Using the Accumulation Buffer
for Visualization

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The Accumulation Buffer

1. You can multiply the RGBs in the Back Buffer by a constant
2. You can multiply the RGBs in the Accumulation Buffer by a constant
3. You can add the RGBs in the Back Buffer to the RGBs in the Accumulation Buffer
4. You can copy the Accumulation Buffer to the Back Buffer

Here’s how the Accumulation Buffer works:

1. Draw the new frame into the Back Buffer and multiply all its RGBs by A.
2. Multiply all the Accumulation Buffer’s RGBs by (1 - A) and add the
   Back Buffer into it ("GL_ACCUM"). Basically, you are blending the new
   animation frame with a collection of the old frames.
3. Copy ("GL_RETURN") the Accumulation Buffer to the Back Buffer.
4. Swap the Front and Back Buffers ("glutSwapBuffers").

The framebuffer starts out as: FB0 = Black
The first frame results in: FB1 = A*F1 + (1-A)*FB0 = A*F1 + (1-A)*Black
The second frame results in: FB2 = A*F2 + (1-A)*A*F1 + (1-A)^2*Black
The third frame results in: FB3 = A*F3 + (1-A)*A*F2 + (1-A)^2*A*F1 + (1-A)^3*Black

glAccum(GL_MULT,       A);
glAccum(GL_ACCUM,   1.-A);
glAccum(GL_RETURN, 1.00);

Using the Accumulation Buffer to Achieve Motion Blur

1. Multiple all the Accumulation Buffer’s RGBs by (1 - A) and add the
Back Buffer into it ("GL_ACCUM"). Basically, you are blending the new
animation frame with a collection of the old frames.
2. Copy ("GL_RETURN") the Accumulation Buffer to the Back Buffer.
3. Swap the Front and Back Buffers ("glutSwapBuffers").

The framebuffer starts out as: FB0 = Black
The first frame results in: FB1 = A*F1 + .100*FB0 = A*F1 + .100*Black
The second frame results in: FB2 = A*F2 + .090*F1 + .010*Black
The third frame results in: FB3 = 0.900*F3 + .090*F2 + .009*F1 + .001*Black

A = 0.900

Using the Accumulation Buffer to Achieve Motion Blur

The framebuffer starts out as: FB0 = Black
The first frame results in: FB1 = .900*F1 + .100*FB0 = .900*F1 + .100*Black
The second frame results in: FB2 = .900*F2 + .100*F1 + .090*FB0 + .090*Black
The third frame results in: FB3 = .900*F3 + .100*F2 + .090*F1 + .090*Black