

Media Technology

Group Work 3

Digital Audio Compression

(Codecs, Codec Parameters, Mean Opinion Score, Data rate)

Digital Audio Compression

Why are *Codecs, Codec Parameters, Mean Opinion Score, Data rate* important?

- Digital audio compression is vital for almost every digital media industry.
- Codecs, their parameters have a substantial impact on the final perceived sound quality.
- There are appropriate codecs and settings depending on your source (Music, voice or a mixture)

Group Work Report

- Please prepare a 1 to 2 page report of your findings from this group work. Outline the important points from each exercise and your results. (Use the section questions as a guide)
- Everyone should hand in their own report (no group reports please).
- The report is due, in printed form, by the beginning of the next Media Technology lecture.

Overview for Today

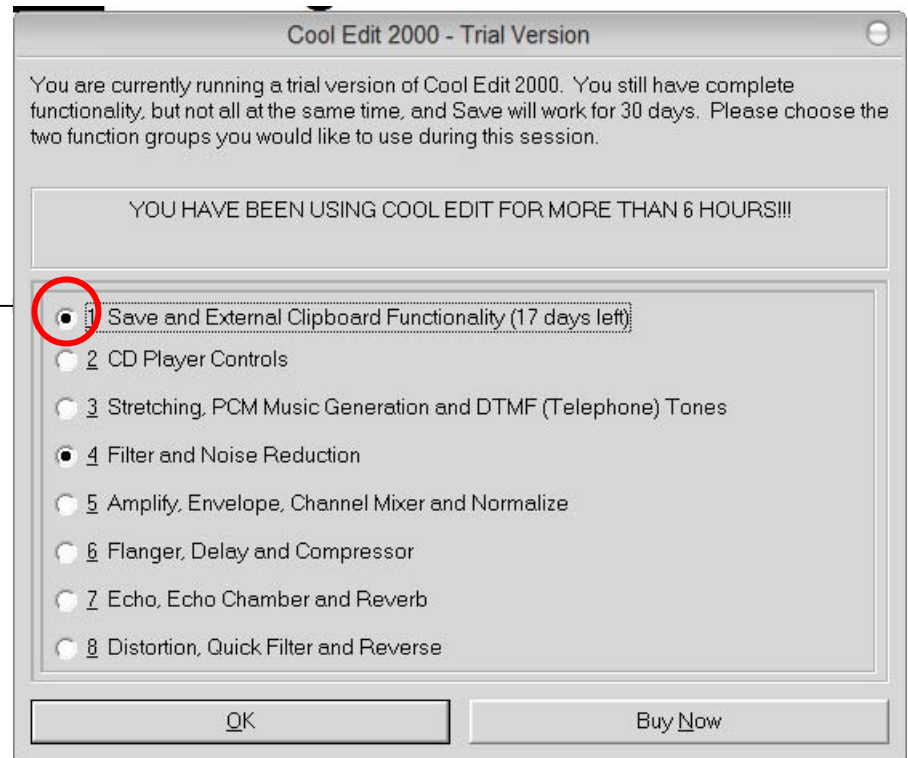
1. Compressing audio with CoolEdit Pro.
2. Compress two audio files with a variety of codecs.
3. Listen to each encoded file and choose a mean opinion score for that file.
4. Graph the mean opinion score in relation to the data rate for each file.

Enable Saving for CoolEdit Pro

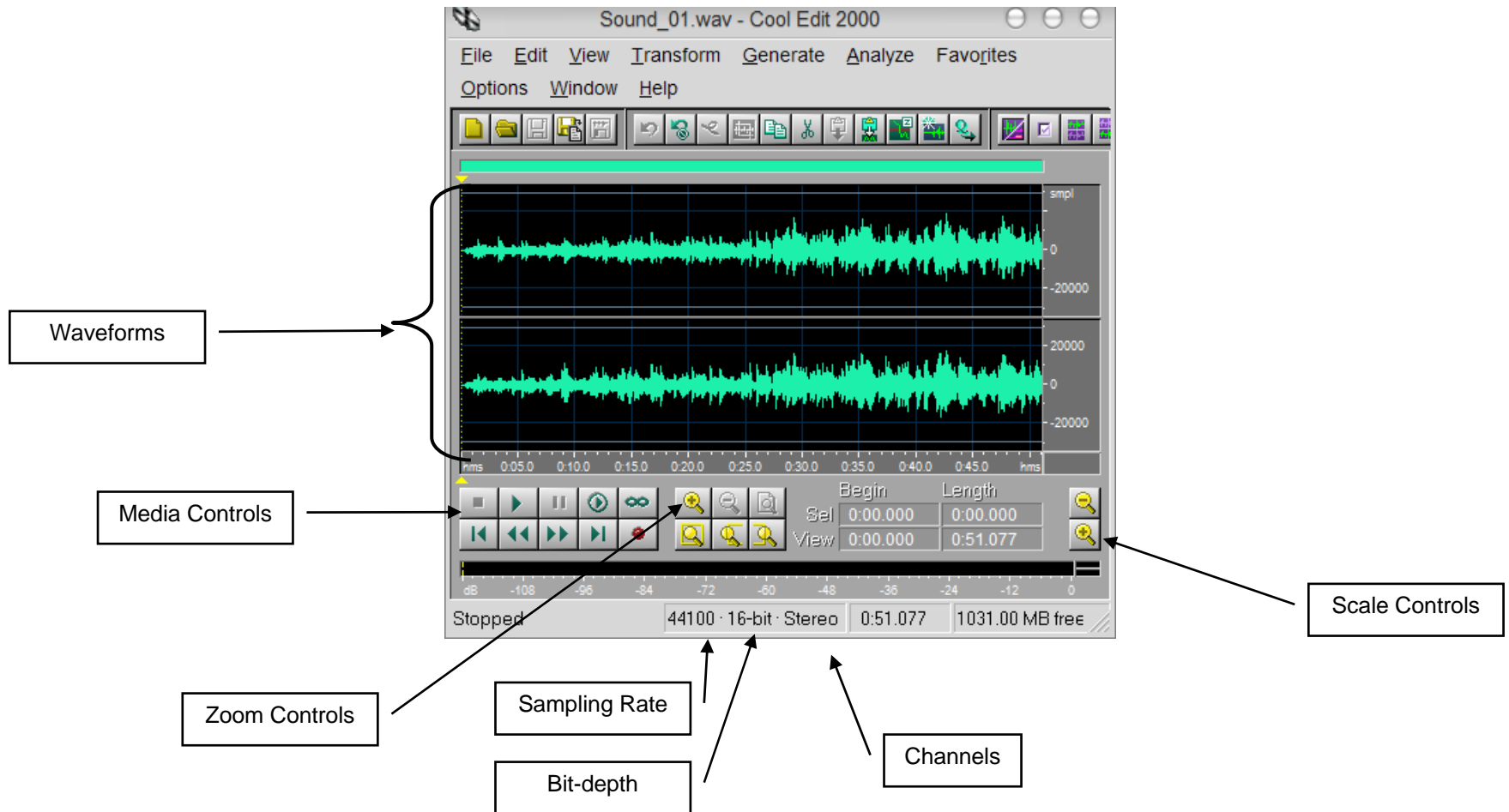
When starting CoolEdit Pro, please **select** option 1 – “*Save and External Clipboard...*”

- The work today does requires saving your work.
- **WARNING:** Please do not save over the original source files!

Check this when starting CoolEdit

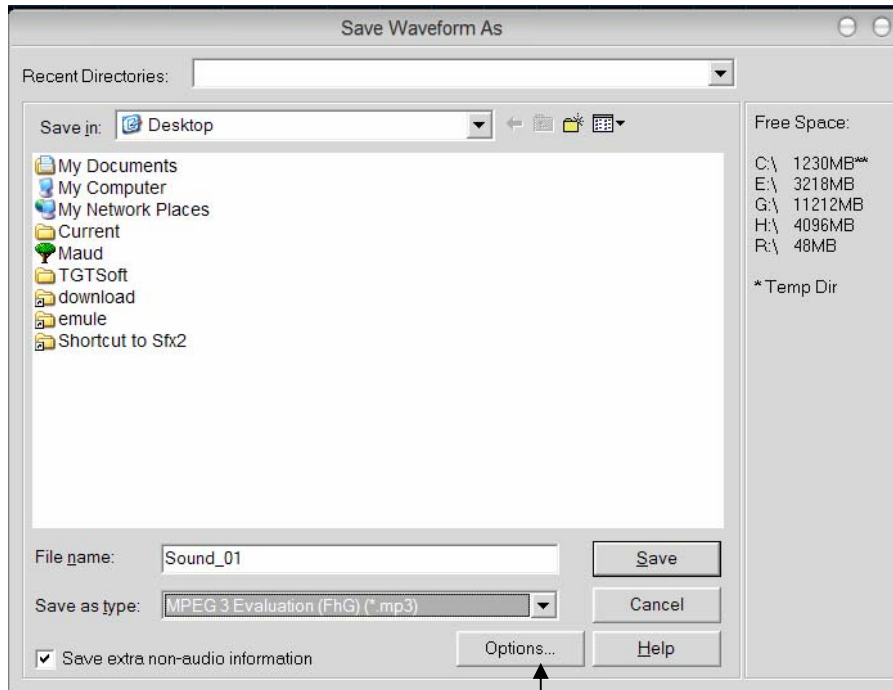


Review of CoolEdit Pro



Compression Settings

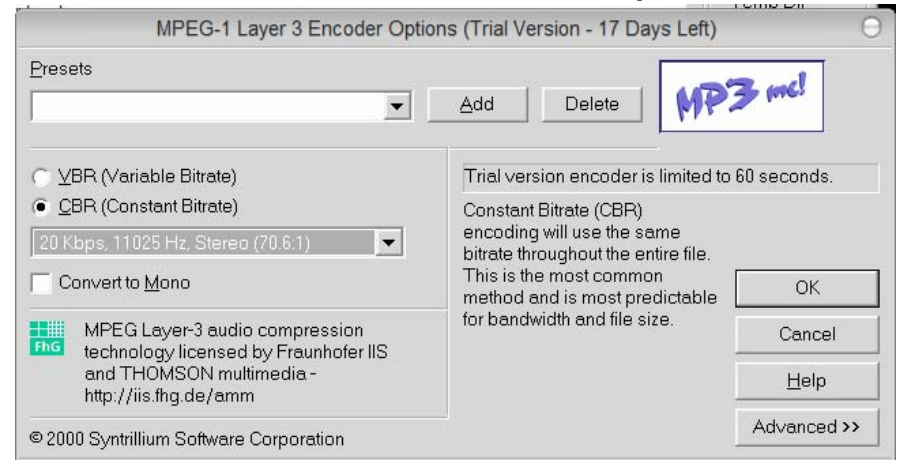
The CoolEdit 'Save Waveform As' Dialog Box



To Compress Audio

- Open an audio file in CoolEdit Pro
- **Menu:** File > Save Copy As...
- Click 'Options...' to open the encoder settings

The CoolEdit MP3 Encoder Options



Things to Notice

- Encoder options *are different* for each codec.
- Some codecs have both presets and 'Advanced' options.
- Not all codecs allow sophisticated adjustments.

Encode Source Files

Procedure for encoding

- Create a work folder for your work on the 'D' drive (location given in class).
- Locate the two sample files:
 - Sample_01.wav (music file)
 - Sample_02.wav (voice file)
- Export **each** source file in 6 formats:
 1. Open Sound_01.wav in CoolEdit Pro
 2. **MENU:** File > Save Copy As...
 3. Choose a codec (see the codec list below).
 4. Use the 'Options' button for any additional settings (if needed) .
 5. Choose a meaningful name for the output file (destination in your work folder).
 - like Sound_01-mp20kbps, etc.
 6. Click Save.
 7. Repeat saving for each codec in the list below.
 8. Finally repeat the entire procedure for Sound_02.wav
- Codec list
 - MP3 20Kbps
 - MP3 128Kbps
 - MP3 64Kbps
 - A-Law 8-bit
 - Windows PCM
 - DVI ADPCM 2bit/sample

Mean Opinion Scores (Music)

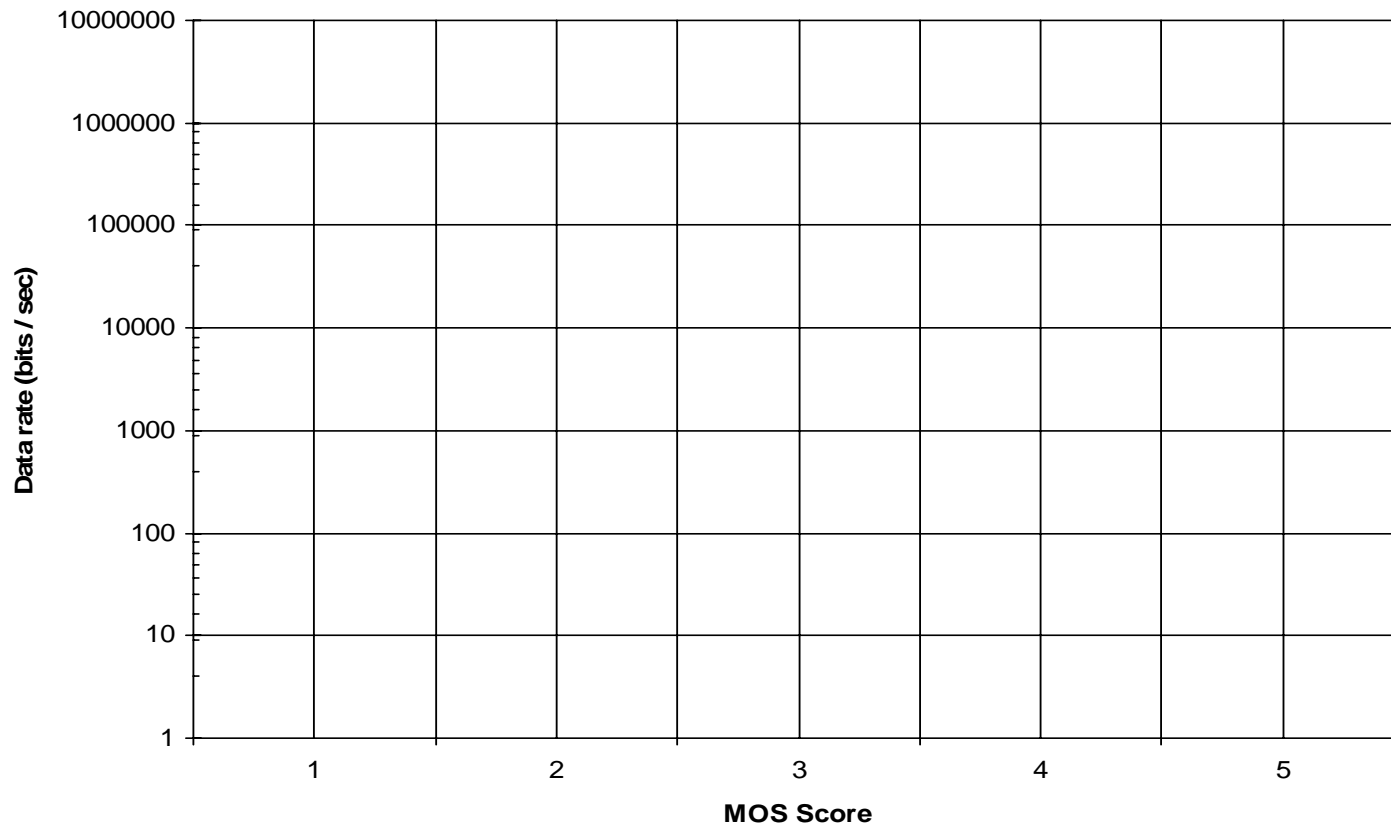
- For each exported **voice file**, rate the sound quality from 1 – 5
- Calculate the data-rate in bits/second: $((\text{file size in Kilobytes}) * (1024) * 8) / \text{duration in seconds}$

Codec	MOS Score: (1) bad; (2) poor; (3) fair; (4) good; (5) excellent					Data-rate (bits/sec)
	1	2	3	4	5	
MP3 20Kbps						
MP3 128Kbps						
MP3 64Kbps						
A-Law 8-bit						
Windows PCM						
DVI ADPCM 2bit/sample						

Mean Opinion Scores for Sound_01 (Music)

Mean Opinion Score Graph (Music)

- For each exported **voice file**, plot the MOS value against the data-rate
- **Question:** Which codec(s) perform the best for this music selection?
 - In terms of perceived sounds quality vs. data rate



Mean Opinion Scores (Voice)

- For each exported voice file, rate the sound quality from 1 – 5
- Calculate the data rate in bits/second: $((\text{file size in Kilobytes}) * (1024) * 8) / \text{duration in seconds}$

Codec	MOS Score: (1) bad; (2) poor; (3) fair; (4) good; (5) excellent					Data-rate (bits/sec)
	1	2	3	4	5	
MP3 20Kbps						
MP3 128Kbps						
MP3 64Kbps						
A-Law 8-bit						
Windows PCM						
DVI ADPCM 2bit/sample						

Mean Opinion Scores for Sound_02 (Voice)

Mean Opinion Score Graph (Voice)

- For each exported voice file, plot the MOS value against the data rate
- **Question:** Which codec(s) perform the best for this music selection?
 - In terms of perceived sounds quality vs. data rate

