Administrative Stuff

▶ Midterm 2
▶ Assignment 10 due Thursday
▶ Assignment 11 (last one!) posted soon
Histogram of 1068 Midterm 2

\[ \mu = 68.4, \sigma = 19.3, \text{median} = 69.5 \]
Practice Problem

- Implement a BankAccount class.
- BankAccounts should have
  - an account number
  - a balance
  - both of these should be accessible to other classes only indirectly through the constructor and other methods
- Include the methods:
  - deposit, which is passed an amount to deposit. (If a negative amount is passed, deposit 0)
  - withdrawal, which is passed an amount to remove, and returns the amount actually removed
  - getBalance, which returns the current balance
  - a constructor to initialize the fields
  - a toString method to obtain a String representation
  - an equals method to compare this account with another for equality
public class BankAccount {
    private int accountNumber;
    private double balance;

    /* constructor */
    public BankAccount(int initialAccountNumber, double initialBalance) {
        accountNumber = initialAccountNumber;
        balance = initialBalance;
    }

    /* accessor method */
    public double getBalance() {
        return balance;
    }
}
Solution. deposit() and withdrawal()

```java
public void deposit(double amount) {
    if (amount > 0)
        balance += amount;
}

public double withdrawal(double amountToWithdraw) {
    double amountWithdrawn;
    if (amountToWithdraw > balance) {
        amountWithdrawn = balance;
        balance = 0;
    } else {
        amountWithdrawn = amountToWithdraw;
        balance = balance - amountWithdrawn;
    }
    return amountWithdrawn;
}
```
public String toString() {
    return "account: " + accountNumber + ", balance: " + balance;
}

public boolean equals(BankAccount other) {
    return accountNumber==other.accountNumber &&
    balance==other.balance;
}
Is this ok?

... 

BankAccount charlie = new BankAccount(1234, 315.20); 

System.out.println("charlie's balance is: " + charlie.balance);
Is this ok?

...  

BankAccount charlie = new BankAccount(1234, 315.20);

System.out.println("charlie's balance is: "+charlie.balance);

No

» balance is private
» use getBalance instead
BankAccount charlie = new BankAccount(1234, 315.20);

/* compiler error: */
/* System.out.println("charlie's balance is: "+ */
/* charlie.balance); */

/* ok */
System.out.println("charlie's balance is: "+
    charlie.getBalance());
A Little Bit More

Add the methods:

- depositATM()
- withdrawalATM()

which work the same as the previous methods, except that they assess a transaction fee of $3.
We Add

Transaction Fee

```java
public class BankAccountV2 {
    public static final double TRANSACTION_FEE=3.0;
    private int accountNumber;
    private double balance;
}
```

New Methods

```java
public void depositATM(double amount) {
    deposit(amount-TRANSACTION_FEE);
}

public double withdrawalATM(double amountToWithdraw) {
    return withdrawal(amountToWithdraw+TRANSACTION_FEE);
}
```