# Introduction to Programming II Project Log

-Week 13-14

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| **Project title:** | Music Visualization |
| **Topic:** | Firework Extension |

## What progress have you made this topic?

I have not made any progress on my last extension so far. This is because I have planned to spend this two week learning the firework extension, which I believe will be helpful for my project. Additionally, I watched all the videos on Coursera to gain other relevant knowledge of the project.

## What problems have you faced and were you able to solve them?

Understanding the calculation for adaptive beat detection, particularly the derivation of the constant "c" used to determine the beat threshold, can be challenging because it involves some mathematical concepts such as linear equations and variance. And I think the video has not explained well enough for me to fully understand it. Therefore, I sought assistance from my lecturer for further clarification and a better understanding of this part of the code.

## What are you planning to do over the next few weeks?

I am going to work on my spinning wheel extension.

1. Draw out a five section of color wheel.
2. Adjust the colors of each part based on changes in the corresponding music frequencies, which are bass, low mid, mid, high, and treble.
3. Make the color wheel rotate in each frame to create the spinning effect.

## Are you on target to successfully complete your project? If you aren't on target, how will you address the issue?

I am on track to complete my project according to my Gantt chart. However, I have not yet started working on my last extension, which makes me as it nervous as I feel like I may be falling behind. To address this, I think I will quickly begin the development of the last extension this weekend to ensure that I can complete it on time.

-Week 15-16

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|---|---|
| **Project title:** | Music Visualization |
| **Topic:** | A Spinning Color Wheel |

## What progress have you made this topic?

I have made a spinning color wheel for the music visualization. The arc function is used to create a five-part wheel which corresponds to 5 of the music frequencies: bass, low mid, mid, high, and treble. The changes in frequency affect the colors of each part of the wheel. Besides, I have used the rotate function to rotate the wheel in each frame.

## What problems have you faced and were you able to solve them?

1. The spinning wheel goes off the canvas.
   Solution: I have done some research and found that rotation happens around the point of origin. So, I added the translate function to set the axis of rotation. The use of translate function successfully controls the wheel to rotate around its center.

2. Display the change of frequency via the brightness of color.
   Solution: I intended to make the brightness of the color wheel change with frequency. I was not able to solve that, and I have done in another way instead.
   Each part of the wheel is randomly filled with colors according to different frequencies. Also, their widths and heights will also be resized according to the frequencies. The higher the frequency is, the larger the size is.

## What are you planning to do over the next few weeks?

I am planning to create three shapes: circle, square, triangle at the center of the wheel that will function as a bass drum. Additionally, I will add a particle effect that will be triggered based on a certain level of music amplitude.

## Are you on target to successfully complete your project? If you aren't on target, how will you address the issue?

I am on track and on target.

-Week 17-18

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|---|---|
| **Project title:** | Music Visualization |
| **Topic:** | A Spinning Color Wheel |

## What progress have you made this topic?

The progress I have made:

1. Three shapes: circle, square, triangle that are created at the center of the wheel that will function as a bass drum.
2. A colorful particle effect that will be triggered based on a certain level of music amplitude.

## What problems have you faced and were you able to solve them?

1. There may be deviations in position when drawing the square and triangle.
   Solution: I have referred to the code for drawing regular n-polygon with n sides from p5js GUI library. This code utilizes trigonometric functions to draw the shape in correct position.
2. Difficult to accurate simulate particle motion.
   Solution: To create particle motion attributes, I assigned vector values to position, velocity, and acceleration. I referred to other particle system and keep changing the value until I obtained the desired output.
3. Separating particle code into different JavaScript file
   Solution: To improve the organization of my extension code, I separate the particle effect into different JavaScript file. Although I was not very familiar with this process, so it spent a few hours to debugging an issue with my particle code and eventually fix it.

## What are you planning to do over the next few weeks?

I am planning to integrate a GUI function into the extension to make it more user-friendly.

1. The GUI panel for the spinning wheel extension will include rotate direction, the size of the wheel, the center shape of the wheel and the color of the center shape.
2. Create an instruction page to guide the user on how to display the music visualization.

## Are you on target to successfully complete your project? If you aren't on target, how will you address the issue?

I am somewhat behind the expected progress, but I will catch up to complete the work before the deadline.

-Week 19-20

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|---|---|
| **Project title:** | Music Visualization |
| **Topic:** | A Spinning Color Wheel |

## What progress have you made this topic?

1. Add callback function to the preload function.
2. I have made GUI for the music visualizer.

- The GUI includes the following for the spinning wheel:
  - Rotate direction: The spinning wheel can rotate either clockwise or counterclockwise based on the chosen direction of left or right.
  - Size of wheel: The size of wheel can be adjusted within the range of 0 to 280.
  - Center shape of the wheel: there are three shapes: circle, square and triangle that are created as a beat drum shape of the wheel.
  - Color of the center shape: A color picker is provided for the user to change the color of the center shape.
- The GUI includes the following for the project:
  - User instruction slide at the beginning of the project.
  - Create music forward and backward buttons.

## What problems have you faced and were you able to solve them?

The GUI panels for the two extensions (Block Mid High Low and Spinning Wheel) overlap each other.
Solution: I discovered that I was using the same global variable “gui” in these two extensions, which makes the gui panel overlapped. To debug the issue, I created separate local variable for “gui” in each extension which resolve the problem.

## What are you planning to do over the next few weeks?

1. To make my code comments more comprehensive and easier to understand.
2. Refactoring my code by simplifying lengthy code and removing unnecessary code.
3. Complete the project report.

## Are you on target to successfully complete your project? If you aren’t on target, how will you address the issue?

I am on track and to complete my project.