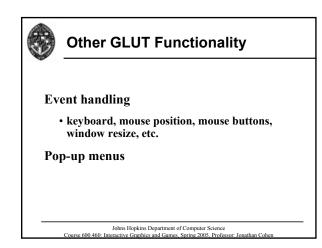
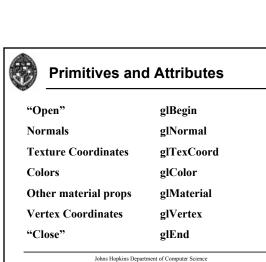




glutCreateWindow

glutDisplayFunc glutMainLoop glutSwapBuffers

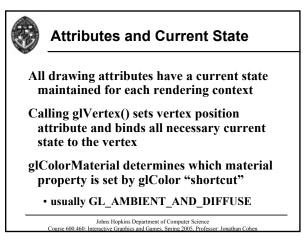


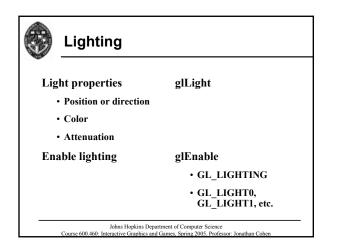


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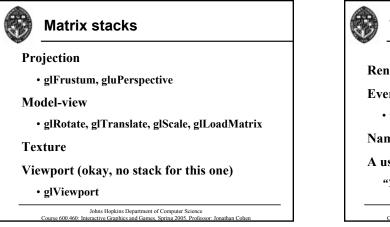
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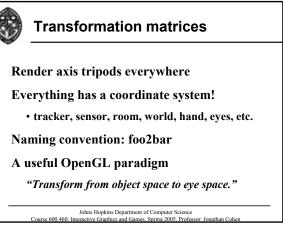
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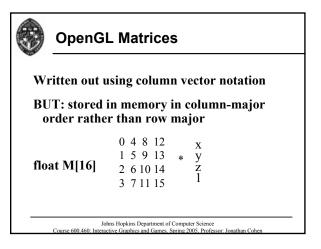


Textures	
Define (load)	glTexImage2D
• Image size	2 ^M x 2 ^N
• Pixel format, data type	
Blend or replace?	glTexEnv
Boundary handling	glTexParameter
Sampling	
Binding	glBindTextureEXT
Update "live" texture	glTexSubImage2DEXT





Column or row vectors?	
$v' = M * v \implies M3*M2*M1*v=M321*v$	
$\mathbf{v}^{\mathbf{X}'}_{\mathbf{y}} = \begin{array}{c} a \ b \ c \ d & \mathbf{X} \\ e \ f \ g \ h & * & \mathbf{y} \\ z & i \ j \ k \ m & \mathbf{Z} \\ 1 & 0 \ 0 \ 0 \ 1 & 1 \end{array}$ $\mathbf{v}^{\prime} = \mathbf{v}^{*} \mathbf{M} \qquad \qquad$	
x'y'z'1 = xyz1 * a e i 0 b f j 0 c g k 0 d h m 1	
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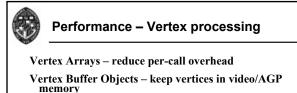
	Frame buffer configuration
Co	lor
Al	pha
De	pth
Do	uble-buffering
	• glutSwapBuffers
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Performance – CPU/API

Minimize state changes Avoid flushing or stalling the pipe • Various gets and readbacks Use multi-processing for non-API functions

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Indexed vertex arrays – reduce data size

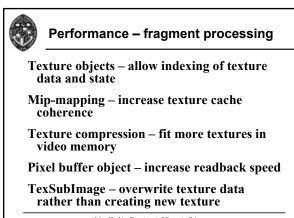
Vertex re-ordering – reduce vertex processing

Triangle Strips - reduce vertices and processing

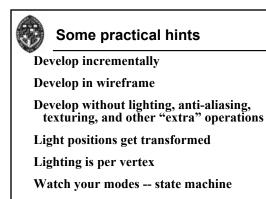
Display lists – opportunities for driver optimizations and storage in video memory

Level of detail – reduce model quality, vertices

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Conclusions

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Reality: event-driven programming Simple drawings are easy Complex stuff is more complex

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For More Information

See the OpenGL and GLUT section of our course homework help page

• will be available soon

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