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Lesson 4: Light work with loops

Get things done quicker

Learning objectives

- Understand the role of loops (for loops)
- Know how to make use of a loop index for iteration
- Understand the concept of parallel processing
- Know the benefits of using loops to reduce code

Crafting your message

As you pick sounds don’t forget to think about the message your music is giving

You can craft your message using the 3 A’s

Awareness

Analysis

Action

Awareness

What new or evolved understanding(s) of racial injustice have you gained during this experience?

What were you not aware of before this experience?

What evidence of the existence of racial inequity most compels you to want to promote and advance racial justice?

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Analysis

To what extent do you feel that you work to promote racial equity? Are there positive things you do already to advance racial justice?

If so, what are they, and what are new or different things you can do moving forward to further promote racial equity?

If standing for racial equity is new for you, what is something you'd like to begin doing and why? In what ways do you see racial injustice take place in your school, neighborhood, city, state, or the country?

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Action

As you make a commitment to address racial inequity, what do you believe will be hard? Who can help or support you? Are there others engaged in work you'd be interested in joining or partnering with?

Who did you learn about this week that inspires you to take action and why?

As you take action, what difference or change do you believe it will make?

How will you use your voice and actions to fight as a member of a marginalized group or as an ally? How can or will you encourage others to promote equity as well?

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Lists recap

```
ciara_drum = CIARA_SET_DRUMBEAT_1 pharell_drum = ENTREP_BEAT_DRUMBEAT
khalid_drum = KHALID_NORM_DRUMBEAT alicia_drum = AK_UNDOG_STEEL_DRUMS

drum_list = [ciara_drum, pharell_drum, khalid_drum, alicia_drum]
```

Activity (pairs)

What symbol represents assignment?

What symbol represents the start and end of the list?

What code do we need to write to play the drumbeat from Khalid?

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Lists recap

```
ciara_drum = CIARA_SET_DRUMBEAT_1
pharell_drum = ENTREP_BEAT_DRUMBEAT
khalid_drum = KHALID_NORM_DRUMBEAT
alicia_drum = AK_UNDOG_STEEL_DRUMS

drum_list = [ciara_drum, pharell_drum, khalid_drum, alicia_drum]
```

Answer: fitMedia(drum_list[2], 1, 1, 8)

Activity (pairs)

What symbol represents assignment?

What symbol represents the start and end of the list?

What code do we need to write to play the drumbeat from Khalid?

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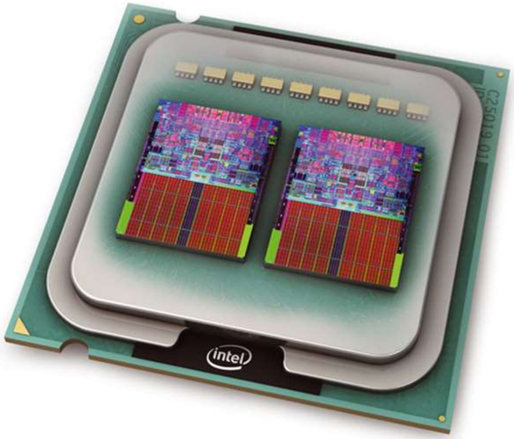
Parallel processing

- The processor (CPU) in your computer has a number of cores
- Imagine these cores as workers inside the processor that can work on different tasks at the same time
- They might even work on the same task to help get that task done quicker
- In EarSketch we can play multiple beats at the same time...



Cores:

CPU is like a brain in a computer, and it has different parts called cores that help it work on more than one thing at a time, making the computer faster

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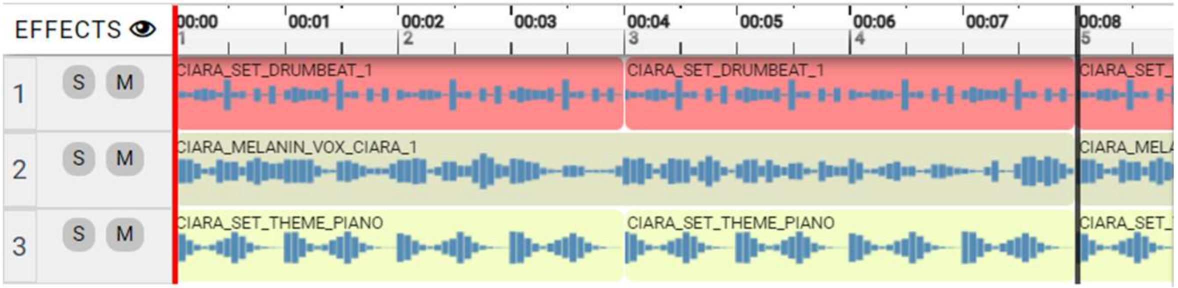
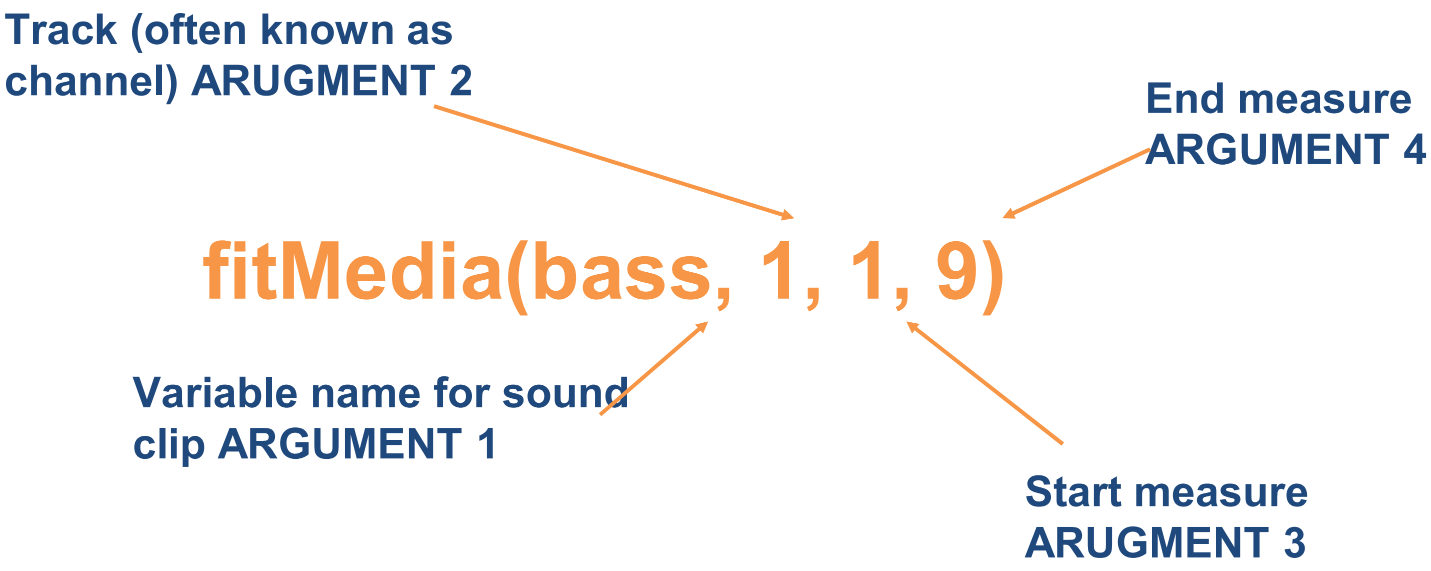
Playing tracks in parallel

- In EarSketch you can play three beats at the same time. In this example we have three channels
  - Channel 1 – drums
  - Channel 2 – vocals
  - Channel 3 - piano



Recap – arguments



Track (often known as channel) ARUGMENT 2

End measure ARGUMENT 4

fitMedia(bass, 1, 1, 9)

Variable name for sound clip ARGUMENT 1

Start measure ARUGMENT 3

The function fitMedia() needs four arguments. It needs all these arguments to do its job of playing the right sound for the amount of time you like.

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Playing tracks in parallel

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara = [ciara_drum, ciara_bass, ciara_vox]
fitMedia(ciara[0], 1, 1, 12)
fitMedia(ciara[1], 2, 1, 12)
fitMedia(ciara[2], 3, 1, 12)
```

Argument to change

Activity

1. Choose a drumbeat, bass and vocal and assign them to a list
2. Play each of the three items in parallel
3. Change the arguments indicated by changing the number – what happens?

Finding patterns

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara = [ciara_drum, ciara_bass, ciara_vox]
fitMedia(ciara[0], 1, 1, 12)
fitMedia(ciara[1], 2, 1, 12)
fitMedia(ciara[2], 3, 1, 12)
```

Notice how the last 3 three lines of code are very similar with the exception of the list index and the track

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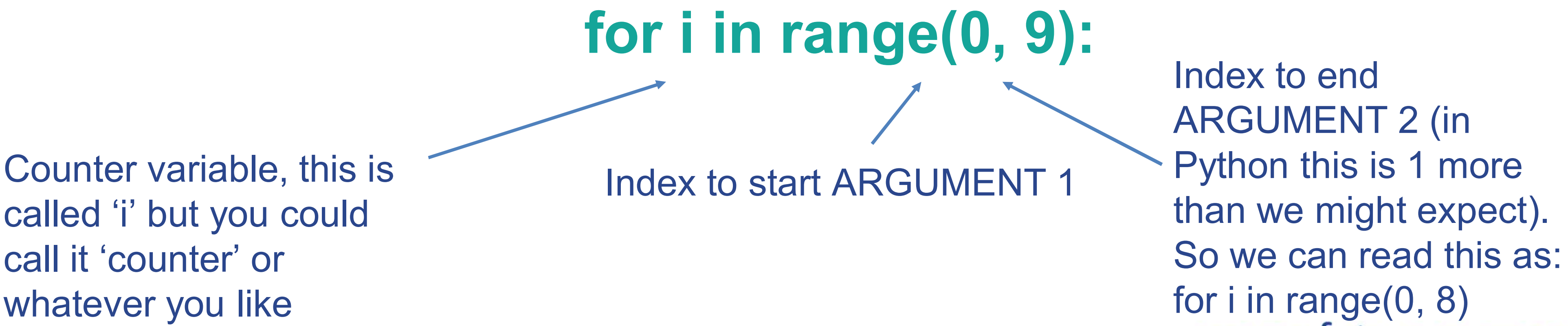
For Loops

- for loops can be used to reduce repeated code
- for loops are in-built functions that require arguments as well:



```
for i in range(0, 9):
```

Counter variable, this is called ‘i’ but you could call it ‘counter’ or whatever you like

Index to start ARGUMENT 1

Index to end ARGUMENT 2 (in Python this is 1 more than we might expect). So we can read this as: for i in range(0, 8)

Making use of loops

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara = [ciara_drum, ciara_bass, ciara_vox]


fitMedia(ciara[0], 1, 1, 12)
fitMedia(ciara[1], 2, 1, 12)
fitMedia(ciara[2], 3, 1, 12)
```

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara = [ciara_drum, ciara_bass, ciara_vox]

for i in range(0, 3):
   fitMedia(ciara[i], i+1, 1, 12)
```

1 is added here to ensure the second argument is one higher than the counter

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Making use of loops

```
ciara_drum = CIARA_SET_DRUMBEAT_1

ciara_bass = CIARA_SET_BASSLINE_1

ciara_vox = CIARA_ROOTED_VOX_VERSE_1

ciara = [ciara_drum, ciara_bass, ciara_vox]


for i in range(0, 3): fitMedia(ciara[i],
  i+1, 1, 12)
```

The for loop will then create the following code:

i= 0

```
fitMedia(ciara[0], 1, 1, 12)
```

i= 1

```
fitMedia(ciara[1], 2, 1, 12)
```

i= 2

```
fitMedia(ciara[2], 3, 1, 12)
```

What’s wrong with this code?

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara_perc = CIARA_SET_PERC_CLAP_1
ciara_kick = CIARA_SET_KICK_1
ciara = [ciara_drum, ciara_bass, ciara_vox, ciara_perc, ciara_kick]

for i in range(0, 6): fitMedia(ciara[i], i+1, 1, 12)
```

What’s wrong with this code?

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara_perc = CIARA_SET_PERC_CLAP_1
ciara_kick = CIARA_SET_KICK_1
ciara = [ciara_drum, ciara_bass, ciara_vox, ciara_perc, ciara_kick]

for i in range(0, 4): fitMedia(ciara[i], i+1, 1, 12)
```

What’s wrong with this code?

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara_perc = CIARA_SET_PERC_CLAP_1
ciara_kick = CIARA_SET_KICK_1
ciara = [ciara_drum, ciara_bass, ciara_vox, ciara_perc, ciara_kick]

for j in range(0, 4): fitMedia(ciara[i], i+1, 1, 12)
```

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What’s wrong with this code?

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara_perc = CIARA_SET_PERC_CLAP_1
ciara_kick = CIARA_SET_KICK_1
ciara = [ciara_drum, ciara_bass, ciara_vox, ciara_perc, ciara_kick]

for i in range(0, 4): fitMedia(ciara[i], i, 1, 12)
```

Getting started with loops?

```
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara_perc = CIARA_SET_PERC_CLAP_1
ciara_kick = CIARA_SET_KICK_1
ciara = [ciara_drum, ciara_bass, ciara_vox, ciara_perc, ciara_kick]

for i in range(0, 6):
  fitMedia(ciara[i], i+1, 1, 12)
```

Activity

Create your own list of 6 or more beats and use a for loop to play them in parallel

Can you create two lists of two different artist and use a selection

/ if statement to allow the use to choose which artist they wish to hear?

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Possible solution

```
from earsketch import *
ciara_drum = CIARA_SET_DRUMBEAT_1
ciara_bass = CIARA_SET_BASSLINE_1
ciara_vox = CIARA_ROOTED_VOX_VERSE_1
ciara_perc = CIARA_SET_PERC_CLAP_1
ciara_kick = CIARA_SET_KICK_1
ciara = [ciara_drum, ciara_bass, ciara_vox, ciara_perc, ciara_kick]
twin_drum = TFLAMES_OMEN_SNARE_VRS
twin_bass = TFLAMES_OC_BASS_VRS_1
twin_vox = TFLAMES_OC_VOX_VRS_1
twin_perc = TFLAMES_OC_SNARE_VRS_1
twin_kick = TFLAMES_OC_KICK_VRS_1
twin = [twin_drum, twin_bass, twin_vox, twin_perc, twin_kick]
```

http://tiny.cc/yvip_l4_sol

```
choice = input(“Which artist? [Ciara or Twin
Flames] “)
if choice == “Ciara”:
  for i in range(0, 5):
    fitMedia(ciara[i], i+1, 1, 12)
elif choice == “Twin Flames”:
  for i in range(0, 5):
    fitMedia(twin[i], i+1, 1, 12)
else: print(“Sorry that artist isn’t available “)
```

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Add your voice to your code

- Later you’ll be starting to develop your song thinking about song structure such as having a verse and chorus
- You’ll be making decisions based on the message you want to give in your music

  In your code, create some comments to highlight your audience and use the print() command to explain what your message is:

  ```
  #Audience: Family and Friends
  print("My song is to explain that there is ongoing racial
  inequity in our community")
  ```

  In your code, create some comments to highlight your audience and use the print() command to explain what your message is.
- Run your code – what does the # do and can you find what the print() command has done?

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