# CS 211In



# Overview

- Doing I/O in Java is a little cumbersome.
- CS211In class:
  - Methods for doing file I/O in a somewhat more convenient if less general way.
  - Makes working with heterogenous data easy
    - Files can have combinations of
      - integers: such as 34 -456
      - words: such as if ad34 er$rt ert:
      - operators: such as ( ) { }
      - We will call such a thing a token.
    - No support for floating-point numbers or strings
  - Some methods specialized for writing parsers.



# Word

- Same rules as an identifier in Java except that : is allowed as part of the word.
- Examples:
  - Hello
  - hello
  - u789
  - sdf:



# Example of file that can be read

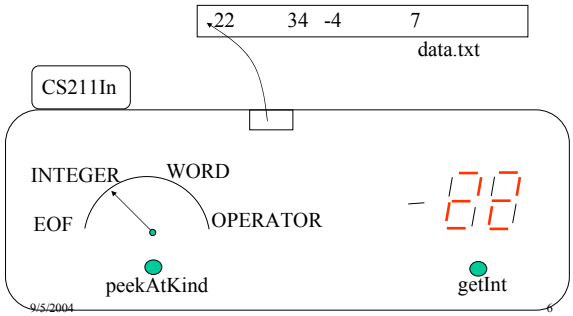
- File contains : ( 34 + -34 wed: -
- Tokens:
  - Operator: (
  - Integer: 34
  - Operator: +
  - Integer: -34
  - Word: wed:
  - Operator: -
  - ……
- Note: white space characters are eaten up

# Key CS211In Methods

- peekAtKind():
  - look at next token in input without consuming it and return an integer that encodes whether that thing is OPERATOR, WORD, INTEGER, or EOF
- getInt():
  - read an integer from file and return it
  - complain if it is not an integer
- getWord() and getOp() are similar.



# Example: add integers in a file






```
public static void main(String[] args)
 {CS211In f = new CS211In("data.txt");//create CS211In object
   int sum = 0;
   while (f.peekAtKind() != CS211In.EOF)
        sum = sum + f.getInt();
   System.out.println(sum);
  f.close();
}
```

This code assumes there is nothing in file other than integers.



# With error-checking

```
public static void main(String[] args)
 {CS211In f = new CS211In("data.txt");//create CS211In object
   int sum = 0;
   while (f.peekAtKind() != CS211In.EOF)
        if (f.peekAtKind() == CS211In.INTEGER)
          sum = sum + f.getInt();
        else
          {System.out.println("File contains non-integer data.");
            break;
           }
   System.out.println(sum);
  f.close();
}
```

## Example with heterogenous data

- The code shown on next slide reads in heterogenous data from a file one token at a time and prints both the token and its kind on the screen.

File contains : (34 + -34 wed: -

Output:

- Operator: (
- Integer: 34
- Operator: +
- Integer: -34
- Word: wed:
- Operator: -
- ……



```
public static void main(String[] args)
 {CS211In f = new CS211In("test1.txt");//create CS211In object
   inputLoop:
      while (true)
       {switch (f.peekAtKind()) {
        case CS211In.EOF: break inputLoop;
        case CS211In.INTEGER: {System.out.println("Integer: " + f.getInt();
                               break;
                              }
        case CS211In.WORD: {System.out.println("Word: " + f.getWord();
                            break;
                           }
        case CS211In.OPERATOR: {System.out.println("Operator: " + f.getOp();
                                break;
                               }
        default: {System.out.println("Unknown kind in file");
                  break inputLoop;
                 }
       }
  f.close();
}
```



## Additional methods in CS211In

- void match(char c):
  - if next token in input is operator c, advance file-pointer past it
  - if next token in input is not c, print error message
- void match(String s):
  - similar to previous method except that it checks for word s



- boolean check(char c):
  - if the next token in the input is operator c advance past it and return true.
  - otherwise, do not advance file-pointer and return false.
- boolean check(String s):
  - similar to previous method, except that it checks for word s

```
interface CS211InInterface {
      int INTEGER  = -1, //returned by peekAtKind at integer token
        WORD     = -2,//returned by peekAtKind at word token
        OPERATOR = -3,//returned by peekAtKind at operator token
        EOF      = -4;//returned by peekAtKind at end-of-file
      int peekAtKind(); //returns one of the integers above
      int getInt(); //read an integer from file
      String getWord(); //read a word
      char getOp();//read an operator
      void match(char c);//verify that next thing in file is c
      void match(String s);//verify that next thing in file is s
      boolean check(char c);//is the next thing in file c?
      boolean check(String s);//is the next thing in file s?
      void pushBack();//back up by one token in the file
      int lineNo();//where are we?
      void close();
}
```