Computational Literacy Proposal
EarSketch
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10/18/18

Topic Area:
Want to learn how to code but find it boring? Does learning Python sound cool but intimidating? In this two hour workshop, you will learn the basics of python, all while creating music! We will use a program called EarSketch to teach computational ideas with the underlying motivation to create awesome music!

Learning Objectives:
1. Learn the basic principles of coding in python.
2. Enter the mindset of a programmer.
3. See how code can be used in the arts and other fields.

By the end of this workshop students:
- Are able to write a simple piece of code
- Know what a function is
- Know how to use iteration in a code using for loops
- Know multiple data types
- Know how to continue to program and learn in Python and Earsketch

What is EarSketch?
Earsketch is an NSF sponsored research project run out of Georgia Tech. The mission is to increase computational interest and understanding by incorporating music into computational theory. This falls in line with the STEAM philosophy (incorporating Arts into the teaching of STEM concepts). Earsketch[1] is a web-based program that is freely available online. It appears like many coding IDEs and uses professionally generated music samples. Users can code in either Python or JavaScript.

Procedure:

Elapsed Time (min)	Length of Section	What type of section	Description of section
0-5	5 Min	Talk to full class	Introduction to who we are Any idea for icebreaking (what genre of music they like, if they play any instrument; etc.)

[1] https://earsketch.gatech.edu/earsketch2/

5-10	5 Min	Demo for class	Demo of Earsketch and what they will be able to do by the end of the workshop. *Let students make an account and open up IDE.*
10-15	5Min	Talk to full class	Introduction to the IDE and what components are there (script, console, DAW). *Let students explore the IDE.*
15 -25	10 min	Talk to full class	What is a function & arguments
25 - 30	5 Min	Talk to full class	Introduction to putting a sound clip in the script/DAW
30 - 45	15 min	Independent/small group experiment	Students use fitMedia function to put sound clips into script
45 - 55	10 Min	Talk to full class	Introduction to different data types including strings (using MakeBeat)
55 - 65	10 Min	Independent/small group experiment	Students try making a beat string in their code
65 - 75	10 Min	Talk to full class	Introduction to loops (using MakeBeat)
75 - 85	10 Min	Independent/small group experiment	Students put their make beats into for loops
85 - 90	5Min	Talk to full class	How to create your own functions
90 - 105	15 Min	Independent/small group experiment	Students try adding a custom function to their code and then free to experiment with other coding principles in EarSketch
105- 115	10 Min	Full class	Ask students to pair in groups of 2 or 3 and share their music as well as the code. Provide prompts to guide discussion. Ask students to fill out survey and assessment questions.
115-120	5 Min	Full class	Share different resources to help them to continue in python, earsketch or programming.

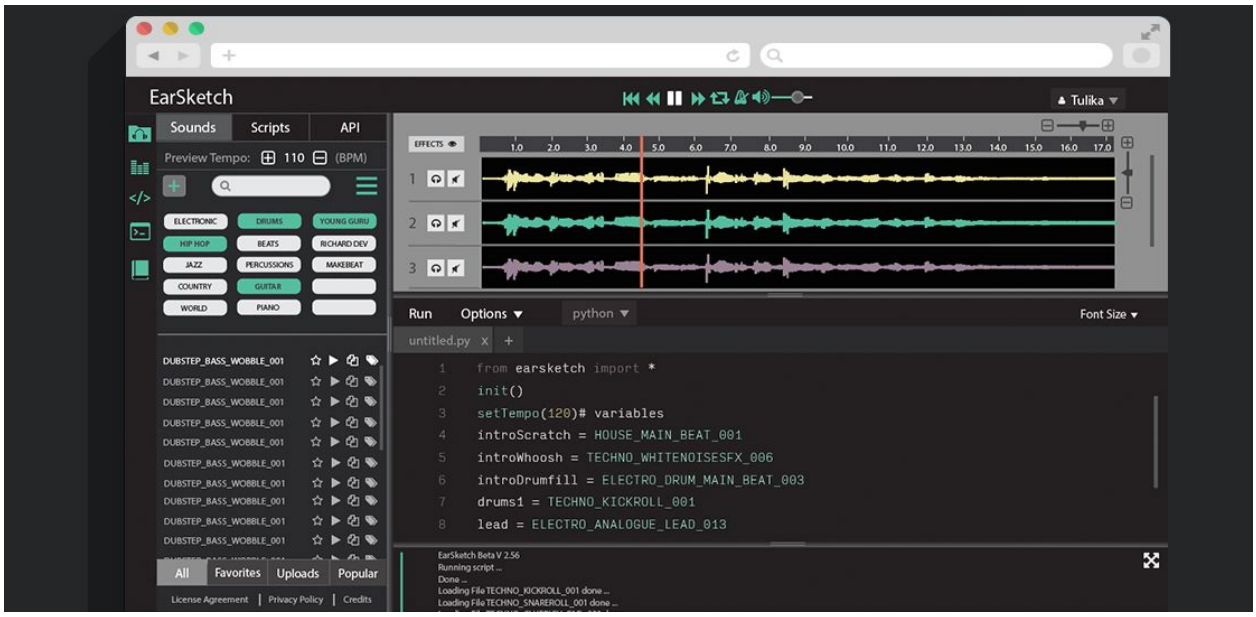
Assessing the Learning Objectives:
We will assess what students learn during the last 10 minutes of the class by asking them to share their code/music and also fill out a survey. We also observe students' progress during the class.

Bios:
Jamie is a 3rd year PhD Student in the Delta Lab, getting a Joint PhD in the Computer Science and Learning Sciences program (a new program between McCormick and SESP). She is advised by Nell O'Rourke and is working on understanding mindset for novice programmers that promotes a growth mindset. She is funded by the NSF GRFP.

Elham completed her PhD in Computer Science December 2017 and is now a postdoctoral researcher at Inclusive Lab at Northwestern University directed by Anne Marie Piper. Her research focuses on designing learning experiences for children using novel technologies such as augmented reality and haptic devices. During her PhD, she worked on an NSF sponsored research project at Northwestern on bringing computational thinking into STEM classrooms (http://ct-stem.northwestern.edu/) from 2011 to 2015.

Notes:
We used the insights gained from last two years and feedback from students and professors to update the order of the lesson and the approach we use to teaching some of the programming concepts.

Our procedure worked much better last year than the first year. Some changes of this version, include incorporating earlier introduction of the IDE and encouraging students to share their music and code in pairs instead of the whole class.



Key Features

Learn Python and JavaScript

Learn one of the most popular programming languages in the world.

Create & Share Music

Create music in popular styles like dubstep and hip hop and share the songs with your friends

No Prior Experience Required

You don't need to know anything about music or coding to get started.

Remix sounds

Create your own music from a library of sounds by Young Guru (Jay Z's audio engineer) and Richard Devine, or record or upload your own sounds.

Free

EarSketch is completely free to use.

No software downloads

EarSketch is web-based. There is nothing to download or install.