Notes on Deliverables

October 16, 2024 10:30 PM

1. Comment the given Windows Audio code, and provide analysis for each parameter & function wrapper.

2. Windows program to record n seconds of audio from the microphone, and another to play it back.
   - ↳ Mono sound, at least 8bit samples @ 8KHZ;
   - ↳ Adjustable parameters, question mark.

3. Simple menu to call:
   - ↳ Record functions,
   - ↳ Playback functions,
   - ↳ Queue functions.

4. Project Management
   - . Status Report
   - . Schedule.

5. Diagnostic Document
   - ↳ Testing scenarios
   - ↳ Parameter list.

Menu Functions

- Record
- Save
-

Menus

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CMS Menus

Menus:

(the menu it is linked to after an action is selected)

1) Main Menu

- Record (Menu 2)
- Exit (Menu 0)

2) During Recording

- Recording now... (Menu 3) ---- Can modify the length time of the recording--

3) Post Recording Menu

Instead of "Playing recording from buffer" and "Would you like to save your audio recording? (y/n): "

- Save Recording (Menu 5)
- Playback (Menu 4)
- Rerecord (goes back to the main menu to record) (Menu 2)
- Delete Recording (Menu 6)
- Exit (Menu 10)

4) Playback Menu
"Playing…"

(Menu 3)

5) Save Recording Menu

"Recording # saved successfully"

Record (Menu 2)
Playback (Menu 4)

6) Delete Recording Menu

"Recording Deleted"

- Main Menu (Menu 1)
- Exit (Menu 0)

0) Exit Menu

"Exiting program…"

10) Error Menu

“ERROR”
“Recording not saved”

- Save Recording (Menu 5)
- Recording Playback (Menu 4)
- Rerecord (Menu 2)
- Delete Recording (Menu 6)
- Exit without saving (Menu 0)

Windows API Links and Explanations

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Wave HDR

https://learn.microsoft.com/en-us/windows/win32/api/mmeapi/ns-mmeapi-wavehdr

- Structure defines the header used to identify a waveform-audio buffer.
  - Contains:
    ↳ Pointer to waveform buffer.
    ↳ Length of buffer.
    ↳ # of bytes recorded. (When used as input buffer only).
    ↳ pointer to user data.
    ↳ Flags - Bitwise OR of Ø or more flags (defined in the table at the link).
    ↳ # of times to play the loop. (When used as an output buffer only).
    ↳ pointer to next (reserved).
    ↳ reserved. (reserved).

→ Use WHDR_BEGINLOOP + WHDR-ENDLOOP to specify the beginning + ending blocks of data for looping.
↳ To loop 1 block, specify the same block for both flags.

Wave FORMATEX

https://learn.microsoft.com/en-us/windows/win32/api/mmeapi/ns-mmeapi-waveformatex

- This structure defines the format of waveform-audio data.
  ↳ Universal format data only. Include this struct inside of another struct to define additional formatting for a waveform-audio data type (first member of the struct, then other info after).

→ Formats with more than 2 channels or samples of more than 16 bits are described with WAVEFORMATEXTENSIBLE, which includes the WAVEFORMAT structure.

- Contains:
  ↳ Waveform-audio format type.
  ↳ Number of channels.
  ↳ Sample Rate in Hz. (common values: 8k, 11.025k, 22.05k, or 44.1k).
  ↳ Data Transfer Rate in bytes per second. (nBPS = (sample rate)(Block alignment)).
  ↳ Block Alignment in bytes. $\left(nBA = \frac{(nChannels)(bits\ per\ sample)}{8}\right)$.

↳ Data transfer [illegible] bytes per [illegible]

↳ Block Alignment in bytes. ($nBA = \frac{(nChannels)(bits\ per\ sample)}{8}$).

- ↳ Software must process a multiple of nBA bytes of data at a time.
- ↳ Data read/write must start at the beginning of a block/sample.

↳ Bit Depth. (8bit or 16bit). (container size, not necessarily sample size).

- ↳ Some compression can't define a value for bitdepth, so it can also be Ø.

↳ Size of Extras. → IGNORE for our purposes, since we are using WAVE_FORMAT_PCM.

WaveOutOpen

https://learn.microsoft.com/en-us/windows/win32/api/mmeapi/nf-mmeapi-waveoutopen

- Opens the given waveform-audio