Core Java

11. Collections
Collections

• Collections are ways to handle multiple objects with ease
• Problems arising due to a huge number of variables otherwise
• Arrays are not the only way
• Java provides collections in addition to standard arrays
• Easier to work with the Java Collections Framework than with arrays
Array

- An array in Java can be used to hold objects of the same type together
- In C, Strings were arrays of characters which terminated with the NUL character
- People got tired of having to memory manage arrays; String class holds such an array internally, does lots of boilerplate work
- Arrays are still used for performance or memory issues
The arguments passed to `public static void main` are an array

`String []args`

Access length of array using `length` which is treated as a member. Not a function call!

`int nargs=args.length;`

Array elements can be accessed by subscript, an integer from 0 to `arr.length-1`: `arr[i]`
Syntax

int []arr2;
int arr[], arr3[30] = {2, 3, 4, 5};
arr = new int[20];
int [][]arr4;
arr4 = new int[20][];
arr4[0] = new int[10];
arr4[1] = new int[2];
Collections

- Collections are usually found in `java.util` package
- Besides, some other third-party collection frameworks are available (Jakarta Commons Collections)
- Use Collections to save time, reuse code & avoid bugs
- Collections usually work with objects than primitives
Collections of Objects

• If not primitives, why use it?
• Autoboxing provides a way to case primitives to objects
• Example: `Integer a=4;`
• Those objects can now be added to Collections
• Disadvantage is memory usage
• Advantage is lesser code (no need for function overloading), better maintenance
ArrayList

- `java.util.ArrayList` is a replacement for Arrays in Java
- Is a subclass of `java.util.List`
- Other implementation of `List` is `LinkedList`
- Important methods: `length()`, `add()`, `get()`, `remove()`
- Other method of access is through Iterators
- Enhanced for-loop makes `Iterators` easier
HashMap

- HashMap is a particular implementation of java.lang.Map
- It allows you to store unique objects and retrieve them fast
- Used for attributes, properties
- Useful methods: get(), put(), remove()
- keys() and iterate through property list
Demonstration

• Compile and Execute a few programs
Questions?