

CSCI 136:
Data Structures
and
Advanced Programming
Lecture 5
Generics

Instructor: Dan Barowy
Williams

Topics

- WordSeq: expansion
- Vector
- Association

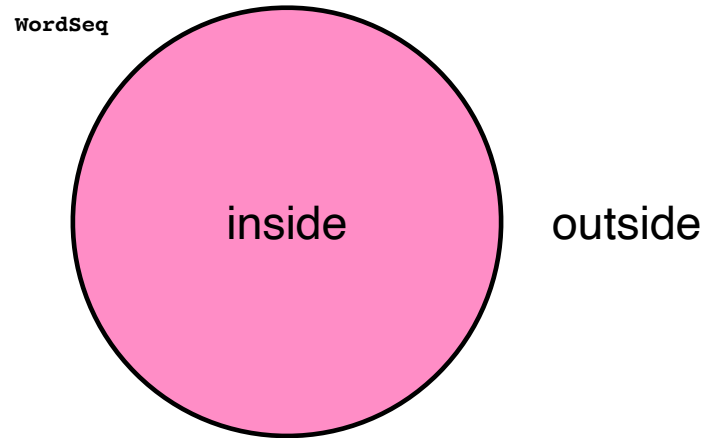
Your to-dos

1. Lab 2, **due Tuesday 2/22 by 10pm.**
2. Read **before Mon**: Bailey, Ch 5.1.

Announcements

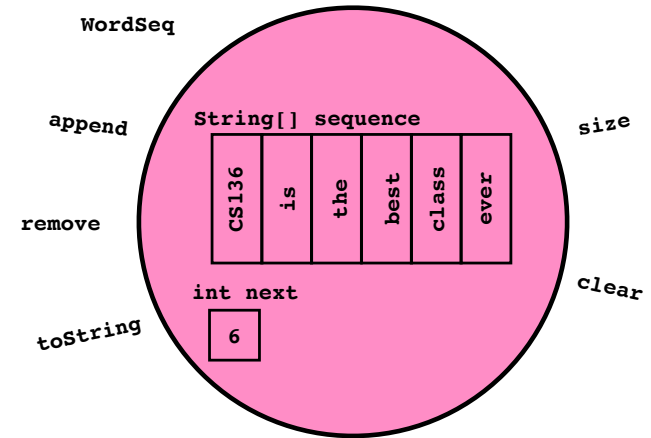
- No colloquium this week.

Think of a class as having two sides.



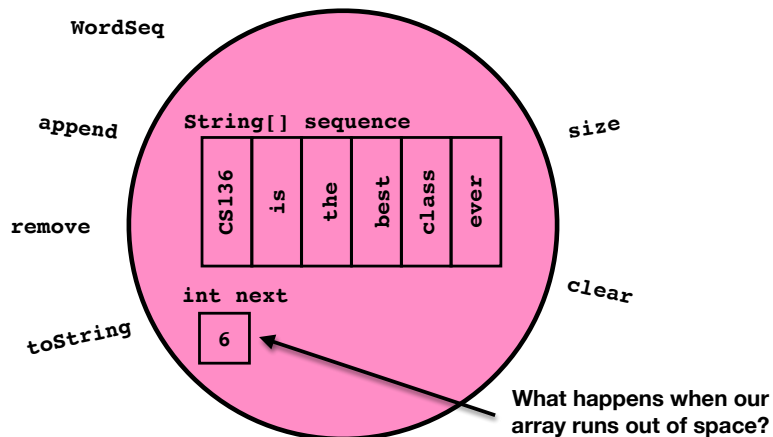
Design so “user” **never** needs to “**look inside**”.

Think of a class as having two sides.



Design so “user” **never** needs to “**look inside**”.

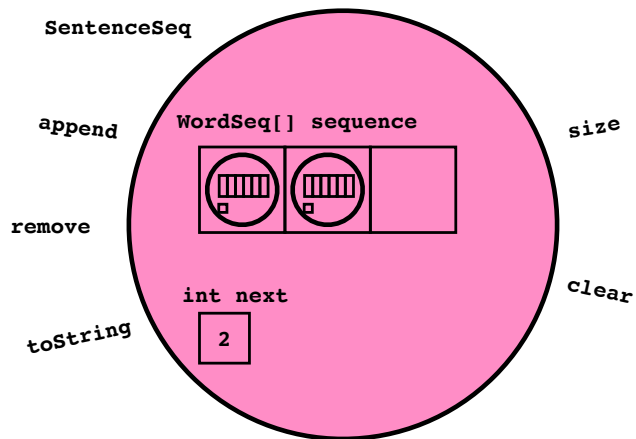
Think of a class as having two sides.



Design so “user” **never** needs to “**look inside**”.

WordSeq: Expand

Classes can **encapsulate** other classes!



This is **how we construct** complex software.

Problem:

I want to know how **frequently** every **word** appears in a given file.

Example:

how much wood would a woodchuck chuck if a woodchuck could chuck wood

'how' occurs 1 times.
'much' occurs 1 times.
'wood' occurs 2 times.
'would' occurs 1 times.
'a' occurs 2 times.
'woodchuck' occurs 2 times.
'chuck' occurs 2 times.
'if' occurs 1 times.
'could' occurs 1 times.

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count

↓
how much wood would a woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1

↓
how much wood would a woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1



how much wood would a woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1



how much wood would a woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1



how much wood would a woodchuck chuck if a woodchuck could chuck wood

Problem:

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If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1
a	1



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much	1
wood	1
would	1
a	1
woodchuck	1

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much	1
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would	1
a	1
woodchuck	1
chuck	1

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If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1
a	1
woodchuck	1
chuck	1
if	1

how much wood would a woodchuck chuck if a
woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1
a	2
woodchuck	1
chuck	1
if	1


how much wood would a woodchuck chuck if a
woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1
a	2
woodchuck	2
chuck	1
if	1


how much wood  would a woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1
a	2
woodchuck	2
chuck	1
if	1
could	1


how much wood would  a woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	1
would	1
a	2
woodchuck	2
chuck	2
if	1
could	1


how much wood would a  woodchuck chuck if a woodchuck could chuck wood

Problem:

I want to know how **frequently** every **word** appears in a given file.

If I had to do this on paper, what would that look like?

word	count
how	1
much	1
wood	2
would	1
a	2
woodchuck	2
chuck	2
if	1
could	1

how much wood would a woodchuck  chuck if a woodchuck could chuck wood

What is a table, really?

word	count
how	1
much	1
wood	2
would	1
a	2
woodchuck	2
chuck	2
if	1
could	1

What do you think?

A **sequence** of **pairs** of (**word**, **count**)

Approach:

We are going to use “off the shelf” data structures to solve this.

<http://www.cs.williams.edu/~bailey/JavaStructures/doc/structure5/index.html>

Let's write this code!

Recap & Next Class

Today:

- WordSeq: expansion
- Generics: Vector and Association

Next class:

- A little more about generics
- Time and space complexity