LIBRARIES

• A **library** is a collection of frequently used tools to facilitate programming large applications (or other libraries)

• Examples you probably have seen
  • `java.Math`
  • `java.util.Scanner`
  • `java.util.Random`

• Other examples
  • Access to servers/databases
  • Graphics
  • Reflection
LIBRARIES

“Truly knowing a language requires knowing the library”
-Paraphrased from Bjarne Stroustrup

“Libraries are languages”
-Paraphrased from Gabriel dos Reis
SUMMARY OF CLASSES (LIST RELATED)

- **ArrayList<E>** - Resizable-array doubling (supports List)
- **LinkedList<E>** - Doubly linked list (supports List, Deque, Stack, and Queue)
- **Vector<E>** - Resizable-array incremental (supports List)
- **Stack<E>**
- **ArrayDeque<E>** - Resizable-array doubling (supports Deque, Stack, and Queue)
- Others outside the scope of this course
- To find how to use them, go to the Java API!
1. `Scanner s = new Scanner(new File("numbers.txt"));`
2. `ArrayList<Integer> numbers = new ArrayList<>();`
3. `while (s.hasNextInt())`
   4. `numbers.add(s.nextInt());`
5. `...elsewhere...
6. `int sum = 0;`
7. `for (int n = 0; n < numbers.size(); ++n)`
   8. `sum += numbers.get(n);`
PROBLEMS

• Linear regression. Lets help the sciences by creating a simple program for linear regression modeling. Look here for how we compute correlation coefficients. Here is experimental data.

• For a given data file, find the correlation coefficient between all pairs of columns. Find the most correlated items.

• I recommend trying the solve this problem for x08.txt

• Lets discuss together how to break the problem down into manageable pieces.