

```
Output:
```

```
100
```

```
*/
```

```
public static void main(String[] args)
{
    int[][] matrix = new int[10][10];
    fillArray(matrix, 20);
    System.out.println(matrix[2][2]);
}

private static void fillArray(int[][] arr, int value)
{
    for (int[] row : arr)
        Arrays.fill(row, value);
}

/*
Output:
20
*/
```

```
public static void main(String[] args)
{
    int[][] matrix = new int[5][];
    for (int i = 0; i < matrix.length; i++)
        initArray(matrix[i]);
    System.out.println(matrix[0][0]);
}
```

```
private static void initArray(int[] arr)
{
    arr = new int[5];
    Arrays.fill(arr, 10);
}
```

```
/*
Runtime Error
*/
```



```
int[][] matrix = new int[5][5];
for (int[] row : matrix)
{
    row = new int[5];
    Arrays.fill(row, 10);
}
System.out.println(matrix[0][0]);
/*
Output:
0
*/
```

```
int[][] matrix = new int[5][5];  
for (int[] row : matrix)  
    Arrays.fill(row, 10);  
System.out.println(matrix[0][0]);  
/*  
Output:  
10  
*/
```

```
public static void main(String[] args)
{
    int[] original = { 1, 2, 3, 4, 5 };
    int[] copy = Arrays.copyOf(original, original.length);
    copy[0] = 20;
    System.out.println(original[0]);
    int[] refCopy = original;
    refCopy[0] = 20;
    System.out.println(original[0]);
}
```

```
/*
Output:
1
20
*/
```

```
public static void main(String[] args)
{
    Car[] original = { new Car("BMW 456", 400), new Car("Ford 123", 300) };
    Car[] copy = Arrays.copyOf(original, original.length);
    copy[0].speed = 100;
    System.out.println(original[0].speed);
    copy[0] = new Car("BMW 456", 400);
    System.out.println(original[0].speed);
    Car[] refCopy = original;
    refCopy[0].speed = 20;
    System.out.println(original[0].speed);
    refCopy[0] = new Car("BMW 456", 400);
    System.out.println(original[0].speed);
}
```

```
/*
Output:
100
100
20
400
*/
```