CHAPTER 3 DESIGN ETUDE

BEFORE WE EXPLORE PROGRAMMABILITY AND SOUND IN CHAPTER 4...
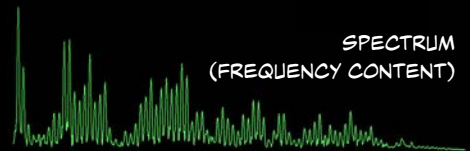
SEEING SOUND!

DESIGN AND PROTOTYPE A REAL-TIME **SOUND VISUALIZATION SOFTWARE.** SOUND GOES IN, GRAPHICS RESPOND IN REAL TIME, CONVEYING SOMETHING ABOUT THE AUDIO. IN PARTICULAR, DESIGN SOMETHING TO VISUALIZE BOTH THE TIME-VARYING SOUND (WAVEFORM) AS WELL AS THE INSTANTANEOUS FREQUENCY CONTENT (SPECTRUM). IF YOU'D LIKE, USE SNDPEEK AS A STARTING POINT (HTTPS://ARTFUL.DESIGN/).
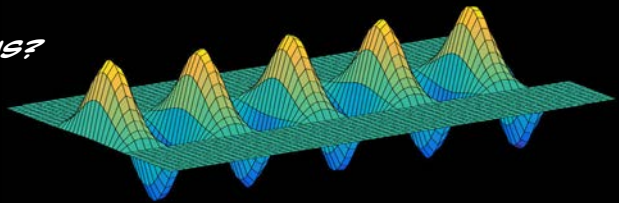
• PART 1: WAVEFORM

TO START, THINK ABOUT HOW TO VISUALIZE THE **TIME DOMAIN WAVEFORM.** CONCEIVE, SKETCH, PLAN.

IN A WAY, THE WAVEFORM IS NOTHING MORE THAN A SET OF POINTS THAT, WHEN CONNECTED, SKETCH OUT A SIGNAL. THIS SET OF POINTS CHANGES RAPIDLY (DOZENS OF TIMES PER SECOND), GIVING RISE TO THE FLUIDITY AND FLOW OF ANIMATION.
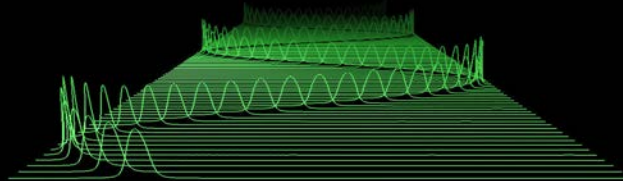
WAVEFORM
(TIME-VARYING AIR PRESSURE)

SPECTRUM
(FREQUENCY CONTENT)

HOW MIGHT IT **LOOK?** HOW TO **EXPRESS** THE SIGNAL? IN SNDPEEK, THE WAVEFORM IS SIMPLY CONNECTED BY LINE SEGMENTS. WHAT ARE OTHER WAYS? PERHAPS THESE POINTS CAN TRACE OUT THE RIDGE ON A STRANGE AUDIO-MODULATED 3D MOUNTAIN? ALSO DOES IT HAVE TO BE LINEAR? CAN A WAVEFORM BE REPRESENTED **CIRCULARLY**, OR AS A **SPIRAL** FORM?

OR HOW ABOUT SOMETHING LIKE **THIS?**

• PART 2: SPECTRUM

FIND A WAY TO VISUALLY REPRESENT EACH SPECTRUM THAT CORRESPONDS WITH EACH WAVEFORM IN TIME. FOR EXAMPLE, SNDPEEK KEEPS TRACK OF THE MOST RECENT SPECTRA AND DRAWS ALL OF THEM IN A WATERFALL PLOT TO VISUALIZE THE CHANGING OF THE SPECTRUM OVER TIME. HOW MIGHT YOU REPRESENT THIS?

• PART 3: PROTOTYPE, PERSONALITY, NARRATIVE

PROTOTYPE IT. MAKE IT. USE WHATEVER TOOLS AND LANGUAGES MAY BE AVAILABLE TO YOU (E.G., C++, OPENGL, PROCESSING) -- OR RECRUIT A FRIEND WHO PROGRAMS! WHATEVER YOU DO, DO IT WITH **PERSONALITY** AND AESTHETICS. **TRY IT** ON SOUND. YELL OR PLAY MUSIC INTO IT, RUN A SHEPARD TONE GENERATOR THROUGH IT! HOW DOES IT LOOK? IS IT USEFUL? IS IT FUN? DOES IT CAPTURE SOMETHING BEAUTIFUL? HOW CAN YOU MAKE IT MORE NUANCED? FUNCTIONALLY, **DOES IT READ?** AESTHETICALLY, DOES IT MAKE YOU **FEEL SOMETHING?** DELIGHTED? MESMERIZED? PLEASED?