CSCI 136: Data Structures & Advanced Programming

Lecture 4:
Crash Course Conclusion

Histograms - Strings - Assertions

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Questions about Lab 1

```
[ ][O][ ][O][ ][ ][O][ ][ ]
 0  1  2  3  4  5  6  7  8

Which coin do you want to move? 3
How far?

_*_*__*__

| |0| |1| | |2| | |
```

Review

- **Invariants**
  - Enforced by **protected** state, **accessors**, and **final**
- **Interfaces** are stateless abstractions of properties
- **static** members/methods on the class instead of an instance
- **java.util.Random**
- Strategies for storing state in arrays

Array Syntax Review

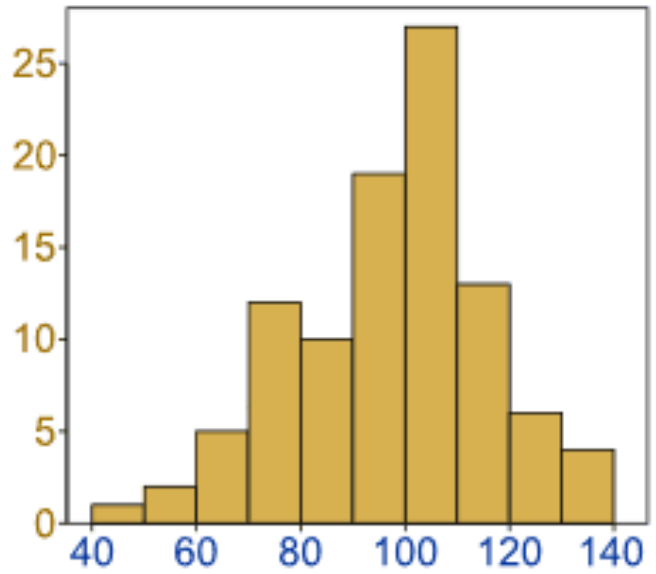
```
public class NumberBag {
   protected int[] data;

   public NumberBag(int n) {
     data = new int[n];
     data[3] = 62;
     data[data.length - 1] = 4;
     System.out.println(data[0]);
   }
}
```

Today

1. Histogram
2. String
3. Assertions

HISTOGRAM LIVE CODING DEMO



Essential String Methods

https://docs.oracle.com/javase/8/docs/api/java/lang/String.html

int length()

char charAt(int)

String substring(int, int)

int indexOf(String, int)

Assertions

assert *Expression*$_1$: *Expression*$_2$;

```
assert data != null : "No array provided";

assert x > data.length :
  "Out of bounds x = " + x +
  " data.length = " + data.length;
```

Design Summary

- **Design** your program on paper, in English
  - Nouns = state => **members**
  - Verbs = computation => **methods**
  - Group into **classes**
- A class should be a **reusable** collection of state + computation
- **main()** is your particular program (like top level in Python)
- Look at sample programs
- Read documentation

Monday

- **Contracts**: invariants, pre/post conditions, and interfaces revisited
- **Associations**
- **Vectors**: arrays that can change length

Lab #1 due Monday night!