CS 251
Intermediate Programming
Java Collections Framework

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What is a collection?

A *collection* is an object that groups multiple objects into a single unit. Collections are used to store, retrieve, manipulate, and communicate aggregate data.
A *collections framework* is a unified architecture for representing and manipulating collections.

**Interfaces:** The abstract data types that represent collections. Allow collections to be manipulated independently of the representation details.

**Implementations:** The concrete implementations of the collection interfaces. Reusable data structures.

**Algorithms:** Methods that perform useful computations (searching, sorting, etc.) on objects that implement collection interfaces. Polymorphic. Algorithms are reusable functionality.
Benefits of Java Collections

• Reduces programming effort
• Increases program speed and quality
• Allows interoperability among unrelated APIs
• Reduces effort to learn and use new APIs
• Reduces effort to design new APIs
• Encourages software reuse
Core Collection Interfaces

- Collection – root of the collection hierarchy
- Set – no duplicates
- List – ordered collection, sequence
- Queue – holds elements for processing
- Deque – double ended queue
- Map – maps keys to values
Polymorphic algorithms

The Collections class provides algorithms for:

- Sorting
- Shuffling
- Routine data manipulation – reverse, fill, copy, swap, addAll
- Searching
- Finding extreme values – min, max