貪食蛇

1081507
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- 蛇可以移動(ad左右轉/ws加減速)
- Line:155~193

```
function KeyDown(event){
  drawBoard();
  if(angleInDegrees==360)angleInDegrees=0;
  if('a'==event.key){//console.log('a is pressed!');
    angleInDegrees += 4;
    if(angleInDegrees>=360)angleInDegrees=0;
    rotationInRadians = angleInDegrees * Math.PI / 180

    eat(translation[0],translation[1]);
    drawSnake(joints);
  }
  else if('d'==event.key){//console.log('d is pressed!');
    angleInDegrees -= 4;
    if(angleInDegrees<=0)angleInDegrees-=360;
    rotationInRadians = angleInDegrees * Math.PI / 180;

    eat(translation[0],translation[1]);
    drawSnake(joints);
  }
  else if('w'==event.key){//console.log('w is pressed!');
    translation[0]-=5*Math.sin((angleInDegrees)* Math.PI / 180);
      translation[1]-=5*Math.cos((angleInDegrees)* Math.PI / 180);

    eat(translation[0],translation[1]);
    drawSnake(joints);
  }
  else if('s'==event.key){//console.log('s is pressed!');
    translation[0]+=1.01*Math.sin((angleInDegrees)* Math.PI / 180);
    translation[1]+=1.01*Math.cos((angleInDegrees)* Math.PI / 180);

    eat(translation[0],translation[1]);
    drawSnake(joints);
  }
  for (const [key, value] of points)
```

- (1)蛇身可以擺動
- Line:114~144
- swingRadians控制擺動

```
function render(time) {
  var now = time * 0.001;
  var deltaTime = Math.min(0.1, now - then);
  then = now;
  //gl.clearColor(0, 0, 0, 0);
  //gl.clear(gl.COLOR_BUFFER_BIT | gl.DEPTH_BUFFER_BIT);

   drawBoard();
   drawSnake(joints);
   eat(translation[0],translation[1]);

   for (const [key, value] of points)
   drawPoint(key,value);

   if(0<=count&&count<10){swingRadians+=0.05;}//console.log('+');
   else {swingRadians-=0.05;}//console.log('-');}

   count++;
   if(count>=20)count=0;

   translation[0]-=1.02*Math.sin((angleInDegrees)* Math.PI / 180)
   translation[1]-=1.02*Math.cos((angleInDegrees)* Math.PI / 180)

   if(translation[1]>=710)translation[1]=710;
   if(translation[1]<=12)translation[1]=12;
   if(translation[0]>=1520)translation[0]=1520;
   if(translation[0]<=12)translation[0]=12;

  requestAnimationFrame(render);
}
requestAnimationFrame(render);
```

- (2)採用階層式的Transformation
- Line:219~263，先畫蛇頭再畫身體(243~263)

```
    // Compute the matrices
    var translationMatrix = m3.translation(translation[0], translation[1]);
    var rotationMatrix = m3.rotation(rotationInRadians);
    var scaleMatrix = m3.scaling(scale[0], scale[1]);//gl.canvas.width/2
    var moveOriginMatrix = m3.translation(0 ,30);// make a matrix that will move tl

    // Multiply the matrices.
    var matrix =m3.identity();
    matrix = m3.multiply(matrix, translationMatrix);
    matrix = m3.multiply(matrix, rotationMatrix);

    gl.uniformMatrix3fv(matrixLocation, false, matrix);

    gl.bufferData(
      gl.ARRAY_BUFFER,
      new Float32Array([
        0, 0,-20,
        40,20, 40,]),
      gl.STATIC_DRAW);

    // Draw the head.
    var primitiveType = gl.TRIANGLES;
    var offset = 0;
    var count = 3;
    gl.drawArrays(primitiveType, offset, count);

  //drawBody
  for (var ii = 0; ii < joints; ii++){
   var swingMatrix = m3.rotation(swingRadians);
   // Multiply the matrices.
   matrix = m3.multiply(matrix,moveOriginMatrix);
   matrix = m3.multiply(matrix, scaleMatrix);
   matrix = m3.multiply(matrix, swingMatrix);

   // Set the matrix.
   gl.uniformMatrix3fv(matrixLocation, false, matrix);

   // Draw the geometry.
   var primitiveType = gl.TRIANGLES;
   var offset = 0;
```

隨機生成食物們

創造一個map，新增隨機食物左上角的點(x，y)

```
96    let points = new Map(); // 建立空的 Map
97
98    for (var ii = 0; ii < 30; ++ii){
99      var x=randomInt(1500),y=randomInt(700);
100     points.set(x,y);
101   }
```

吃掉食物後會產生更多食物

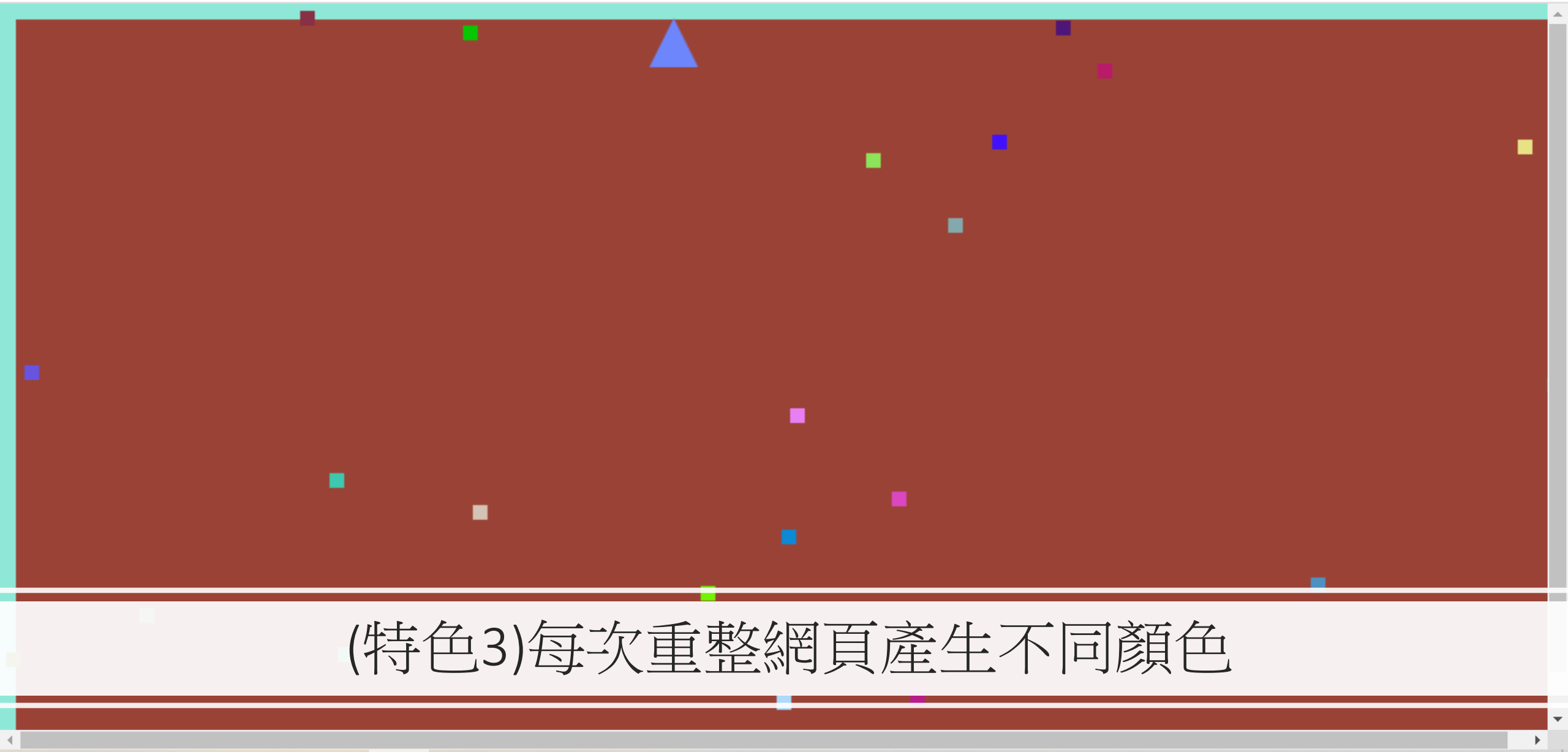
(特色1)可精準判斷蛇頭有沒有吃到點點，判斷蛇頭是否落在點裡or邊上

(特色2)食物會一直閃爍

```
265  function eat(x, y){//較精準吃食物
266    x=Math.round(x),y=Math.round(y);//四
267    for(var ii=-12;ii<=12;ii++){
268     if(points.has(x+ii)){//舌頭(x,y)是否
269       var ty=points.get(x+ii);
270       if(ty-12<=y&&y<=ty+12)
271       {
272        points.delete(x+ii);
273        var tempX=randomInt(1500),tempY=r
274        points.set(tempX,tempY);
275        joints++;
276        break;
277       }
278     }
279    }
280  }
```

- 畫邊框，且蛇頭無法穿越

```
316  function drawBoard(){
317  //const width  = document.documentElement.scrollWidth, height = docu
318  //var height=gl.canvas.height,width=gl.canvas.width;
319
320   setRectangle(gl,0, 0, 1540, 730);
321   drawBoard2(gl,color1);
322
323   setRectangle(gl,13, 13, 1540-30, 730-30);
324   drawBoard2(gl,color2);
325  }
326 function drawBoard2(gl,colorData){
327   webglUtils.resizeCanvasToDisplaySize(gl.canvas);
328
329     gl.viewport(0, 0, gl.canvas.width, gl.canvas.height);
330
331     gl.useProgram(program);
332
333     gl.bindVertexArray(vao);
334
335     gl.uniform2f(resolutionUniformLocation, gl.canvas.width, gl.canva
336
337     gl.uniform4fv(colorLocation, colorData);
338
339     var matrix = m3.identity();
340
341     gl.uniformMatrix3fv(matrix, false, matrix);
342
343   var primitiveType = gl.TRIANGLES;// Draw the rectangle.
344   var offset = 0;
345   var count = 6;
346   gl.drawArrays(primitiveType, offset, count);
347  }
348  }
349  //ENDmain
```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(特色3)每次重整網頁產生不同顏色
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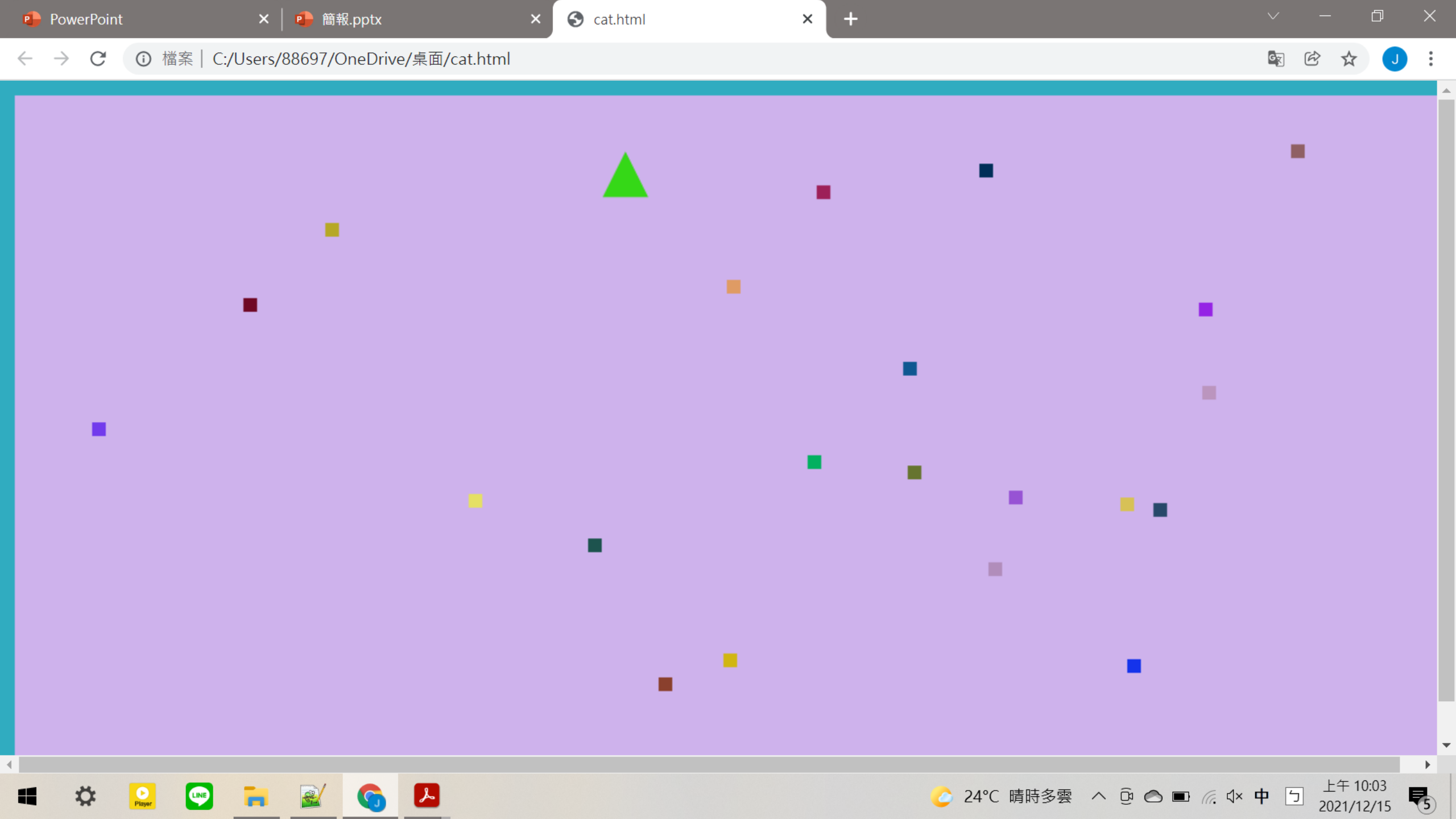
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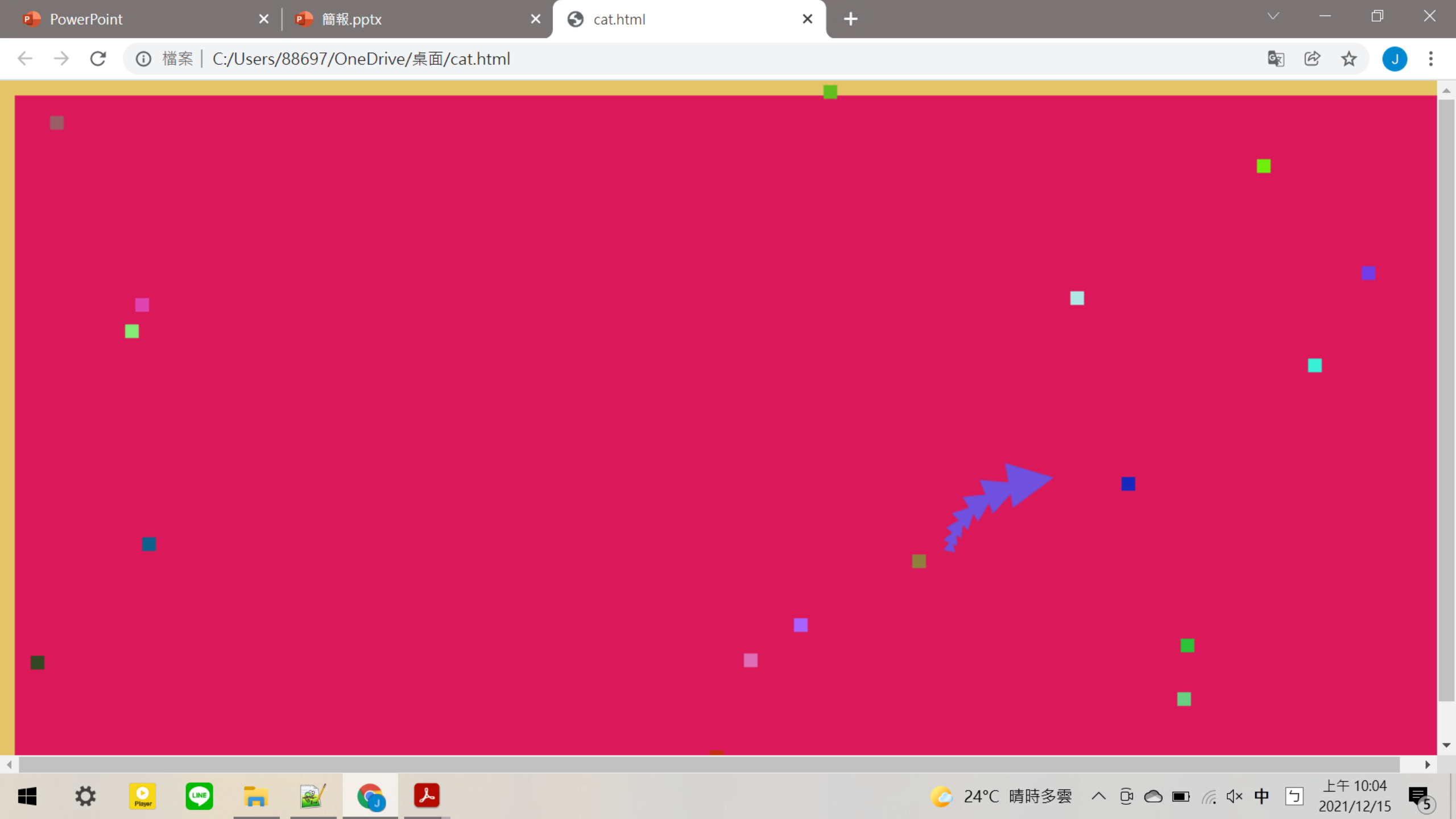
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