# Lecture 4

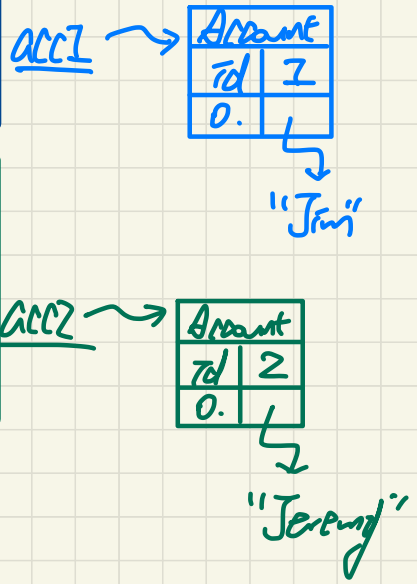
## Part F

## *Classes and Objects - Static Variables*

# Managing Account IDs: Manual

```
public class Account {
  private int id;
  private String owner;
  public int getID() { return this.id; }
  public Account(int id, String owner) {
    this.id = id;
    this.owner = owner;
  }
}
```

```
class AccountTester {
  Account acc1 = new Account(1, "Jim");
  Account acc2 = new Account(2, "Jeremy");
  System.out.println(acc1.getID() != acc2.getID());
}
```

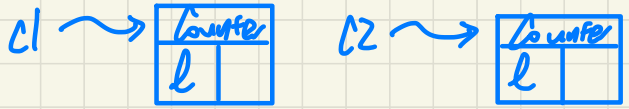



Counter.g.

## non-static variables

int l;

- attribute
- → instance-specific: ① each object of the class has its own copy.
- initialized in constructors.
- ② To access it, a context object is necessary. e.g. c1.l.

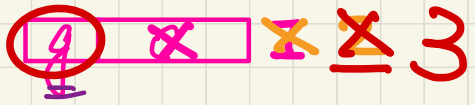



## static variables

static int g = 0;

- instance-independent: ① all objects of the class share the same copy.
- initialized upon declaration.
- ② To access it, class name suffices.

# Declaring Global Variables among Objects



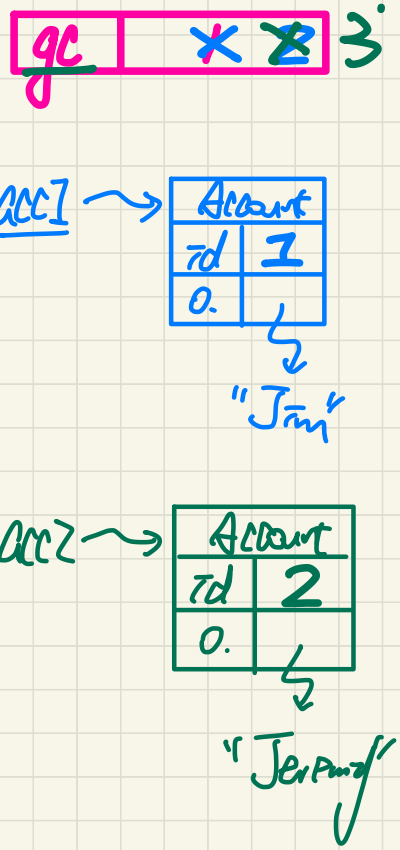
```
public class Counter {
    private int l;
    static int g = 0;

    public Counter() {
        this.l = 0;
    }

    public int getLocal() {
        return this.l;
    }

    public void incrementLocal() {
        this.l ++;
    }

    public void incrementGlobal() {
        g ++;
    }
}
```

```
public class CounterTester {
    public static void main(String[] args) {
        Counter c1 = new Counter();
        Counter c2 = new Counter();

        System.out.println("c1's local: " + c1.getLocal());
        System.out.println("c2's local: " + c2.getLocal());
        System.out.println("Global accessed via c1: " + c1.g);
        System.out.println("Global accessed via c2: " + c2.g);
        System.out.println("Global accessed via Counter: " + Counter.g);

        c1.incrementLocal();

        c2.incrementLocal();

        c1.incrementGlobal();

        c2.incrementGlobal();

        Counter.g = Counter.g + 1; // Counter.global ++;
    }
}
```

# Managing Account IDs: Automatic

```
class Account {
  private static int globalCounter = 1;
  private int id; String owner;
  public Account(String owner) {
    this.id = globalCounter;
    globalCounter ++;
    this.owner = owner; } }
```

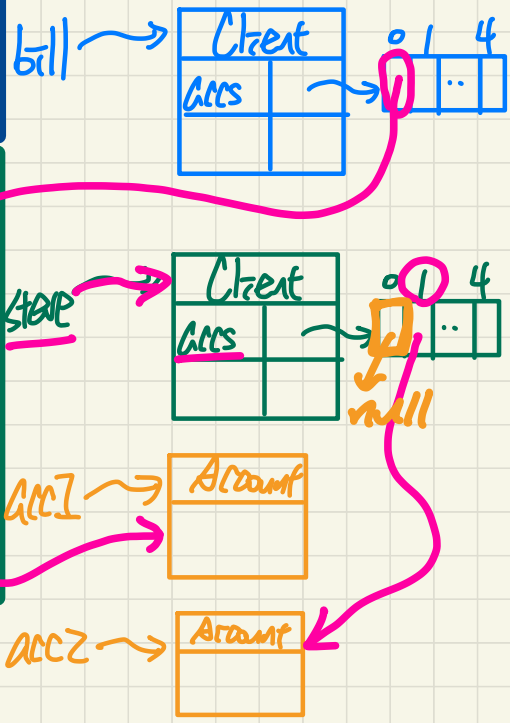
```
class AccountTester {
  Account acc1 = new Account("Jim");
  Account acc2 = new Account("Jeremy");
  System.out.println(acc1.getID() != acc2.getID()); }
```



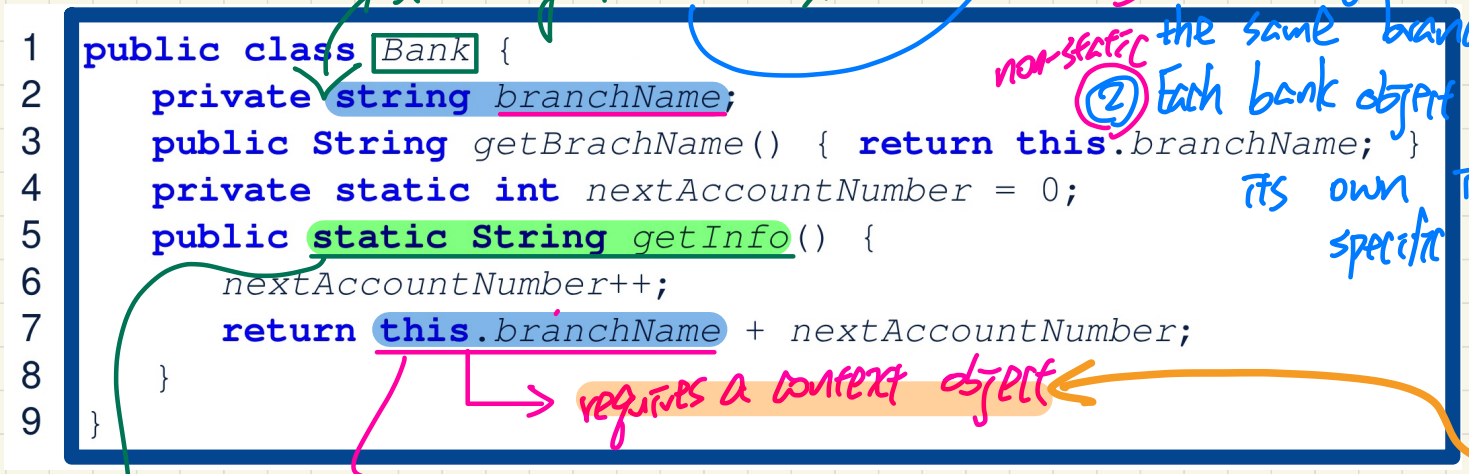
# Misuse of Static Variables

```
public class Client {
  private Account[] accounts;
  private static int numberOfAccounts = 0;
  public void addAccount(Account acc) {
    this.accounts[this.numberOfAccounts] = acc;
    this.numberOfAccounts ++;
  }
}
```

```
public class ClientTester {
  Client bill = new Client("Bill");
  Client steve = new Client("Steve");
  Account acc1 = new Account();
  Account acc2 = new Account();
  bill.addAccount(acc1);
    /* [redacted] bill.getAccounts()[0] */
  steve.addAccount(acc2);
    /* mistakenly added to steve.getAccounts()[1]! */
}
```



# Use of Static Variables: Common Error



```
1  public class Bank {
2      private string branchName;
3      public String getBrachName() { return this.branchName; }
4      private static int nextAccountNumber = 0;
5      public static String getInfo() {
6          nextAccountNumber++;
7          return this.branchName + nextAccountNumber;
8      }
9  }
```