Practice with Memory

Draw memory pictures for the following code segments. Show any changes and cross out old data or memory. Answer any questions. Make sure your answer matches your picture.

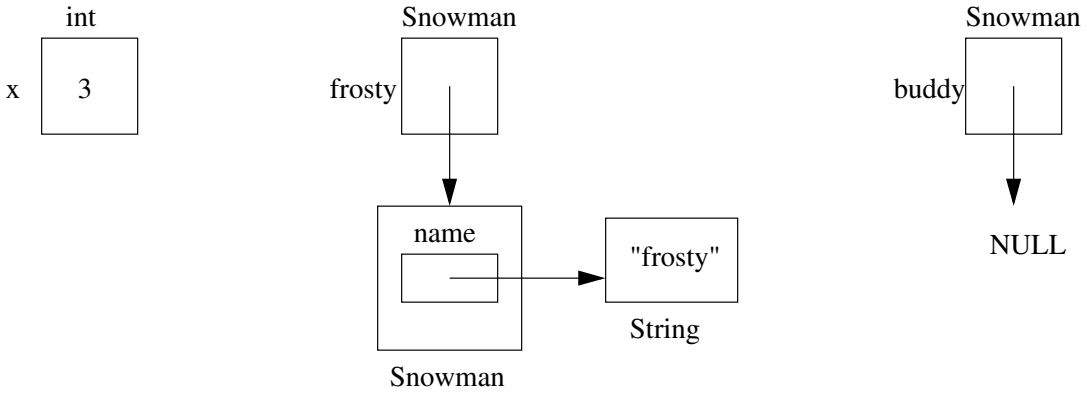
Each memory box should include

- the variable name if the box has a name
- the type (all boxes will have a type)
- the data (either an arrow, data value, a set of smaller boxes for member data, or a note saying its a class if you dont know what member data is included). The data may be an arrow to NULL or a 0 if its never been initialized.

When an arrow changes, scribble it out and draw the new one so we can see it has changed. If a box without a name has no arrows to it the Java Garbage collector can take it away.

Example:

```
int x = 3;
Snowman frosty = new Snowman("frosty");
Snowman buddy;
```



1. The basics

```
int i = 3;
double d;
String s;  // This is a class not a primitive
Clown C;
```

2. Arrays are a box with shelves

```
int[] arr = new int[3];
arr[1] = 7;
```

3. Changing primitive data

```
int i = 3;
double d;
d = i + 3.4;
i = 6;
d = 42.42;
```

4. Changing references

```
String s = "hiya";
Snowman frosty = new Snowman();
frosty = new Snowman();
s = "byebye";
```

5. Changing array values

```
String[] arr2 = new String[4];
arr2[0] = "hi";
arr2[1] = "bye";
arr2[2] = arr2[0];
arr2[0] = "yup";
```

6. A mix of all the above

```
int i = 2;
String name1 = "frosty";
Snowman[] myLawn = new Snowman[i];
myLawn[0] = new Snowman(name1);
System.out.println(myLawn[0].getName());
myLawn[1] = new Snowman("buddy");
System.out.println(myLawn[1].getName());
myLawn[0] = myLawn[1];
System.out.println(myLawn[0].getName());
name1 = myLawn[1].getName();
System.out.println(name1);
```

What prints?