Bugün: 17.Ağustos.2022

Geometri Desenleri

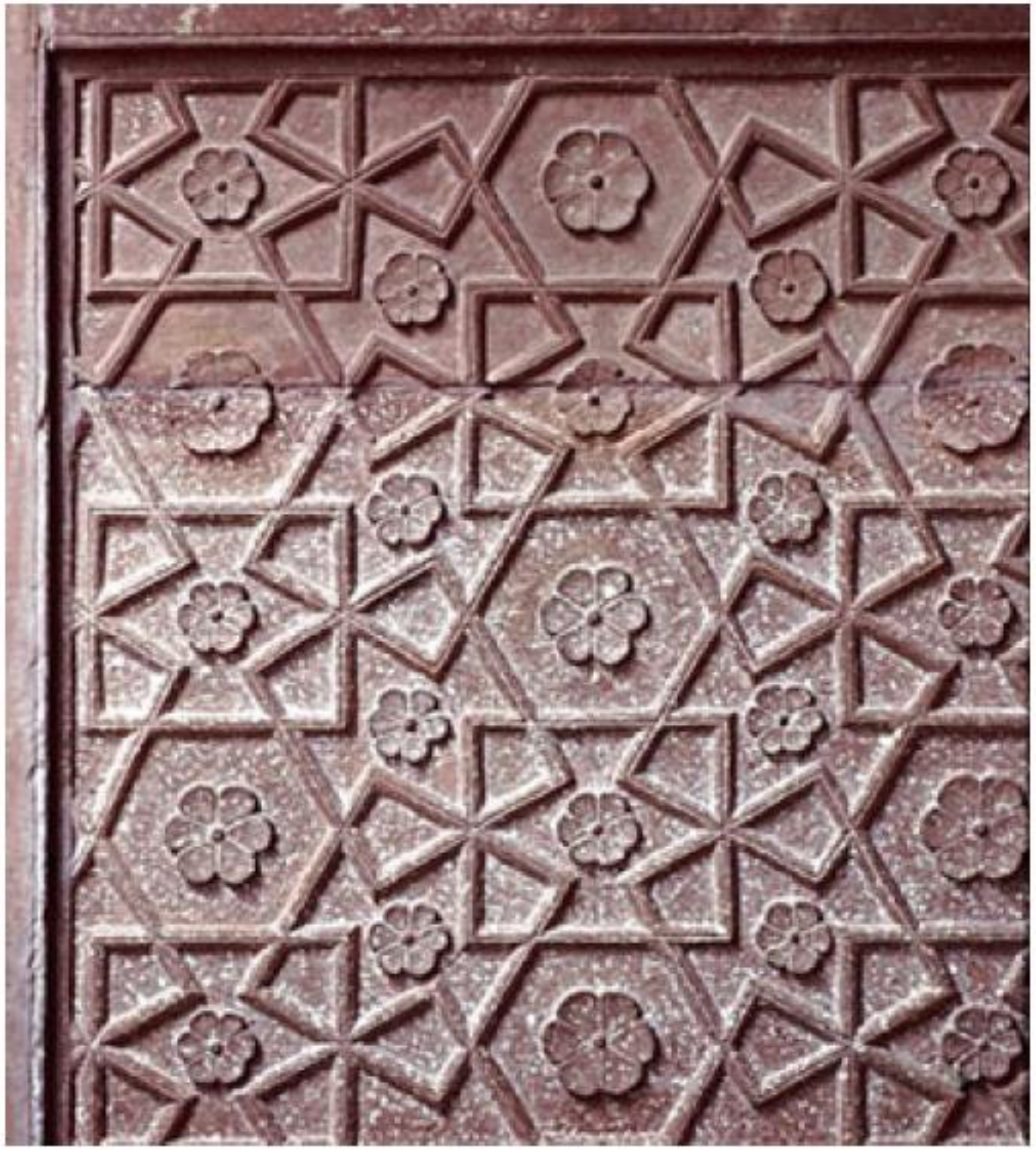
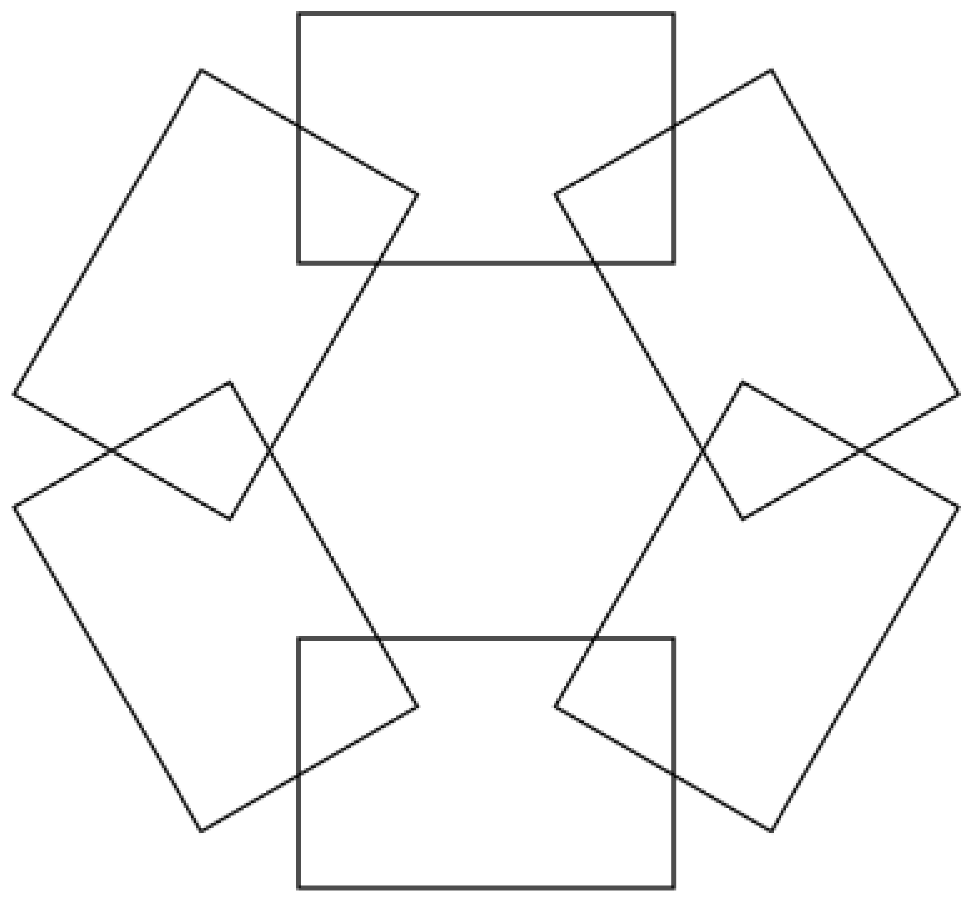


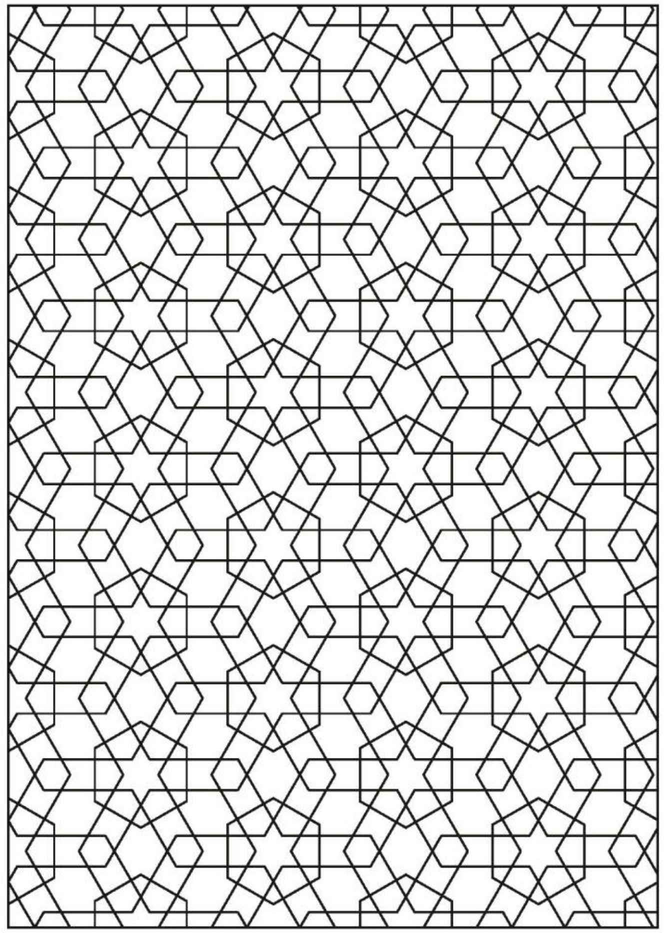
Fig. 6.2 Carved masonry and stone relief, Agra Fort, Agra. See also (Fig. 14.3a). This example is dated 1573, with earlier examples in Iran and Cairo. This pattern is unusual in having a 6-way intersection (Patterns in Islamic Art web site 2017, IND 0332)

```
function setup() {
  createCanvas(400, 400);
  rectMode(CENTER);
  angleMode(DEGREES);
  noFill();
}

function draw() {
  background(255);
  push();
  translate(width*0.5,height*0.5);
  rotate(90);
  for(let i = 0; i<6 ; i++){
    push();
    rotate(i*60);
    translate(100,0);
    rect(0,0,80,120);
    pop();
  }
  pop();
}
```

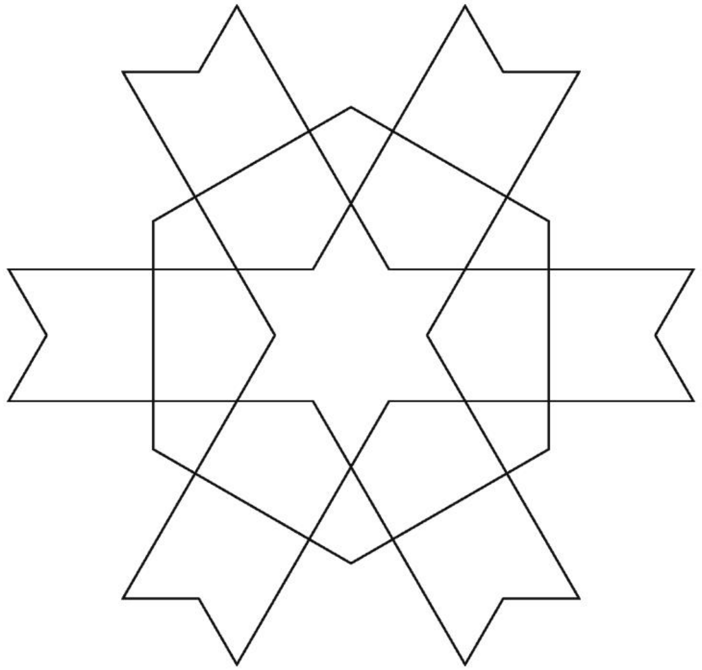


Geometrik Deseni Kodlamak

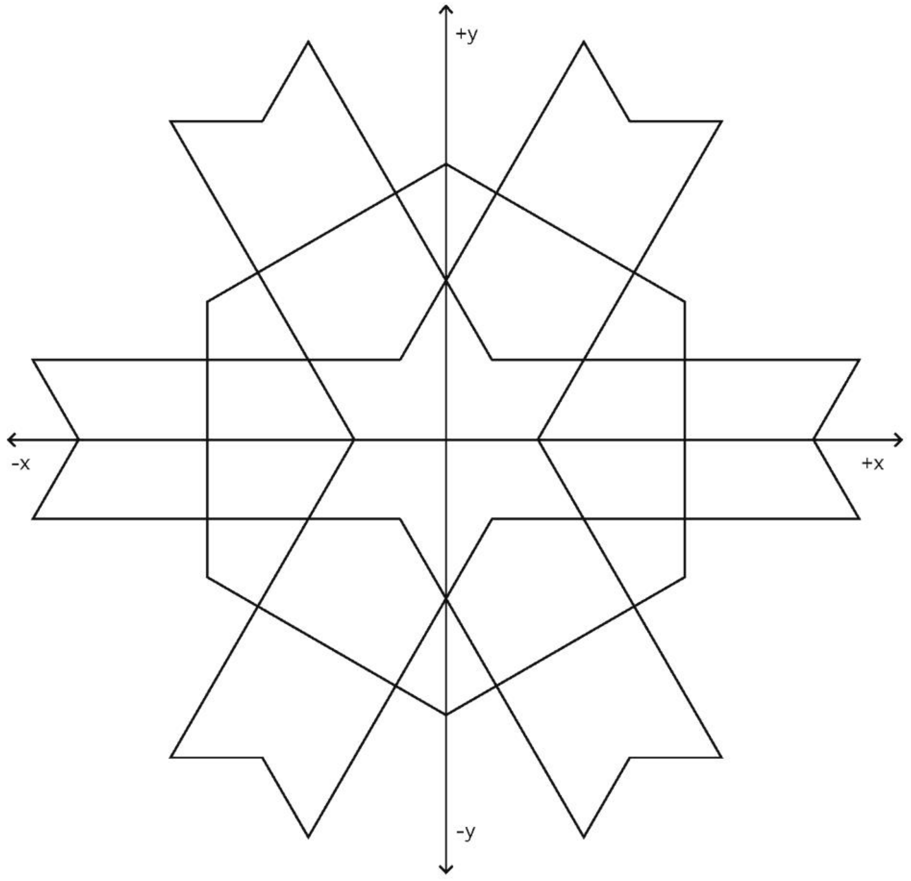
Aşağıdaki deseni inceleyin ve bu deseni oluşturan temel görsel bileşeni bulmaya çalışın.



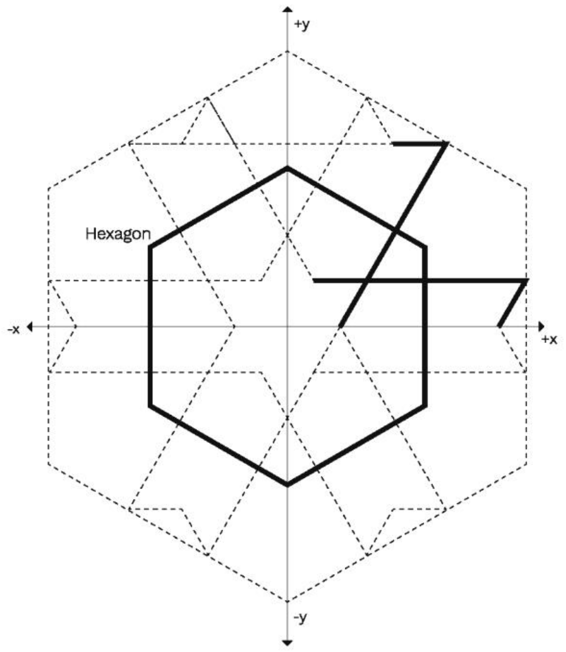
Motif



Motif

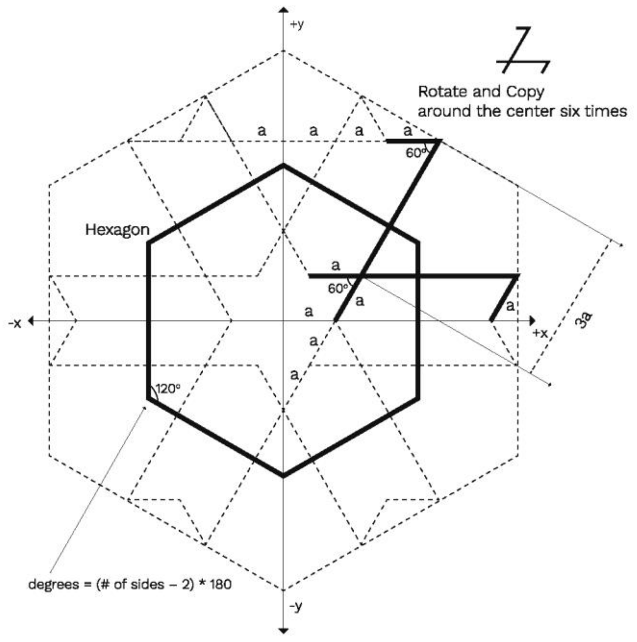


Temel Görsel Bileşini İnceleyelim



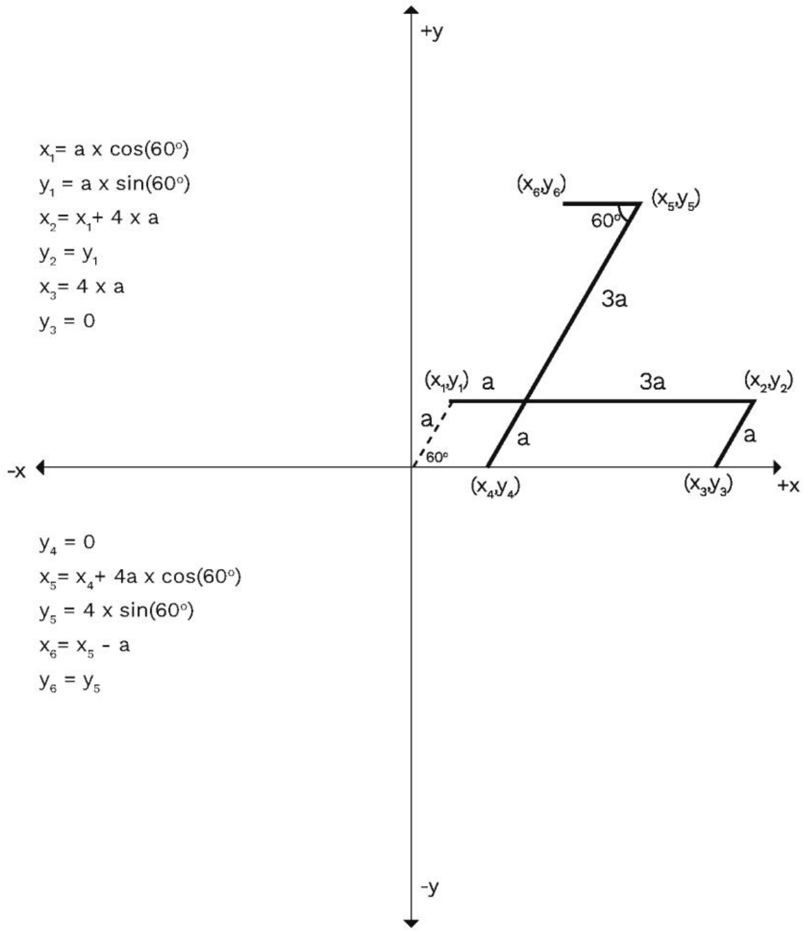
Açıları ve Vertex noktalarını tespit etmek

Aşama 1 : Vertex noktalarını bulalım



Açıları ve Vertex noktalarını tespit etmek

Aşama 2 : Önce aşağıdaki şekli oluşturalım



$x_1 = a \text{ x } \cos(60^\circ)$

$y_1 = a \text{ x } \sin(60^\circ)$

$x_2 = x_1 + 4 \text{ x } a$

$y_2 = y_1$

$x_3 = 4 \text{ x } a$

$y_3 = 0$

$y_4 = 0$

$x_5 = x_4 + 4a \text{ x } \cos(60^\circ)$

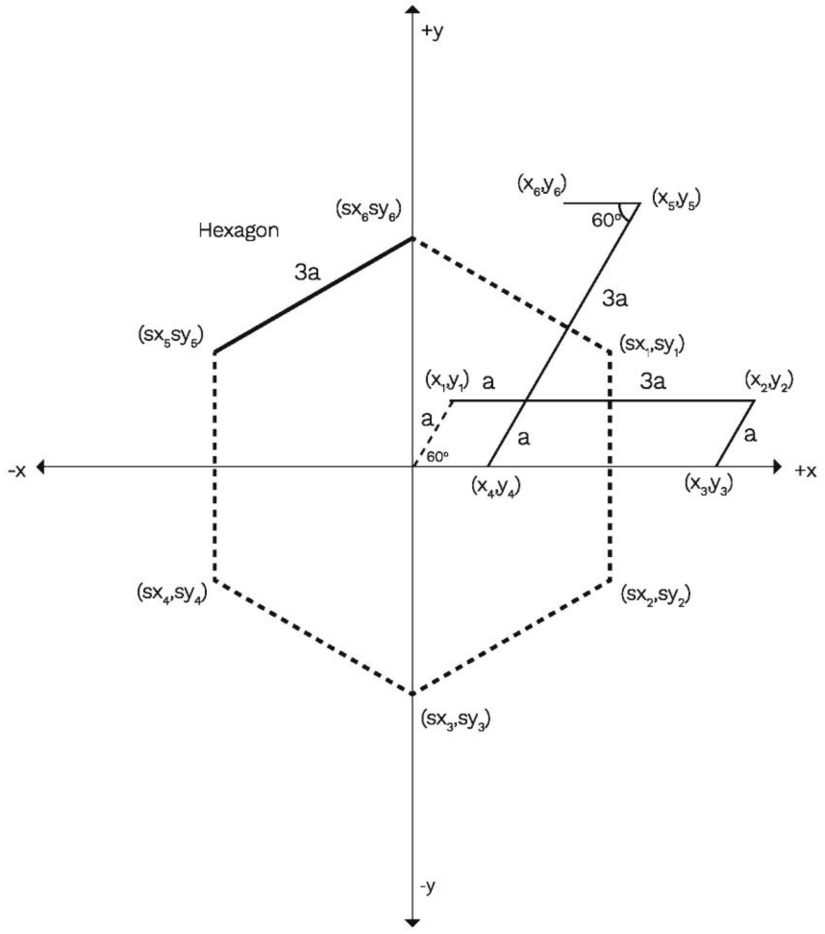
$y_5 = 4 \text{ x } \sin(60^\circ)$

$x_6 = x_5 - a$

$y_6 = y_5$

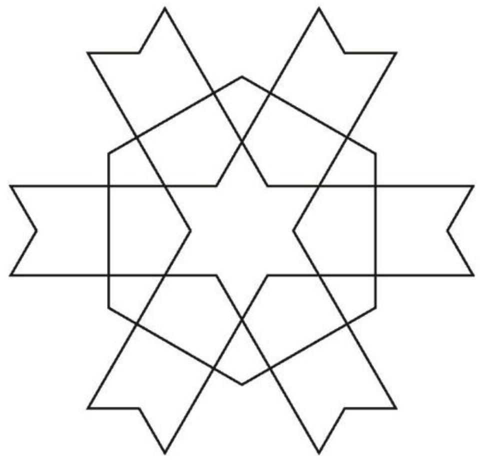
Açıları ve Vertex noktalarını tespit etmek

Step 3 : Now we will draw our attention to the hexagon



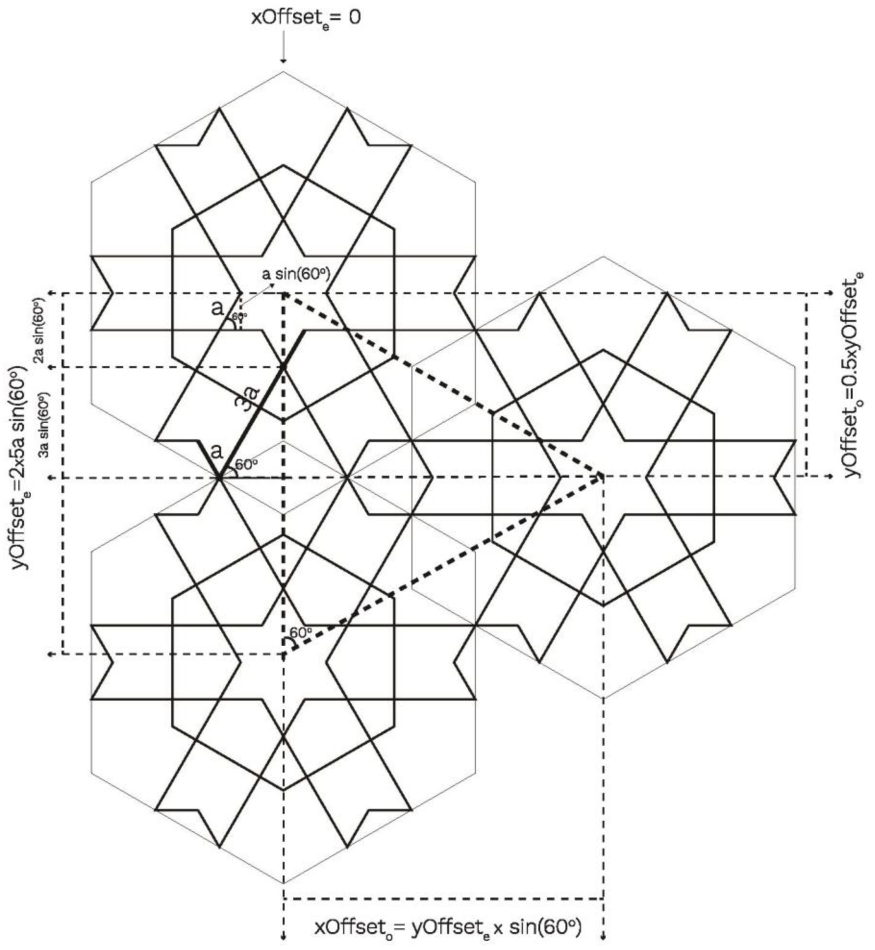
Motifi Oluşturmak

```
let a = 50; //scale factor
function setup() {
  createCanvas(600, 600);
  angleMode(DEGREES);
}

function draw() {
  background(255);
  stroke(0);
  noFill();
  push();
  translate(width * 0.5, height * 0.5); //center on screen
  for (let i = 0; i < 6; i++) {
    push();
    rotate(60 * i);
    beginShape();
    let x1 = a * cos(60);
    let y1 = -a * sin(60);
    let x2 = x1 + 4 * a;
    let y2 = y1;
    let x3 = 4 * a;
    let y3 = 0;
    vertex(x1, y1);
    vertex(x2, y2);
    vertex(x3, y3);
    endShape();
    beginShape();
    let x4 = a;
    let y4 = 0;
    let x5 = x4 + 4 * a * cos(60);
    let y5 = -4 * a * sin(60);
    let x6 = x5 - a;
    let y6 = y5;
    vertex(x4, y4);
    vertex(x5, y5);
    vertex(x6, y6);
    endShape();
    pop();
  }
  //hexagon
  rotate(90);
  let angle = 360 / 6;
  beginShape();
  for (let ang = 0; ang < 360; ang += angle) {
    let sx = cos(ang) * 3 * a;
    let sy = sin(ang) * 3 * a;
    vertex(sx, sy);
  }
  endShape(CLOSE);
  pop();
  noLoop();
}
```



Bezeme Yapısını İnceleyelim

Aşama 4 : Yukarı ve aşağıya kaymaları belirleyecek xoffset ve yoffset değerlerini hesaplayalım.


xOffset$_e$= 0
a sin(60º)
a
60º
2a sin(60º)
3a sin(60º)
yOffset$_e$=2x5a sin(60º)
3a
a
60º
60º
yOffset$_o$=0.5xyOffset$_e$
xOffset$_o$= yOffset$_e$ x sin(60º)

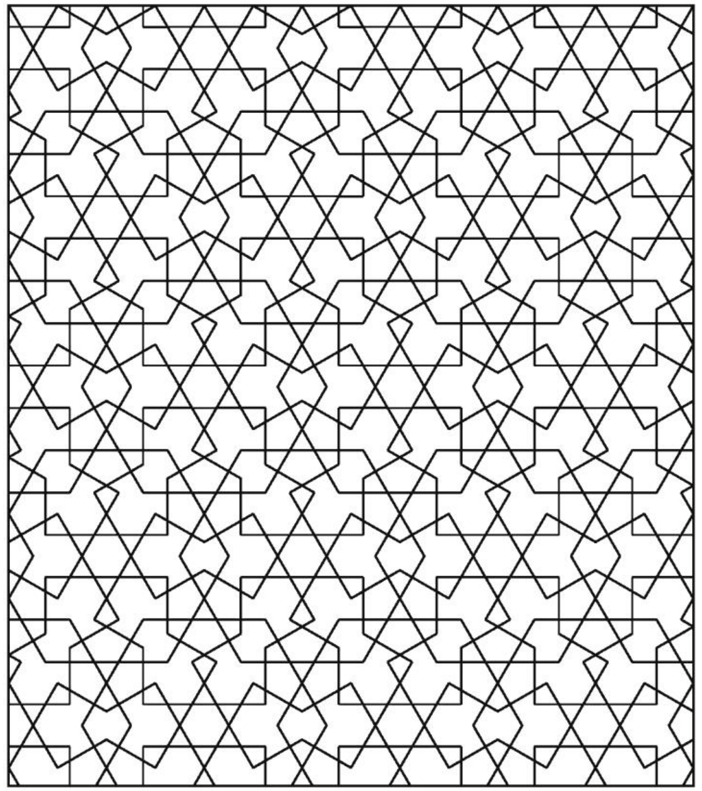
Bezeme Kodu

```
// Motif class
class Motif{
 constructor(r) {
  this.a = r;
 }

 display() {
  for (let i = 0; i < 6; i++) {
   push();
   rotate(60 * i);
   beginShape();
   let x1 = this.a * cos(60);
   let y1 = -this.a * sin(60);
   let x2 = x1 + 4 * this.a;
   let y2 = y1;
   let x3 = 4 * this.a;
   let y3 = 0;
   vertex(x1, y1);
   vertex(x2, y2);
   vertex(x3, y3);
   endShape();
   beginShape();
   let x4 = this.a;
   let y4 = 0;
   let x5 = x4 + 4 * this.a * cos(60);
   let y5 = -4 * this.a * sin(60);
   let x6 = x5 - this.a;
   let y6 = y5;
   vertex(x4, y4);
   vertex(x5, y5);
   vertex(x6, y6);
   endShape();
   pop();
  }

  //hexagon
  rotate(90);
  let angle = 360 / 6;
  beginShape();
  for (let ang = 0; ang < 360; ang += angle) {
   let sx = cos(ang) * 3 * a;
   let sy = sin(ang) * 3 * a;
   vertex(sx, sy);
  }
  endShape(CLOSE);
 }
}
```

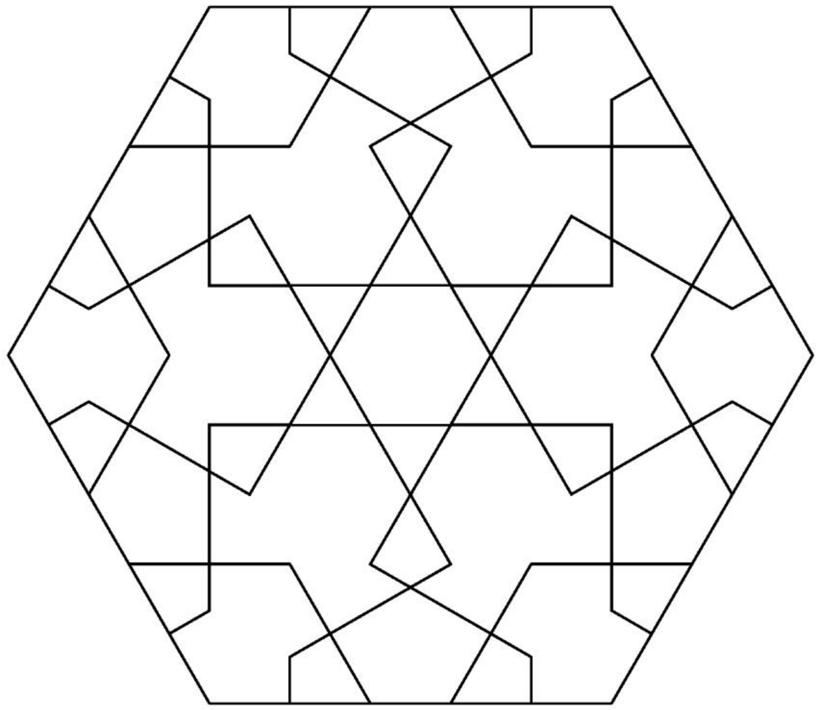
```
let motives = []; // Declare array
let nRow;
let nCol;
let a = 16;
let xoffsetEven, yoffsetEven, xoffsetOdd, yoffsetOdd;

function setup() {
 createCanvas(600, 600);
 angleMode(DEGREES);

 //even columns 0,2,4,...
 //odd columna 1,3,5,...
 xoffsetEven = 0;
 yoffsetEven = 2 * 5 * a * sin(60);
 xoffsetOdd = yoffsetEven * sin(60);
 yoffsetOdd = yoffsetEven * 0.5;

 //approximate the nRow and nCol values
 //try and see the results
 nRow = ceil(width / xoffsetOdd);
 nCol = 1+ceil(height / yoffsetEven);
 //generate the motives array
 for (let i = 0; i < nRow * nCol; i++) {
  motives.push(new Motif(a));
 }
}

function draw() {
 background(0);
 stroke(255);
 noFill();
 noLoop();
 for (let c = 0; c < nCol; c++) {
  for (let r = 0; r < nRow; r++) {
   push();
   if (c % 2 == 0) {
    //columns 0,2,4,6
   } else {
    //columns 1,3,5,7
    translate(0, yoffsetOdd);
   }
   translate(xoffsetEven * c + xoffsetOdd * c, yoffsetEven * r);
   tiles[c + r * nCol].display();
   pop();
  }
 }
}
```

Geometrik Deseni Kodlamak

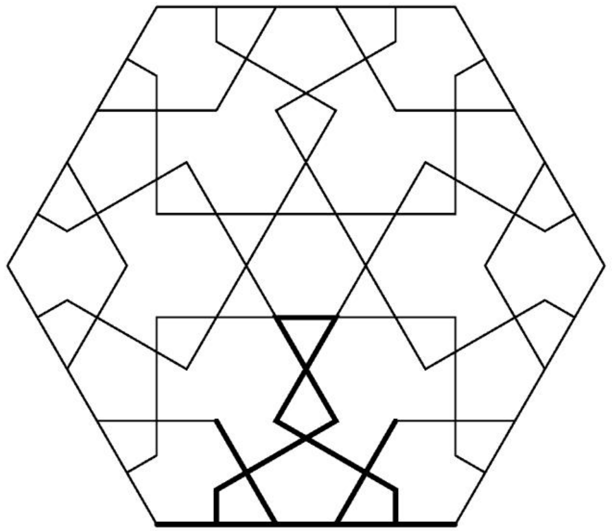
Aşağıdaki deseni inceleyin ve bu deseni oluşturan temel görsel bileşeni bulmaya çalışın.



Motif

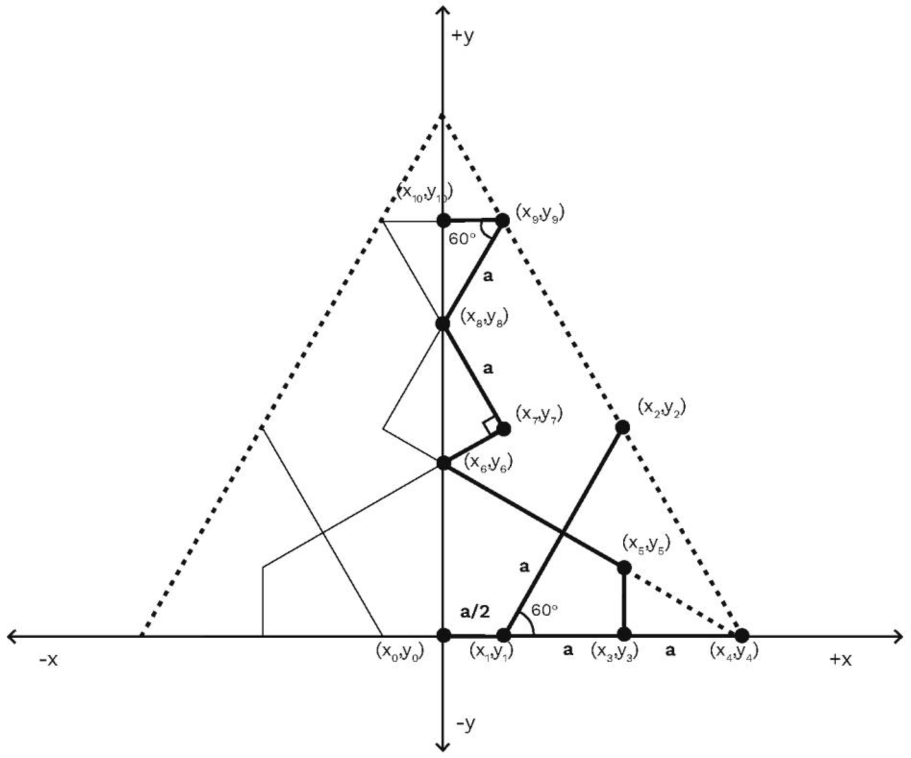


Temel Görsel Bileşini İnceleyelim



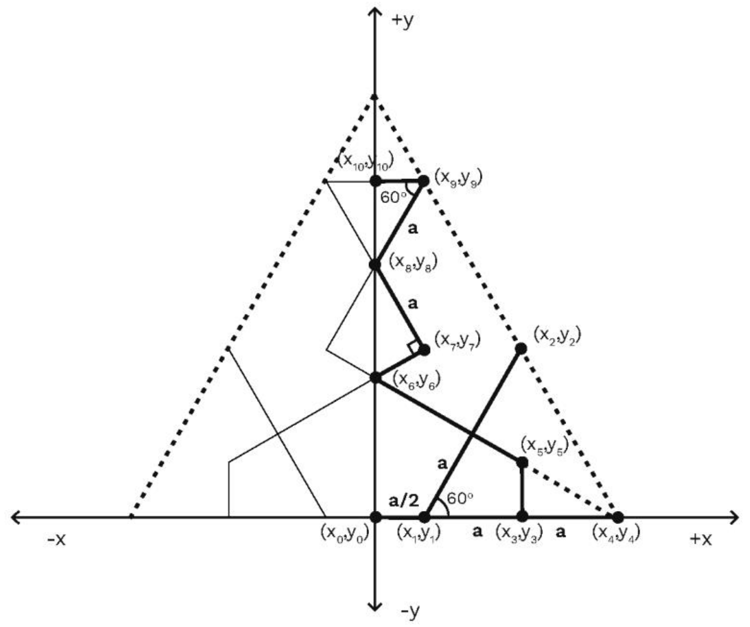
Açıları ve Vertex noktalarını tespit etmek

Aşama 1 : Vertex noktalarını bulalım



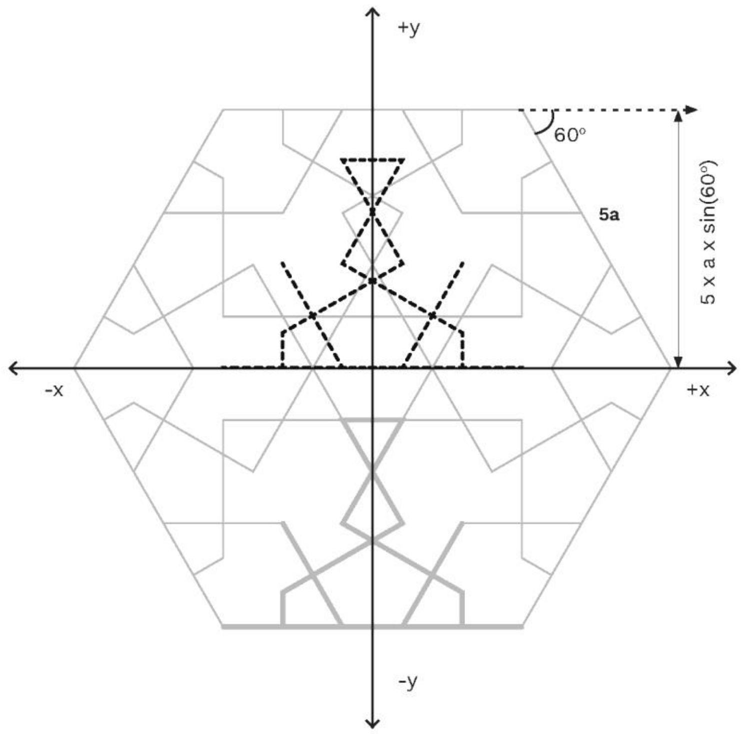
Açıları ve Vertex noktalarını tespit etmek

Aşama 1 : Vertex noktalarını bulalım



$x_0 = 0$	$x_5 = 1.5 \times a$	$x_{10} = 0$
$y_0 = 0$	$y_5 = a/\tan(60^\circ)$	$y_{10} = 4 \times a \times \sin(60^\circ)$
$x_1 = 0.5 \times a$	$x_6 = 0$	
$y_1 = 0$	$y_6 = 2.5 \times a/\tan(60^\circ)$	
$x_2 = 2 \times a \times \cos(60^\circ) + 0.5 \times a$	$x_7 = a \times \sin(30^\circ)$	
$y_2 = 2 \times a \times \sin(60^\circ)$	$y_7 = 2 \times a \times \sin(60^\circ)$	
$x_3 = 1.5 \times a$	$x_8 = 0$	
$y_3 = 0$	$y_8 = 3 \times a \times \sin(60^\circ)$	
$x_4 = 2.5 \times a$	$x_9 = a \times \sin(30^\circ)$	
$y_4 = 0$	$y_9 = 4 \times a \times \sin(60^\circ)$	

Aşama 2 : Motif aşağıya kaydırılmalı ve merkeze göre 60 derece rotasyon uygulanarak 6 defa oluşturulmalı

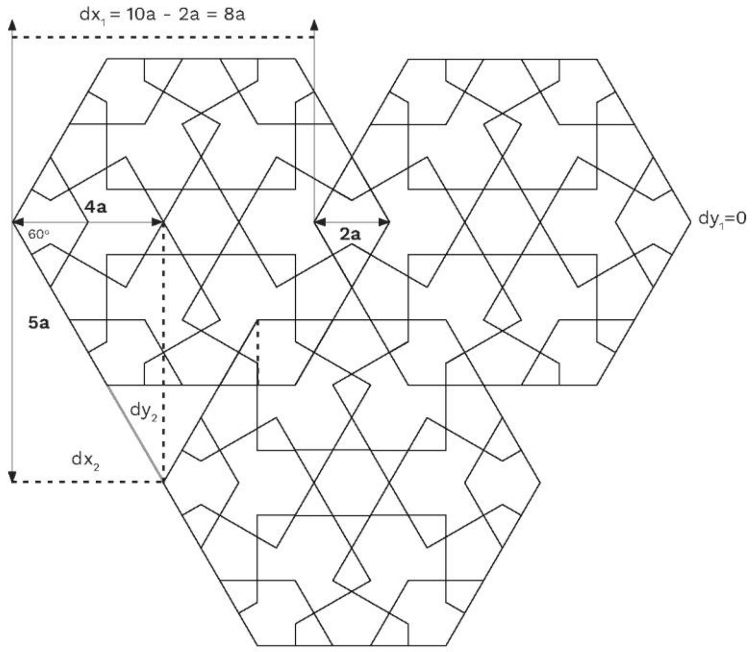


Motifi Oluşturmak

```
let a = 40;

function setup() {
        createCanvas(600, 600);
        noFill();
        angleMode(DEGREES);
}
function draw() {
        let x0,y0,x1,y1,x2,y2,x3,y3,x4,y4,x5,y5,x6,y6,x7,y7,x8,y8,x9,y9,x10,y10;
        background(255);
        push();
        translate(width*0.5, height*0.5);
        x0 = 0;
        y0 = 0;
        x1 = 0.5 * a;
        y1 = 0;
        x2 = 2 * a * cos(60) + 0.5 * a;
        y2 = -(2 * a * sin(60));
        x3 = 1.5 * a;
        y3 = 0;
        x4 = 2.5 * a;
        y4 = 0;
        x5 = 1.5 * a;
        y5 = -a / tan(60);
        x6 = 0;
        y6 = (-2.5 * a) / tan(60);
        x7 = a * sin(30);
        y7 = -(2 * a * sin(60));
        x8 = 0;
        y8 = -(3 * a * sin(60));
        x9 = a * sin(30);
        y9 = -(4 * a * sin(60));
        x10 = 0;
        y10 = -(4 * a * sin(60));

        for (let i = 0; i < 6; i++) {
        push();
        rotate(i * 60);
        translate(0, 5 * a * sin(60));
        beginShape();
        vertex(x0, y0);
        vertex(x1, y1);
        vertex(x2, y2);
        endShape();

        beginShape();
        vertex(x1, y1);
        vertex(x4, y4);
        endShape();
```

```
            beginShape();
            vertex(x3, y3);
            vertex(x5, y5);
            vertex(x6, y6);
            vertex(x7, y7);
            vertex(x8, y8);
            vertex(x9, y9);
            vertex(x10, y10);
            endShape();

             //mirror on y axis
            beginShape();
            vertex(-x0, y0);
            vertex(-x1, y1);
            vertex(-x2, y2);
            endShape();

            beginShape();
            vertex(-x1, y1);
            vertex(-x4, y4);
            endShape();

            beginShape();
            vertex(-x3, y3);
            vertex(-x5, y5);
            vertex(-x6, y6);
            vertex(-x7, y7);
            vertex(-x8, y8);
            vertex(-x9, y9);
            vertex(-x10, y10);
            endShape();

            pop();
        }

    pop();
    noLoop();
}
```

Step 3 : Yukarı ve aşağıya kaymaları belirleyecek xoffset ve yoffset değerlerini hesaplayalım.



$dx_1 = 8a$

$dy_1 = 0$

$dx_2 = 4a$

$dy_2 = \tan(60^\circ) \times 4a$

Bezeme Kodu

```
/*
Code written by Selcuk ARTUT 2022
Geometric Patterns with Creative Coding
All rights reserved
*/
// Tile class
class Tile {
  constructor(r) {
    this.a = r;
  }

  display() {

    let x0,y0,x1,y1,x2,y2,x3,y3,x4,y4,x5,y5,x6,y6,x7,y7,x8,y8,x9,y9,x10,y10;
    x0 = 0;
    y0 = 0;
    x1 = 0.5 * this.a;
    y1 = 0;
    x2 = 2 * this.a * cos(60) + 0.5 * this.a;
    y2 = -(2 * this.a * sin(60));
    x3 = 1.5 * this.a;
    y3 = 0;
    x4 = 2.5 * this.a;
    y4 = 0;
    x5 = 1.5 * this.a;
    y5 = -this.a / tan(60);
    x6 = 0;
    y6 = (-2.5 * this.a) / tan(60);
    x7 = this.a * sin(30);
    y7 = -(2 * this.a * sin(60));
    x8 = 0;
    y8 = -(3 * this.a * sin(60));
    x9 = this.a * sin(30);
    y9 = -(4 * this.a * sin(60));
    x10 = 0;
    y10 = -(4 * this.a * sin(60));
    for (let i = 0; i < 6; i++) {
      push();
      rotate(i * 60);
      translate(0, 5 * this.a * sin(60));

      beginShape();
      vertex(x0, y0);
      vertex(x1, y1);
      vertex(x2, y2);
      endShape();

      beginShape();
      vertex(x1, y1);
```

```
      vertex(x4, y4);
      endShape();

      beginShape();
      vertex(x3, y3);
      vertex(x5, y5);
      vertex(x6, y6);
      vertex(x7, y7);
      vertex(x8, y8);
      vertex(x9, y9);
      vertex(x10, y10);
      endShape();

      //mirror on y axis
      beginShape();
      vertex(-x0, y0);
      vertex(-x1, y1);
      vertex(-x2, y2);
      endShape();

      beginShape();
      vertex(-x1, y1);
      vertex(-x4, y4);
      endShape();

      beginShape();
      vertex(-x3, y3);
      vertex(-x5, y5);
      vertex(-x6, y6);
      vertex(-x7, y7);
      vertex(-x8, y8);
      vertex(-x9, y9);
      vertex(-x10, y10);
      endShape();

      pop();
    }
  }
}

let tiles = []; // Declare array
let nRow;
let nCol;
let dx1, dy1, dx2, dy2;

let r = 16;
```

```
function setup() {
  createCanvas(1080, 1080);
  angleMode(DEGREES);
  noFill();
  strokeWeight(1);

  nRow = floor(height / (2*r));
  nCol = floor(width / (2*r));

  for (let i = 0; i < nRow * nCol; i++) {
    tiles.push(new Tile(r));
  }

  dx1 = 8.0*r;
  dy1 = 0;
  dx2 = 4.0*r;
  dy2 = 4.0*r*tan(60);

}

function draw() {
  background(255);
  stroke(0);
  for (let r = 0; r < nRow; r++) {
    for (let c = 0; c < nCol; c++) {
      push();
      translate(c * dx1, dy1 + dy2*r);
      if (r % 2 == 1) {
        //rows 1,3,5,7
        translate(dx2,0);
      }
      tiles[r + c * nRow].display();
      pop();
    }
  }
}
```

Teşekkürler.
İletişimde kalalım!

Facebook/selcuk.artut
Instagram: selcukartut
Web: www.selcukartut.com
Email: selcukartut@gmail.com