Introduction to EarSketch!
Why is coding easy?

If you can understand a recipe, you can learn to code music.

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Let's analyze a song.

Musical Ingredients

✘ How long is this intro?
  → In seconds? Beats? Measures?
  → (1 measure = 4 beats)

✘ What are the song’s musical transitions?

✘ Is there repetition?

✘ Are there layers and contrasts?

Call Me Maybe link
Rhythm: beats, tempo, measures

✘ A beat is a basic unit of time in music.
✘ The speed of the song in beats per minute is called tempo.
✘ A measure is four beats (also called a note).
Rhythm: beats, tempo, measures

The above shows one measure (four beats)
What is the tempo (beats per minute) for this music clip?
Let’s use another song intro example.

Musical Ingredients

× How **long** is this intro?
  → In seconds? Beats? Measures?
  → (1 measure = 4 beats)

× What are the song’s musical **transitions**?

× Is there **repetition**?

× Are there **layers and contrasts**?

I love my Uttrakhand Sanskriti link
EarSketch Interface

Browser

Digital Audio Workstation

Code Editor

Console

Tutorials

The Building Blocks of a Program

The instructions given in a script allow the computer to process many types of information. This information is structured so that the music produced by EarSketch sounds pleasing. We will continue learning about rhythm, data types, and functions.

Rhythm

When we refer to rhythm of a song, we are describing an arrangement of sounds as music flows through time. Musicians use many words to describe rhythm, including: tempo, meter, measure, beat, and sub-beat. These terms are useful in DAWs like EarSketch because they help you organize the elements of your music in time.

A beat is the basic unit of time in music. The overall speed of a song, or tempo, affects the length of a beat. Tempo is measured in beats per minute (BPM). Higher tempos result in faster songs, and therefore shorter beat duration. Note: the term "beat" is sometimes used as a shorthand for drumbeat, or a repeated rhythmic pattern of percussive sounds. You can usually tell which kind of beat someone is talking about from the context.

Copy the following code example into your code editor, press run, and press play. Press the loop button to continuously repeat the pattern. Try counting "1, 2, 3, 4" counting one beat for each hit of the kick drum. Notice that the timeline starts at measure 1 and ends at measure 2.

```python
# python code
#
# script_name: Beats
#
# author: The EarSketch Team
#
# description: Counting beats and sub-beats in a measure
#
# Setup
from earSketch import *
Init()
setTempo[120]

# Music
fitMedia[TECHNO_LOOP_PART_002, 1, 1, 2] # Each kick drum hit lasts a quarter note: 1/4 of a measure.
fitMedia[TECHNO_LOOP_PART_031, 2, 1, 2] # Each cymbal hit lasts a 16th note: 1/16 of a measure.

# Finish
```
Getting Started With EarSketch

✗ Navigate web browser to https://earsketch.gatech.edu
✗ Create account and log in
✗ Create a new script and copy and paste code from the Rhythm Tutorial (Unit 1, Section 2.1)
✗ Run it and hear the music. Try uncommenting the second line containing fitMedia function! Run it again
✗ Play the music in a loop and then commenting/uncommenting and running....
Coding Raw Ingredients

Data Type

- Numbers
  - Integers
  - Floating point
- Strings
- Constants
- Variables
  - Do not have spaces
  - Can’t use reserved words or functions like print
  - Should be meaningful but not too long

Examples

3, 4, 8
4.235, 5.091349
“my first mix”,
“0++-”
RD_ROCK_POPELECTRICICLEAD_10
mainDrum, guitar1, guitar2, horn, vocal
Reusable Sauces

- **Function**
  - a block of organized reusable code that does an action
  - has its own ingredients (*parameters*)
  - abstraction
  - *Example*: `setTempo(120)`
  - *Premade* or homemade … *hot sauce or dressing*
Reusable Sauce: **fitMedia** Function

- **fitMedia**(*music sample, track, startMeasure, endMeasure*)

- **Example code:**

  ```
  # Inserts audio file on track two, measures 1 to 9
  # (stop at beginning of measure 9).
  fitMedia(HIPHOP_FUNKBEAT_001, 2, 1, 9)
  ```
fitMedia Examples

- fitMedia_example1.py
- fitMedia_example2.py
Reusable Sauce: **setEffect** Function

- **setEffect**(track, effect, option, , , )
  - Example effects: delay, volume and many others
  - See tutorial for details

- **Example 1:** `setEffect_example1.py`
  - Modify the code so the two tracks fade out in the last measure

- **Example 2:** `setEffect_example2.py`
  - Modify the code to have fade in and out on track 2 also
DJ Amit

- Demo using fitMedia and setEffect
Tutorials: Suggestions

Lessons, code, videos...

✗ Unit 1, Ch 1: sections... 3, 8, 9 ← basics

✗ Unit 1, Ch 2: sections... all ← rhythm

✗ Unit 1, Ch 4: sections... all ← effects

✗ Unit 2, Ch 6: sections... all ← transitions
Challenge

Explore, but make...

1. Pick a **genre**
2. **Sample** some cool sounds from the library (< 15 min)
3. Rough out the **structure** of a composition (< 5 min)
4. Make at least two **transitions**
5. **Use** at least 3 different **sounds**
6. Use at least one **effect**