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Chapter 4: Reading Input

After this chapter you will be able to:

– catch exceptions
– read user input
readLine()

- Calling `readLine()` reads user input up to the carriage return
- `readLine` must be called via an object of type `BufferedReader`

- Two steps
  - create an object of type `BufferedReader`
  - call `readLine`
First Step

- `System.in` is associated with the keyboard input stream
- Use `System.in` to construct an object of type `BufferedReader`

```java
BufferedReader input = new BufferedReader(
    new InputStreamReader(System.in));
```

Objects are constructed by invoking `new`
First Step Continued

• Names BufferedReader and InputStreamReader must be imported

import java.io.BufferedReader;
import java.io.InputStreamReader;

BufferedReader input = new BufferedReader(
    new InputStreamReader(System.in));

Use import to refer to names defined in external packages
Second Step

• Call `readLine` to get input line

```java
import java.io.BufferedReader;
import java.io.InputStreamReader;
BufferedReader input = new BufferedReader(new InputStreamReader(System.in));
String inputLine = input.readLine();
```

• `readLine` returns an object of type `String`
Exceptions

- Exceptions correspond to *run-time* errors
- There are many kinds of Java Exceptions
  - IOException
  - EOFException
  - FileNotFoundException
  - UnknownHostException
  - MalformedURLException and many more
Throwing Exceptions

• A method can declare that it may \texttt{throw} an exception

\begin{verbatim}
public String readLine() \texttt{throws} IOException
\end{verbatim}

\begin{verbatim}
public static int parseInt(String s) \texttt{throws} NumberFormatException
\end{verbatim}
Catching Exceptions

• An exception may be caught and handled using try and catch

BufferedReader input = new BufferedReader(
        new InputStreamReader(
                System.in));

try {
    String inputLine = input.readLine();
} catch (java.io.IOException e) {
    System.out.println("oops! An input error");
}

• If no exception occurs then the catch branch is not executed
Compile-time Checking

• The compiler will force you to handle certain exceptions

import java.io.BufferedReader;
import java.io.InputStreamReader;
public class Read {
    public static void main (String [] args) {
        BufferedReader input = new BufferedReader(
            new InputStreamReader(
                System.in));

        String inputLine = input.readLine();
    }
}

• What is wrong?
Compile-time Checking

• Answer: The exception must be caught

```java
import java.io.BufferedReader;
import java.io.InputStreamReader;

public class Read {
    public static void main (String [] args) {
        BufferedReader input = new BufferedReader(
            new InputStreamReader(System.in));

        try {
            String inputLine = input.readLine();
        } catch (java.io.IOException e) {
            System.out.println("oops! An input error");
        }
    }
}
```
An Echo Program

```java
import java.io.BufferedReader;
import java.io.InputStreamReader;
public class Echo {
    public static void main(String[] args) {
        BufferedReader input = new BufferedReader(new InputStreamReader(System.in));
        while (true) {
            System.out.println("type in a line to echo");
            try {
                String result = input.readLine();
                System.out.println("You typed: "+result);
            } catch (java.io.IOException e) {
                System.out.println("oops! An input error");
            }
        }
    }
}
```
Execution

- User’s lines are echoed

<table>
<thead>
<tr>
<th>Input/Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>type in a line to echo</td>
</tr>
<tr>
<td>ok, how about this?</td>
</tr>
<tr>
<td>ok, how about this?</td>
</tr>
<tr>
<td>type in a line to echo</td>
</tr>
<tr>
<td>here is another</td>
</tr>
<tr>
<td>here is another</td>
</tr>
</tbody>
</table>
It’s Exercise Time