Today

- Logistics: in-class exercise 1
- Brief overview of mutation analysis
- 3 paper presentations
  - The Major mutation framework (10+3 min)
  - Are mutants a valid substitute for real faults in software testing? (18+5 min)
  - Can testedness effectively be measured? (18+5 min)
- Open discussion
Logistics

In-class exercise 1: Software testing

- **10/20 at 4pm -- bring your laptop!**
- Groups of size 2-4
- More details on Moodle
Mutation analysis: overview
Mutation analysis: overview

Diagram:
- Program
  - Generate mutants
    - Mutants
- Test suite
Mutation analysis: overview

Each mutant contains one small syntactic change

```java
public float avg(float[] data) {
    float sum = 0;
    for (float num : data) {
        sum += num;
    }
    return sum / data.length;
}
```

```java
public float avg(float[] data) {
    float sum = 1;
    for (float num : data) {
        sum += num;
    }
    return sum / data.length;
}
```
Mutation analysis: overview

public float avg(float[] data) {
    float sum = 0;
    for (float num : data) {
        sum += num;
    }
    return sum / data.length;
}

// Mutants
Mutation analysis: overview

```java
public float avg(float[] data) {
    float sum = 0;
    for (float num : data) {
        sum += num;
    }
    return sum / data.length;
}
```

```java
public float avg(float[] data) {
    float sum = 0;
    for (float num : data) {
        sum += num;
    }
    return sum * data.length;
}
```
Mutation analysis: overview
Paper presentations

- The Major mutation framework (10+3 min)
- Are mutants a valid substitute for real faults in software testing? (18+5 min)
- Can testedness effectively be measured? (18+5 min)