Audio

Make some noise

- Audio is important.
  - Tomlinson Holman's eXperiment.
- Audio is not my favorite segment.
  - Simple on the surface, complex issues.
- Still, audio adds a lot to the experience.
  - Even a beep is better than silence.

History (on the PC)

- Piezoelectric beepers / pc speakers
  - Beep! -> some arpeggios, even (noisy) d/a
- FM synthesis (adlib, soundblaster)
  - Somewhat metallic sound
- DAC
  - LPT DACs, soundblaster, Pro Audio Spectrum..
- Wavetable (sample playback)
  - Gravis Ultrasound, Roland LAPC-1, SB AWE32
- Now: DAC again (MP3, software wavetable...)

TYPICAL I/O

- Music
  - Possibly transitioning depending on the situation in the game.
- Sound effects
  - Several sound effects at the same time.

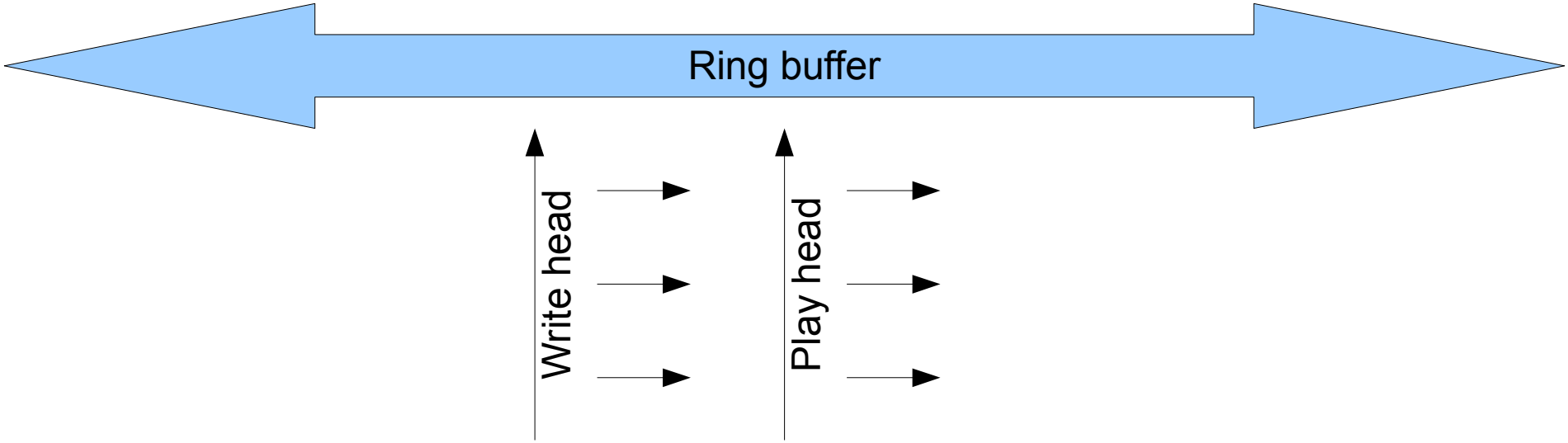
DATA FORMATS

- Bits per sample (1/4/8/16/24, 8/16 typical)
- Signed / unsigned data
- Looping / not looping
- Sample rate (8khz – 48khz typical)
- Channels (mono, stereo, surround)
- Compression (none, adpcm, mp3/ogg)

POSITIONAL AUDIO

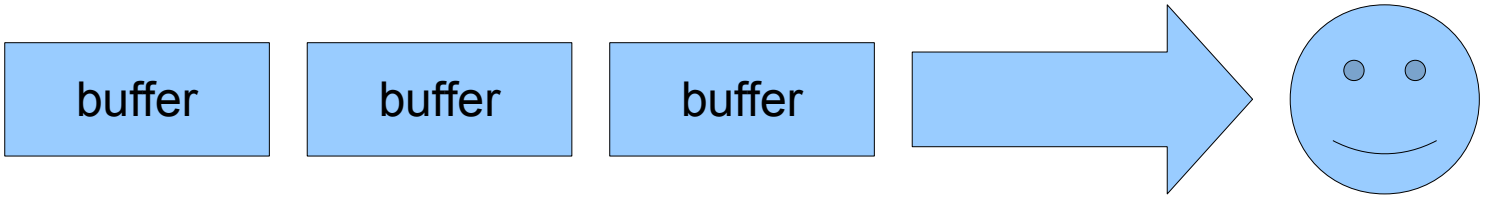
- "3d audio"
- Most useful for first person games
- For 2d games, stereo panning is in most cases good enough

PLAYING AUDIO: RING BUFFER



- Pros: low latency, better control
- Cons: tricky

PLAYING AUDIO: BUFFERED



- When a buffer is finished, callback triggers
- Application mixes new buffer, adds it into queue

- Pros: simple
- Cons: potentially higher latency

PRACTICAL USE

- Game populated with audio events.
- Audio events trigger change in audio.

- In simplest form, trigger a sound effect.
- In more complex form, audio designer can do all sorts of weird things with a separate audio designing software
- Audio may go through environmental filters (echoes etc).

HOMEWORK

- Take a game, preferably a commercial title.
- Listen.
  - How does the background audio work? Does it fade in and out different songs?
  - Does the game use positional audio?
  - Does the game's audio do something interesting?

- Write a short report of your findings.