Arrays Can Hold and Use Multiple Numbers with the Same Name, and, they let You Write a for-loop to Use Them!

```cpp
int X[ ] = { 100, 200, 300, 400, 500, 600, 700 };
int Y[ ] = { 100, 100, 100, 200, 200, 200, 300 };

void setup( )
{
    size( 800, 800 );
    background( 200, 200, 255 );
    stroke(   0,   0,   0 );
    fill(   255, 255,   0 );
}

void draw( )
{
    for( int i = 0; i < X.length; i = i + 1 )
    {
        ellipse( X[ i ], Y[ i ], 100, 50 );
    }
}
```

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```cpp
int NumPoints = 5000;
int W = 800;
int H = 800;
int[ ] X;
int[ ] Y;
int[ ] R;
int[ ] G;
int[ ] B;

void setup( )
{
    X = new int[NumPoints];
    Y = new int[NumPoints];
    R = new int[NumPoints];
    G = new int[NumPoints];
    B = new int[NumPoints];
    size( 800, 800 );
    for( int i = 0; i < NumPoints; i = i + 1 )
    {
        X[ i ] = int( random( 0, W ) );
        Y[ i ] = int( random( 0, H  ) );
        R[ i ] = int( random( 0, 255 ) );
        G[ i ] = int( random( 0, 255 ) );
        B[ i ] = int( random( 0, 255 ) );
    }
}
```

Using the Arrays in a for-loop

```cpp
void draw( )
{
    background( 200, 200, 255 );
    stroke(   0,   0,   0 );
    for( int i = 0; i < NumPoints; i = i + 1 )
    {
        fill( R[ i ], G[ i ], B[ i ] );
        ellipse( X[ i ], Y[ i ], 8, 8 );
    }
}
```

A Cool Pattern
For our next trick, during each frame we are going move each point halfway towards one of three target triangle vertices. Which target to use is chosen at random.

A Cool Pattern will be made even Cooler

For our next trick, during each frame we are going move each point halfway towards one of three target triangle vertices. Which target to use is chosen at random.

The arrays that will hold the points and the colors. They have only been declared. They don’t yet have any memory given to them.

The arrays that hold the three center points. Because of the way this was coded, these arrays do have memory given to them.

Total number of random points

Size of the target vertices

The arrays that will hold the points and the random colors. At this point, memory has been given to them, but they don’t have any values assigned.

Numerical values for the center points. These were chosen for their aesthetic, symmetrical presentation.

Size of the target vertices

Debugging the code: the arrays that hold the points and colors.

Draw each point with its color.

Mathematicians call shapes like this “attractors”