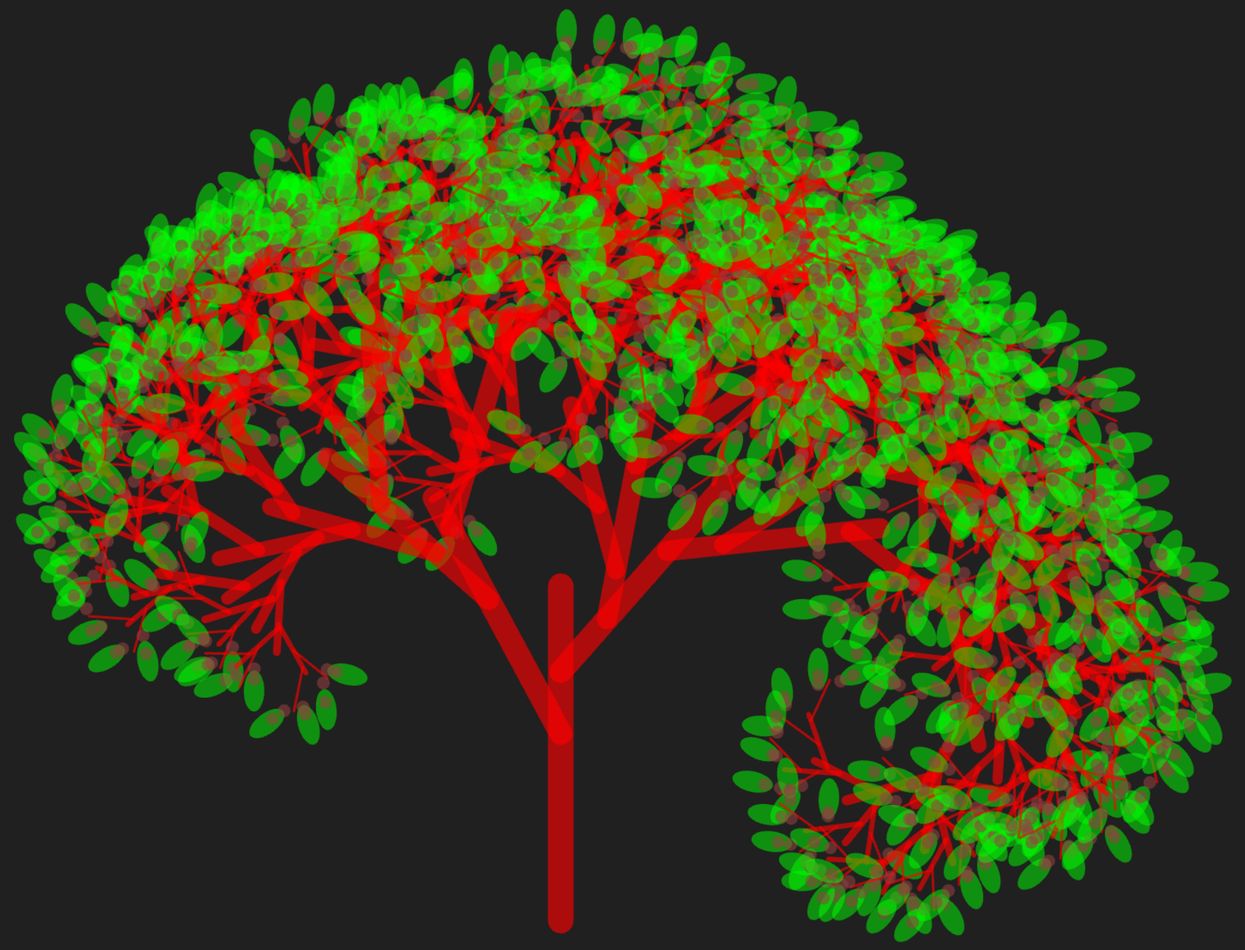
Recursion 🤯

CF1

Gabe Johnson | October 3 2024

Recursive Tree Sketch

https://editor.p5js.org/johnsogg/sketches/RHb2Wa_yT



What’s Recursion

And why are we doing it in CF1?

- Typically recursion is something you do in discrete mathematics and computer science
- I tell my CSCI 2270 students that recursion is one of the three topics that will likely melt their brains
- It isn’t *hard* in the sense that it isn’t hard to ride a bike.
  - Once you get it, you get it.
  - But until then, maybe wear leather if that’s your thing.

No Really, What’s Recursion

And why are we doing it in CF1?

- When a function invokes itself, that’s recursion!
- Use it when you have “self similarity”
- Be careful to provide a stopping condition
- … otherwise you’ll recurse forever, kinda like when you make an infinite loop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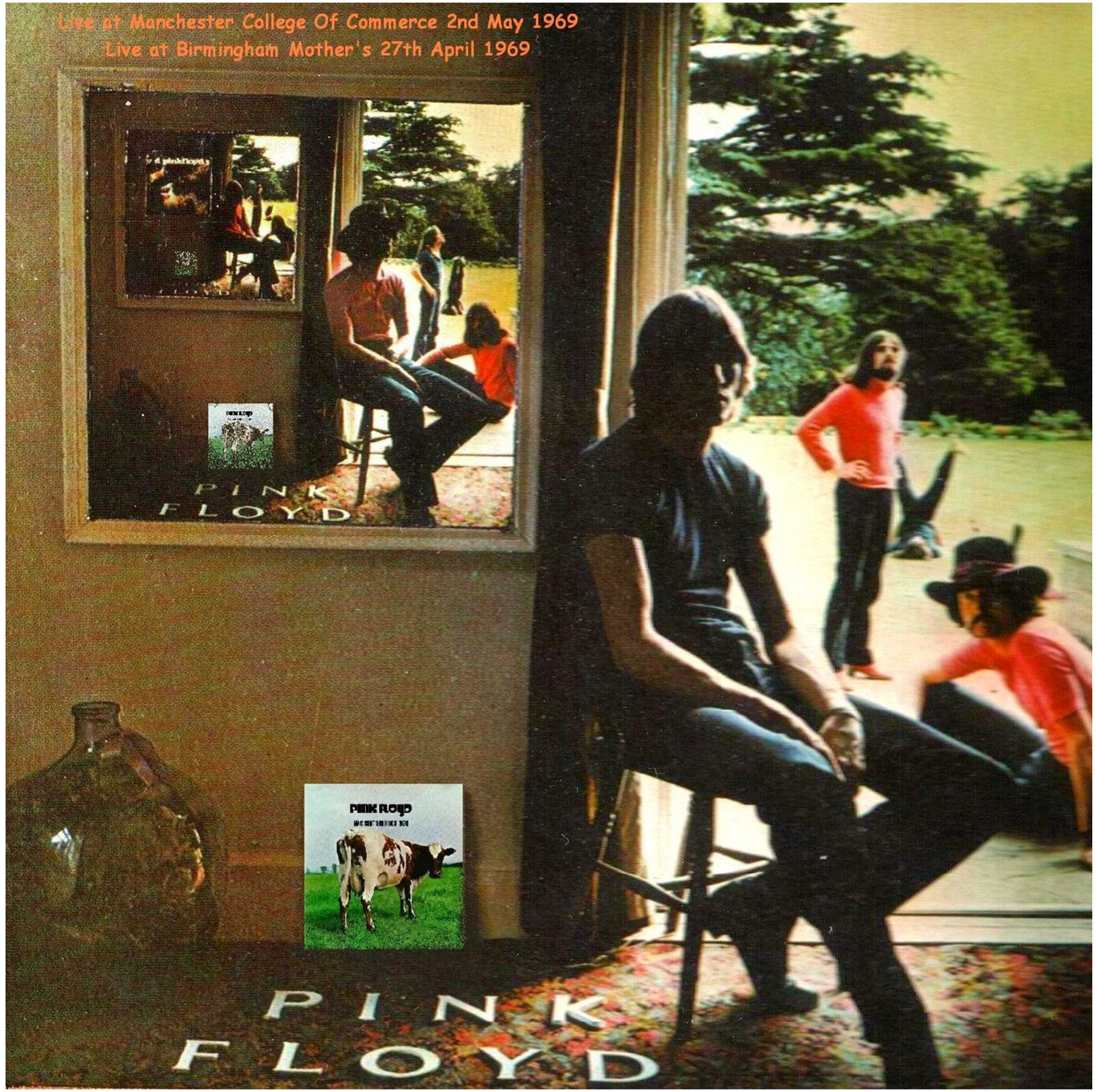
Live at Manchester College Of Commerce 2nd May 1969
Live at Birmingham Mother's 27th April 1969
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FLOYD


gigi
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FLOYD

Some Actual Recursive Code

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
    return;
  }
  rotate(ang);
  line(0, 0, 0, dist);
  translate(0, dist);
  weirdShape(depth + 1, dist, ang);
}
```

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
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  }
  rotate(ang);
  line(0, 0, 0, dist);
  translate(0, dist);
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}
```

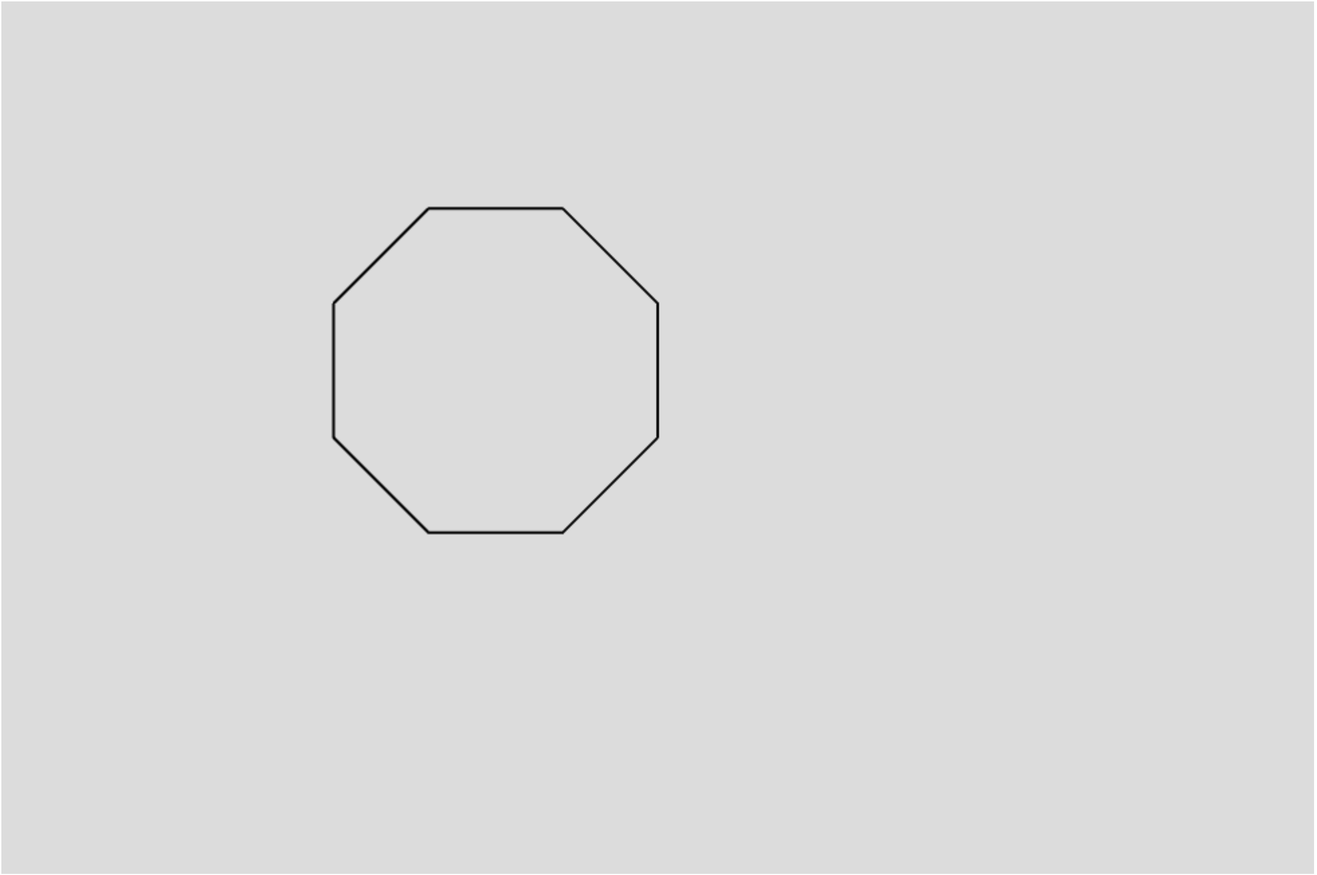

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
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}
```

Takes arguments as normal

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
    return;
  }
  rotate(ang);
  line(0, 0, 0, dist);
  translate(0, dist);
  weirdShape(depth + 1, dist, ang);
}
```

Returns when a stopping condition has been reached.

If you don’t do this, it will recurse forever. This is never what you want.

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
    return;
  }
  rotate(ang);
  line(0, 0, 0, dist);
  translate(0, dist);
  weirdShape(depth + 1, dist, ang);
}
```

If you didn’t return early, then do some work. Here we rotate a bit, draw a line, and then translate to the end of that line.

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
    return;
  }
  rotate(ang);
  line(0, 0, 0, dist);
  translate(0, dist);
  weirdShape(depth + 1, dist, ang);
}
```

Last, issue the recursive call.

Notice that we increase the depth by one, which is necessary for the recursion to eventually end.

```
function weirdShape(depth, dist, ang) {
  if (depth > numSides) {
    return;
  }
  rotate(ang);
  line(0, 0, 0, dist);
  translate(0, dist);
  weirdShape(depth + 1, dist, ang);
}
```