

POST-CLASS LEARNING AND PRACTICE 3.1: UNDERSTAND RENDERING ENGINES

Lesson Objective3.1:

Understand rendering engines. *Topics:* DirectX®, video and audio compression, and resolution (full screen, VSync, and windowed)

Additional learning resources:

MSDN®:

DirectX Developer Center: <http://msdn.microsoft.com/en-us/directx/default.aspx>

DirectX Samples: [http://msdn.microsoft.com/en-us/library/dd368187\(v=VS.85\).aspx](http://msdn.microsoft.com/en-us/library/dd368187(v=VS.85).aspx)

QuickStart, a basic DirectX app: [http://msdn.microsoft.com/en-us/library/br229585\(v=VS.85\).aspx](http://msdn.microsoft.com/en-us/library/br229585(v=VS.85).aspx)

Windows Media Codecs: [http://msdn.microsoft.com/en-us/library/ff819508\(v=VS.85\).aspx](http://msdn.microsoft.com/en-us/library/ff819508(v=VS.85).aspx)

Introduction to DirectX: <http://channel9.msdn.com/coding4fun/articles/Beginning-Game-Development-Part-II-Introduction-to-DirectX>

Audio Compression Using XACT®:

<http://blogs.msdn.com/b/mitchw/archive/2007/04/27/audio-compression-using-xact.aspx>

Other Resources (books, e-reference):

Codecs: frequently asked questions: <http://windows.microsoft.com/en-US/windows7/Codecs-frequently-asked-questions>

The Gamer's Graphics & Display Settings Guide Graphics Settings Vertical Synchronization:
http://www.tweakguides.com/Graphics_9.html

DirectX Tutorial for C#: <http://www.riemers.net/eng/Tutorials/DirectX/Csharp/Series1/tut1.php>

Resources, software, and additional files if needed for this lesson:

1. Internet connectivity

Student Activity:

Directions to the student:

Read the following scenario. Visit the MSDN Encoding Methods site. Create a chart to serve as a quick reference guide for the game design team summarizing the important details of each encoding method.

Scenario:

Kim is enjoying his work in the animation department at Adventure Works and great progress is being made on Adventures in Space, their latest video game project. He has recently been assigned to help the game designers select compression tools for the many audio and image/video assets that will be used in the game.

To be able to help the team members better, Kim needs to brush up on his knowledge of Windows Media Center® Audio and Video codecs encoding methods. Knowing how and when to use each method can help you create high-quality compressed content.

Content:

Encoding Methods

[http://msdn.microsoft.com/en-us/library/ff819095\(v=VS.85\).aspx](http://msdn.microsoft.com/en-us/library/ff819095(v=VS.85).aspx)

Method	Description	Important Notes
Constant Bit Rate Encoding		
Two-Pass Constant Bit Rate Encoding		
Quality-Based Variable Bit Rate Encoding		
Unconstrained Variable Bit Rate Encoding		
Peak-Constrained Variable Bit Rate Encoding		

KEY 3.1: UNDERSTAND RENDERING ENGINES

Content:

Answer will vary.

Method	Description	Important Notes
Constant Bit Rate Encoding	CBR encoding is used primarily for content that is streamed over a network to its destination. In such a scenario, it is important to be able to rely on consistent bandwidth usage.	CBR encoding differs from the other modes in that before starting to encode, you set both the average bit rate of the output content, and the buffer window that applies to that bit rate.
Two-Pass Constant Bit Rate Encoding	The codec compresses the content and returns output samples.	Two-pass CBR encoding has many advantages. It often yields significant quality gains over standard CBR encoding without changing any of the buffering requirements.
Quality-Based Variable Bit Rate Encoding	The primary difference between CBR and VBR is the size of the buffer window used. VBR-encoded streams usually have large buffer windows compared to CBR-encoded streams.	Quality-based VBR uses a single encoding pass and tends to create large compressed streams. When encoding is complete, the codec sets the buffer requirements so that the decoder can decompress the data.
Unconstrained Variable Bit Rate Encoding	Unconstrained VBR does not encode to a specific quality level. It encodes the content to the highest possible quality while maintaining a specified bit rate.	Unconstrained VBR is of limited use, because there are few playback scenarios that have requirements in keeping with its buffer requirements.
Peak-Constrained Variable Bit Rate Encoding	The final encoding mode is peak-constrained VBR. Like unconstrained VBR, this mode uses two encoding passes and encodes to a specified bit rate.	Peak-constrained VBR encoding is useful for playback devices with a finite buffer capacity and some data rate constraints. A common example of this is the encoding used for DVDs.