Two-Dimensional Arrays

```java
int [][] values = new int[20][15];
• Declares an array with 20 rows, 15 cols
• Sum up all the values
int sum = 0;
for (int k=0; k<20; k++)
{
    for (int j=0; j<15; j++)
    {
        sum += values[k][j];
    }
}
```

Pixmap

• Wrapped up our 2-D array into a class
• Pixmap
  – private String myFileName;
  – private BufferedImage myImage;
  – private Dimension mySize;
• Create a pixmap
• Get and Set a color from one pixel
  – public Color getColor (int x, int y)
  – public void setColor (int x, int y, Color value)
Other Pixmap methods

- public String getName ()
- public boolean isInBounds (int x, int y)
- public Dimension getSize ()
- public void setSize (int width, int height)

Classwork - Mirror Vertically and Horizontally

- Mirror vertically
  - Think about writing a swap method
- Mirror horizontally

Classwork - Emboss a Picture

Assignment 4 - Expand

- Example –
  - Expand by 3 rows and 2 columns
Assignment 4 - Blur

• Example – Blur 9 x 9

Assignment 4 – Edge Detection

• Example – edge detect 5x5