The Framebuffers

The Framebuffer Uses RGB Colors

The Framebuffer: Integer Color Storage

The Framebuffer: Floating Point Color Storage

The Framebuffer

Why so many bits?

Many modern algorithms do arithmetic on the framebuffer color components, or treat the framebuffer color components as data. They need the extra precision during the arithmetic. However, the display system cannot display all of those possible colors.
The Framebuffer

- **Z-buffer**
  - Used for hidden surface removal
  - Holds pixel depth
  - Typically 32 bits deep
  - Integer or floating point

# Bits / Z  Total Z Values:
32  \(2^{32} = 4\ B\)

```c
// swap the double-buffered framebuffers
glutSwapBuffers();

// set display mode
glutDisplayMode( GLUT_RGBA | GLUT_DOUBLE | GLUT_DEPTH );

// draw to back buffer
glDrawBuffer( GL_BACK );
```

You draw into here
Front

You draw into here
Back

"swap buffers" changes the role of the two framebuffers

The monitor displays from here
Front

The monitor displays from here
Back

The Video Driver

- **N refreshes/second** (N is between 50 and 100)
- The framebuffer contains the R,G,B that define the color at each pixel
- Because of the double-buffering, Refresh is asynchronous from Update, that is, the monitor gets refreshed at N (60) frames per second, no matter how fast or slowly you update the back buffer.