

## File I/O

- Note – applications are not security restricted. Applets, however, cannot play outside of their “sandbox.” In other words, applets can’t, by default, access local I/O devices or create sockets; they can by use of digital certificates.
- Java possesses over 20 file access classes
- Stream versus random access
- Open → read (input)/ write (output) → close
- Files can be thought of as a series of lines of text. Each line is terminated with an eof character.
- Stream classes
  - Reader
    - BufferedReader
    - InputStreamReader
      - FileReader
  - Writer
    - PrintWriter
      - FileWriter
- Files require `java.io.*` package
- A few methods
  - `BufferedReader` ~ `readLine()`
  - `PrintWriter` ~ `print()` and `println()`

## Graphics and Sound

- Common image formats: GIF (Graphic Interchange Format) and JPEG (Joint Photographic Experts Group)
- Java library supports several audio formats: .au, .wav, .aif (or .aiff), .mid (or .midi)
- `getImage` method informs library of filename and allocates memory for the image

```
private Image image;
```

- `image = getImage(getDocumentBase(), "picture.gif");`
- `image = getImage("http://yourPictures.com/picture.gif");`
- `image = getImage(getCodeBase(), "picture.gif");`

- `drawImage` method loads image into memory and displays graphic on the screen

```
public void paint(Graphics g) {  
    g.drawImage(image, 20, 20, 100, 100, this);  
}
```

```
imagePanel.add(image);
```

- Animation demo
- Handling audio is very similar to graphics

```
private AudioClip sound;  
sound = getAudioClip(getDocumentBase(), "sound.au");
```

- `play`, `loop`, and `stop` methods (e.g. `sound.play();`)
- `AudioTest` source code