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Lesson 1: Get with the beat

Set your tempo

**YOUR
VOICE
IS POWER**

*MAKE BEATS. LEARN CODE.
PROMOTE EQUITY.*

Learning objectives



Code in EarSketch to play a collection of beats



Know how entrepreneurship can promote equity



Use variables and code user interaction to set the tempo of your music



Know how tempo can affect the mood and energy of music



Know the role of in-built functions and arguments

Build your toolbox to promote equity?



RACISM

Activity (pairs or threes)

Discuss what the word 'Racism' means to you.

Can you begin to create a definition for the term?

Build your toolbox to promote equity?



RACISM

Racism is subtle and overt mistreatment, hurt, and harm (discrimination) against individuals or members of a group based on the colour of their skin. It manifests in a variety of ways and impacts everyone differently.

What's the message in the music?



Activity (individual)

Listen to the song “Entrepreneur” by Pharrell Williams

What is the message in the music?

How did his choice of Entrepreneurs inspire you?



<http://www.youtube.com/watch?v=bTOoY5MIkvM>

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What is EarSketch

- It helps you to learn code and make beats
- Using Python you can instruct EarSketch to mix music from a range of artists
- Instead of having text output you can convert your code into audio



Let's get started

- Go to <https://earskech.gatech.edu/earskech2/>
- At the top right, register for a new account (if you don't register an account then your work may not be retrieved next time you work on it)
- Make sure you use your **school / institution email address**
- Click on the **+ button** to start your first coding script



Let's get started

- Give the file a name you'll remember and keep the language on **Python**
- Click **create** to get started

Create a new script

Script Name

What should we call your script?

My amazing Python script .py

Script language

What programming language are you using?

Python

CANCEL

CREATE

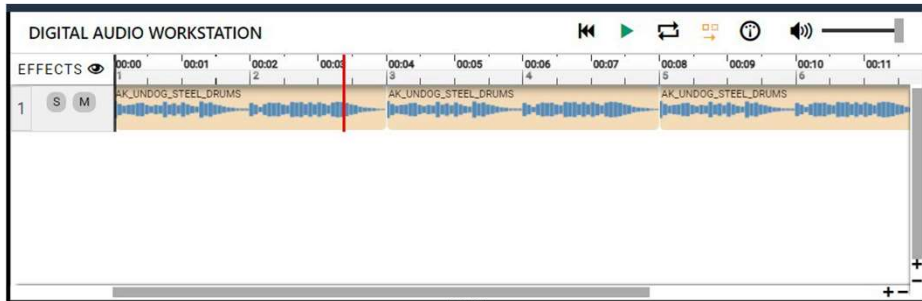
Python :

Python code is a set of instructions written in the Python programming language that tells a computer what to do, like a recipe for a computer to follow.

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The Digital Audio Workstation (DAW)

- EarSketch outputs audio which is visualised in the DAW window



Activity (pairs or threes)

Between you, can you identify the features of the DAW?

Some questions you could ask yourselves are:

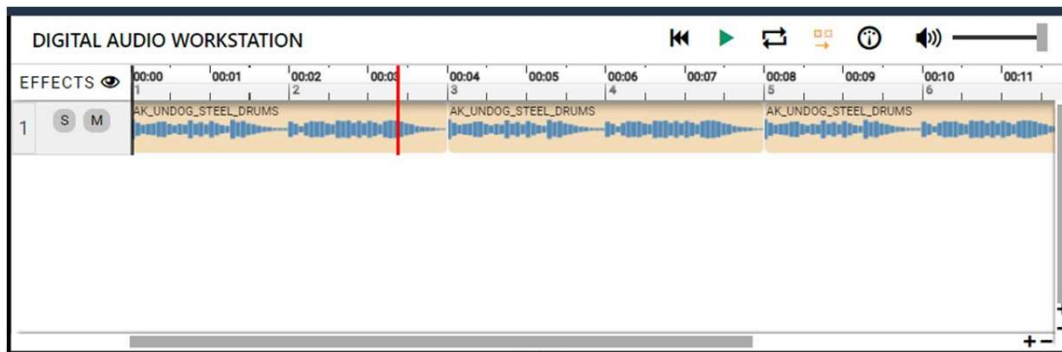
What does the blue line show?

What is the role of the ruler?

What is the purpose of the red line?

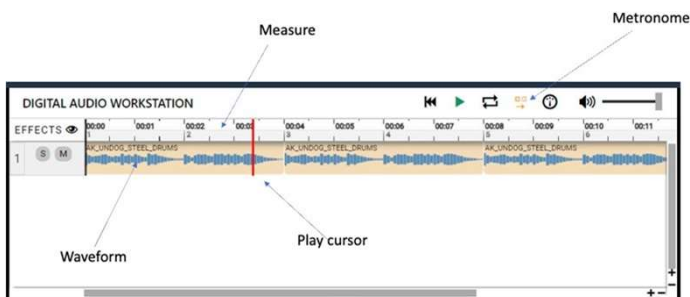
What does the orange symbol mean?

The Digital Audio Workstation (DAW)



DAW:

A digital audio workstation (DAW) is a computer program that musicians and sound engineers use to record, edit, and produce music and other audio files



Reading the DAW

Music 1



<http://tiny.cc/yvipl1a>

Music 2



<http://tiny.cc/yvipl1a2>

Activity (pairs or threes)

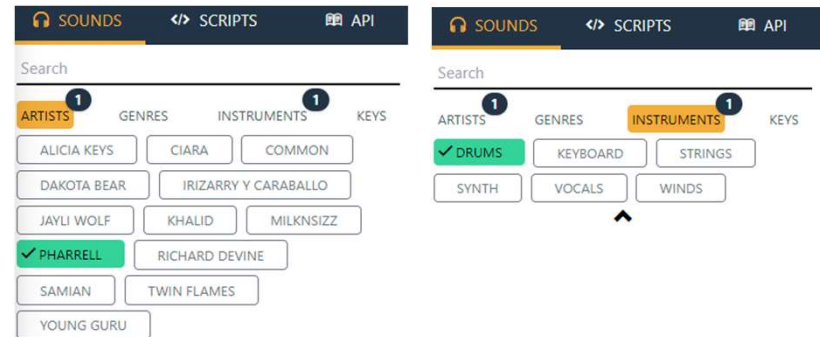
What is similar / different about these examples?

What instruments could be involved in each example?

How long is each piece of music?

Creating your first beat

- From the **sounds** library, we can use the filter to select an **artist** of your choice and filter by **instrument** such as **drums**:
- Click on the clipboard button to paste into your **code editor**



ENTREP_BEAT_DRUMBEAT



Activity

Use the filters to find a beat in the EarSketch library such as a drumbeat and use the clipboard icon to paste the name of the object into your code.

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Variables and naming

- Variables allow us to name data stored in memory so that we can remember it and help others understand what is stored in the variable if they looked at your code.
- Like variables, EarSketch creates objects for each beat:

ENTREP_BEAT_DRUMBEAT ▶

- But this name is long and difficult to remember we could change it to: **pharrell_drum**
- To do this, assign your beat to a variable name like this: **pharrell_drum = ENTREP_BEAT_DRUMBEAT**



Activity

Declare and assign your own variable for the beat you have selected.

In-built functions

- Previously you will have used **in-built functions** in Python. These are pieces of code created by other developers that you can make use of. Can you predict what these do?

```
print("Shhh I'm making beats here!")  
artist = input("Who is your favourite music artist?")  
print(mystring.upper(artist))
```

Function:

A function in Python is a reusable block of code that performs a specific task and can be called multiple times throughout a program.

Activity (pairs or threes)

Can you predict what this code would do?

Can you spot the inbuilt functions you are using/calling?

What might the code look like behind these functions?

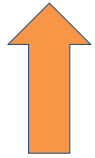
Functions and arguments

- Looking again at the in-built function print()

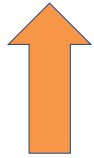
```
name = "Minahil"
```

```
message = "I'm making beats here!"
```

```
print("My name is", name, "and", message )
```



Function name



First argument



Second argument

Activity (pairs or threes)

Consider how we might name a function for playing sound in EarSketch.

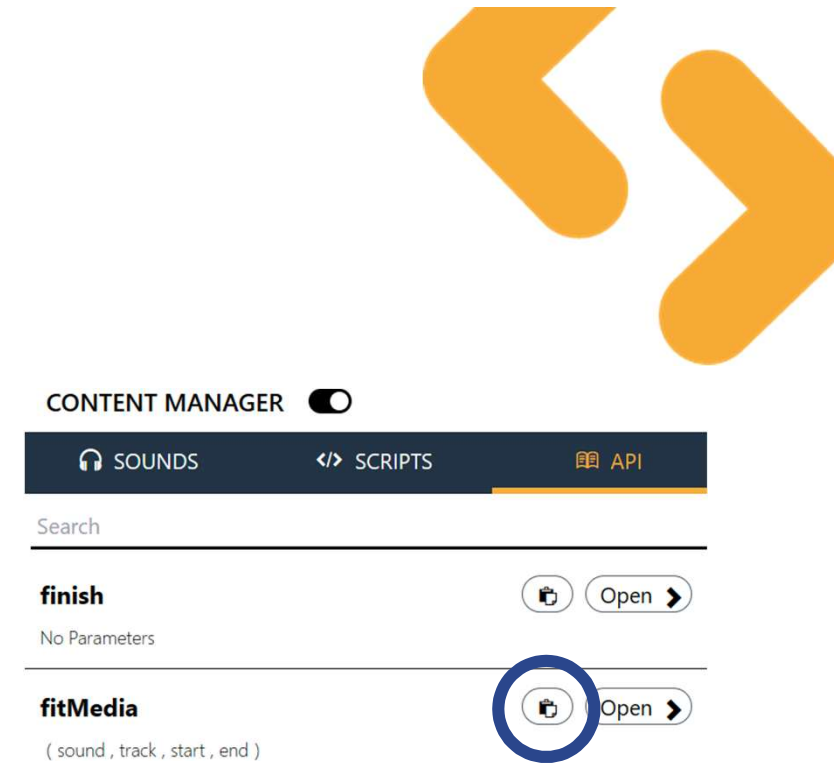
What might we call the function?

What parameter(s) might we provide

Making our first beat

- To play the beat we have selected, you'll need to use the in-built function **fitMedia()**
- Go to APIs and click the **clipboard** next to **fitMedia**

```
fitMedia(sound, track, start, end)
```



Activity

Can you predict what the four parameters might do?

Making our first beat

- Replace argument sound with our variable
- We need to fill all the arguments
- Use or modify the example below:

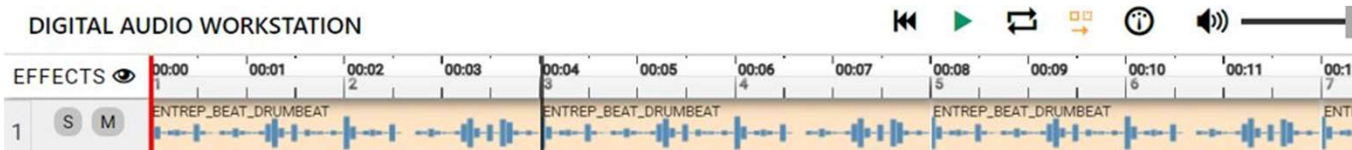
```
pharrell_drum = ENTREP_BEAT_DRUMBEAT ▶  
fitMedia(pharrell_drum, 1, 1, 8)
```

Activity

Edit your code to include fitMedia, use the other arguments of 1, 1, 8, run your code and click play

Change the numbers in the arguments, what happens?

Can you describe the four arguments to someone else?



Debug the code



Can you identify any errors with these input statements?

```
fitmedia(pharrell_drum, 1, 1, 8)
```

```
fitMedia(pharrell_drum, 1, 8, 1)
```

```
fitMedia(pharrell_drum, 1, 6, 6)
```

```
fitMedia(pharrell_drum, 1, 4, 8)
```

Change the tempo

“Enter tempo (120 standard)”

Tempo:

Tempo in music refers to how fast or slow a piece of music is played, and it is measured in beats per minute (BPM).

input(

)

int(

my_tempo

=

setTempo(my_tempo)

Activity

Combine these statements to allow the user to enter their own tempo before playing your selected beat.

Change the tempo

```
my_tempo = int(input("Enter tempo (120 standard)"))  
SetTempo(my_tempo)
```

Enter tempo (120 standard)

Activity

Include this code in your EarSketch project, run, and see what impact this has on your music. Try entering the tempo as:

80

160

What do you notice?

A possible solution:

```
# description:  
from earsketch import *  
pharell_drum = ENTREP_BEAT_DRUMBEAT  
  
my_tempo = int(input("Enter tempo (120 standard)"))  
setTempo(my_tempo)  
  
fitMedia(pharell_drum, 1, 1, 8)
```

<http://tiny.cc/yvipl1sol>



A possible solution:



```
# description:  
from earsketch import *  
pharell_drum = ENTREP_BEAT_DRUMBEAT  
  
my_tempo = int(input("Enter tempo (120 standard)"))  
setTempo(my_tempo)  
  
fitMedia(pharell_drum, 1, 1, 8)
```

<http://tiny.cc/yvipl1sol>



Set your tempo

<https://www.youtube.com/watch?v=f9aHwLqoKL0>

- What will be the message in your music?
- How can you use that message to promote equity?
- What tempo will you use and how will that present the message and energy in your music?
- Share your thoughts with a peer.

Hip-Hop: 85-95 bpm

Pop: 118 bpm

Techno: 120-125 bpm

Electro: 128 bpm

House: 115-130 bpm

Dubstep and Trap: 140 bpm

Drum & Bass: 160-180 bpm

Entrepreneur by Pharrell: Tempo: 83

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