This week (Chapter 2):
  - Abstract data types (Today)
  - Data Structures (Wednesday and Friday)
  - Programming practices (Friday)

Today:
  - Definition *abstract data type*, especially in contrast with *data structure*
  - The “canonical” ADTs
  - Start data structures (time permitting)
Best case  Worst case  Expected case

Bounded linear search

Binary search

Quick sort
An abstract data type (ADT) is a data type whose representation is hidden from the client. Implementing an ADT as a Java class is not very different from implementing a function library as a set of static methods. The primary difference is that we associate data with the function implementations and we hide the representation of the data from the client. When using an ADT, we focus on the operations specified in the API and pay no attention to the data representation; when implementing an ADT, we focus on the data, then implement operations on that data.

[Sedgewick and Wayne, Algorithms, Pg 64; also cf pg 84]
The “canonical ADTs”:

- **List.** Linear collection with sequential and random access.
- **Stack.** Linear collection with LIFO access.
- **Queue.** Linear collection with FIFO access.
- **Set.** Unordered collection with binary membership.
- **Bag.** Unordered collection with enumerated membership.
- **Map.** Unordered collection of associations between keys and values.
Annika Annaliese Raylee Emma
Esther Elizabeth Megan Linnea Chelsea
Karin Joan Kristen
Patricia

1. Patricia

2. Karin
   3. Esther
   4. Annika

5. Elizabeth
   6. Annaliese

7. Joan
   8. Megan
   10. Linnea
      11. Raylee

9. Kristen
   12. Chelsea
      13. Emma

13. Patricia

2. Karin
   5. Esther
   10. Annika

3. Joan
   6. Elizabeth
   11. Annaliese

4. Kristen
   8. Linnea
   12. Raylee

9. Chelsea
   13. Emma
The four basic ways to implement an ADT:

- Use an array
- Use a linked structure
- Use an “advanced” data structure, varying and/or hybridizing linked structures and arrays
- Adapt an existing implementation of another ADT.
Coming up:

Due Tues, Jan 23: (end of day)
Finish reading Section 2.1
Do Ex 1.11
Take ADT quiz

Due Fri, Jan 26:
Read Section 2.(2, 4, & 5)
Take data structures quiz

Also:
Do “Implementing ADTs” project (Mon, Jan 29)