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Lecture 11 Summary
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6 parts: String, Character, Conversion, StringBuffer, Splitting string, Command line arg.
[Class String]
- What is a string?
  - A series of characters in double quotes
  - For Java: Java.lang.String
    - A class representing string
    - Create string objects (reference type)
    - Syntax:
      String aStringObject = new String( "Hello String" ); // OR
     String aStringObject = "Hello String" ;
    - Note:
      aStringObject contains **reference address**
- Constructors provided by class String
  - There are several, see P.7
    OR see http://java.sun.com/j2se/1.5.0/docs/api/java/lang/String.html
- IO
  - Input from Keyboard:
    System.in.read()

    Reads one character (in integer format) from the keyboard

    - Scanner class
      - Using methods next(), nextLine(), etc.
  - Output to Screen:
    System.out.println( ... )
      - Writes a string to the screen with carriage return at the end
    - System.out.print( ... )
      - Writes a string to the screen
- Instance methods provided by Class String
  length()
    - For arrays, length is an instance variable
      For String, length() is a method
  - charAt( int pos )
    - return the character at a position (starts from zero)
  Comparisons: equals(), equalsIgnoreCase(), compareTo() , and compareToIgnoreCase()
    - lexicographic order:
     space < digits (0-9) < letters (A-Z, a-z)</pre>
    - equals() -> return true/false
    - compareTo() -> return 0, >0, or <0</pre>
  - indexOf()
                 -> locates the first occurrence
    lastIndexOf() -> locates the last occurrence
  - substring()
    - extract substring from a string
  concat()
    - concatenate two strings to form a new string
    - Or you can use: +
  - Replacement of strings
    toLowerCase()
    - toUpperCase()
    - trim()
     -> removing whitespace
    replace( char oldChar , char newChar )
     -> replacing all occurrences of oldChar by newChar
  - others:
    - getChars(), hasCode(), startsWith(), and endsWith()
    see http://java.sun.com/j2se/1.5.0/docs/api/java/lang/String.html
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[Class Character]
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- java.lang.Character
  - A Java class that represents char as objects
  - Class Methods:
   - For testing char and returns boolean:
     - isDigit(), isLetter(), isSpaceChar(), isWhiteSpace(),
       isLowerCase(), and isUpperCase()
   - For converting characters:
     - toLowerCase() and toUpperCase()
  - http://java.sun.com/j2se/1.5.0/docs/api/java/lang/Character.html
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[Conversion: Numbers <-> String]
- Conversion Methods:
 1. Numbers to Strings: Three ways:
    - String str = "" + num ;
    - Use Wrapper classes
      - class method of Integer, Long, Float and Double
        String str = Integer.toString( i ); // for int i
        String str = Double.toString( d ); // for double d
     - Use String class method:
      String valueOf(Type Value)
 2. Strings to Numbers Conversion
     Use Wrapper classes' class method:
            i = Integer.parseInt(str1);
      - int
        long 1 = Long.parseLong(str2);
        float f = Float.parseFloat(str3);
        double d = Double.parseDouble(str4);
[StringBuffer]
- Compare:
  - String Class
   - Provides many methods for processing strings
   - But String objects cannot be changed once created
  - StringBuffer Class
   - Provides methods for creating dynamic string information
   - StringBuffer objects can be modified and extended
- StringBuffer Class
  - Instance methods
   - Modify the string contents:
     append() -> Adds a data item to the end
     insert() -> Inserts a data item at a specified index position
     delete() -> removes character(s)
   - About string length:
               -> Returns # characters currently inside
     capacity() -> Returns # characters that can be stored
     ensureCapacity(), setLength()
   - Others (similar to String):
     charAt(), setCharAt(), getChars(), reverse(), replace(),
     substring(), toString()
  - Constructors:
   StringBuffer()
   StringBuffer( int
                      length )
   StringBuffer( String aString )
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[Splitting a String: StringTokenizer and Scanner]
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- StringTokenizer Class
  - From package java.util
  - Main purpose:
    - Breaks up a string into components or tokens
      as separated by delimiters
  - constructors:
    StringTokenizer( String str ) -> white-spaces as delimiter
    StringTokenizer( String str , String delim )
  - After creating a StringTokenizer object, instances methods:
    - hasMoreTokens() -> return true/false
    - nextTokens() -> return next substring
- countTokens() -> return # tokens remaining
- Scanner Class
  - In Scanner class, a word can be used as a delimiter:
    Scanner scObj = new Scanner( "ABC DEF GHI" );
    scObj.useDelimiter( "DEF" );
    while ( scObj.hasNext() ) { String next = scObj.next() ; }
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## [Command Line Arguments]

- The command line is the string of characters we type when starting a program
- Arguments can be given to commands as options. \$java CommandLineApp argument1, argument2, ...
- Arguments of main() methods receive these input arguments: ... main( String[ ] args ) ... -> args stores the array of argument strings
  - -> args[0] stores argument1, etc.

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