language^{12}

→
synchronisation
development/extension
enhanced (light/visual)

Encoding of the visual language of plants.

The project I chosed is the translation and encoding of the visual language of plants. And the snippet I chosed – is the encoding for PhyB, one of the photoreceptors in plants.

Plant vision is not really “seeing" things, but perception through up to 11 types of photoreceptor in their body, just as our four photoreceptors allow our brain to perceive images, allowing us to respond to changes in the environment.

The visual similarities between people and plants reminded me of printing dots, because printing dots are the basic elements for people to produce visual and colors in graphic media, and photoreceptors are also the basic cells for plants to absorb information from outside.

So in week 1, I aimed to visualize and encode the functional language of the plant's photoreceptor, into a basic printing dot.

But before that I want to explain my work in Step 0 first…

我选择的项目是对植物的视觉语言的翻译和编码，
我选择的片段——是对植物的其中一种光受体PhyB的编码部分。

植物视觉，并不是真正意义上的“看见”，而是通过体内多达11种的光受体来感知，这正如我们的四种光受体可以让我们的脑感知到图像，从而让我们能够解释周围变化的环境，并做出反应。

以上人与植物的视觉相似性让我联想到了印刷网点，因为印刷网点是人们在平面媒介中产生视觉图形的基本单位，而光受体也是植物摄入外界信息的基本细胞。

因此，我在第一周做的事是将植物的每一种光受体的功能语言，进行视觉化，并编码为一个基本网点。

但在此之前，我想先解释一下我在Step 0的作品……

Step0

In my Step 0, I tried to decompose the meanings of these photoreceptors,
for example: one of the photoreceptor’s meaning is “tend, grow, absorb…”
Then I translate a word with meanings of different photoreceptors
For example: The word “Scattered” translated in a combination of photoreceptors 2 "interference" + photoreceptors 5 "change" + photoreceptors 6 "branch" + photoreceptors 9 “difference"
So, the meaning of the word “Scattered” in the body of the plant, is produced by the combination of photoreceptors 2, 5, 6, and 9.

因此，我在Step 0的作品中，我尝试对11种感光蛋白的含义进行拆解，例如：Phot1 = 趋向，生长，吸收 ……
然后将某一个词，用不同感光蛋白的含义进行组合翻译
例如： 第21个词：
Scattered = 蛋白2含义“干涉” + 蛋白5含义“变化” + 蛋白6含义“分支”+ 蛋白9含义“不同”
因此 Scattered 这个单词的含义，在植物的体内，由蛋白2，5，6，9共同作用产生。

My Snippet
photoreceptors: Phy B

↓

Because the functions of PhyB involved: syn chro nization, extension/development, enhancement of light/visual perception.
(PhyB has the meanings more than this…)
So,In my translation, the word "language" is translated as PhyB.

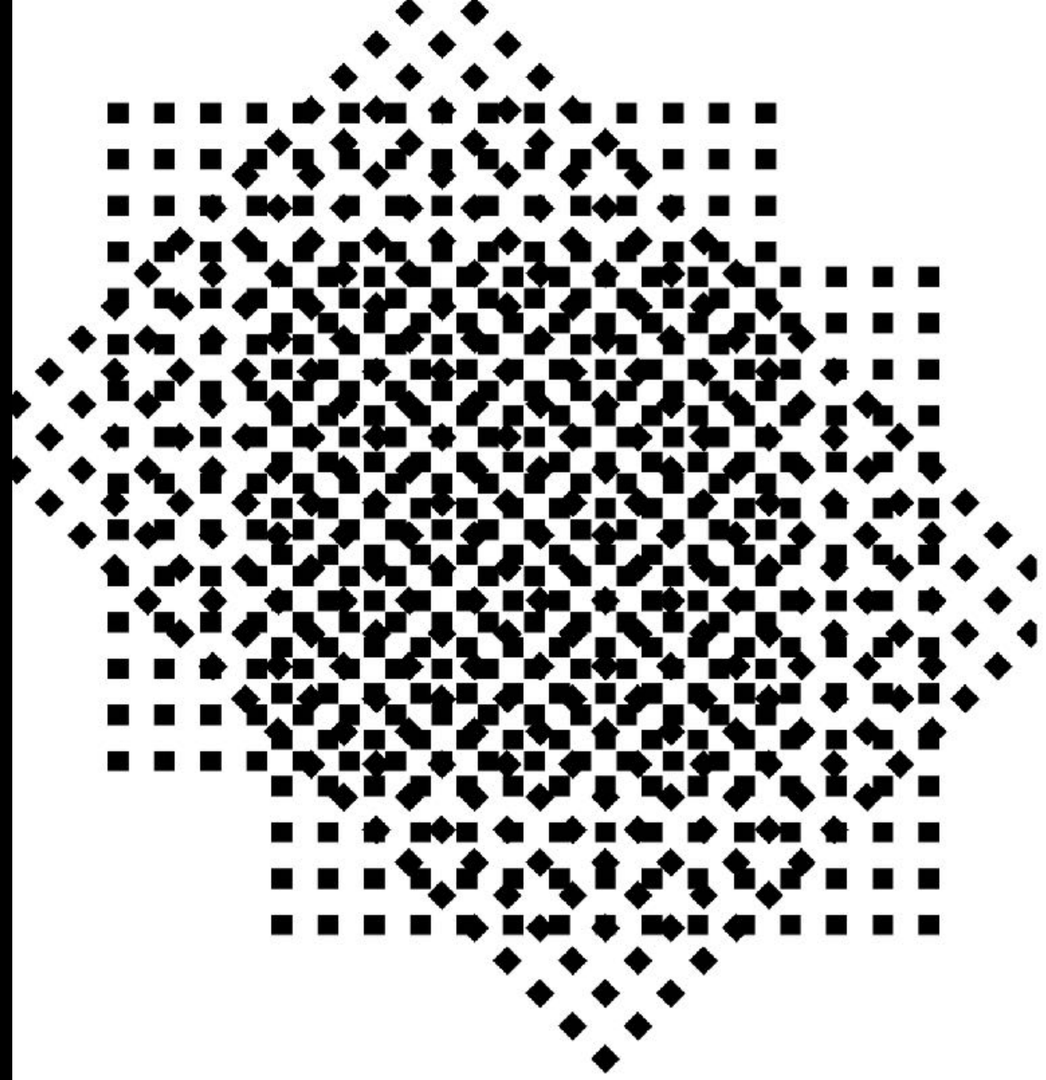
在我的翻译中，“语言”一词被翻译为光受体PhyB，因为PhyB所具有的功能：同步，发展/延伸，增强(光/视觉)感知。

~ “Language”

Step0

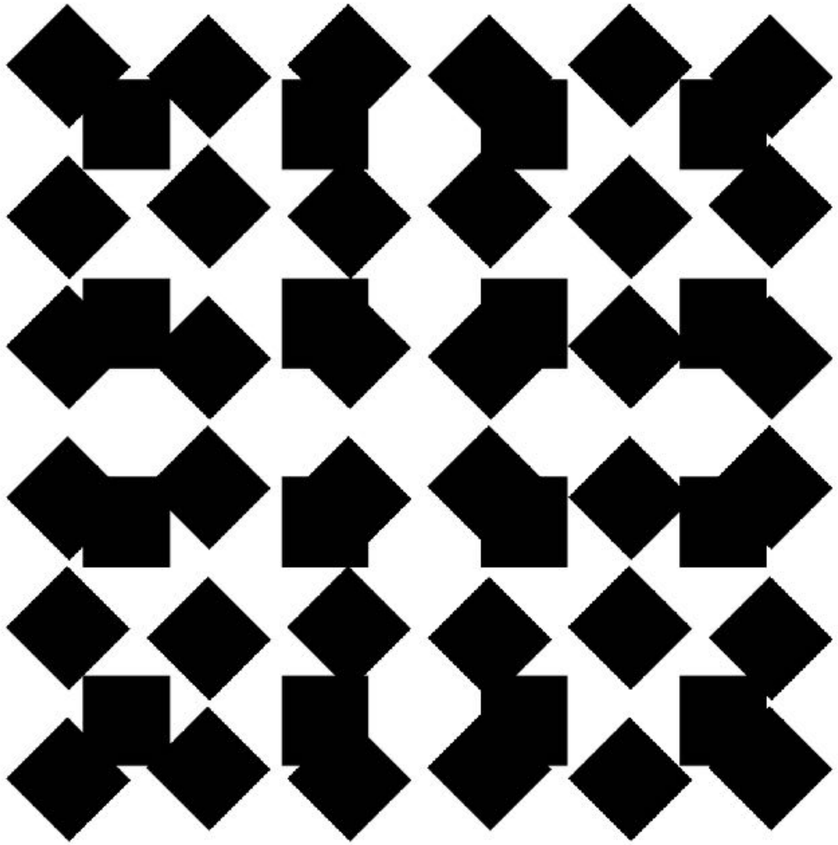
This is my step 0.
I want to explain my coding principles.
This is a translation of the visual language of plants.
so I want to remove people’s subjective aesthetics, and to define the coding actions based on the meaning of the plant’s visual organs themselves.

这是我step 0的设计。
在这里，我要解释一下我的编码原则。
这是对于植物视觉语言的翻译，我不希望这个编码由人的主观审美完成，而是根据植物视觉器官本身的含义，定义编码动作。



Formation of RULE:
Adjust growth direction → Extented move with angle
Adjust biological clock function → Repetition
Adjust flowering function → Rotation

0

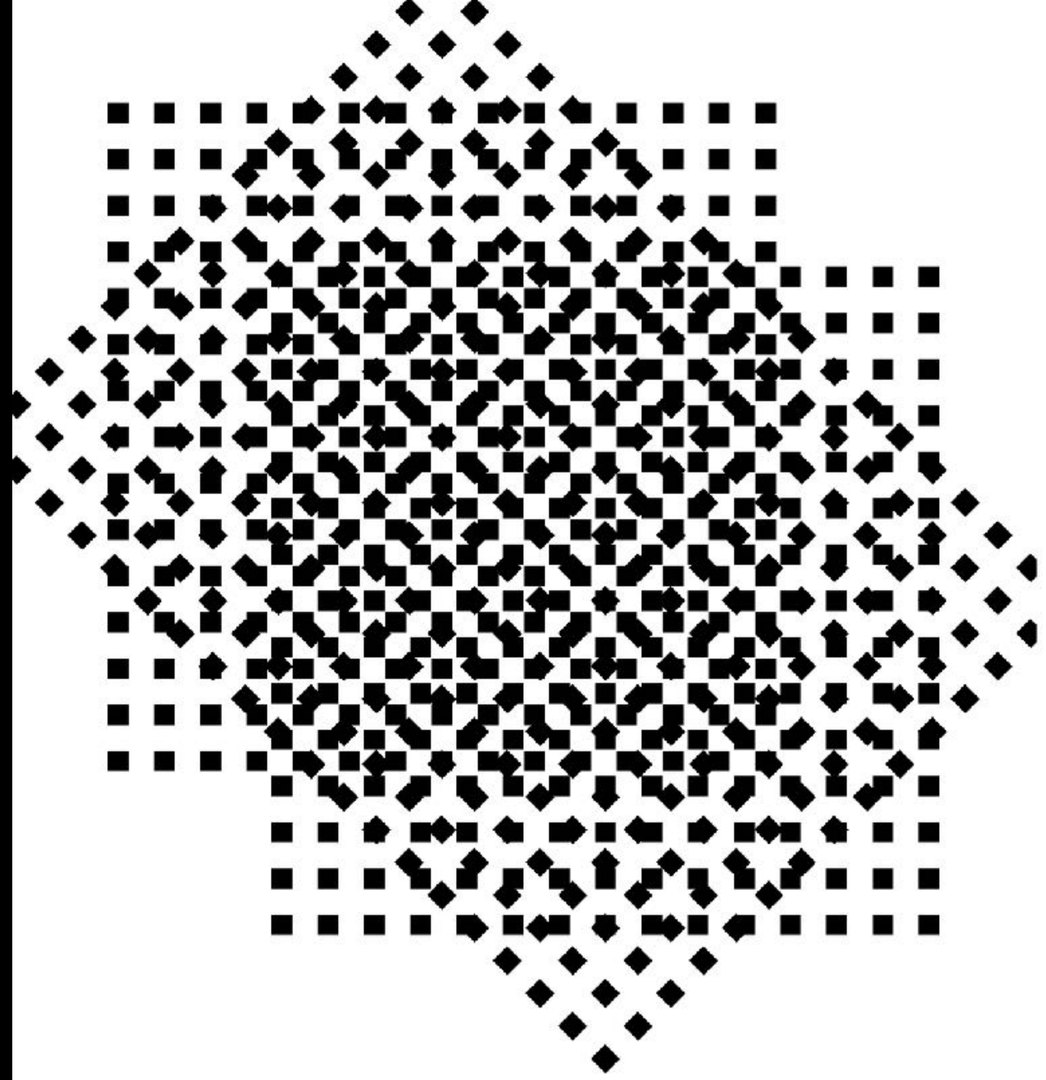


Withdrawal basic dot

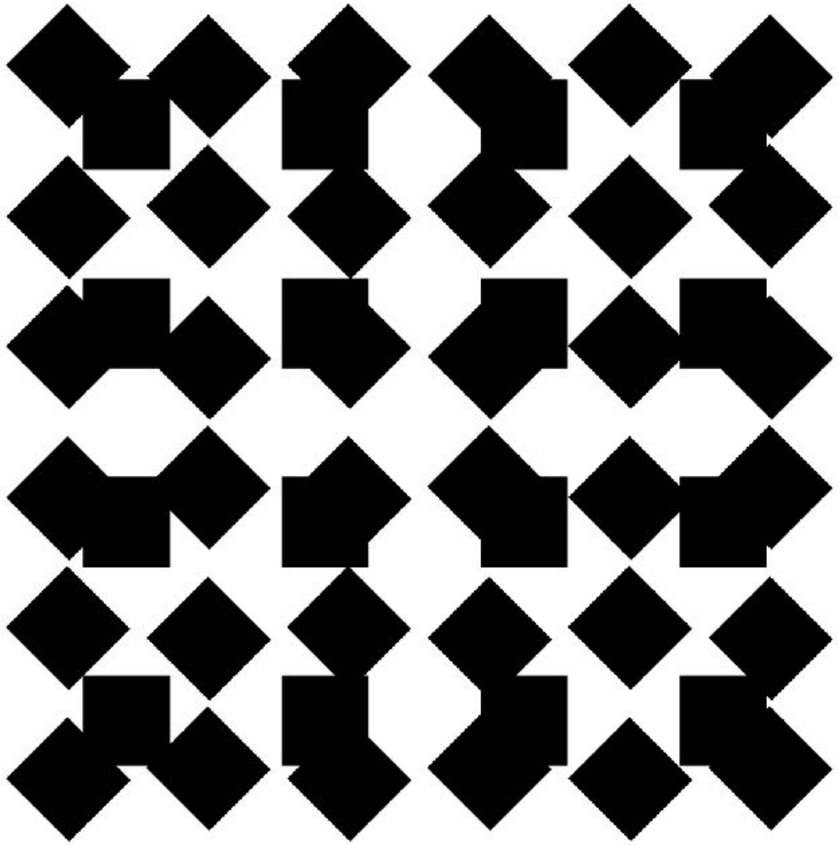
0

PhyB Function	Coding Actions
Regulate flowering	→ Rotate
Regulate growth direction	→ Move and leave track
Regulate biological clock	→ Repeat

调节开花 → 旋转
调节生长方向 → 移动复制
调节生物钟 → 重复



Formation of RULE:
Adjust growth direction → Extented move with angle
Adjust biological clock function → Repetition
Adjust flowering function → Rotation

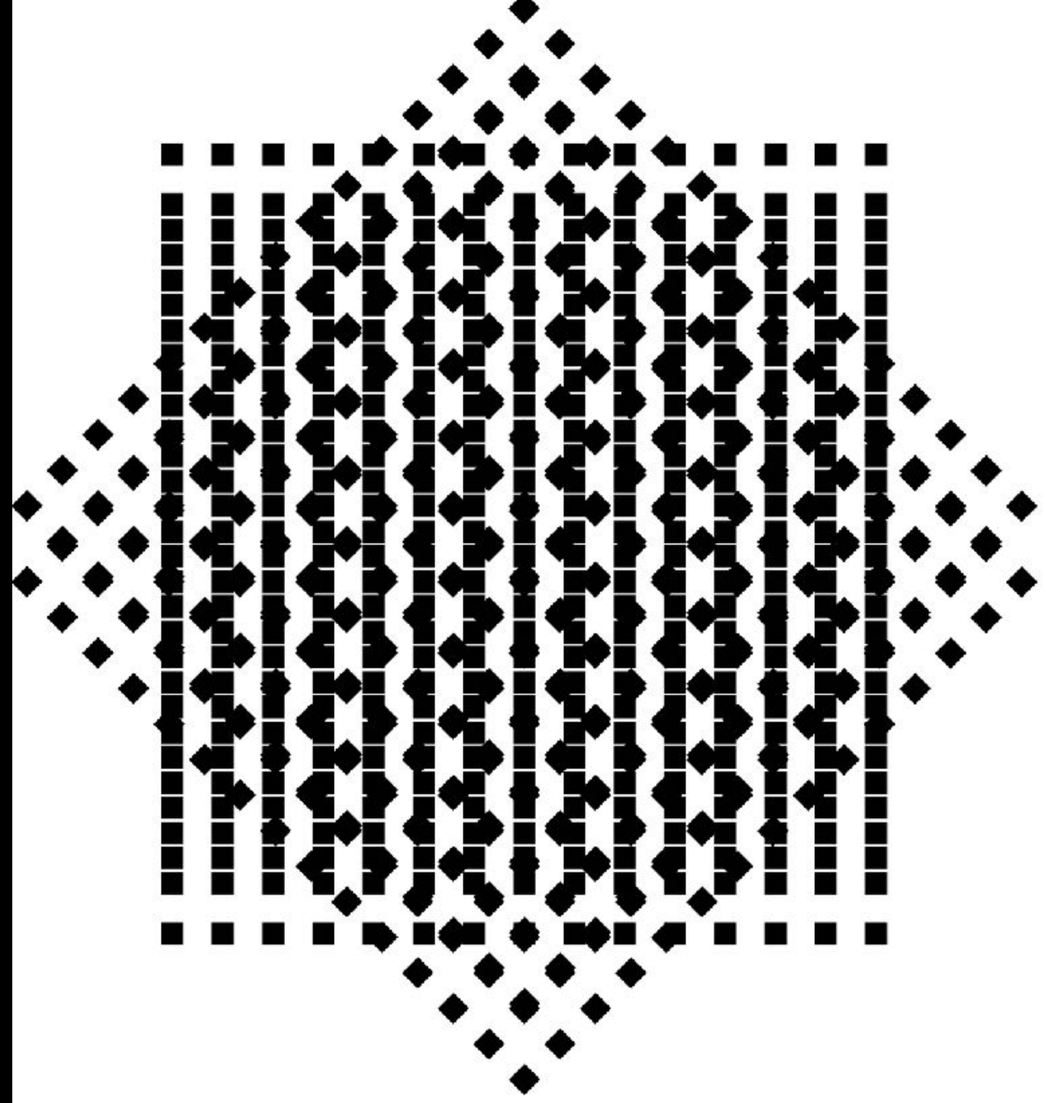


Withdrawal basic dot

Step1

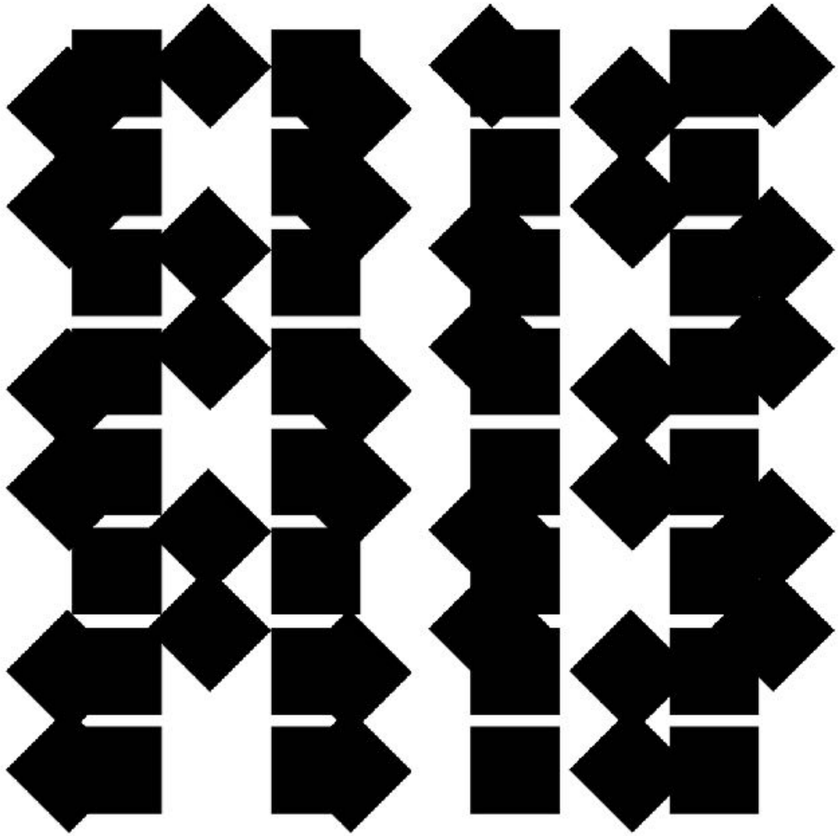
This page, I want to improve the coding in iterations. I try to emphasize the meaning of “development/ extension” in PhyB to be closer to the word "Language" that I need to translate.

同时我想在迭代中，改进原先的编码，我希望更加强调PhyB中关于“发展/延伸”的含义，以更贴近我需要翻译的“Language”这个词，



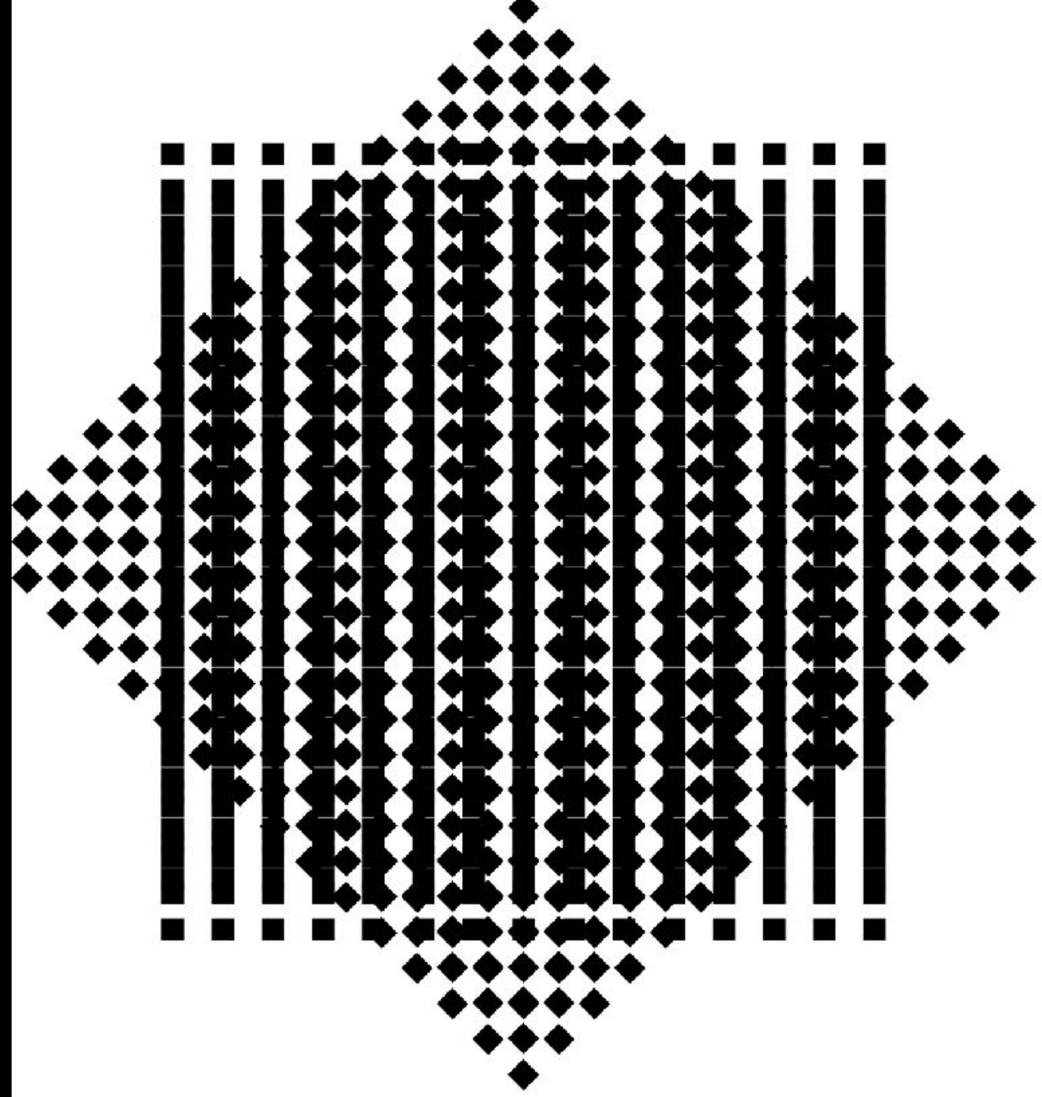
PhyB function (LANGUAGE-related): development/extension 1 (vertical repeat)

1



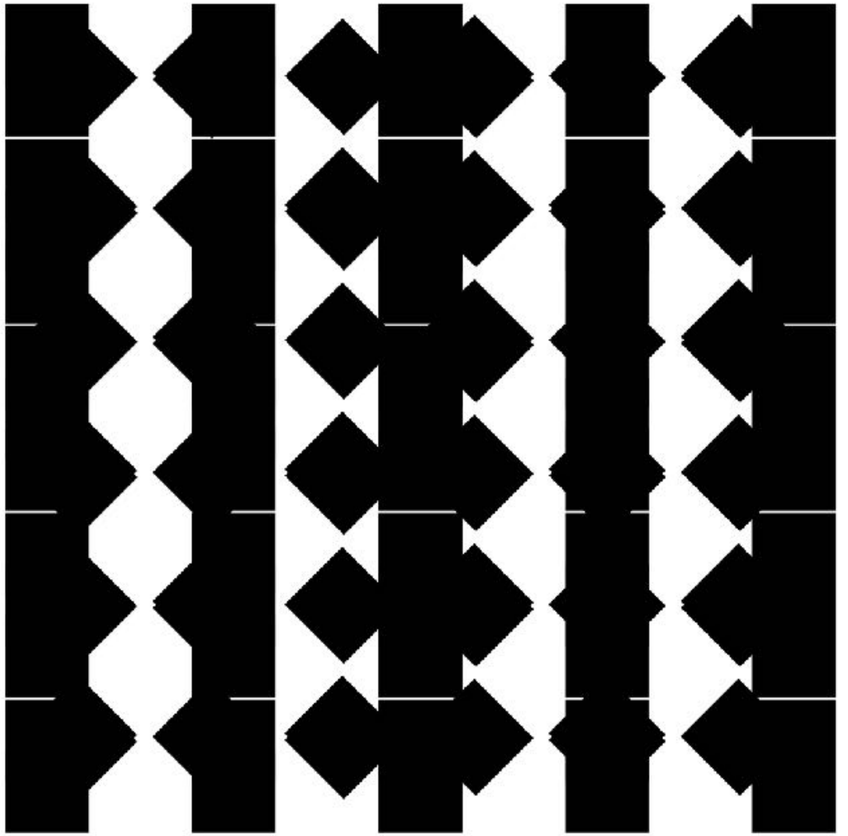
Withdrawal basic dot

2



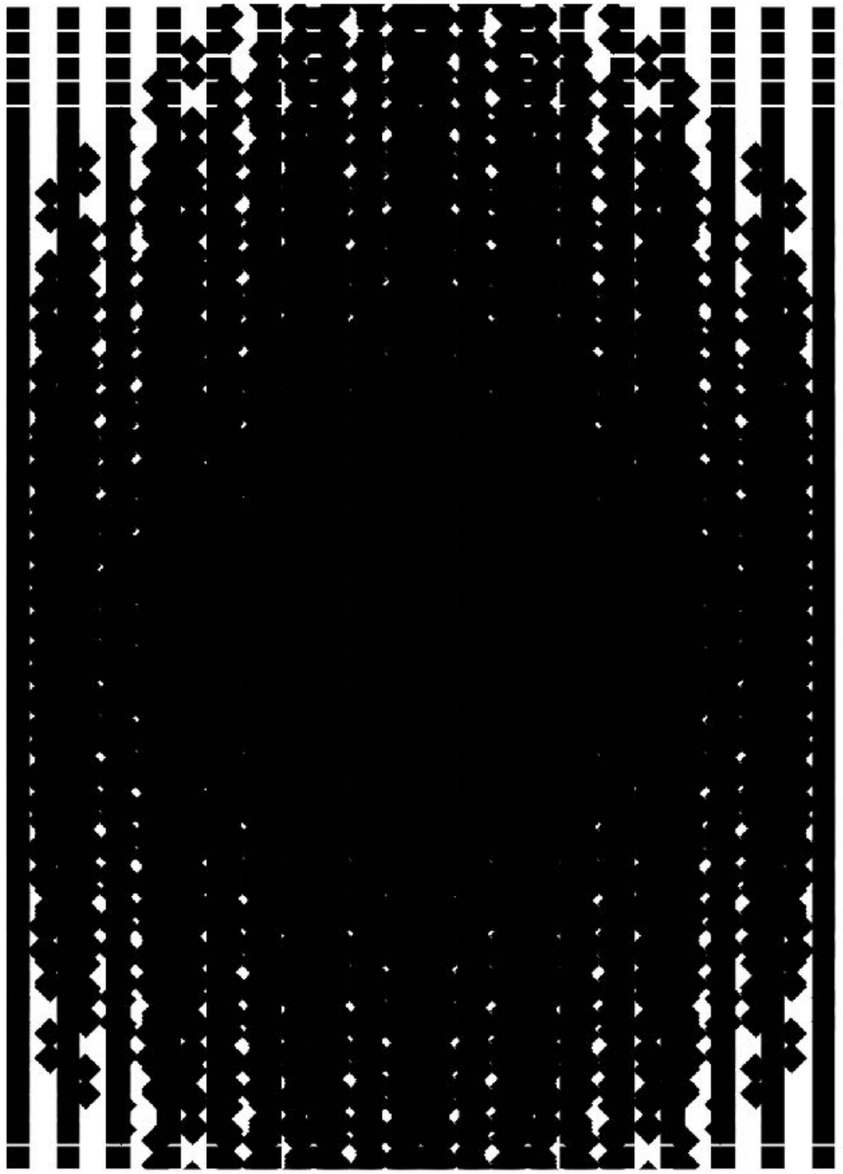
PhyB function (LANGUAGE-related): development/extension 2
(vertical repeat)

3

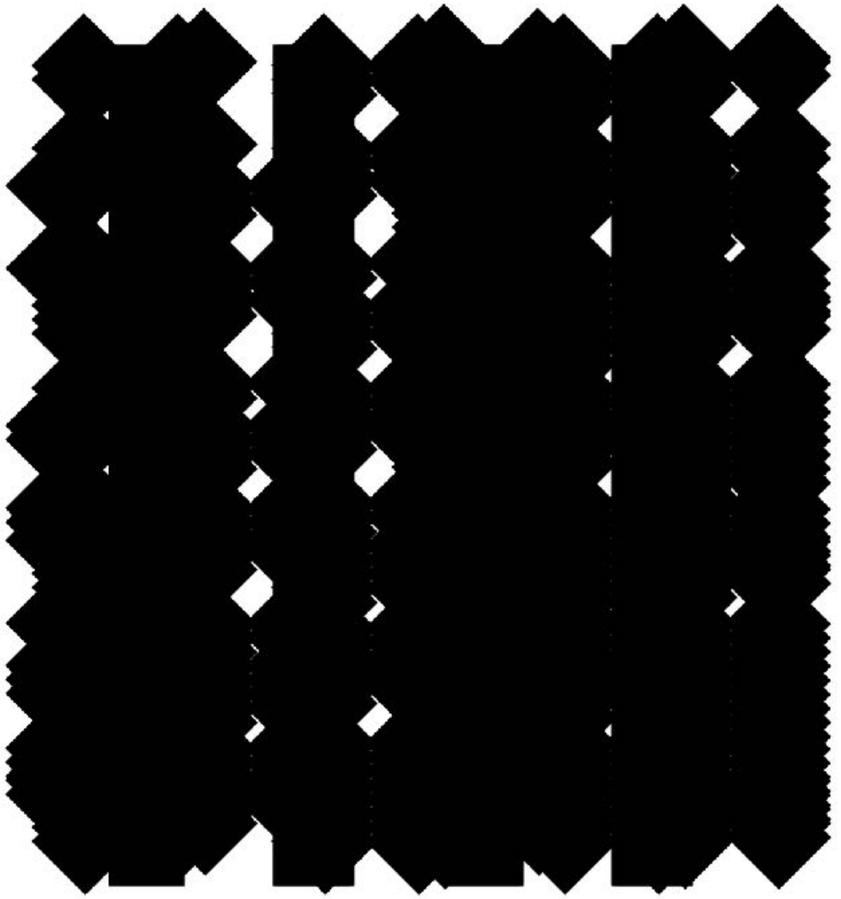


Withdrawal basic dot

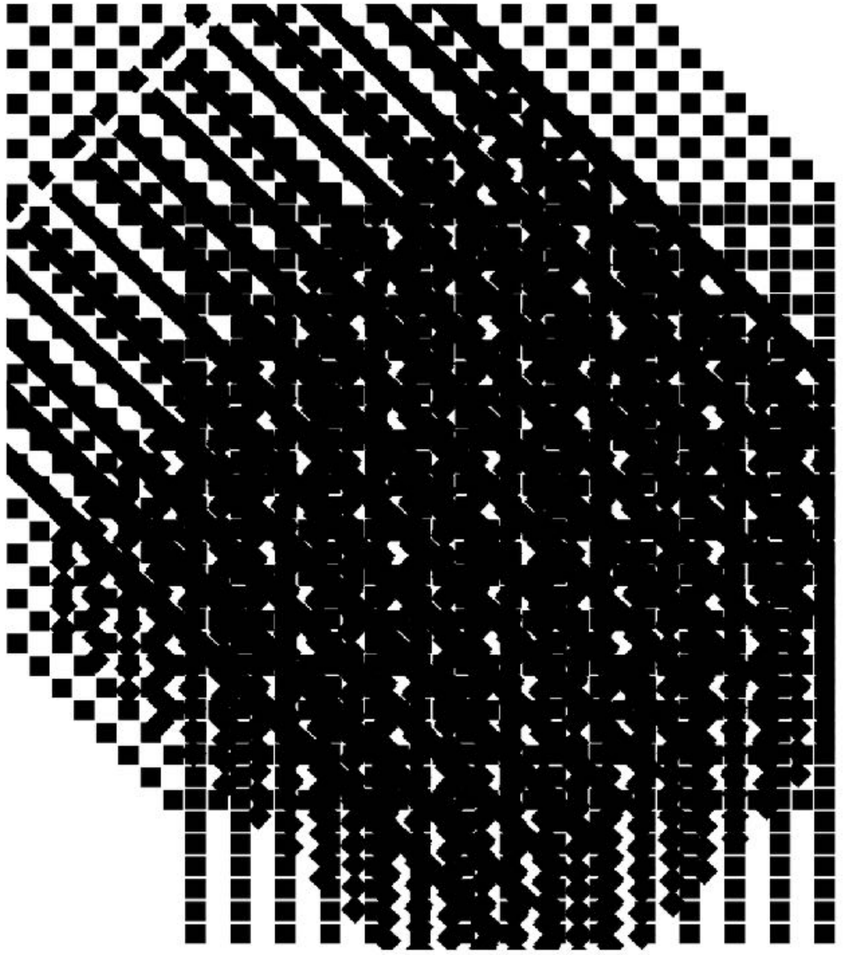
4



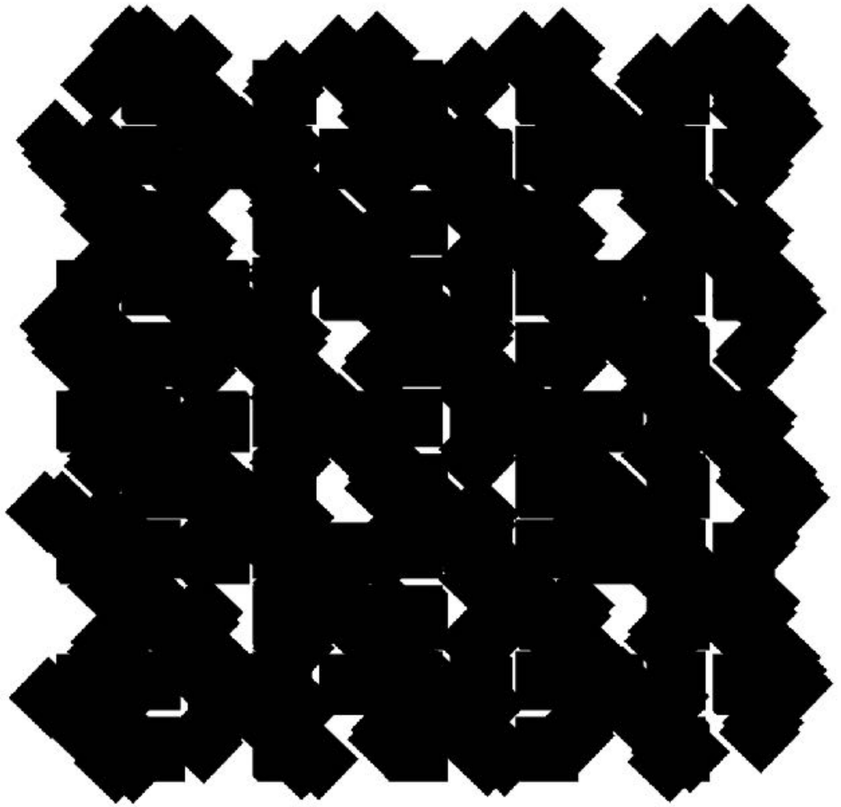
PhyB function (LANGUAGE-related): development/extension 3
(vertical repeat)



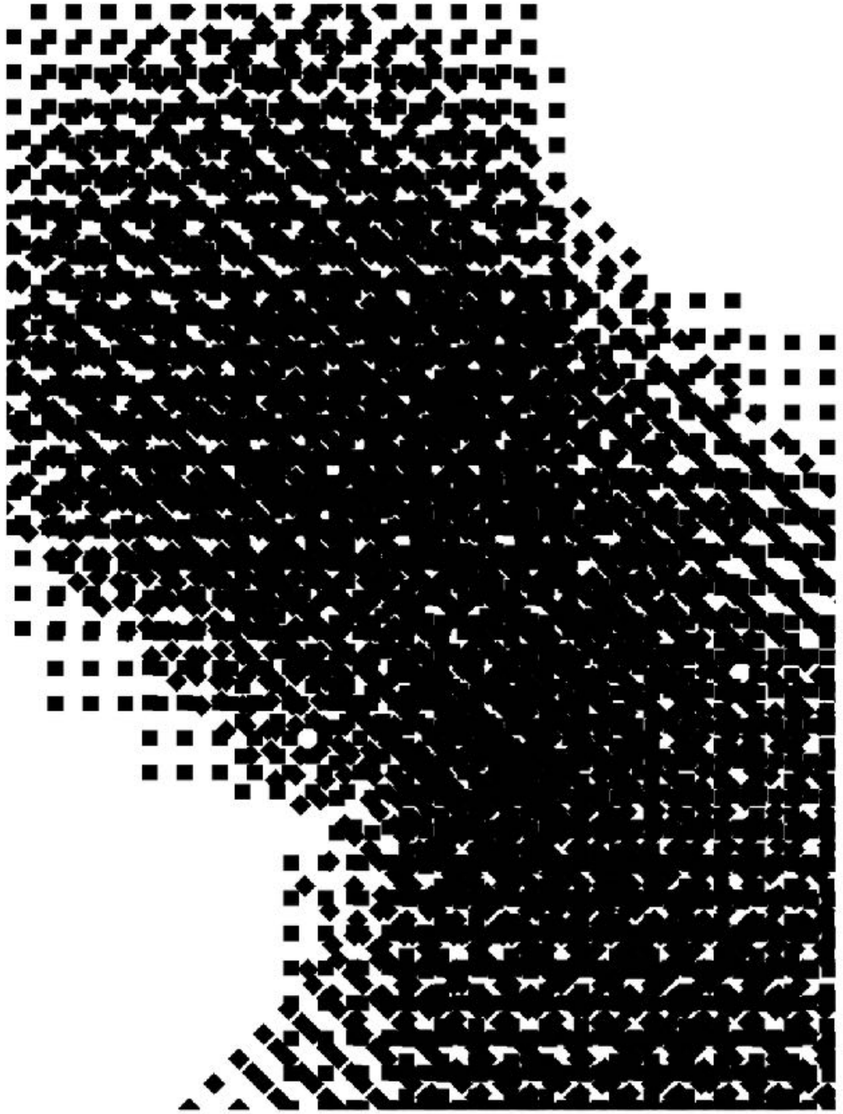
Withdrawal basic dot



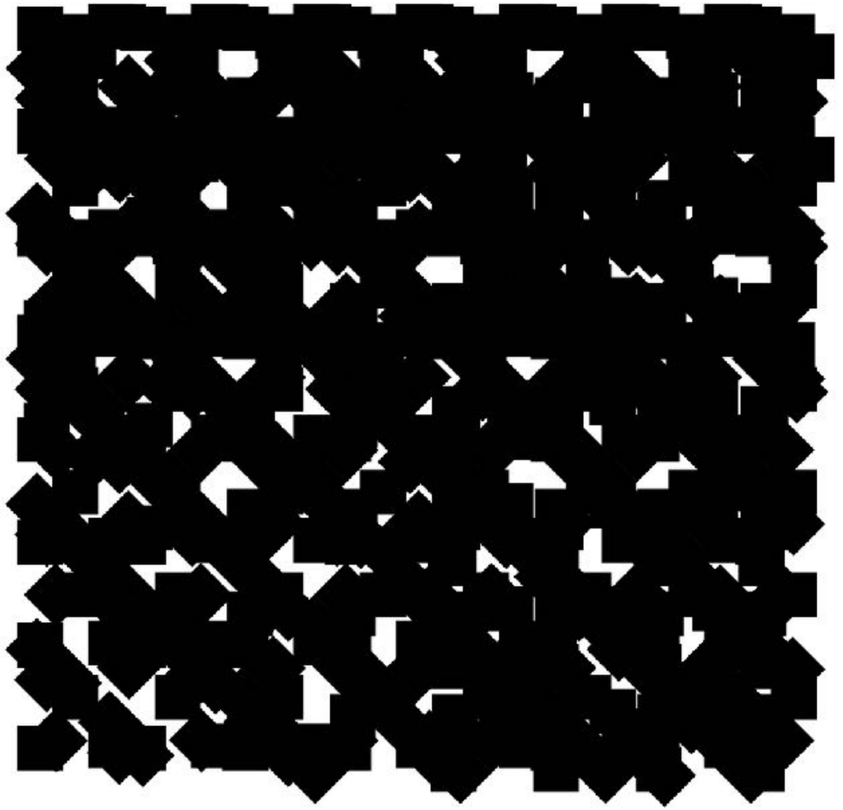
PhyB function (LANGUAGE-related): development/extension
(slanted & vertical repeat)



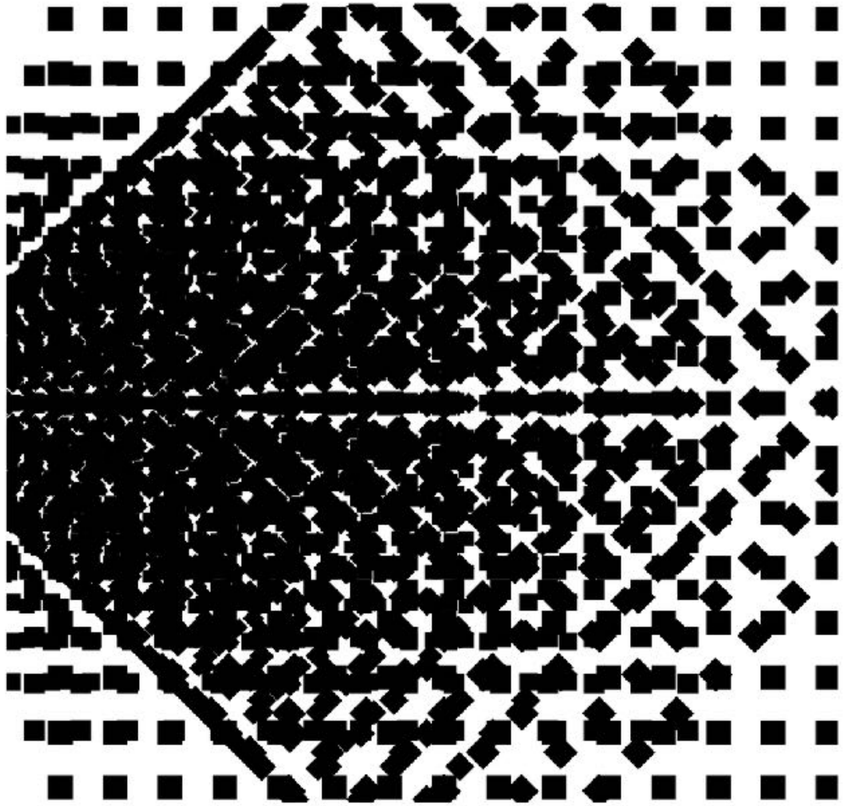
Withdrawal basic dot



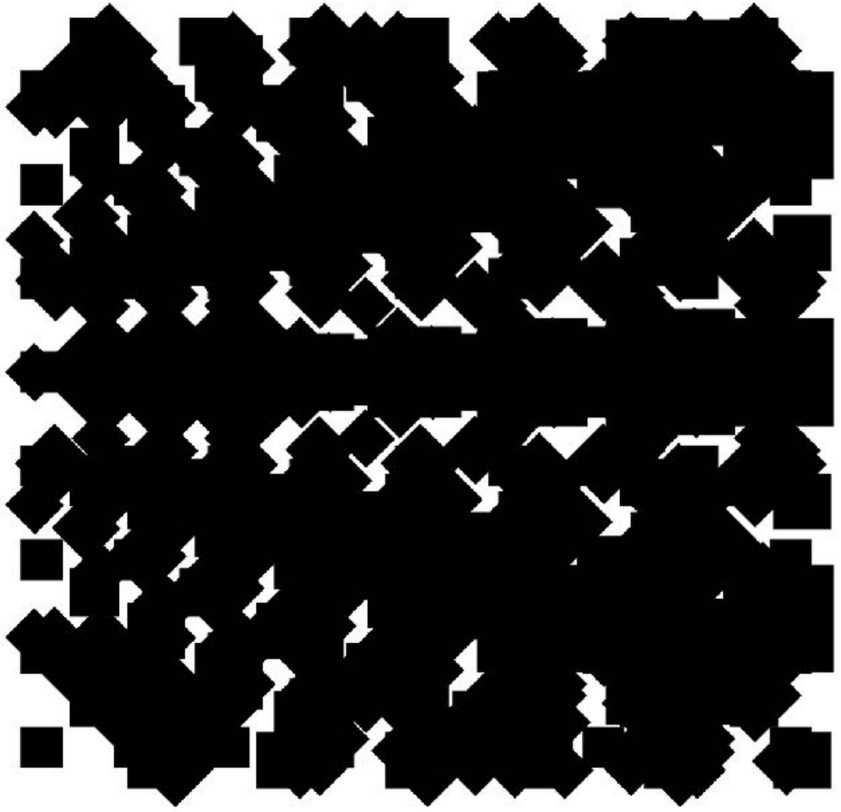
PhyB function (LANGUAGE-related): development/extension
(multi-angle repeat)



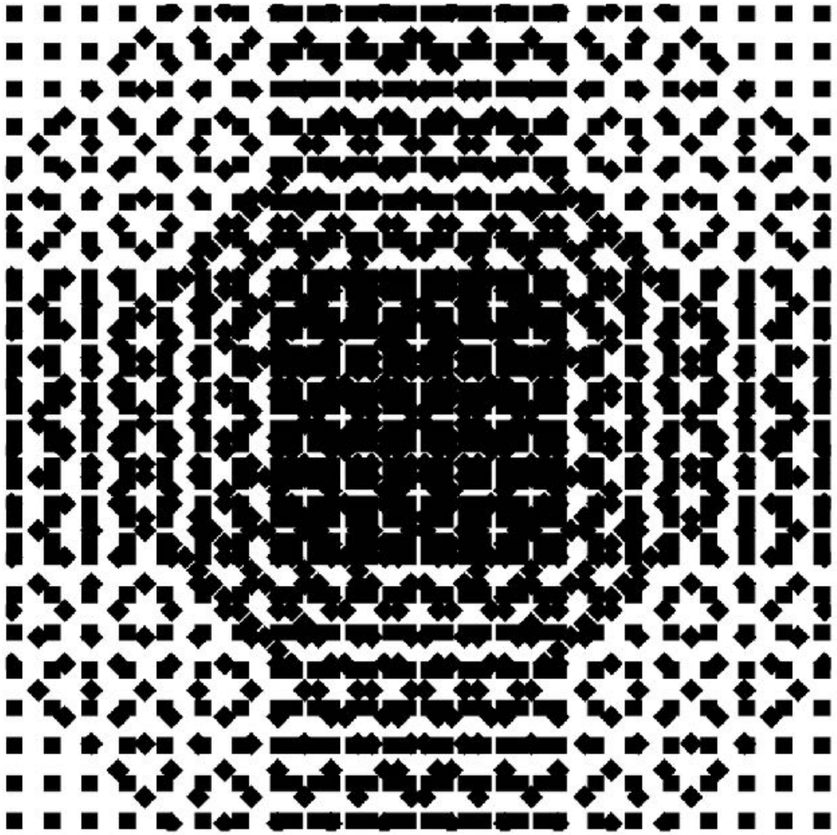
Withdrawal basic dot



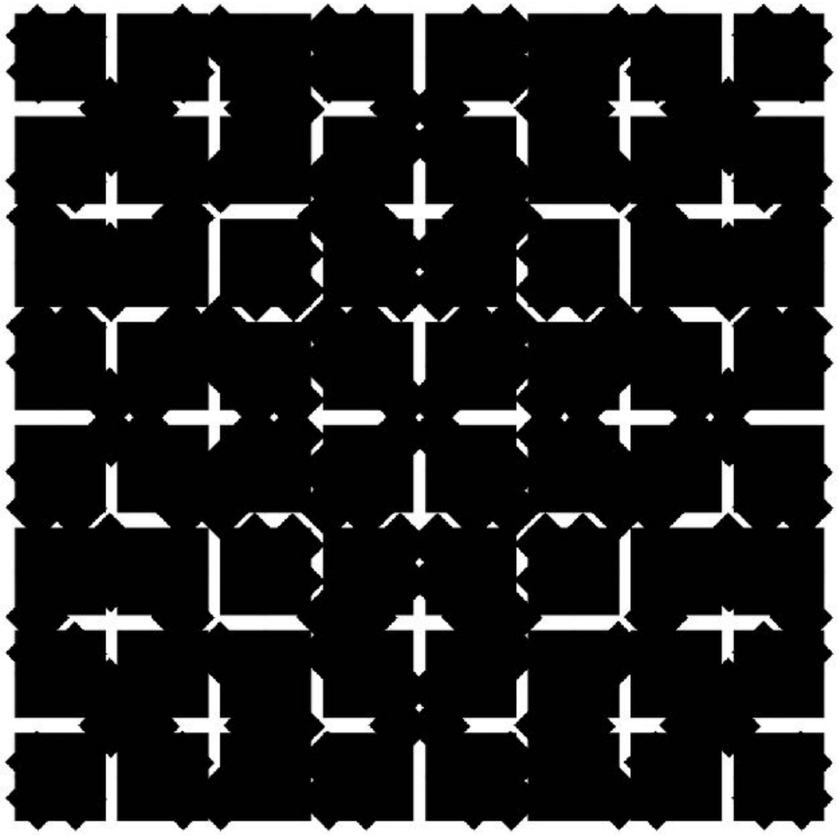
PhyB function (LANGUAGE-related): development/extension
(dispersal - linear repeat 2)



Withdrawal basic dot



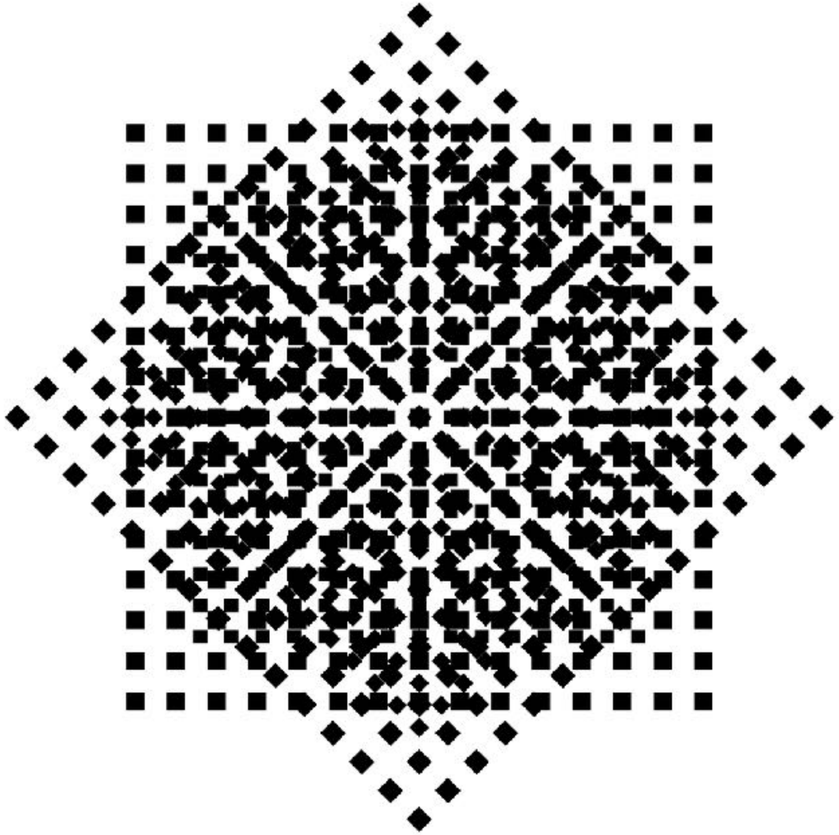
PhyB function (LANGUAGE-related): development/extension
(dispersal - linear repeat 1)



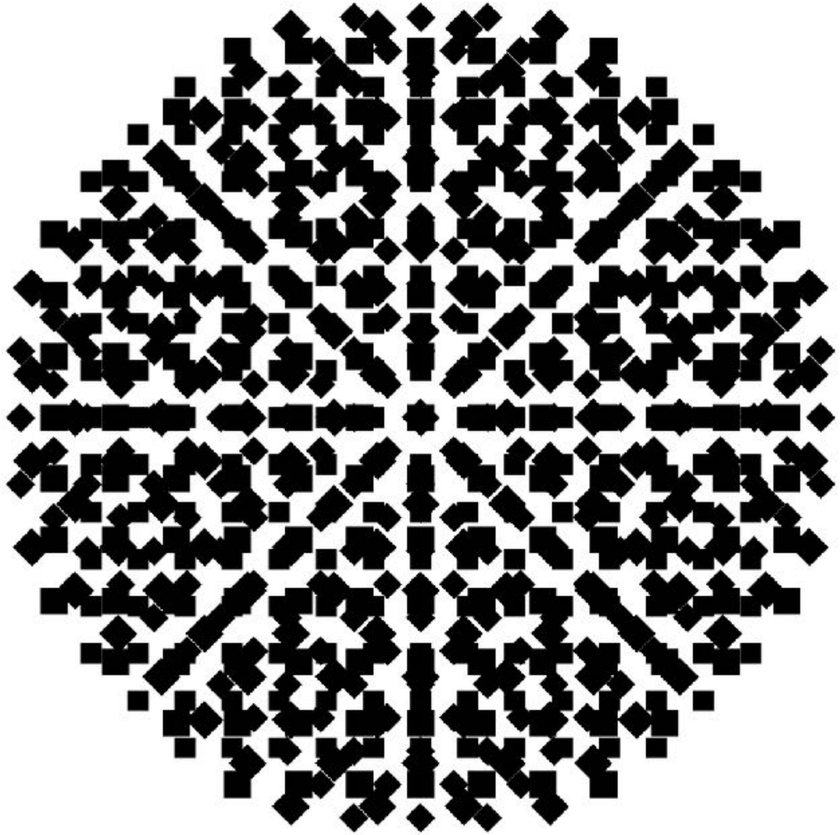
Withdrawal basic dot

Growth is not only about movement in the up/down or left/right, but also about dispersal from the top–down angle.

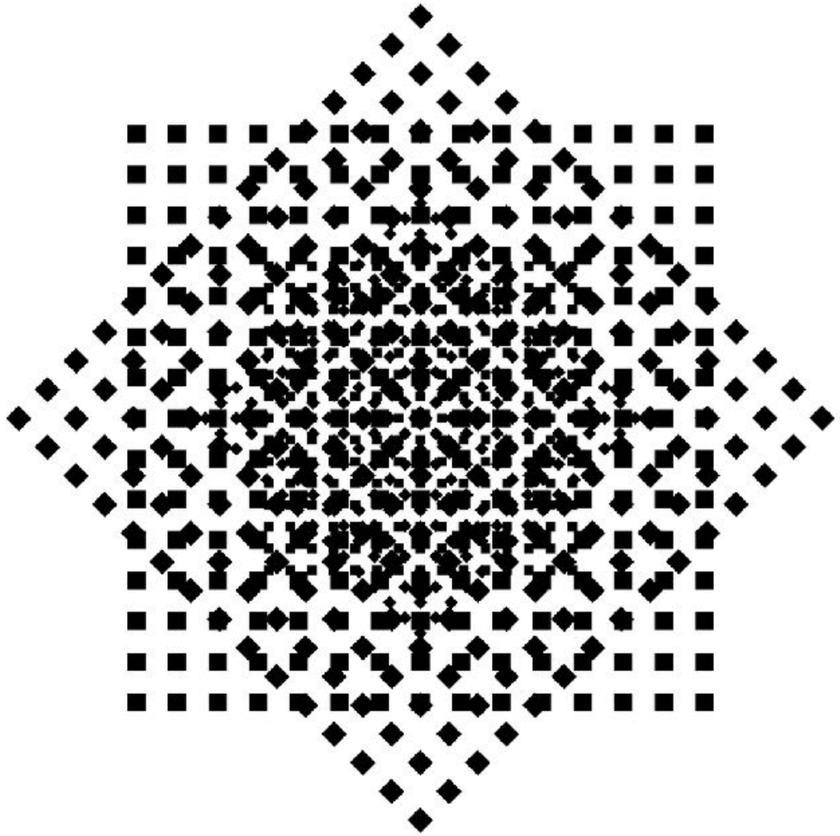
生长模式不只有上下左右的移动，还有俯视角度的扩散



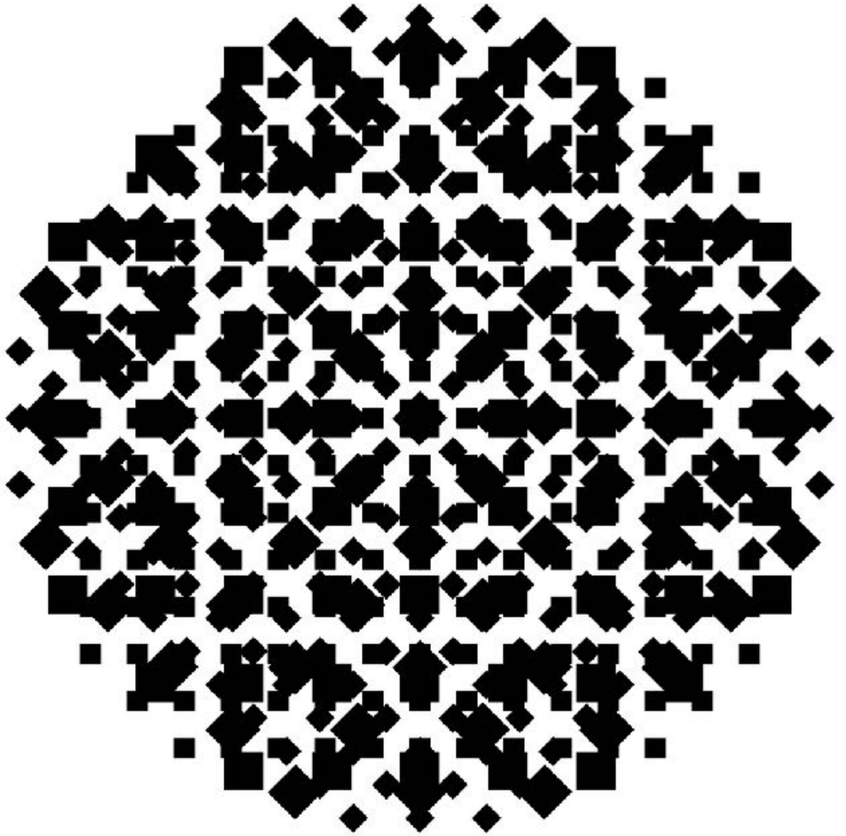
PhyB function (LANGUAGE-related): development/extension (dispersal - center repeat 1)



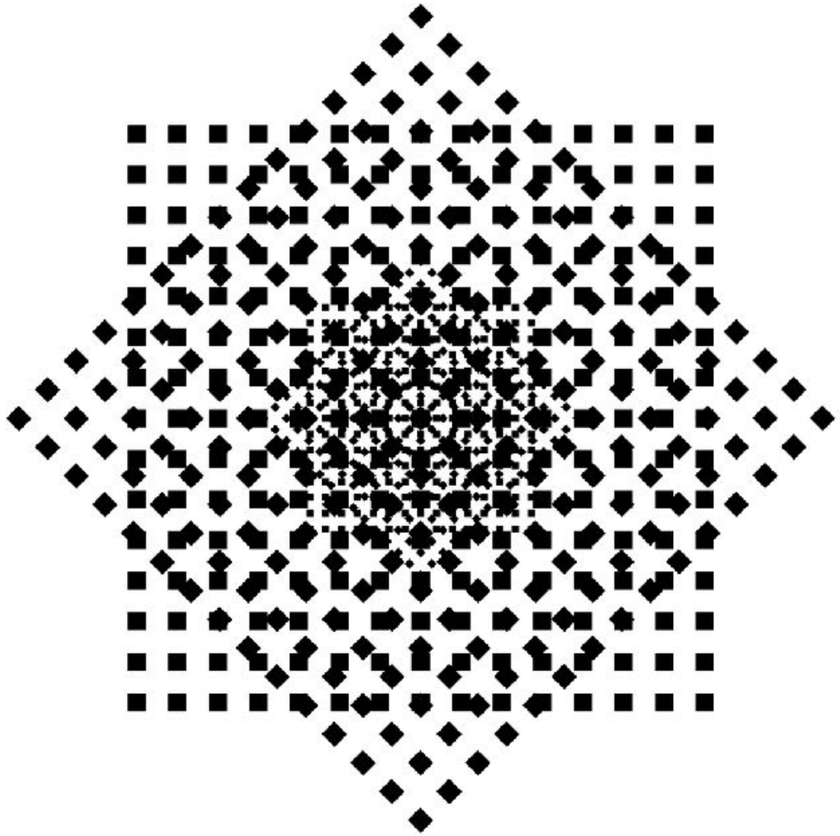
Withdrawal basic dot



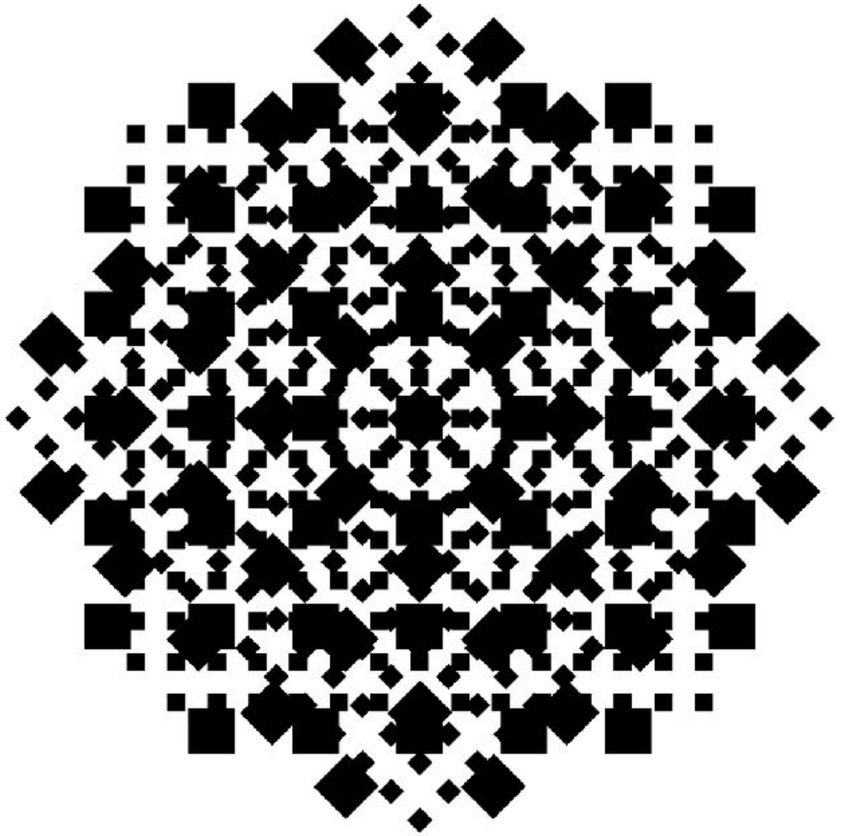
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 2)



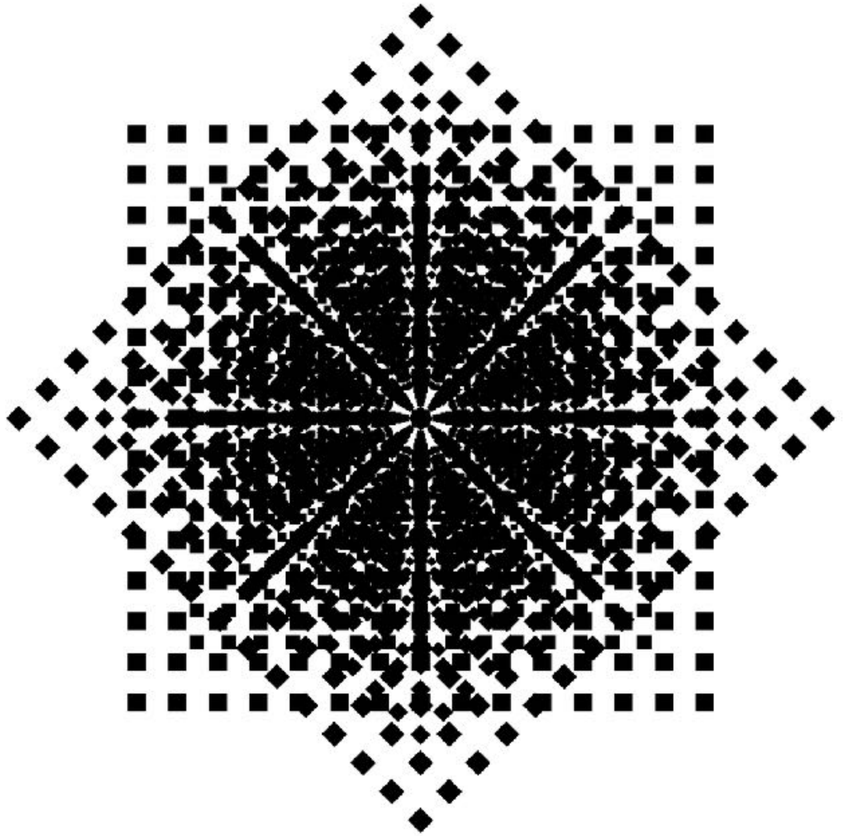
Withdrawal basic dot



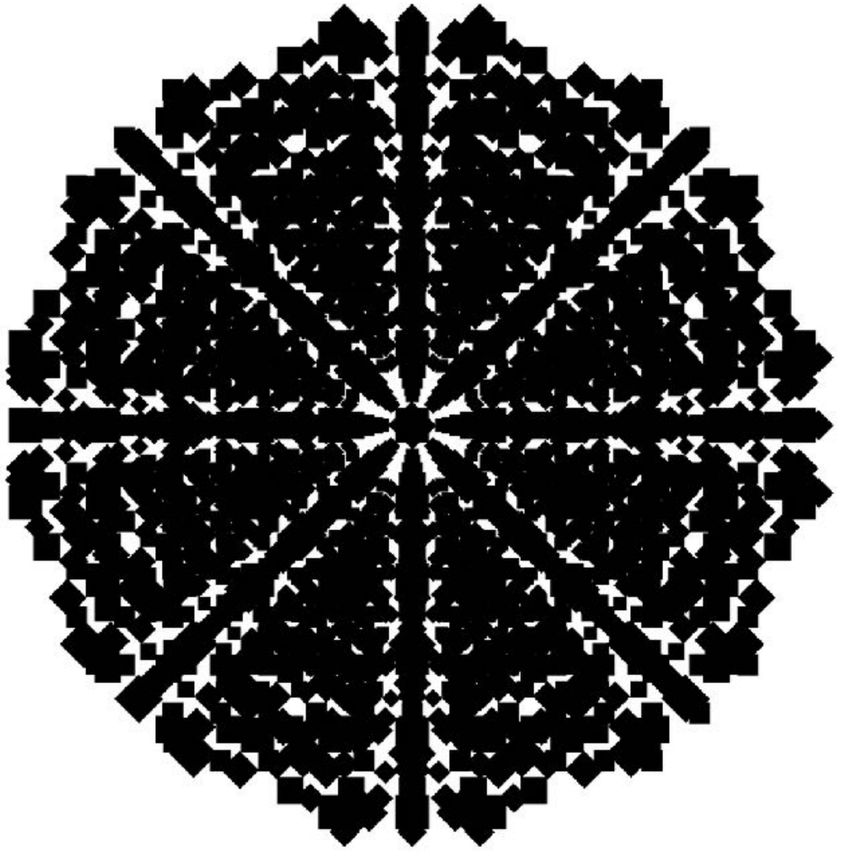
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 3)



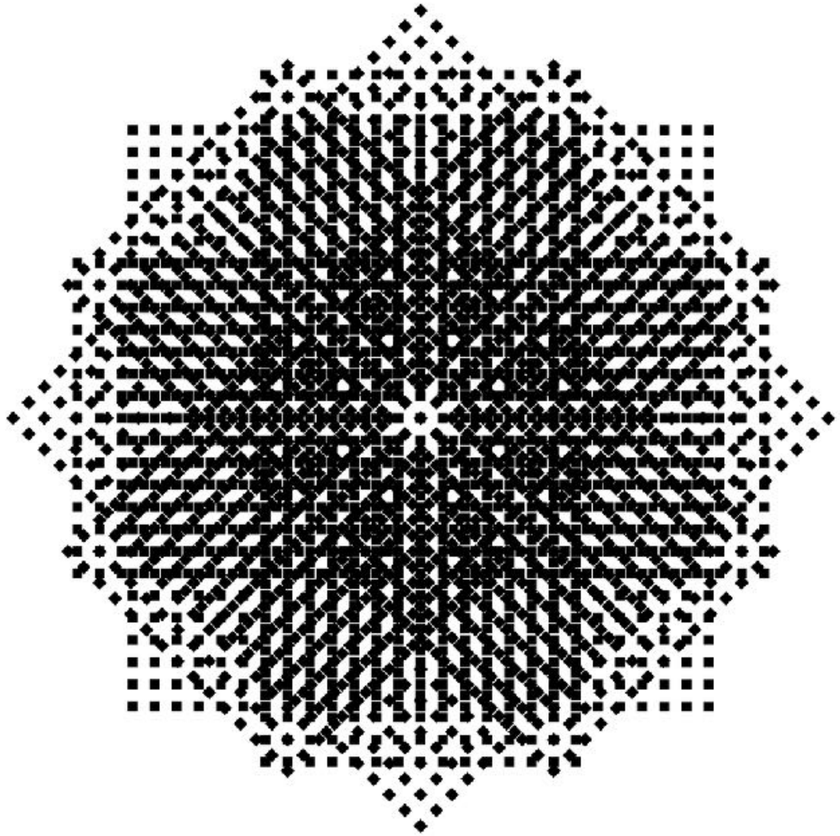
Withdrawal basic dot



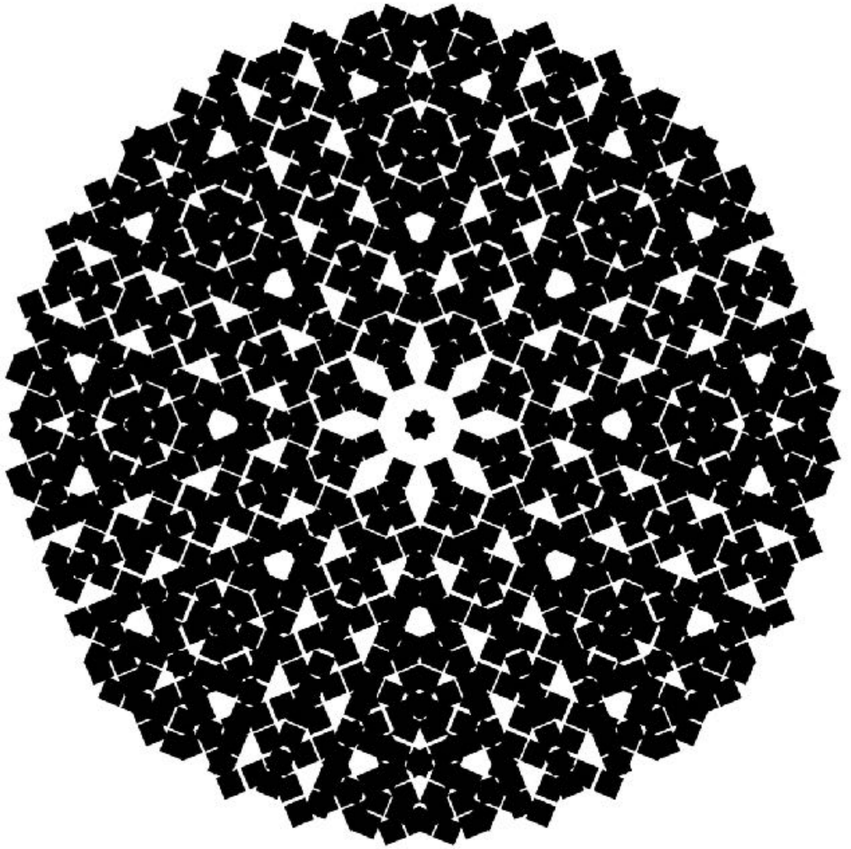
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 4)



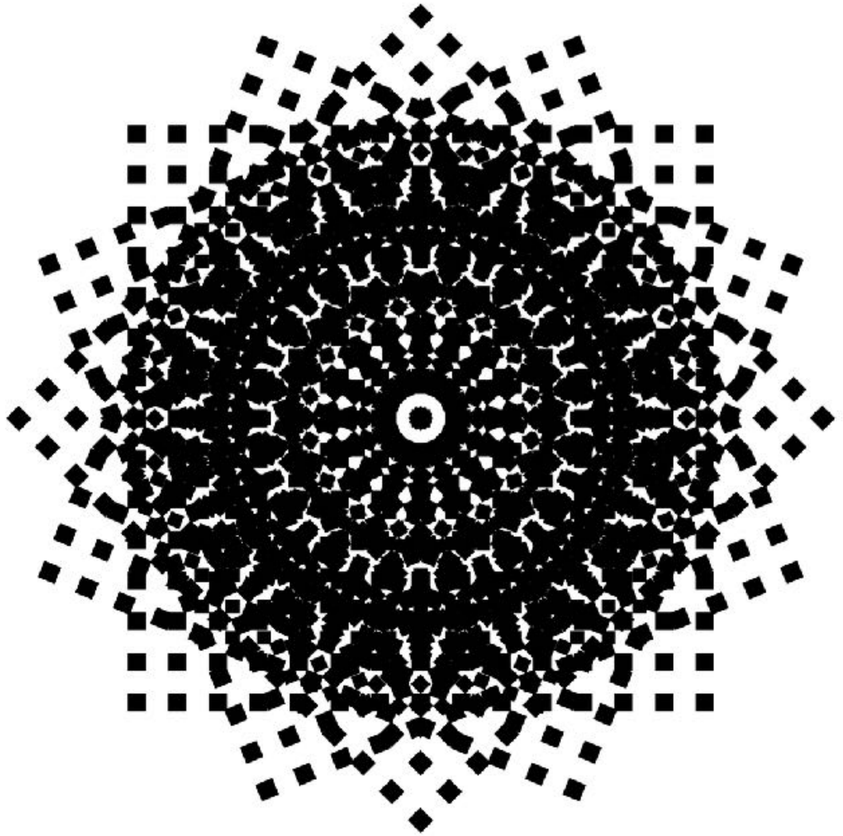
Withdrawal basic dot



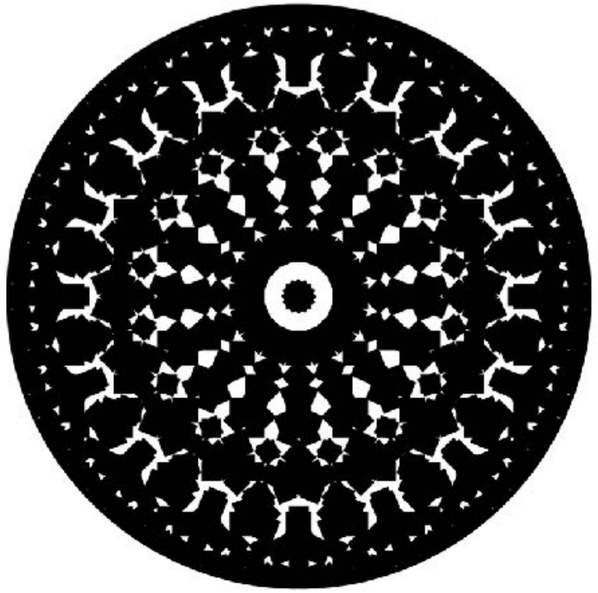
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 5)



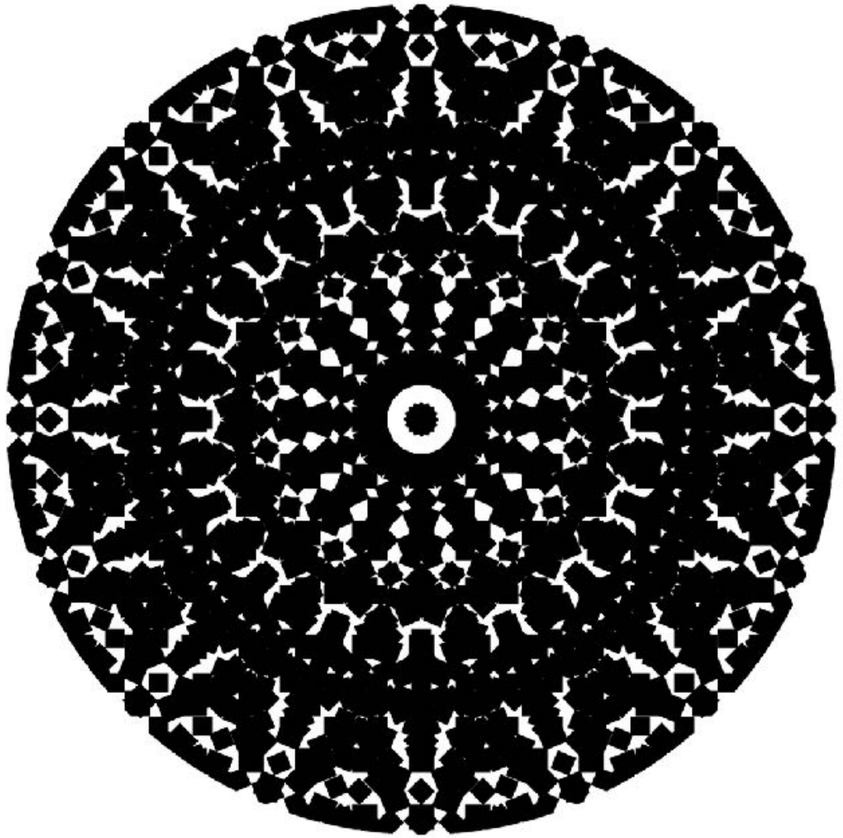
Withdrawal basic dot



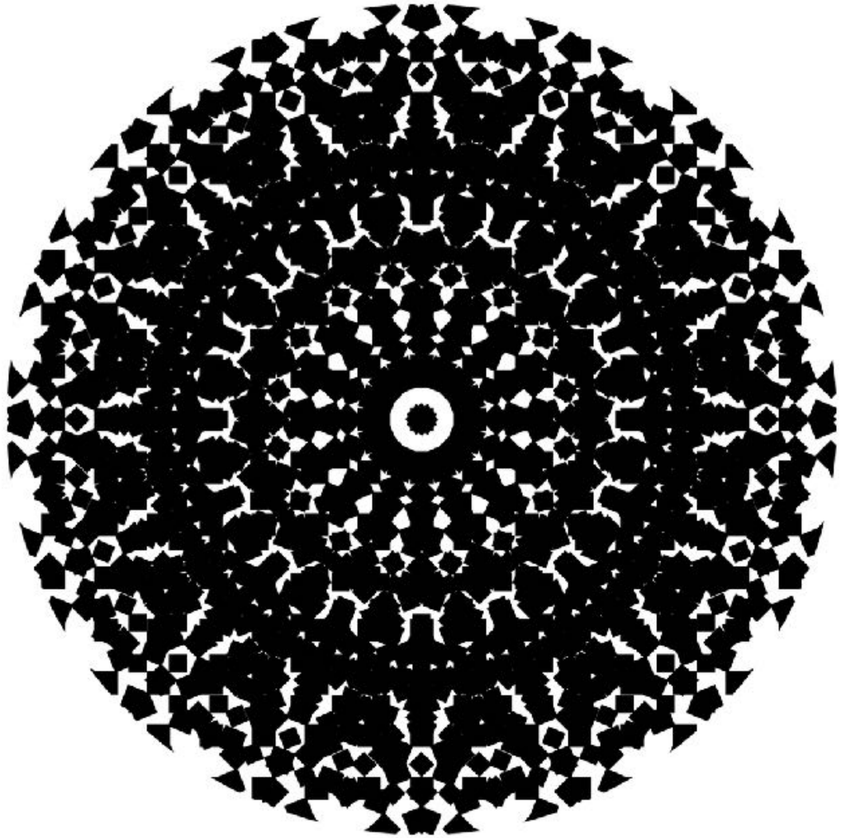
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 6)



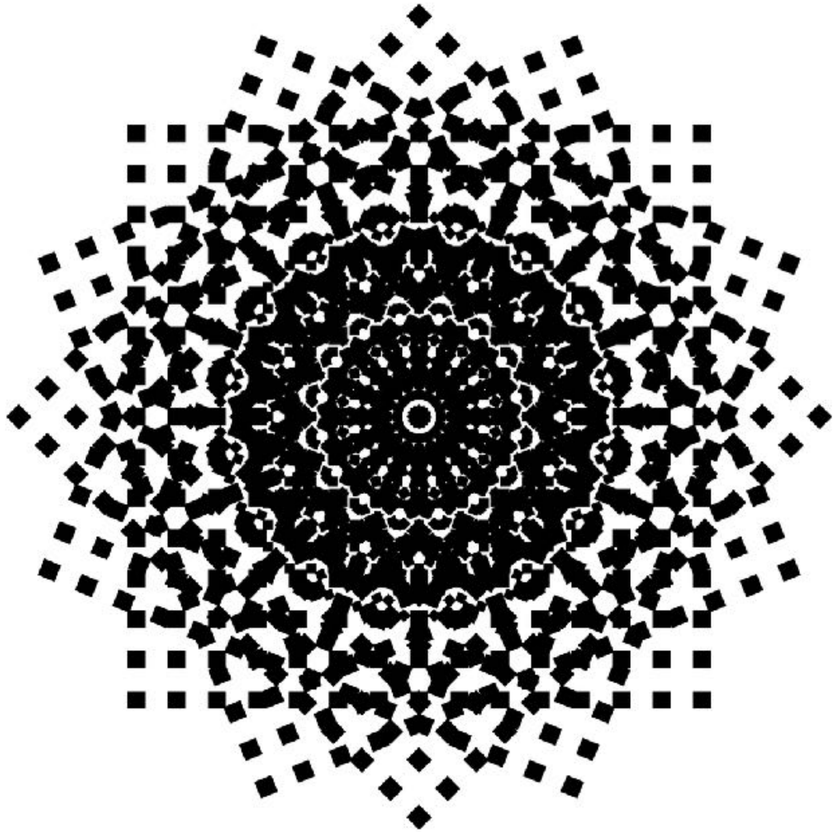
Withdrawal basic dot



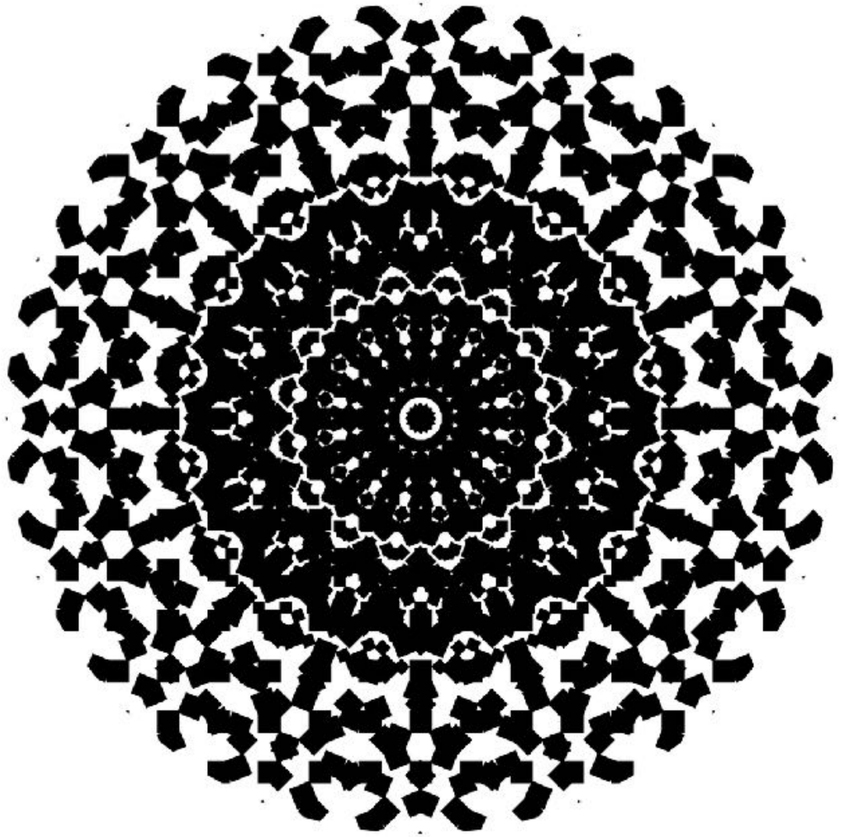
Withdrawal basic dot 2



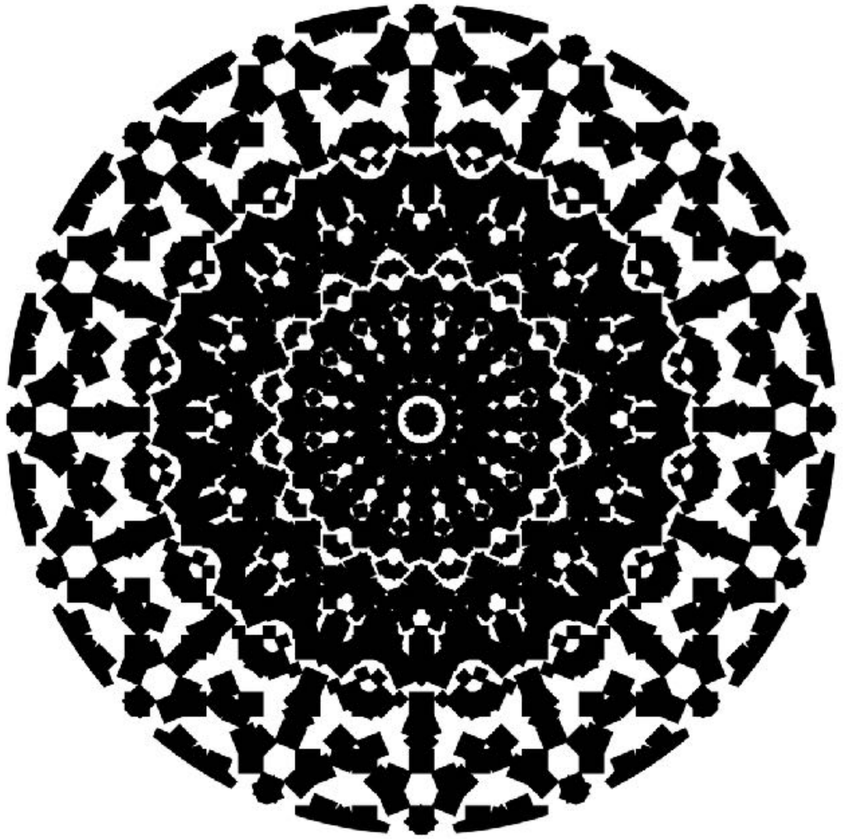
Withdrawal basic dot 3



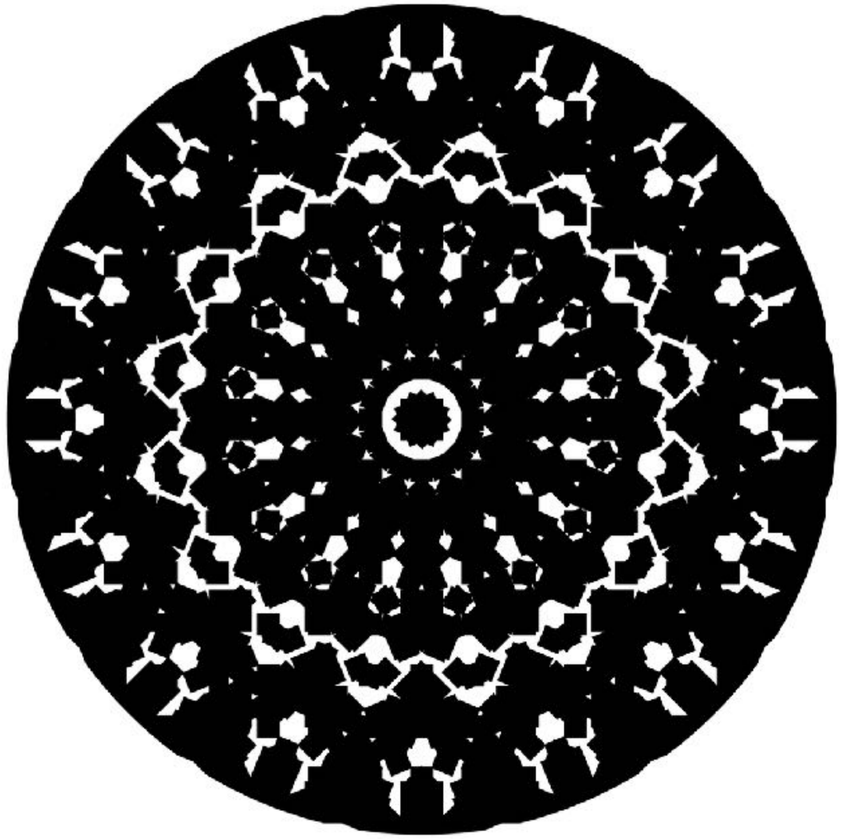
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 7)



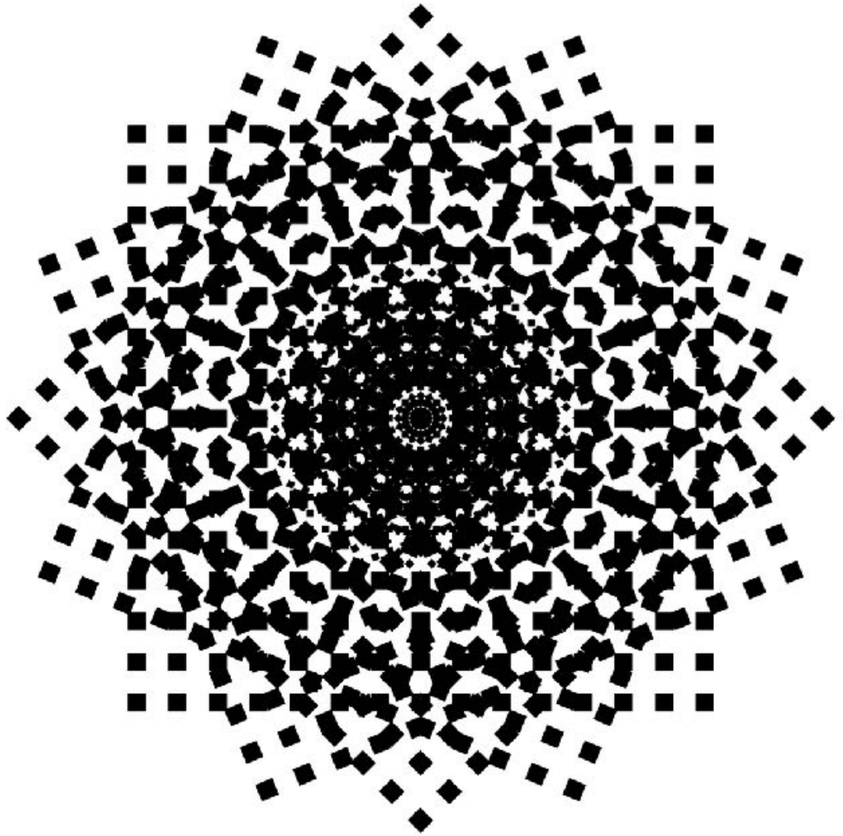
Withdrawal basic dot 1



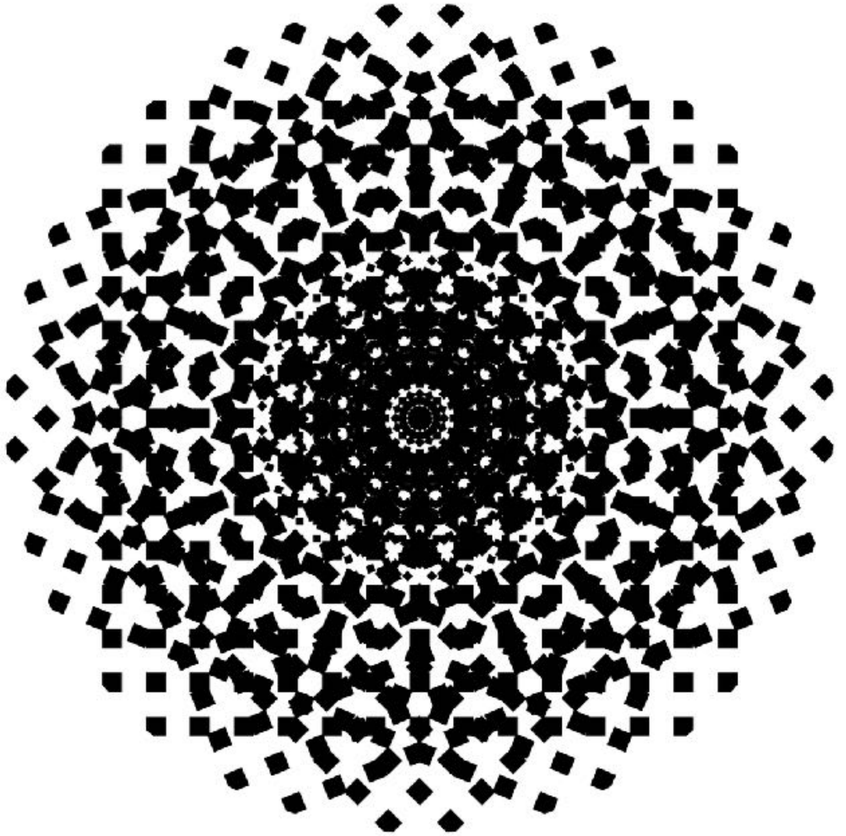
Withdrawal basic dot 2



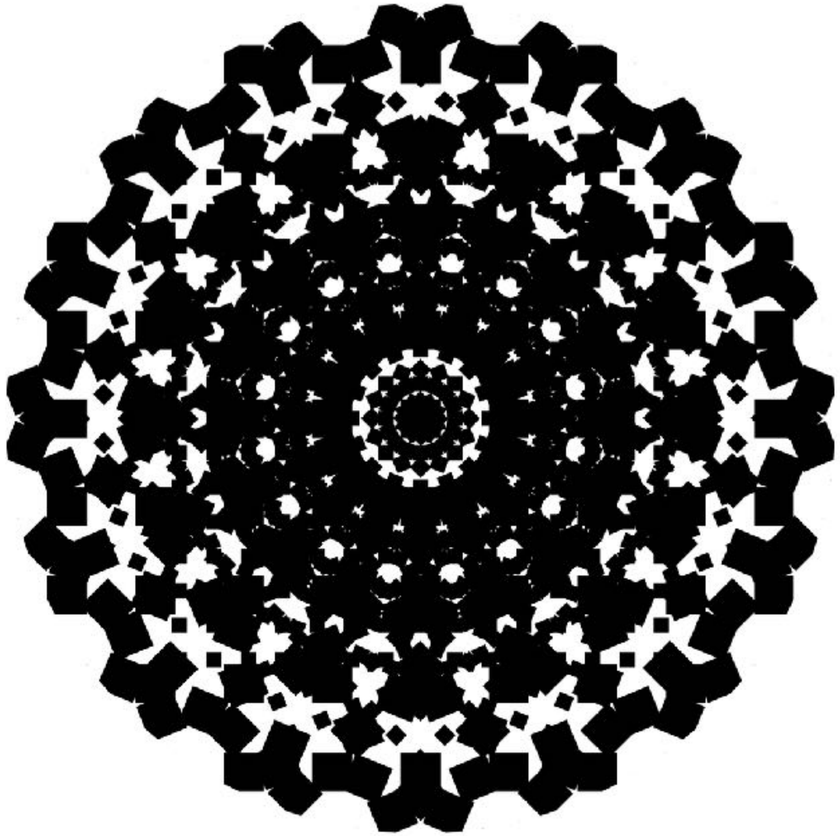
Withdrawal basic dot 3



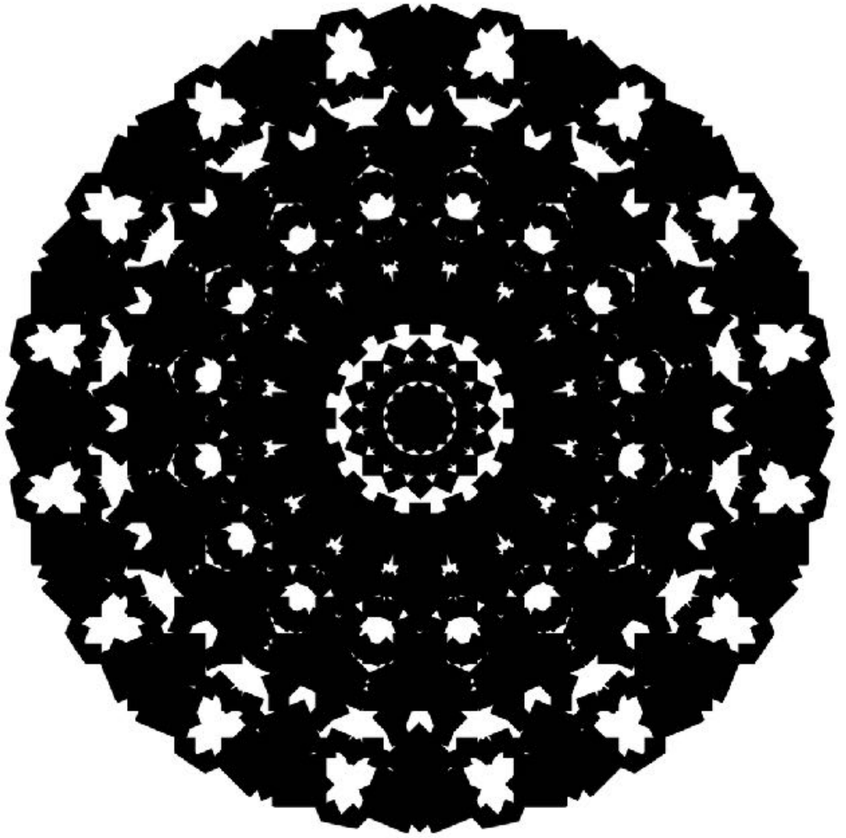
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 8)



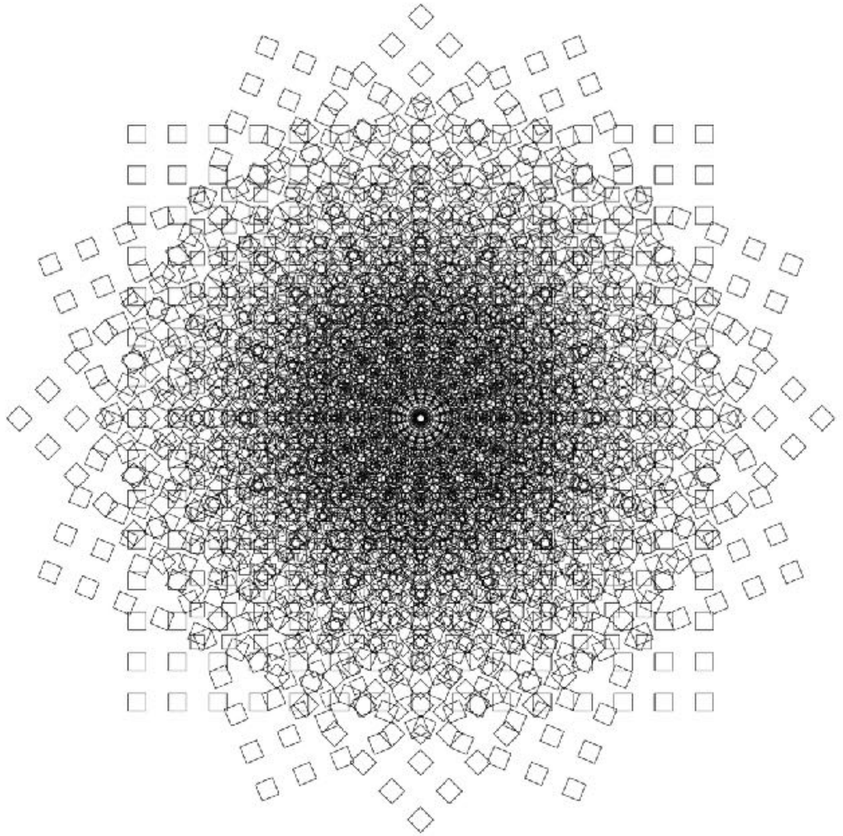
Withdrawal basic dot 1



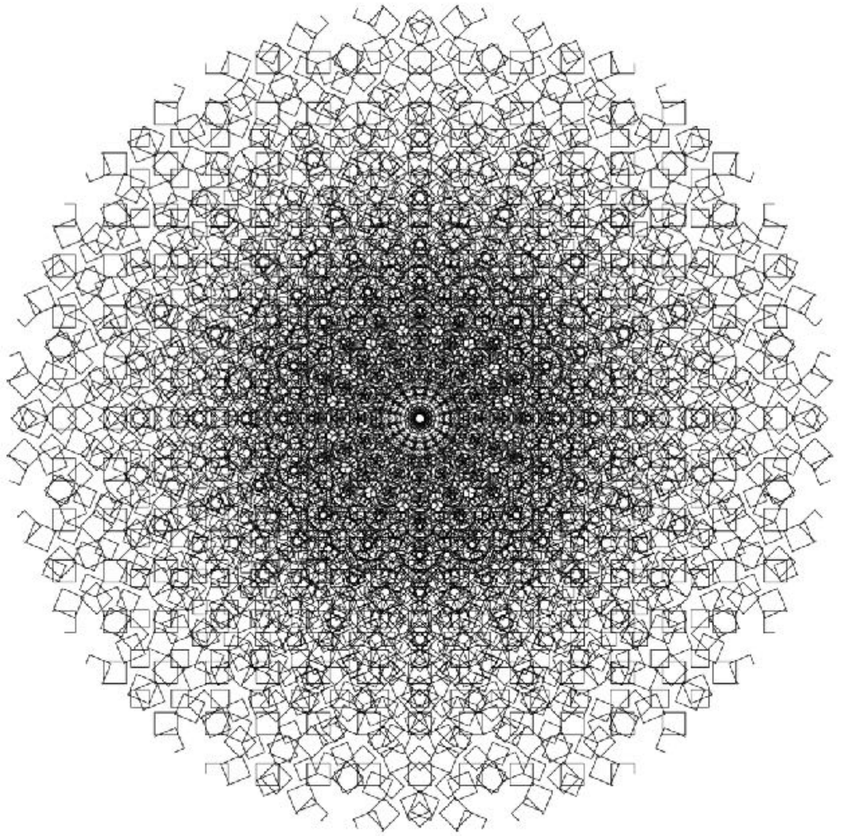
Withdrawal basic dot 2



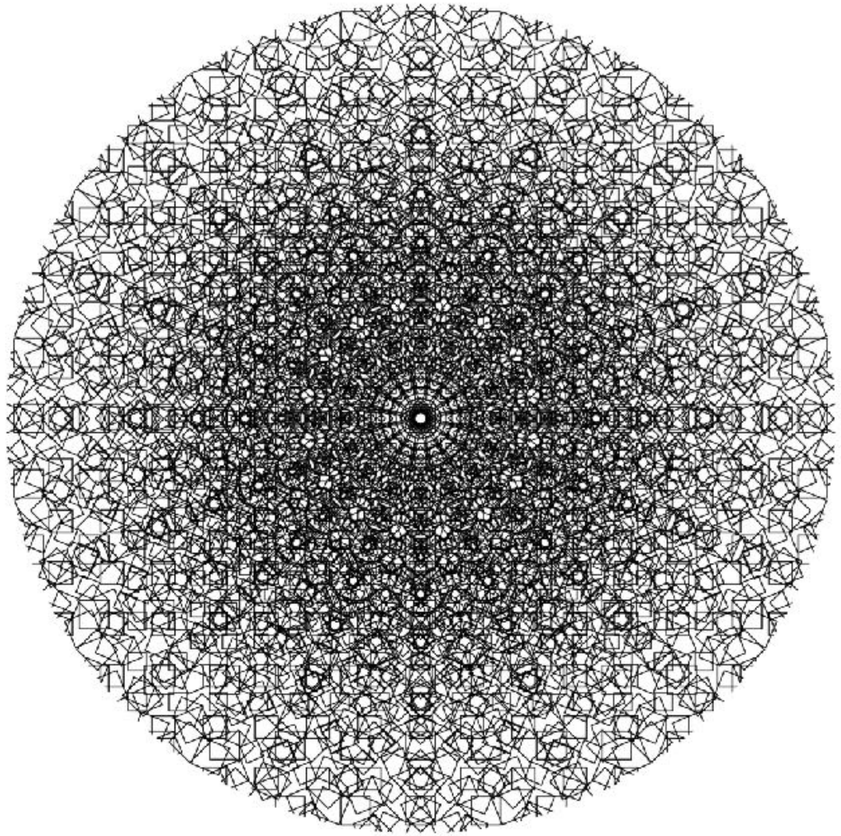
Withdrawal basic dot 3



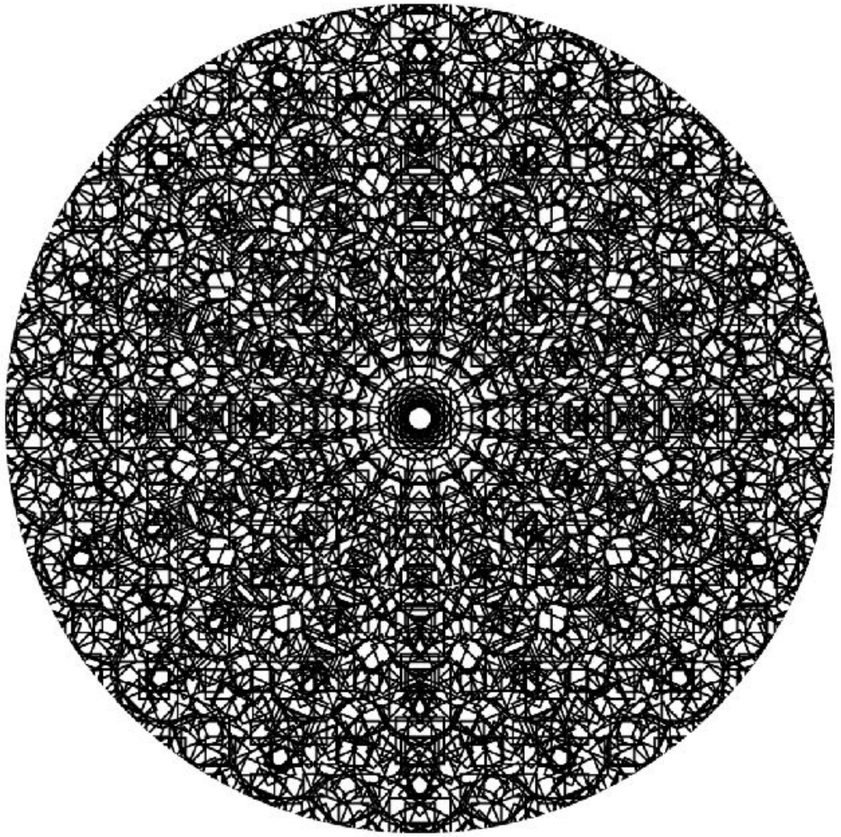
PhyB function (LANGUAGE-related): development/extension
(dispersal - center repeat 9)



Withdrawal basic dot 1



Withdrawal basic dot 2



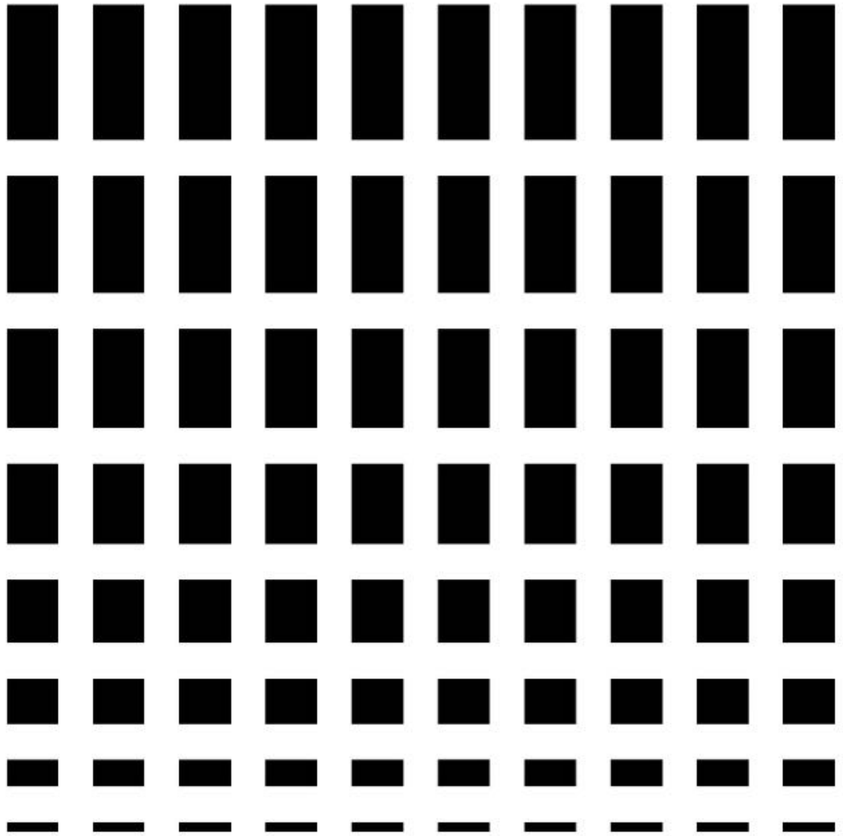
Withdrawal basic dot 3

I want to refine the graphics based on the full functions of PhyB itself, to include all its features but not just the language-related ones.

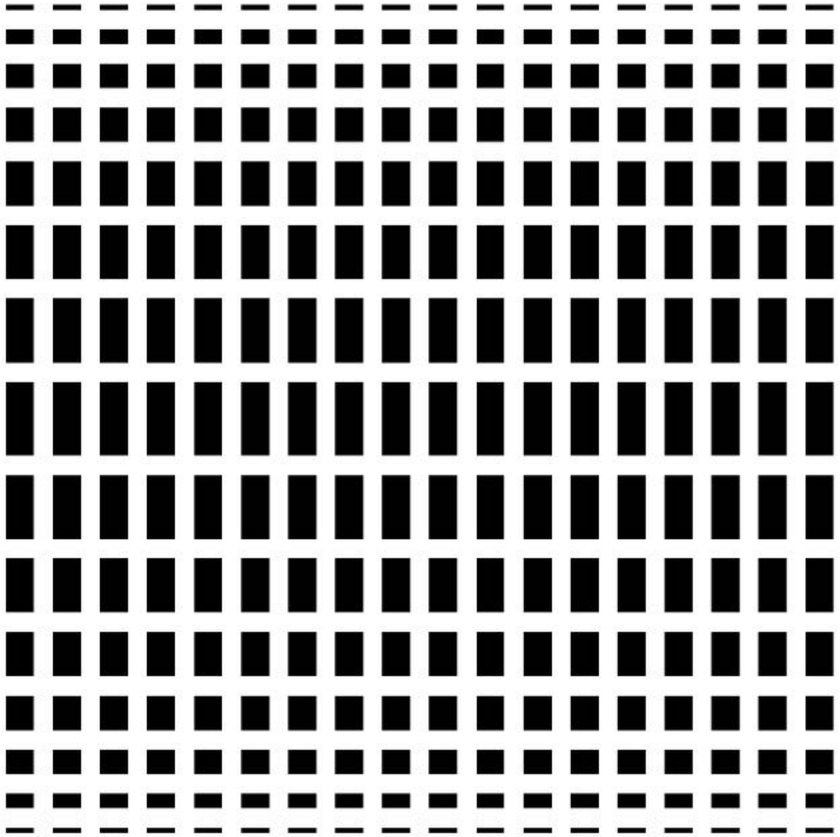
PhyB not only has the function of extension, but also has the function of bidirectional feature – make it long/ short.

我想根据 PhyB本身的全部特征来改进图形，以包含其所有功能，而不仅是与语言相关的。

PhyB不仅仅只有延长功能，还有双向调节的功能 —— 伸长/缩短。



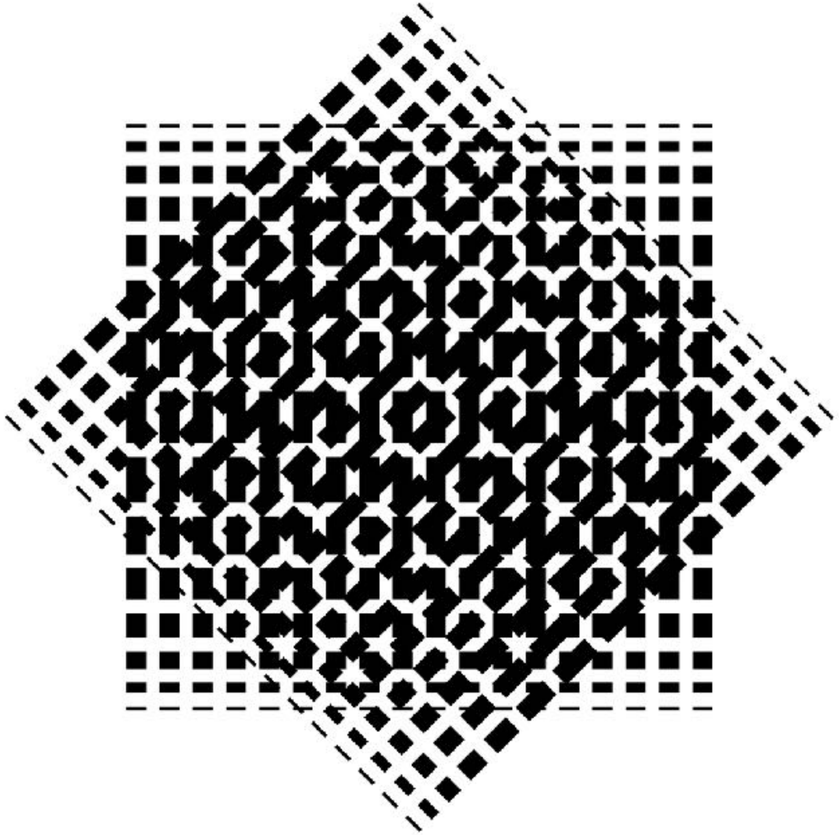
PhyB function (functions of itself):
photomorphogenesis / shape adjustment (forms compact structures and grows rapidly upwards)



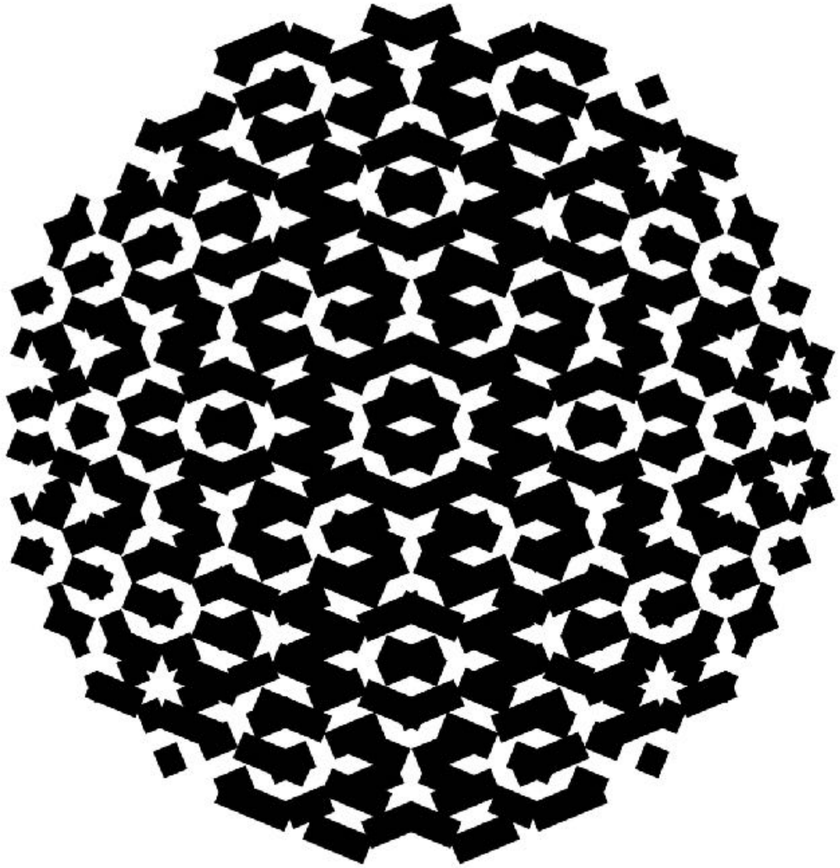
Promote or inhibit growth

PhyB has the function of regulating the flowering period, so I use different frequencies of rotation to represent different flowering periods.

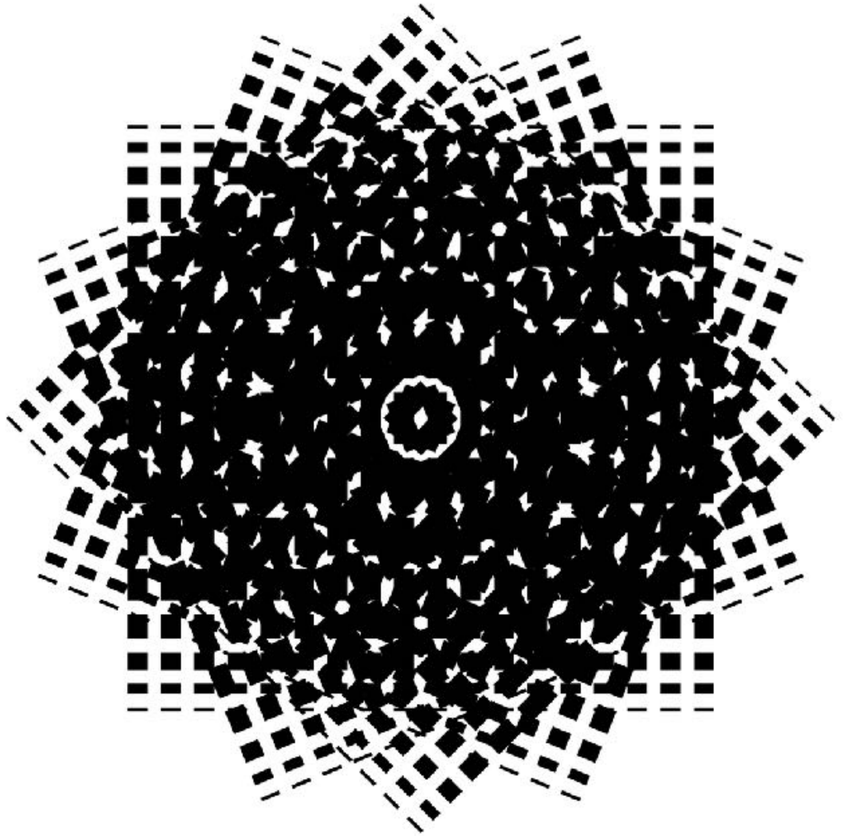
PhyB具有调节花期的功能，因此我用不同频率的旋转代表不同的花期。



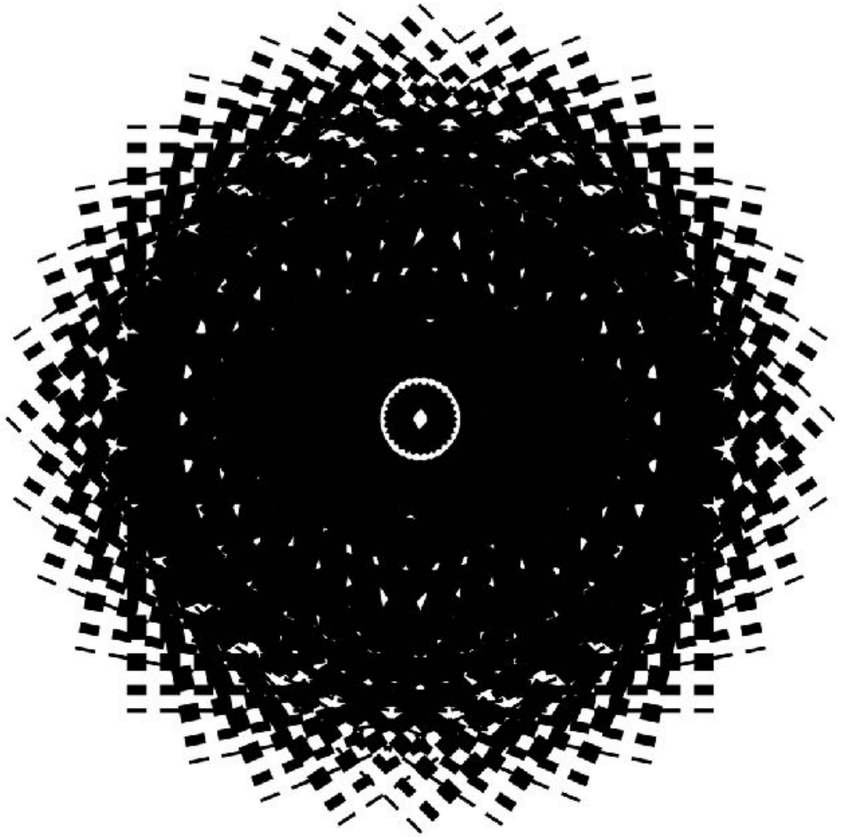
PhyB function (functions of itself):
adjustment of flowering time 1



Withdrawal basic dot



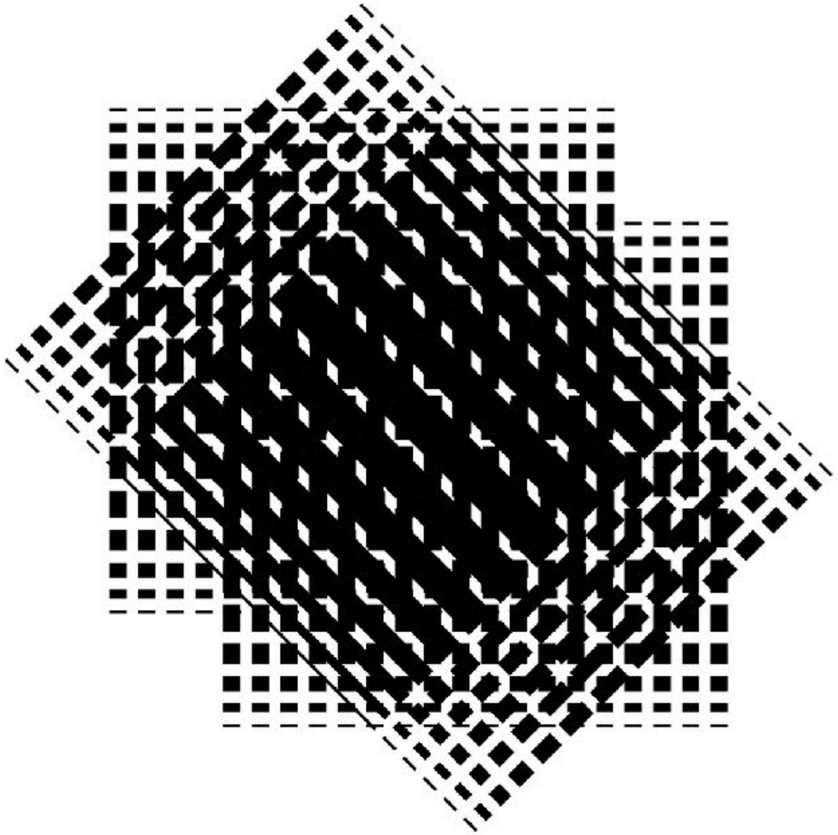
PhyB function (functions of itself):
adjustment of flowering time 2



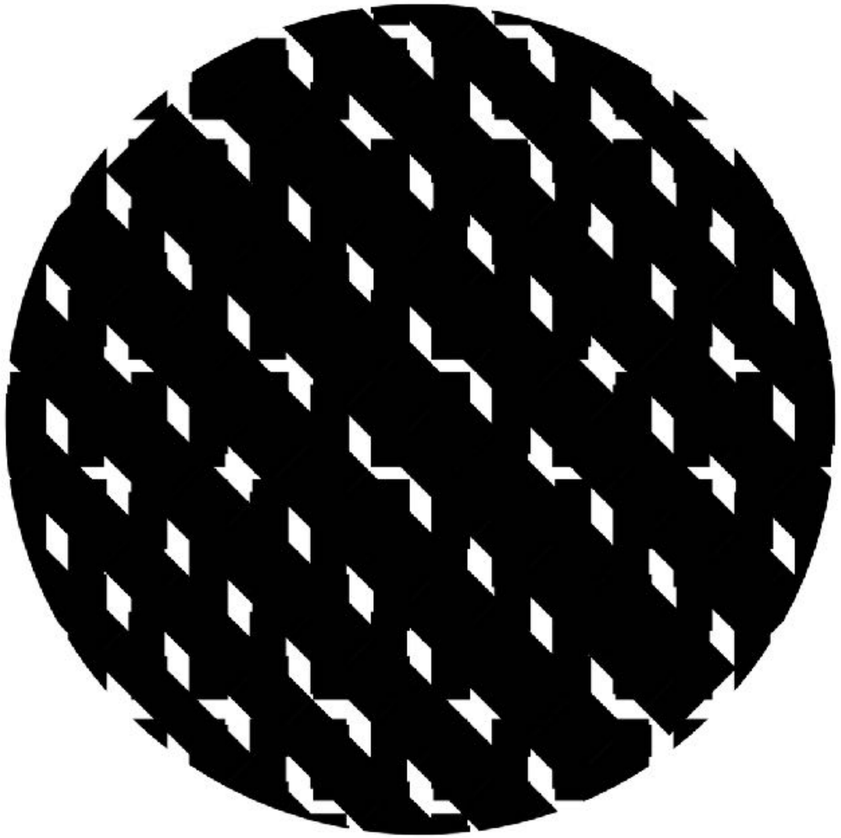
PhyB function (functions of itself):
adjustment of flowering time 3

Next, I performed “extension/ development” – related actions on the redesigned PhyB code (to be closer to the words “language”)

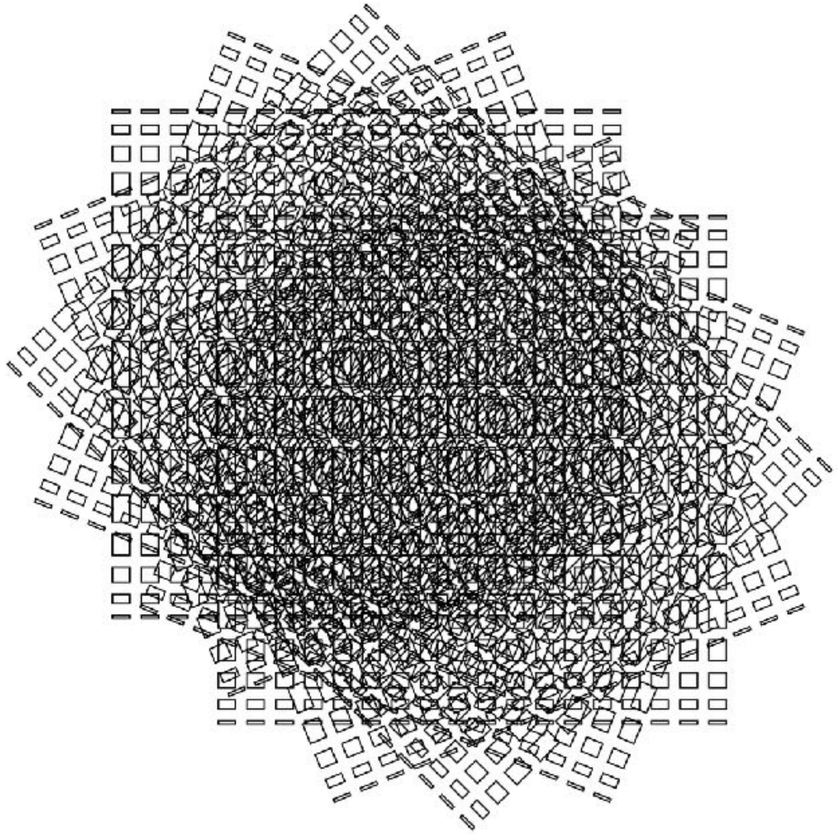
接着，我再对重新设计后的光感蛋白编码进行与“延伸/发展“相关的动作



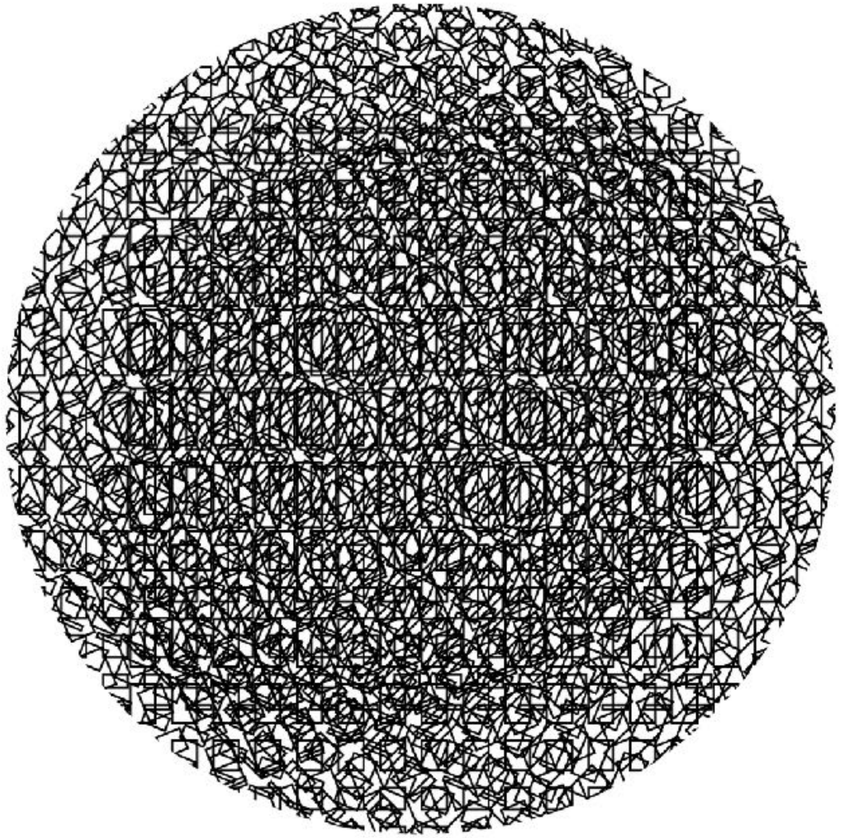
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 1 & slanted repeat



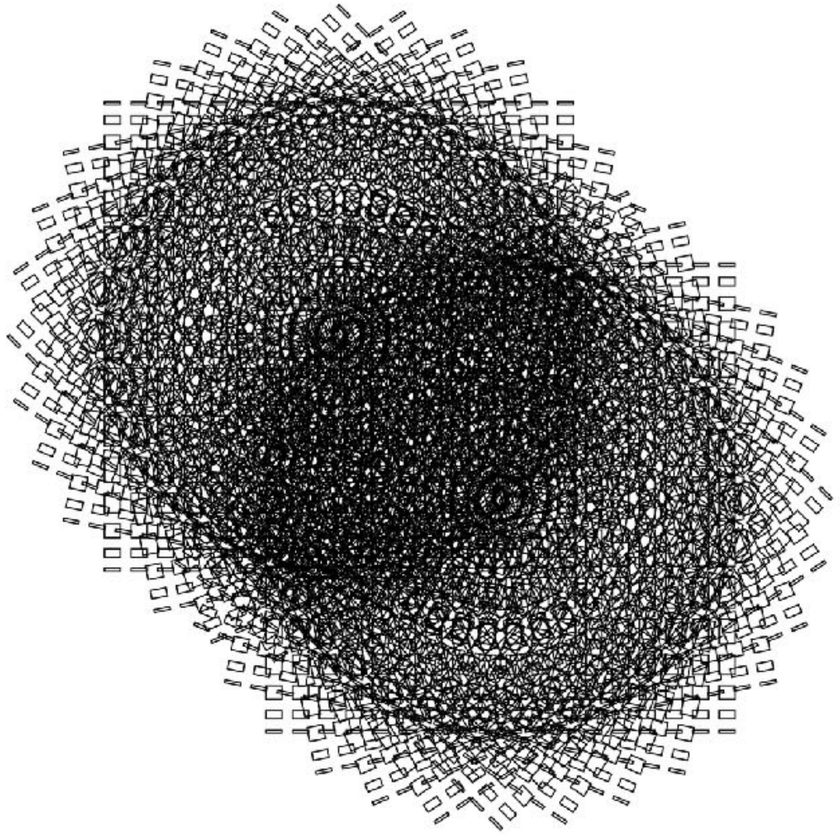
Withdrawal basic dot



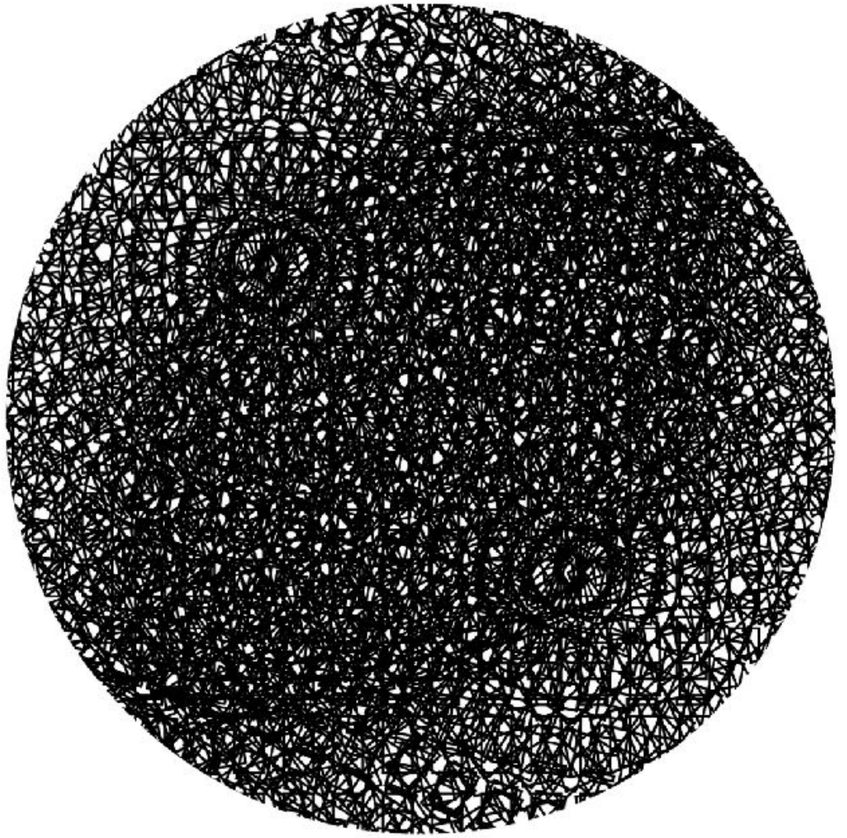
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 2 & slanted repeat



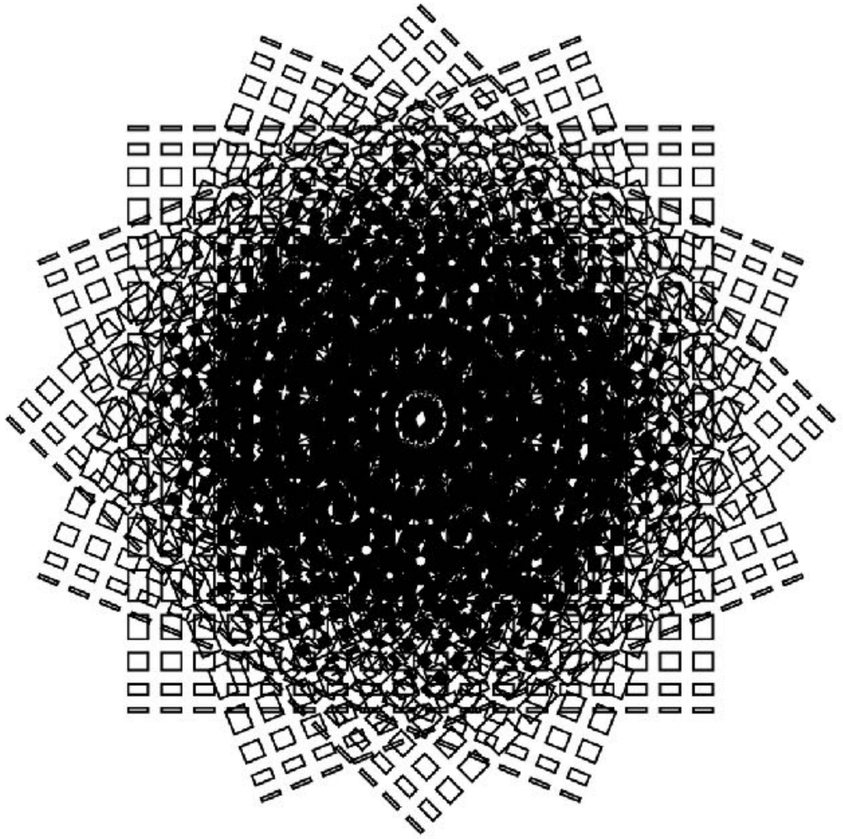
Withdrawal basic dot



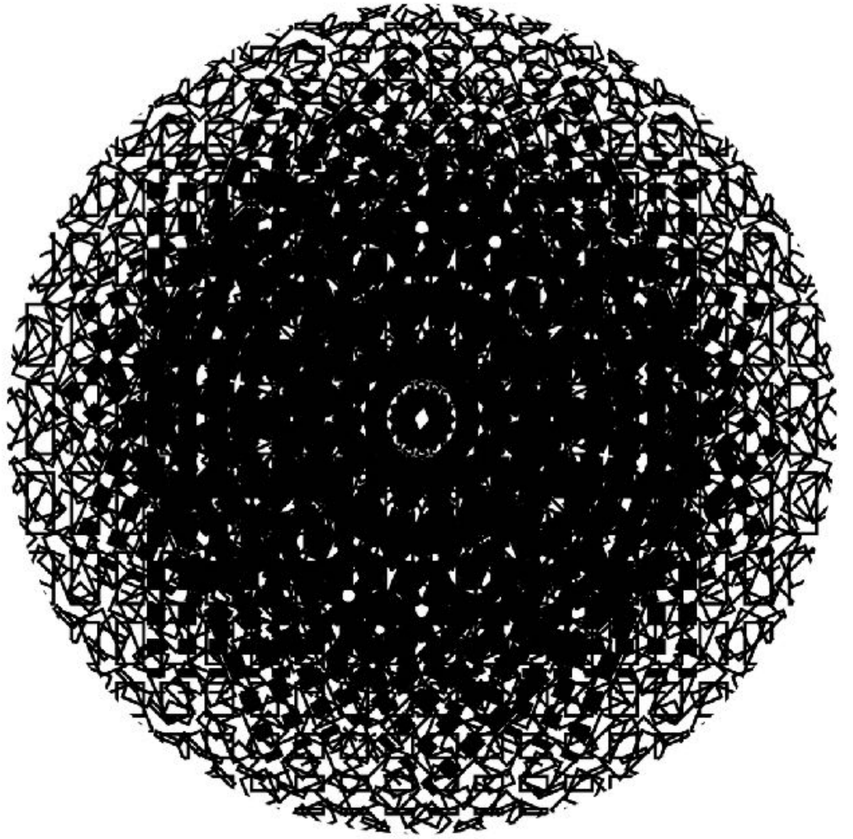
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 3 & slanted repeat



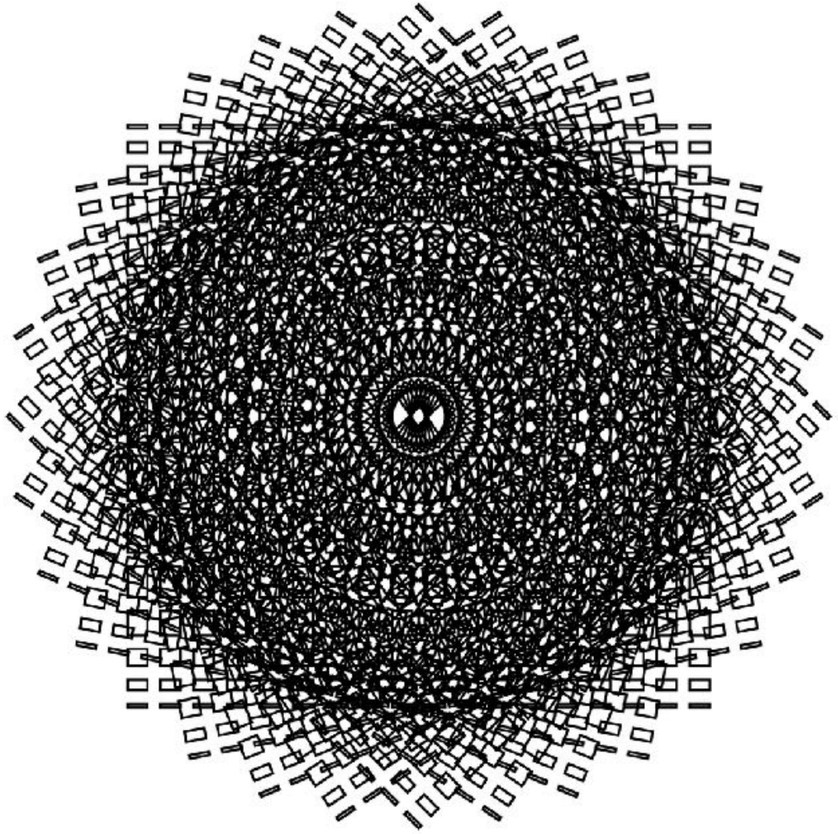
Withdrawal basic dot



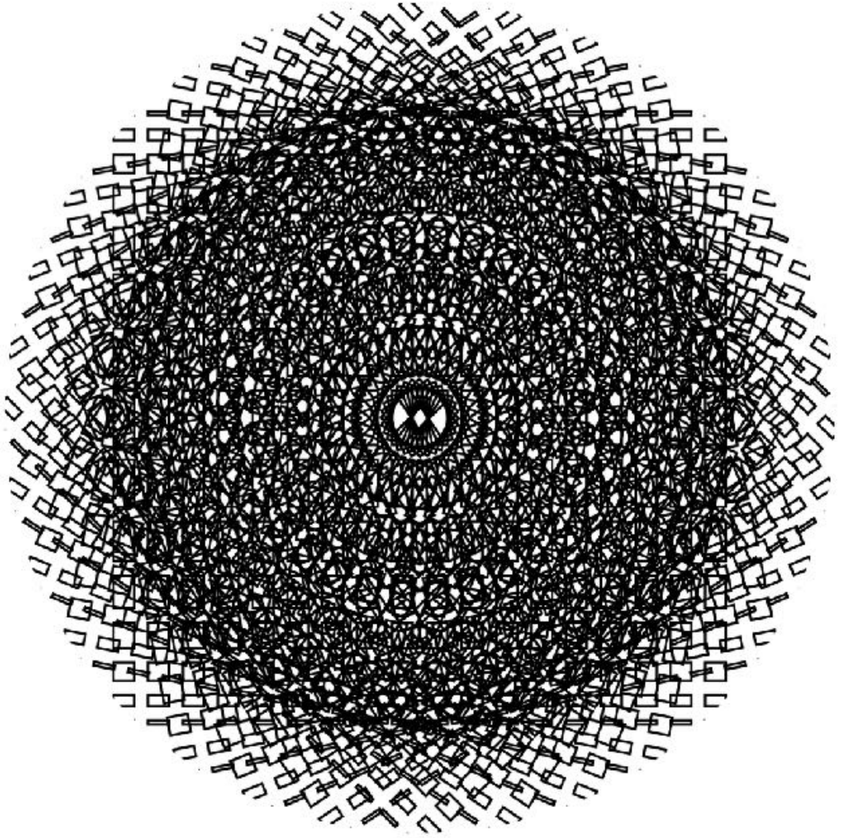
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 2 & dispersal - center repeat



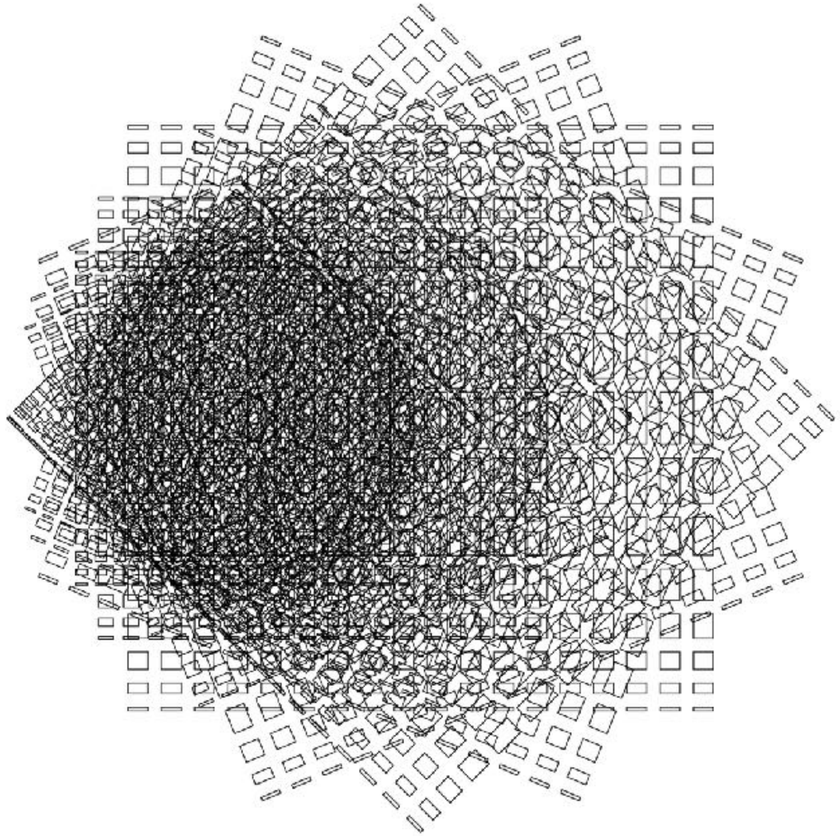
Withdrawal basic dot



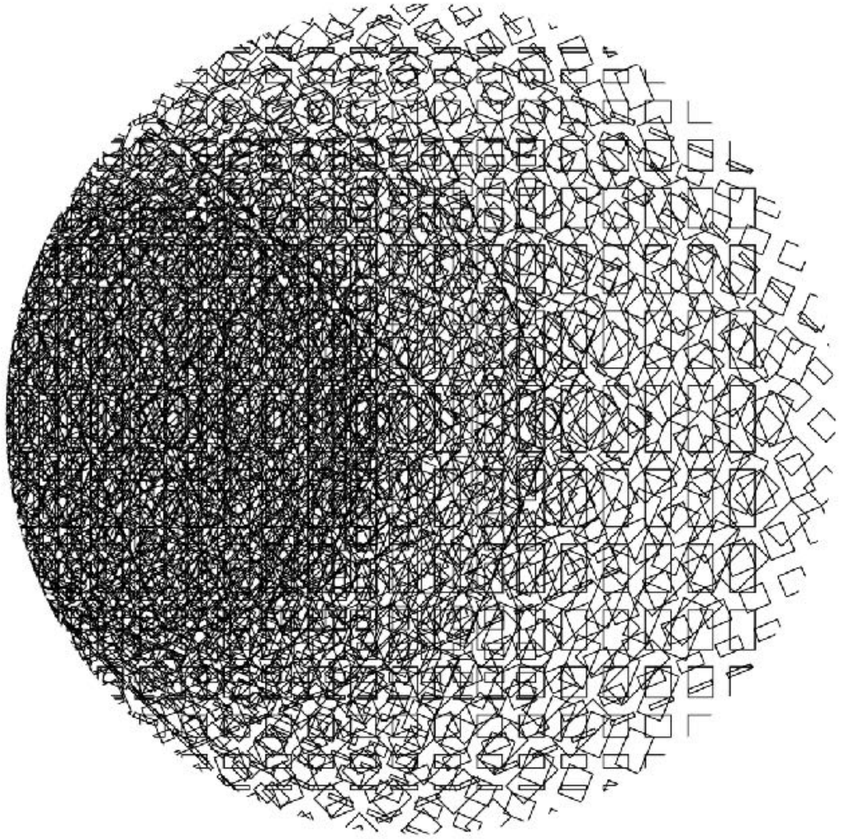
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 3 & dispersal - center repeat



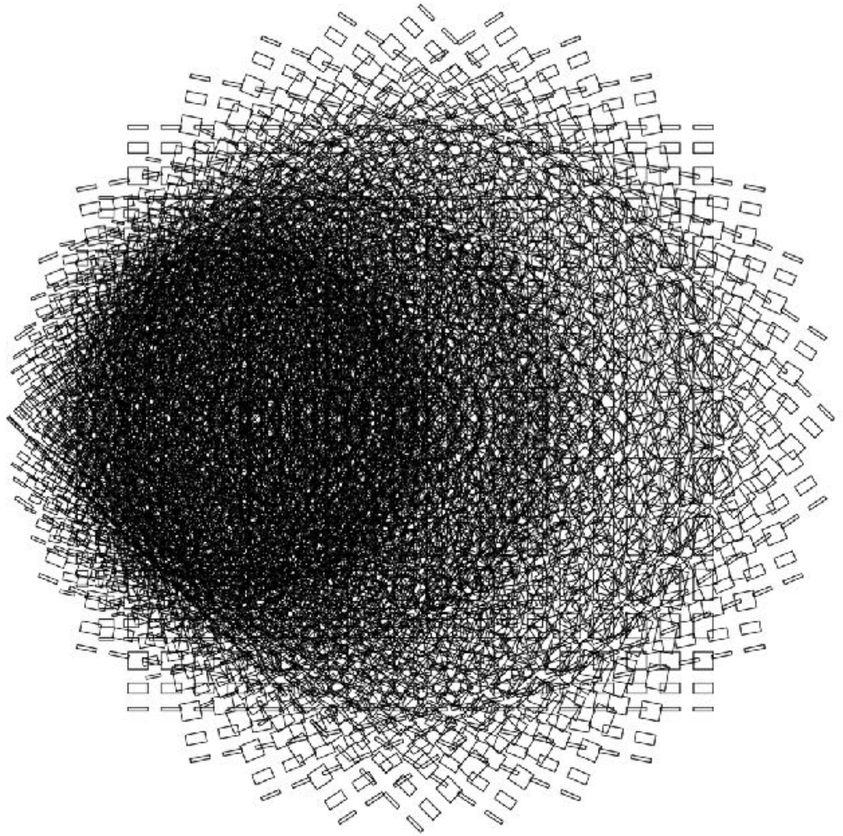
Withdrawal basic dot



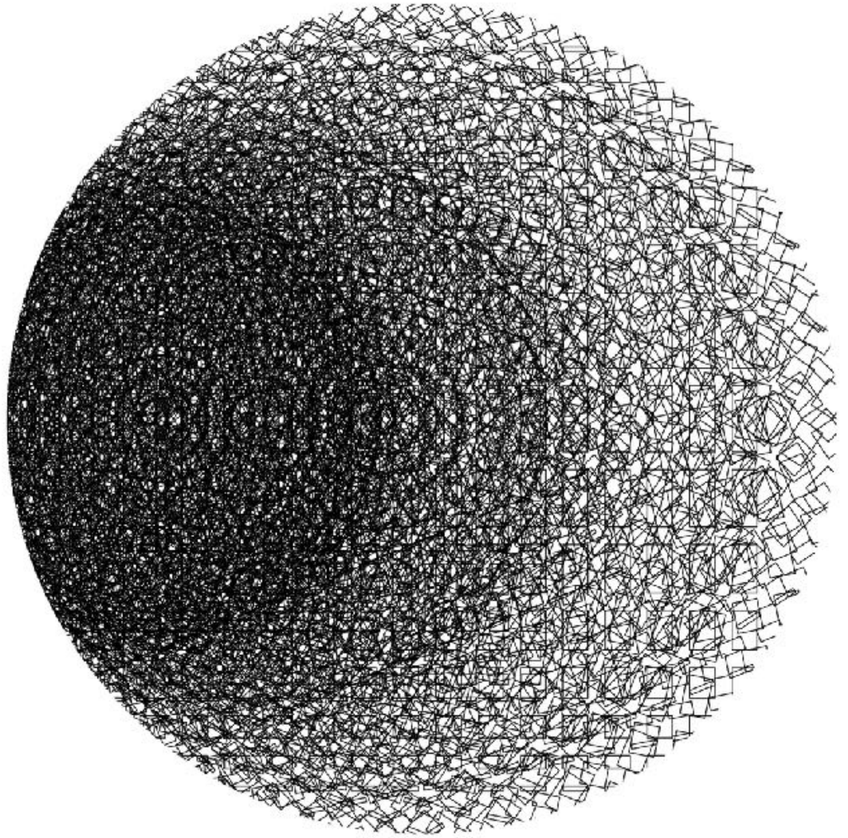
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 2 & dispersal - linear repeat



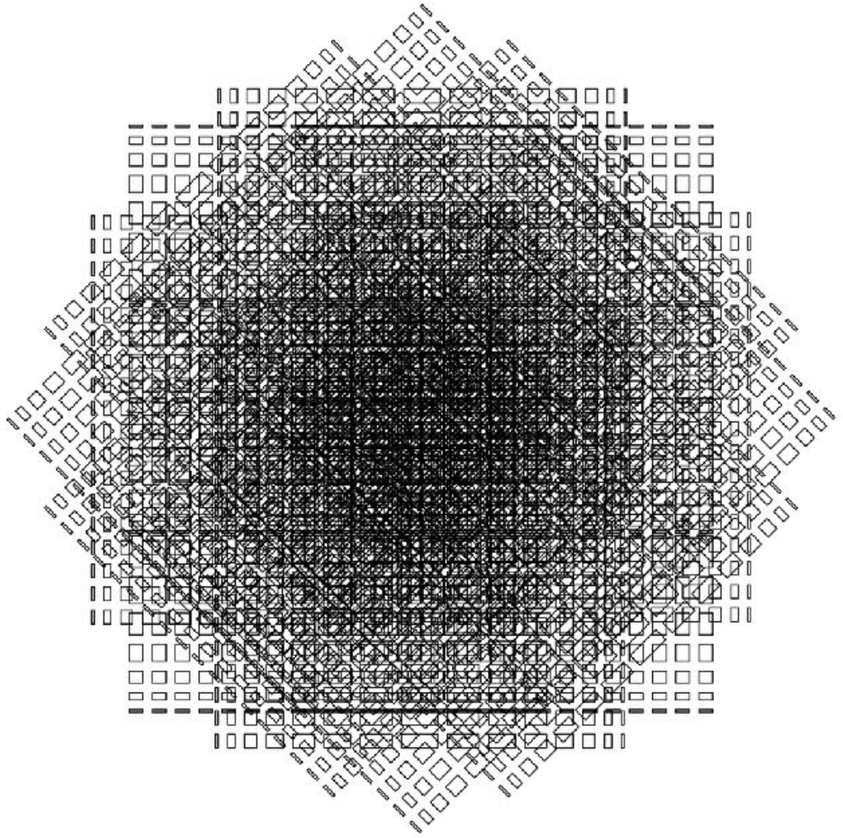
Withdrawal basic dot



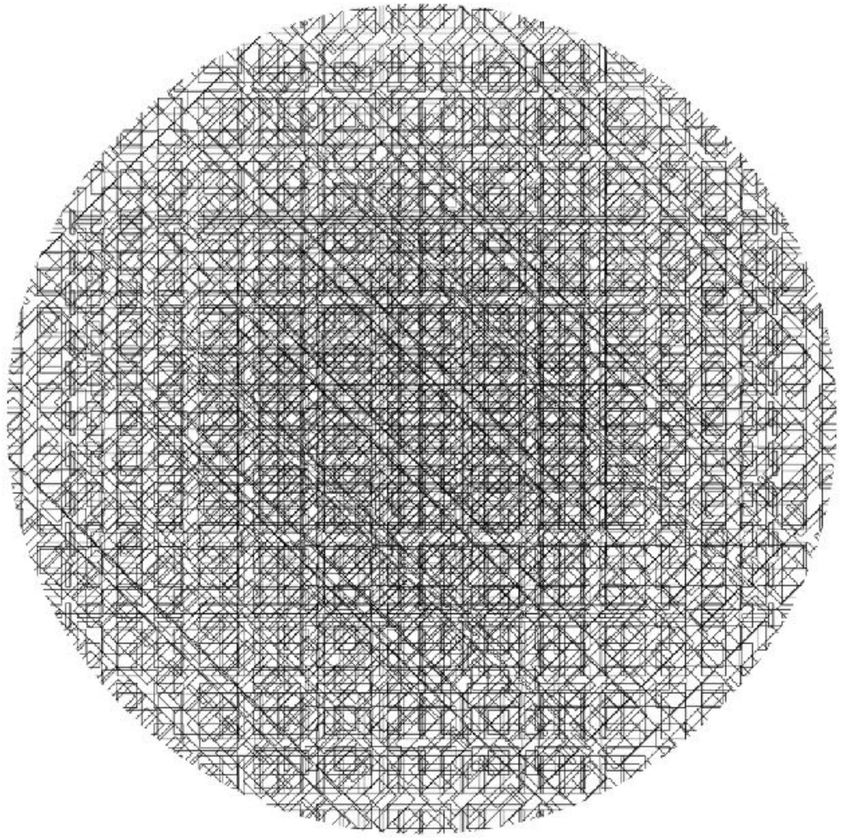
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 3 & dispersal - linear repeat 1



Withdrawal basic dot



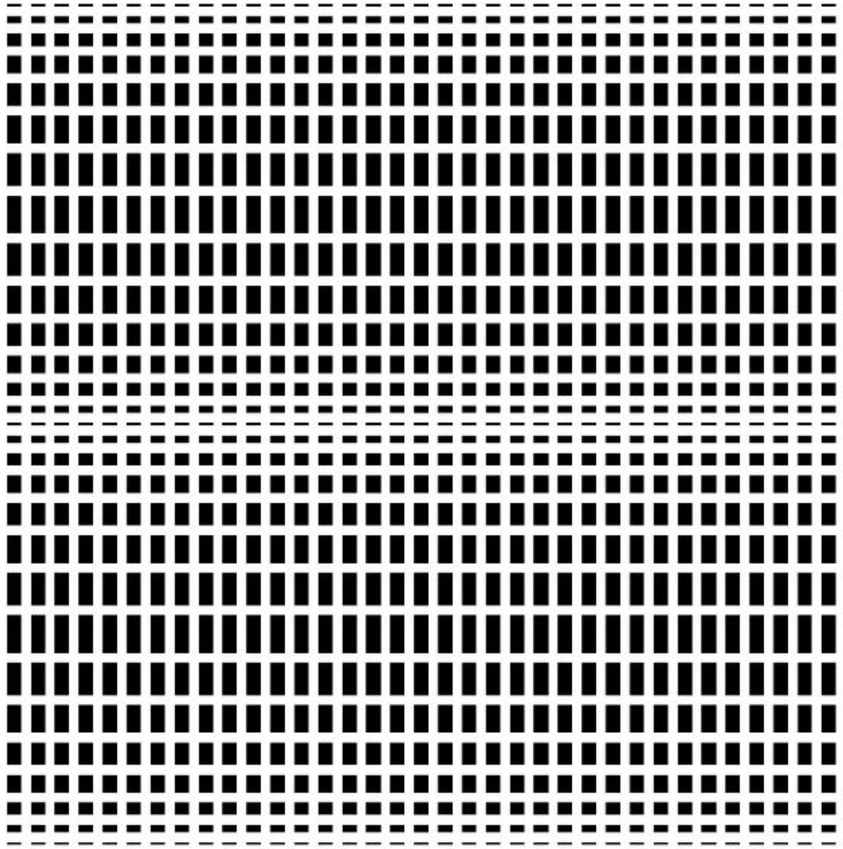
PhyB function (functions of itself & LANGUAGE-related):
adjustment of flowering time 3 & dispersal - linear repeat 2



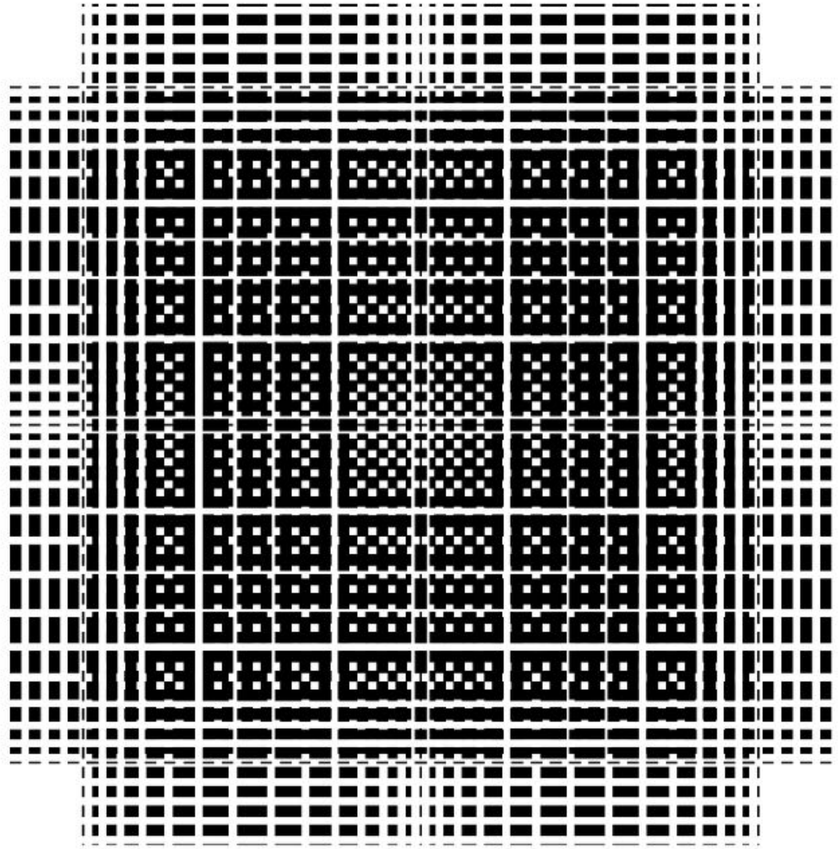
Withdrawal basic dot

PhyB has the function of adjusting biological clock, according to the movement logic: it means = repeat

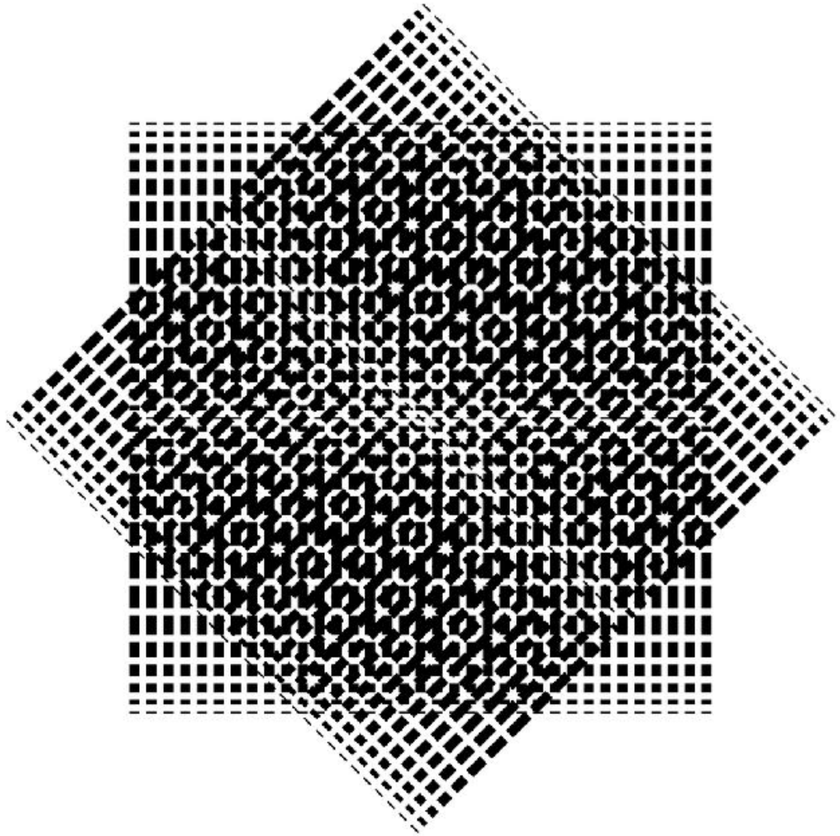
PhyB具有调节周期性的功能，依据操作逻辑：调节周期性=重复



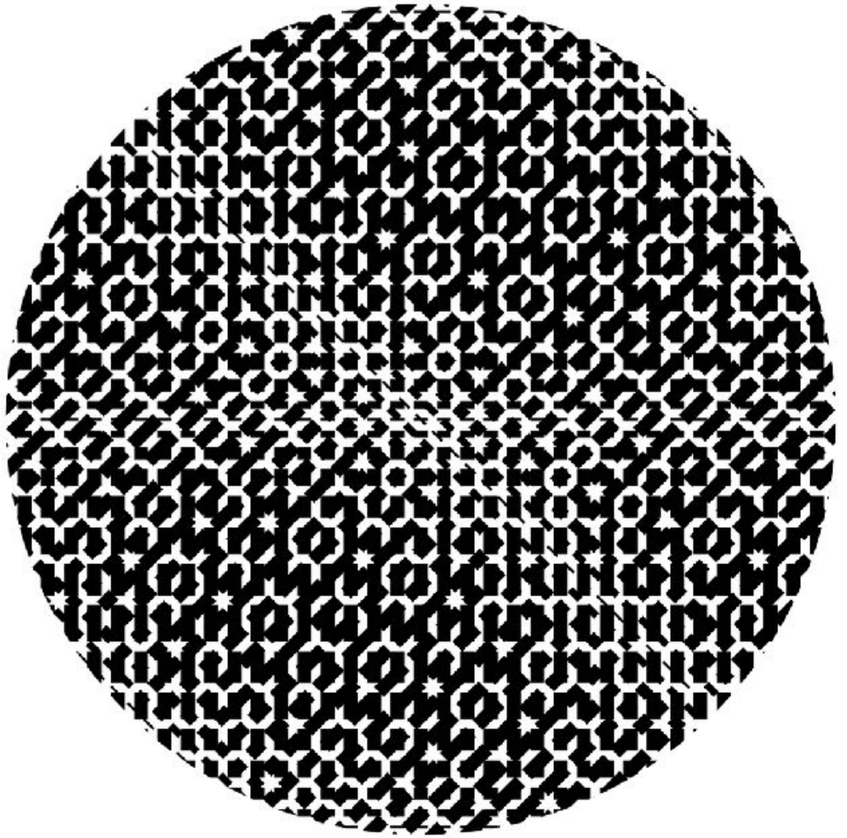
PhyB function (functions of itself):
adjustment of biological clock



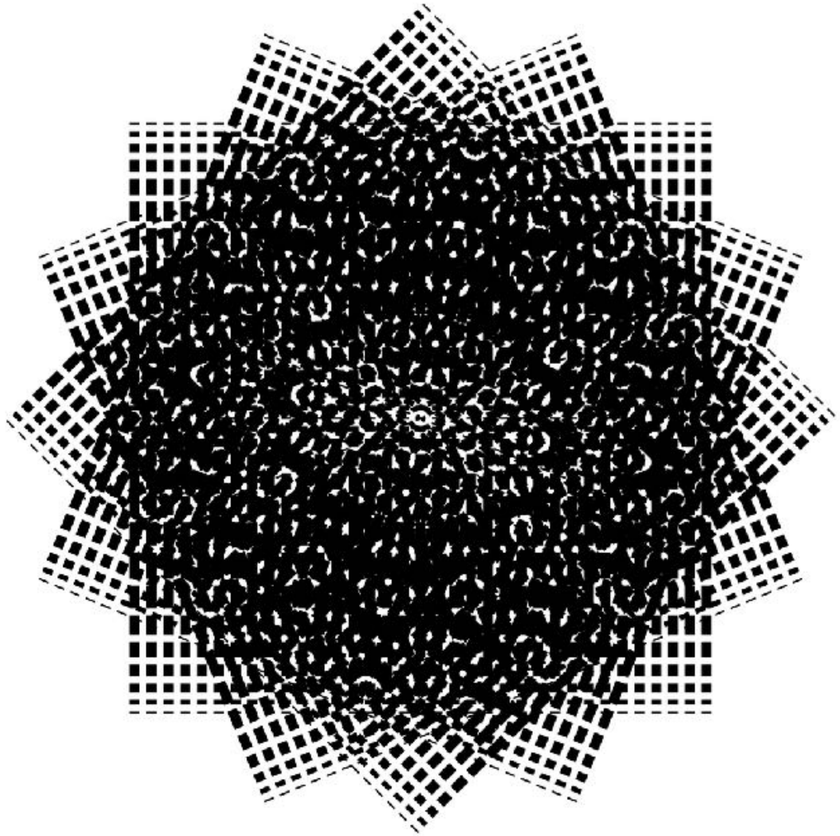
PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 1



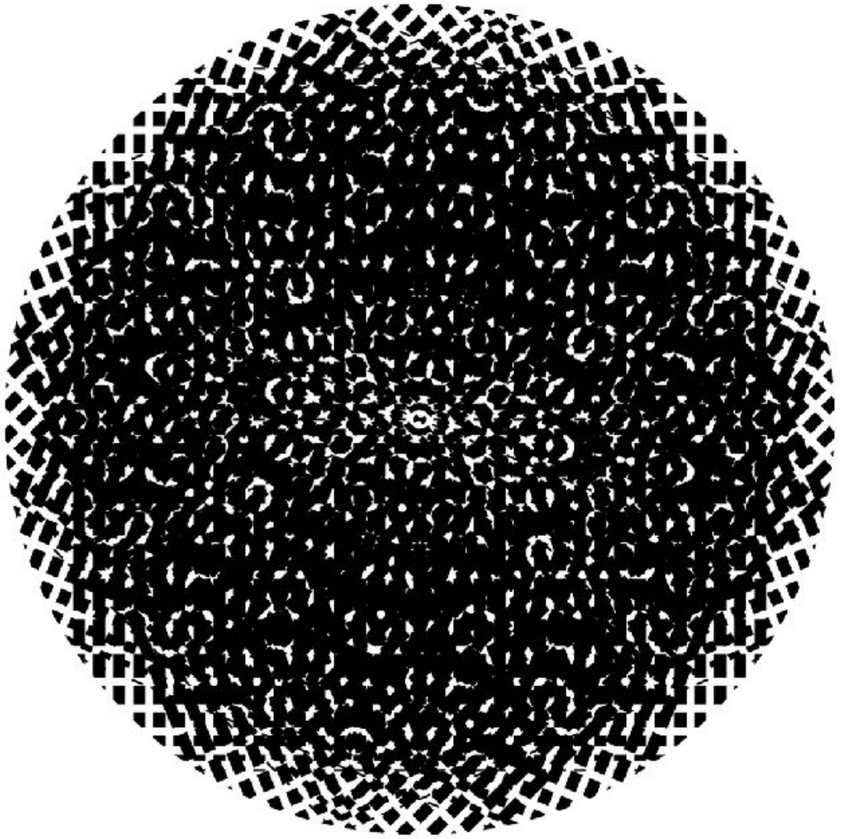
PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 2



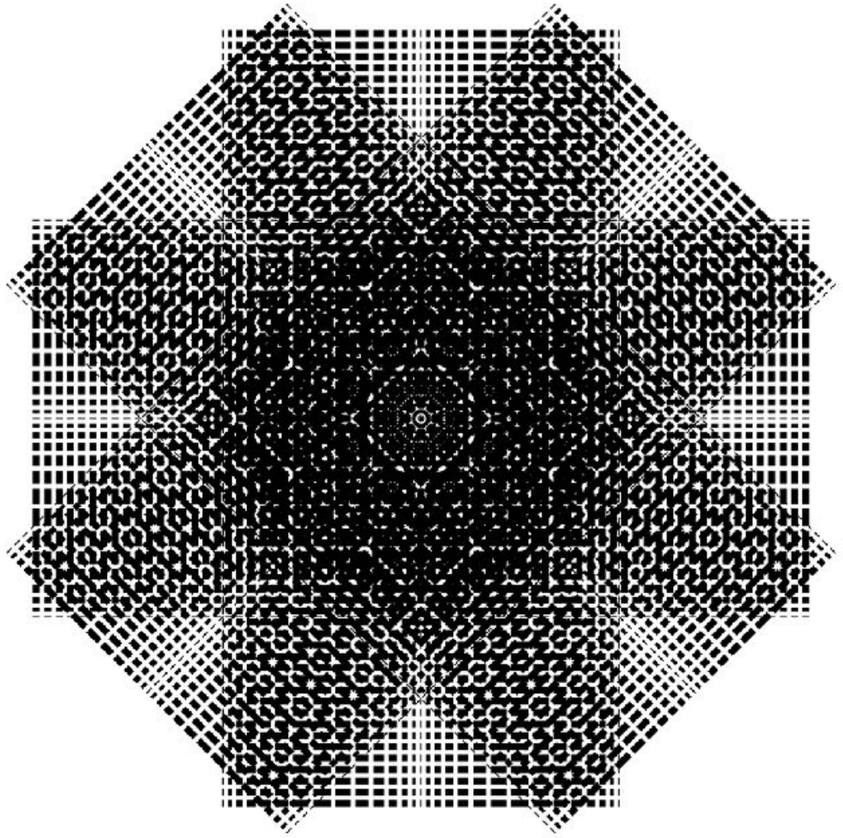
Withdrawal basic dot



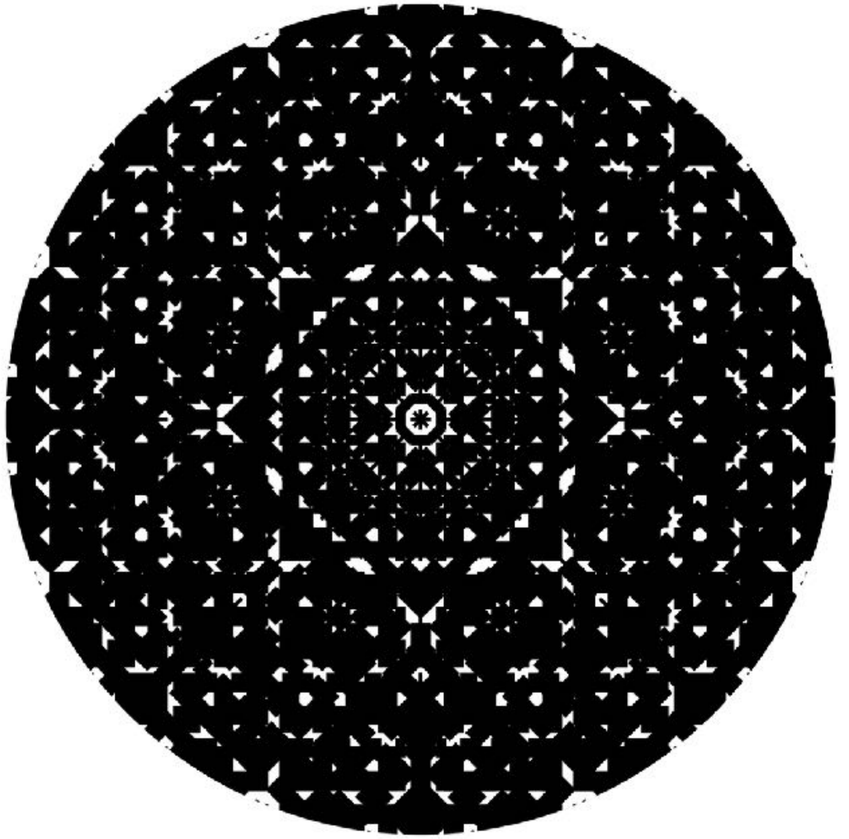
PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 3



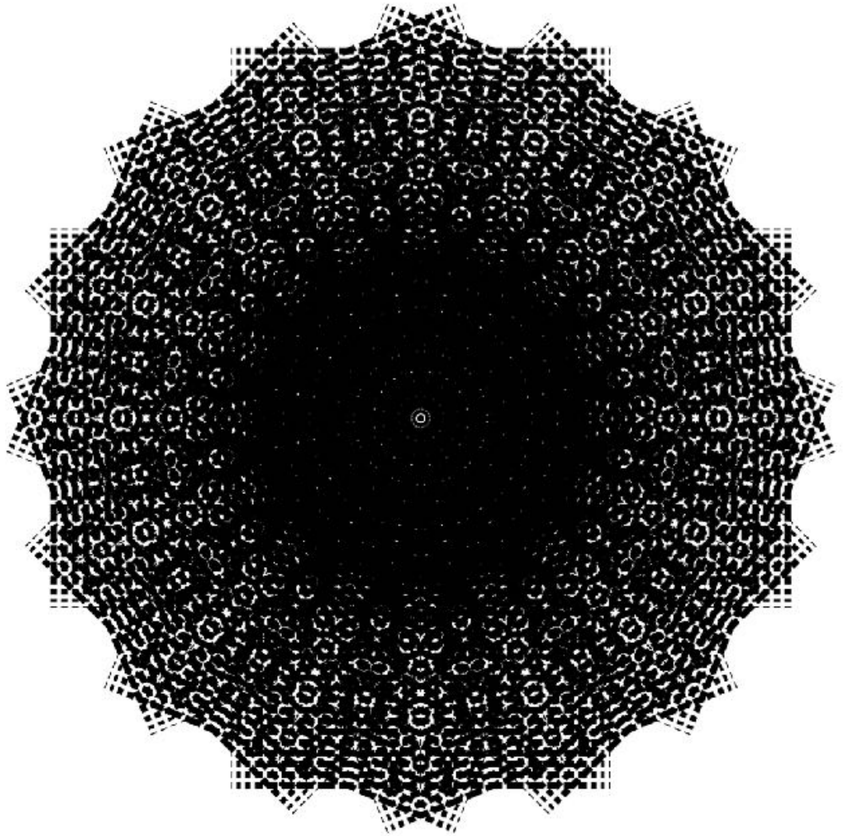
Withdrawal basic dot



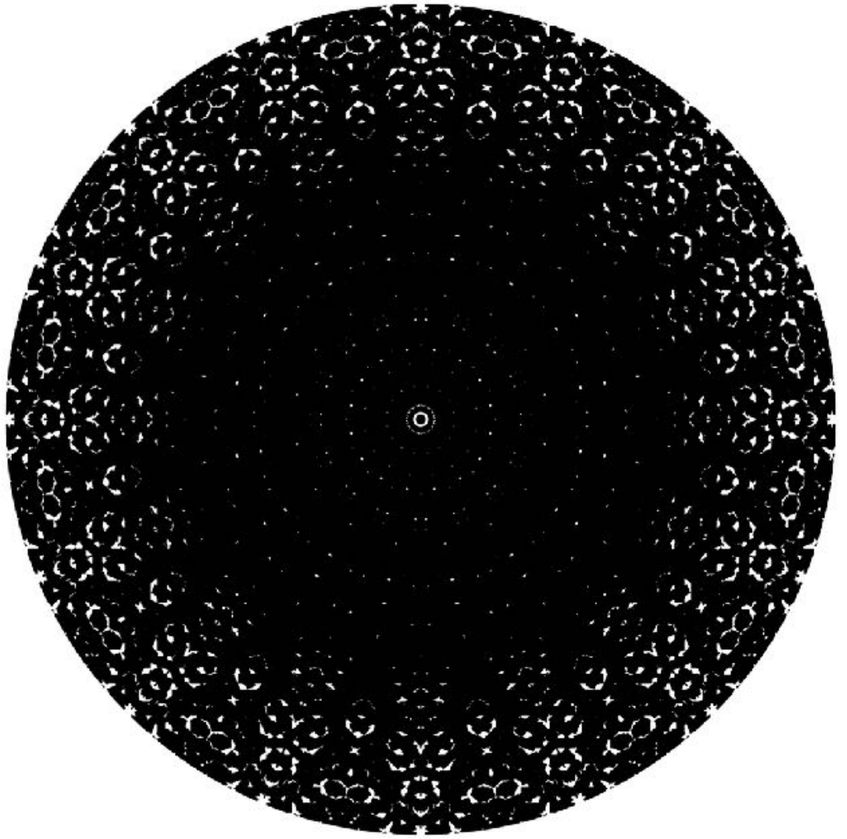
PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 4.1



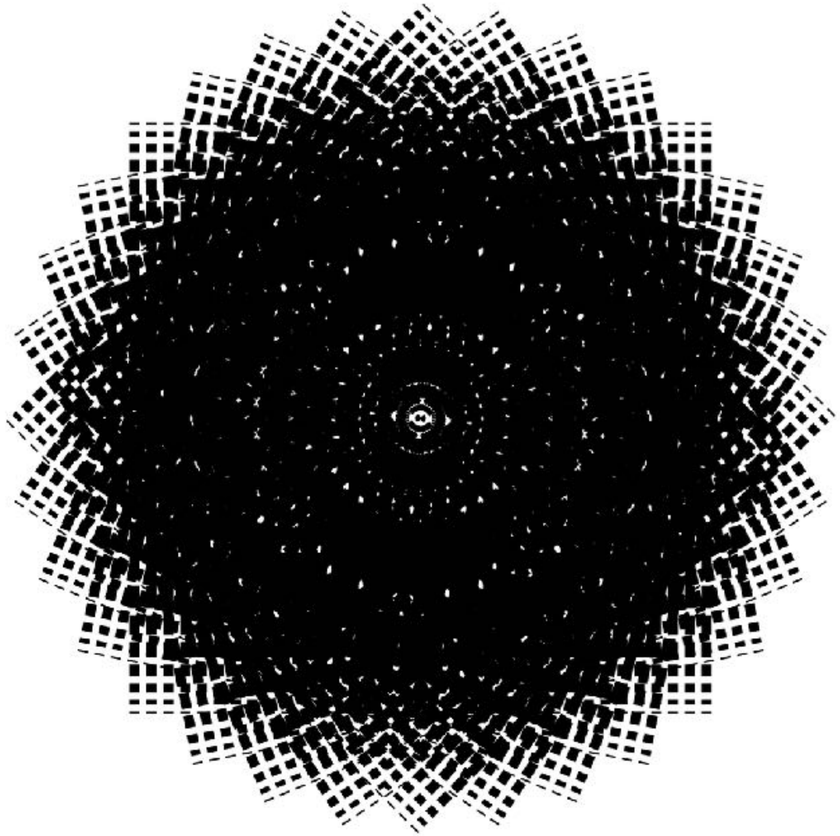
Withdrawal basic dot



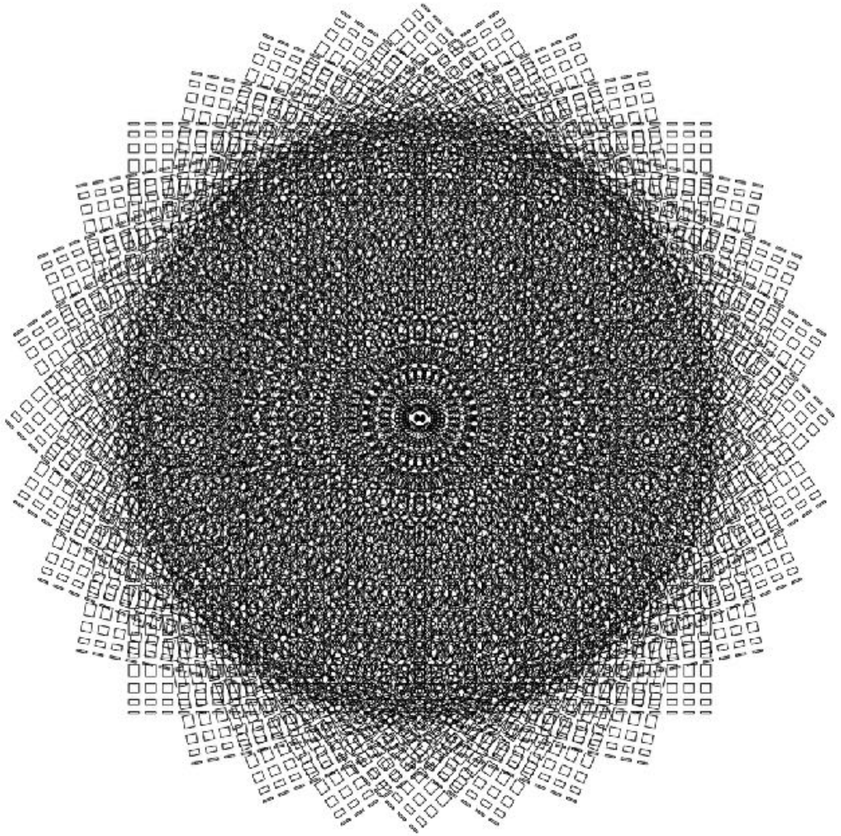
PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 4.2



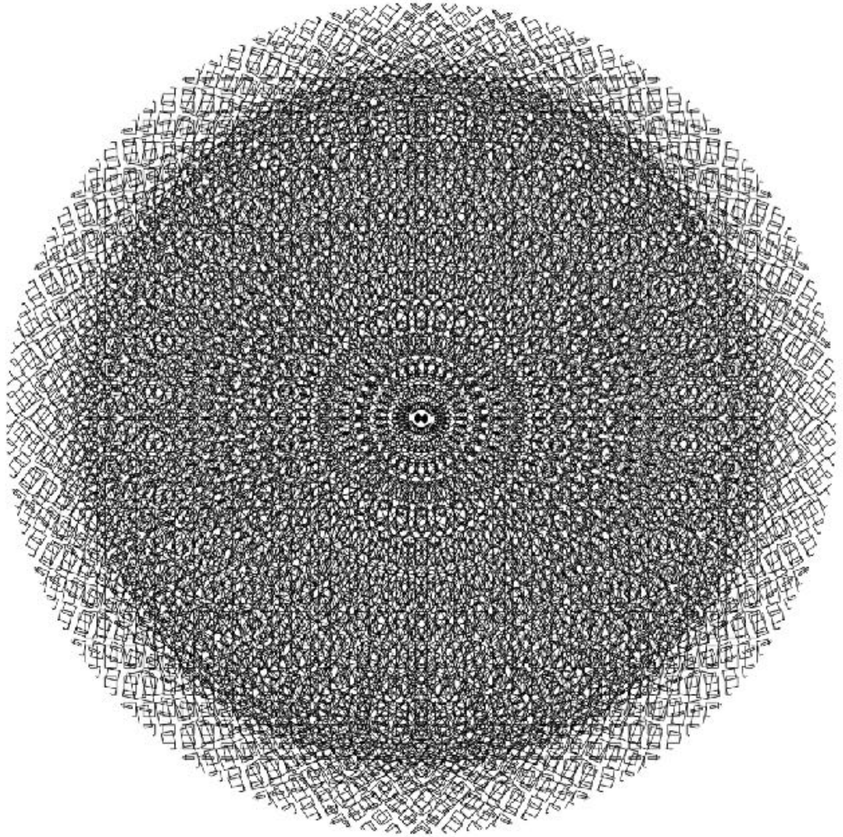
Withdrawal basic dot



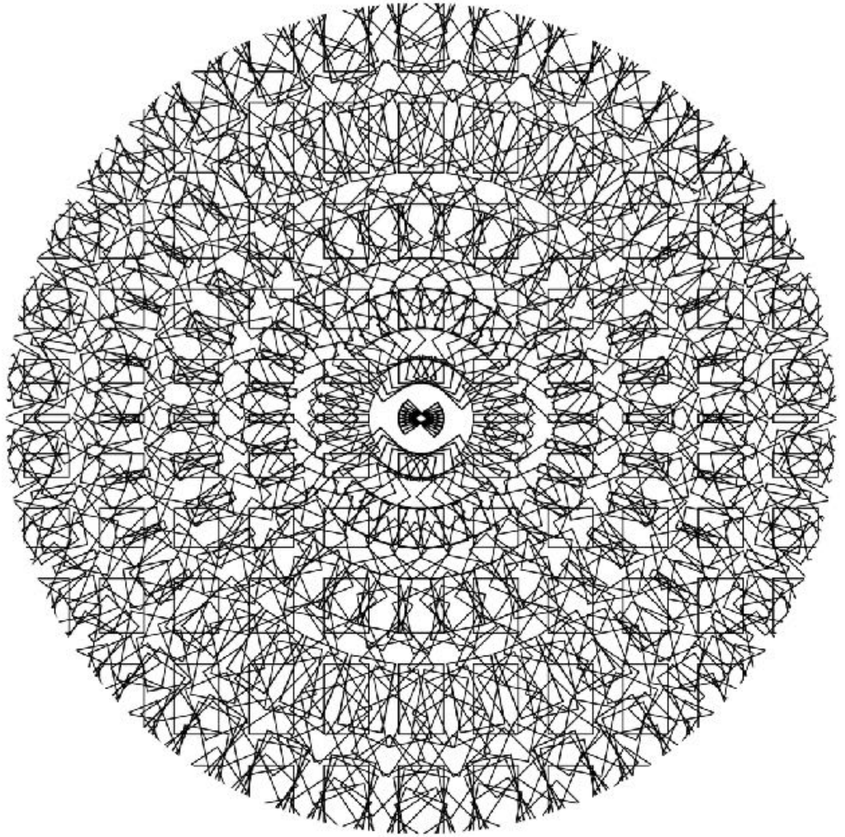
PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 5.1



PhyB function (functions of itself):
adjustment of biological clock & adjustment of flowering time 5.2



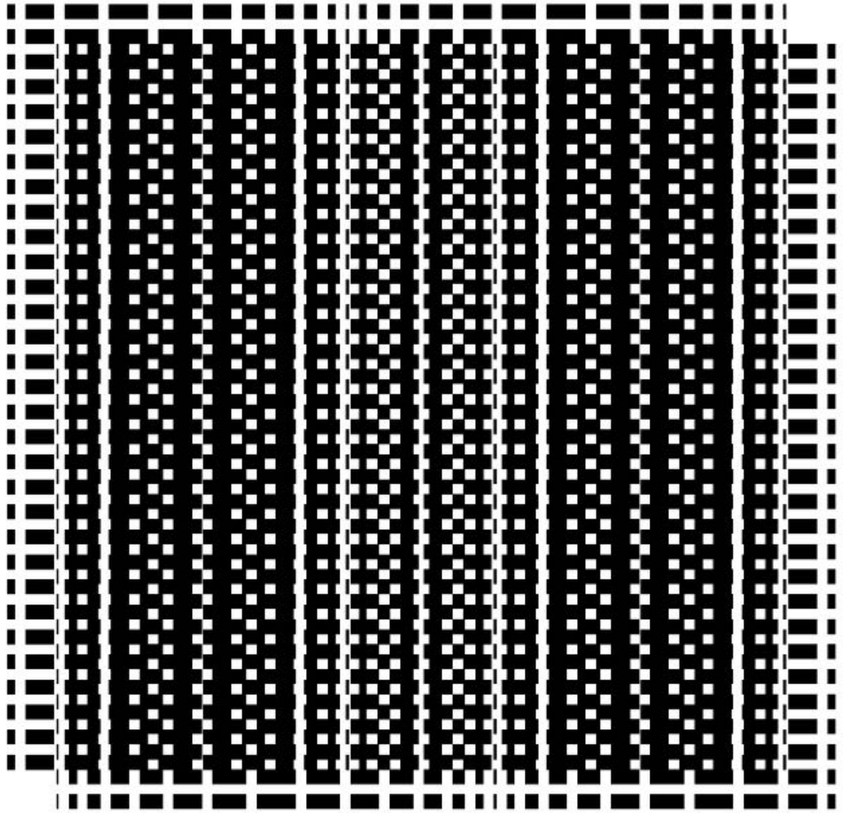
Withdrawal basic dot 1



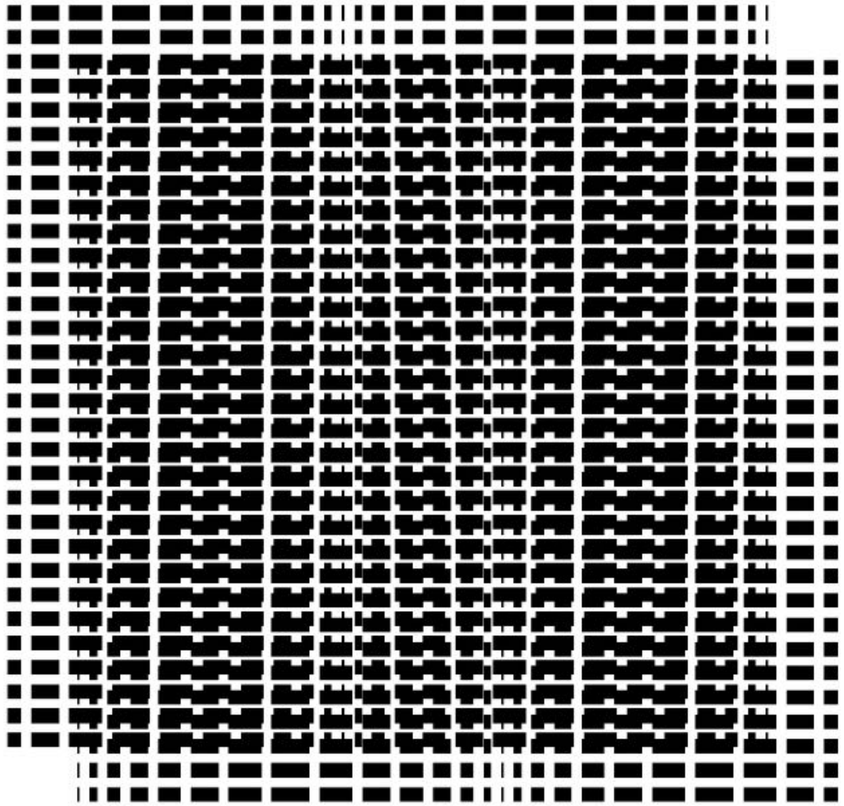
Withdrawal basic dot 2

Emphasis on language-related meanings: move, copy, extend, spread

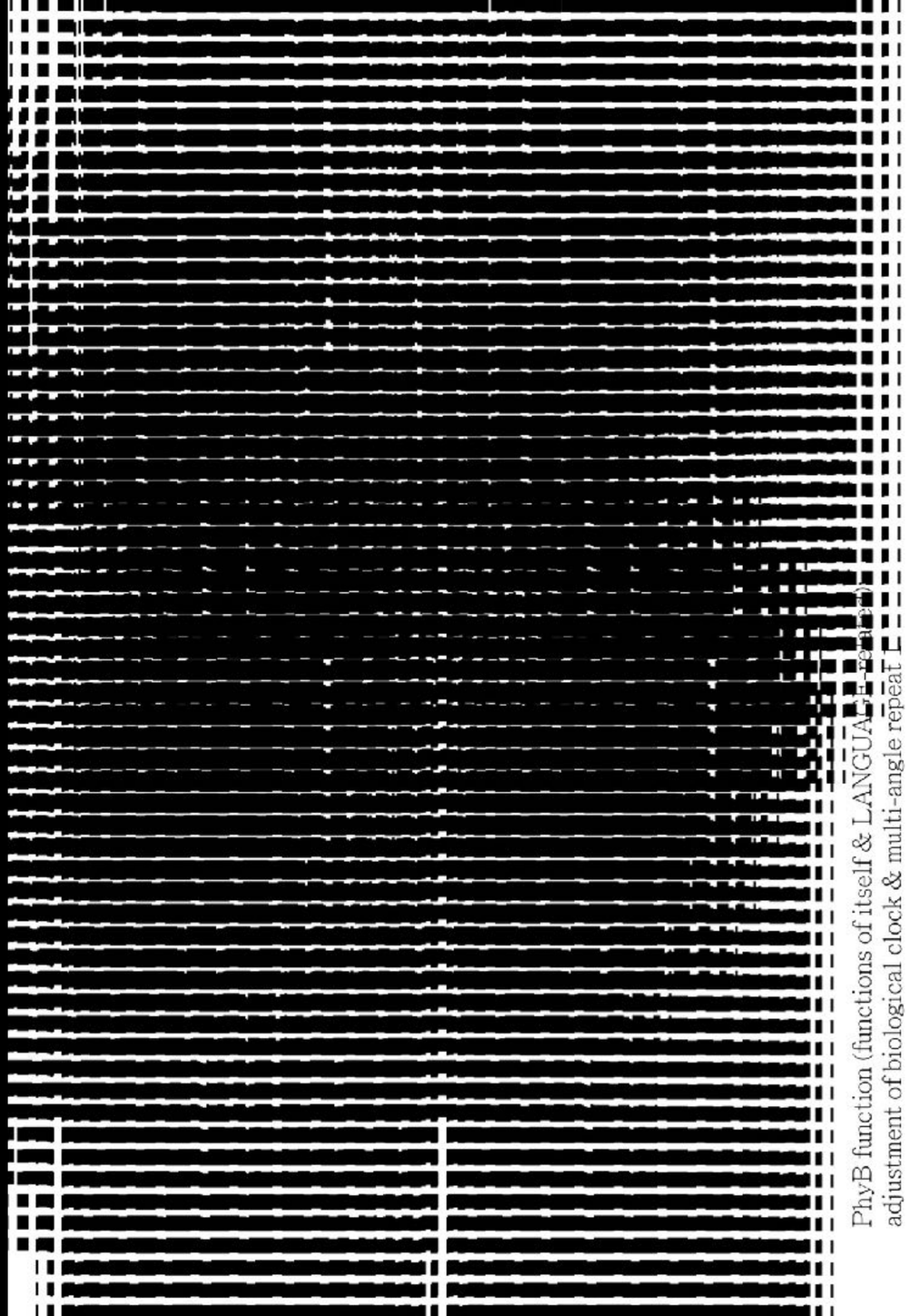
对语言相关的含义进行强调：移动，复制，伸长，扩散。



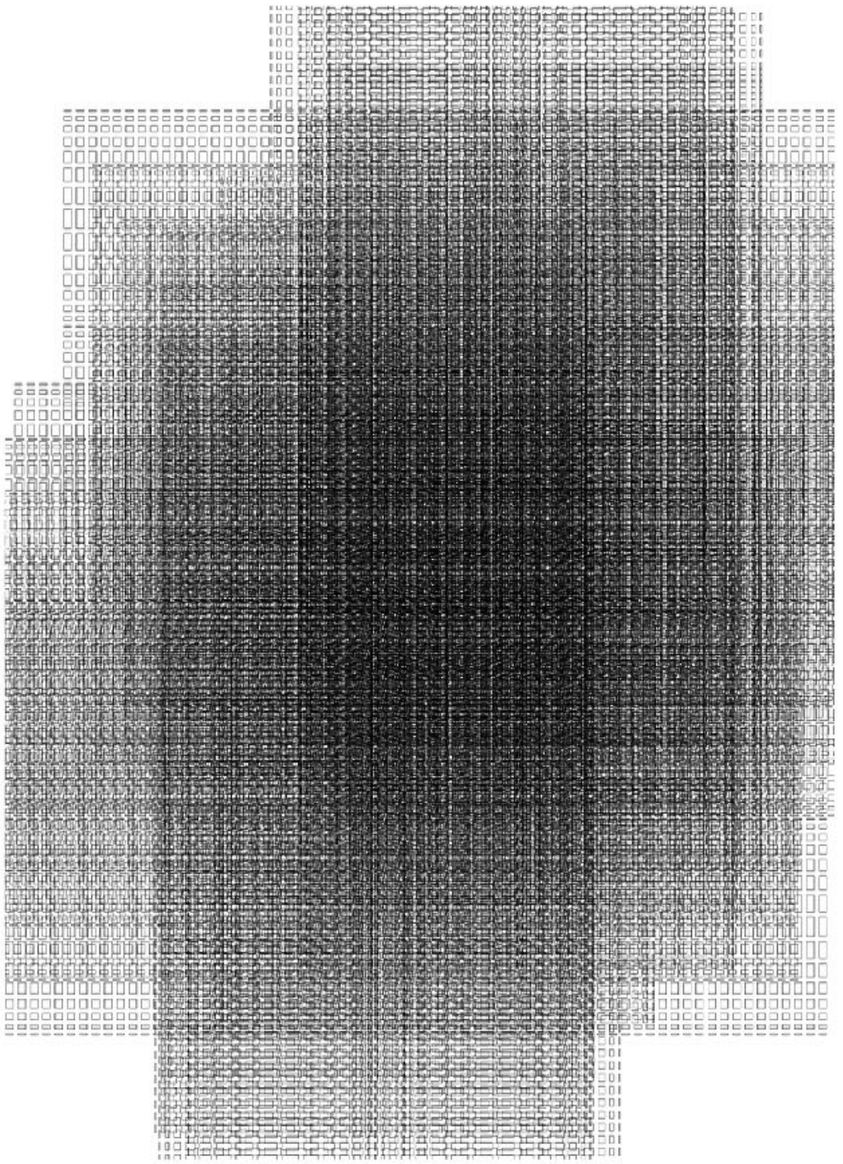
PhyB function (functions of itself & LANGUAGE-related): adjustment of biological clock & slanted repeat 1



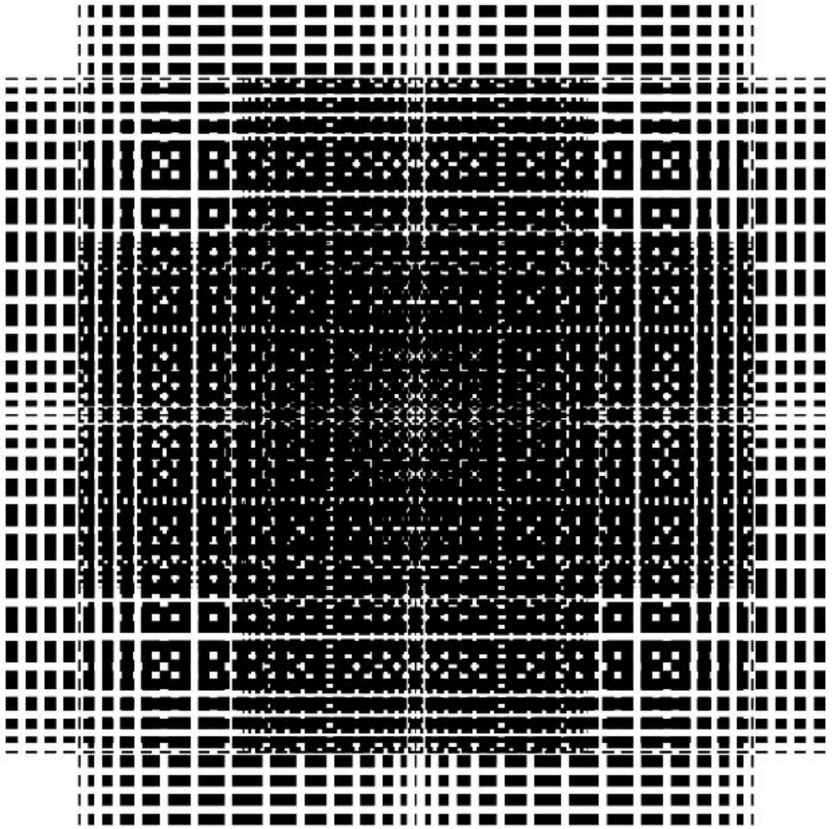
PhyB function (functions of itself & LANGUAGE-related): adjustment of biological clock & slanted repeat 2



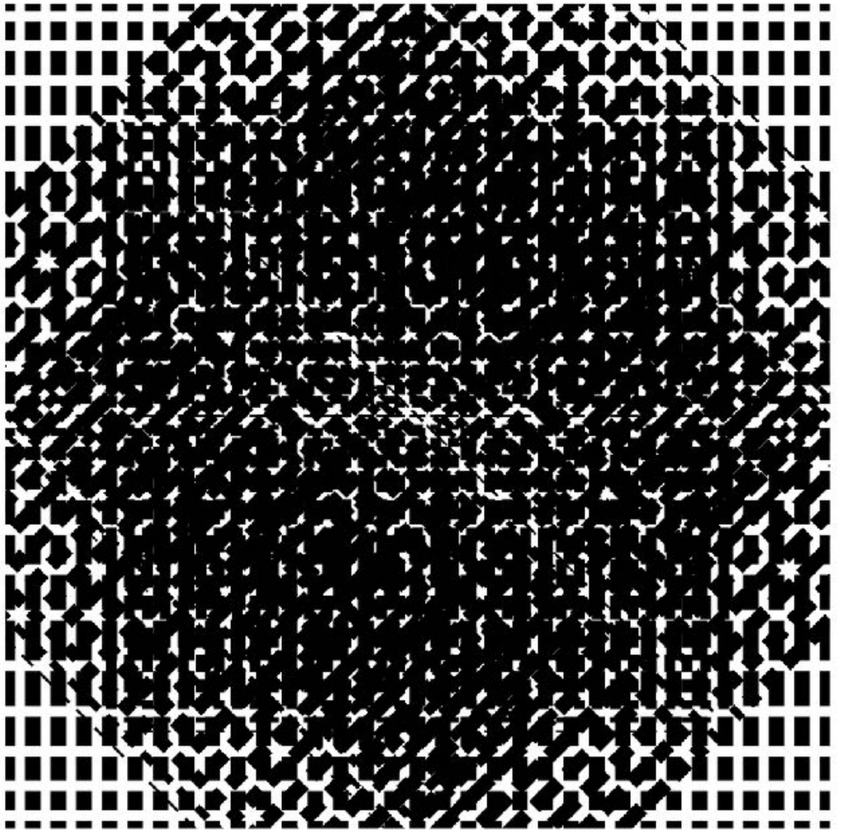
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & multi-angle repeat 1



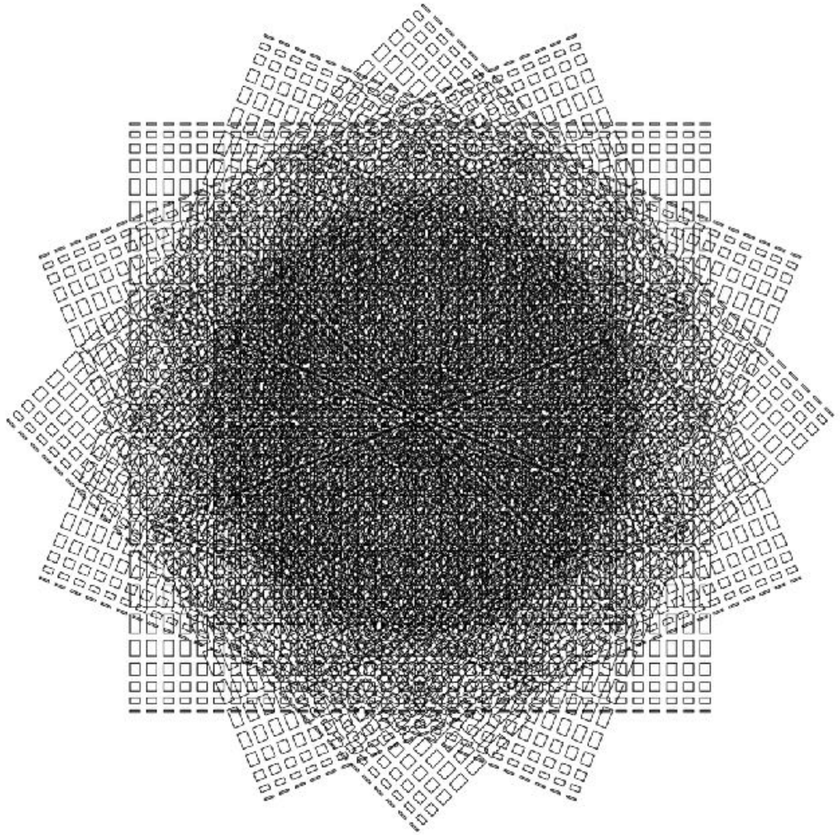
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & multi-angle repeat 2



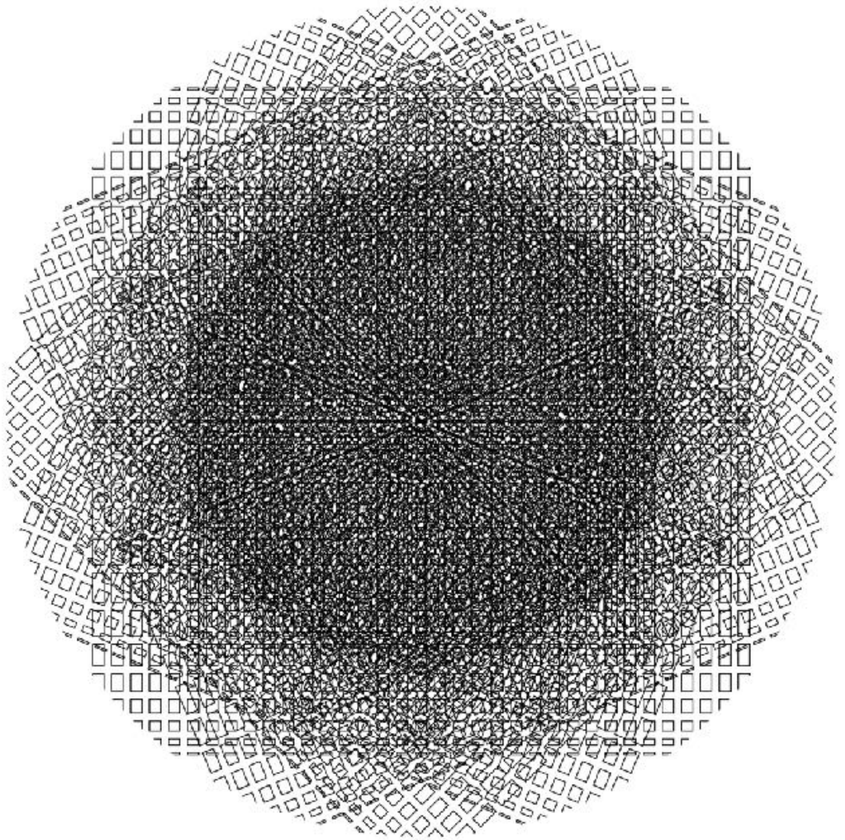
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & adjustment of flowering time 1
& dispersal - center repeat



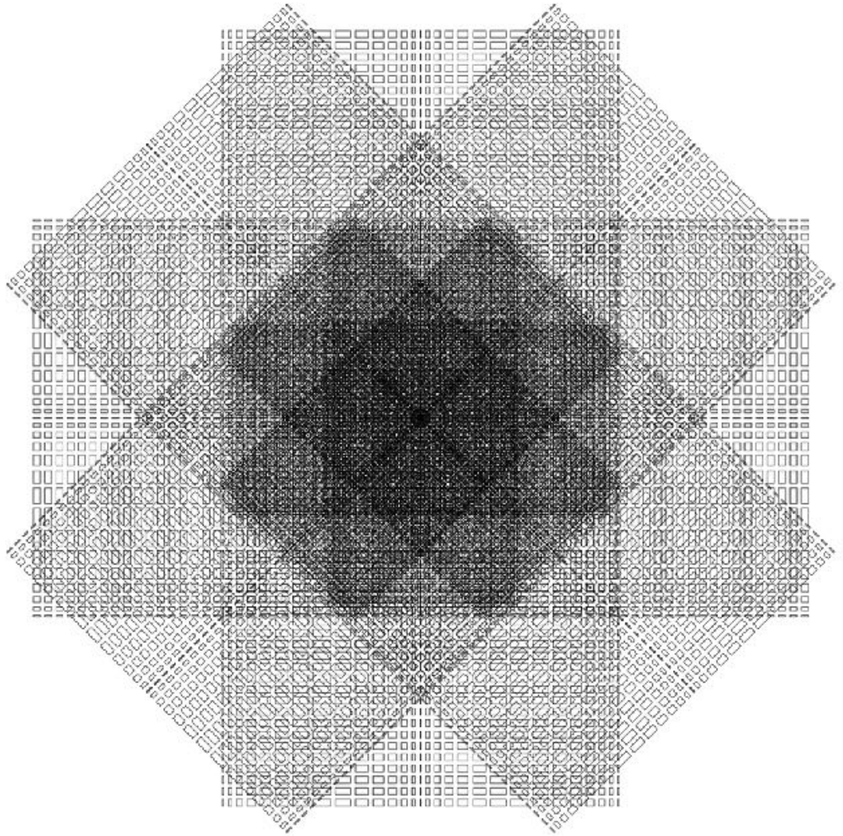
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & adjustment of flowering time 2
& dispersal - center repeat



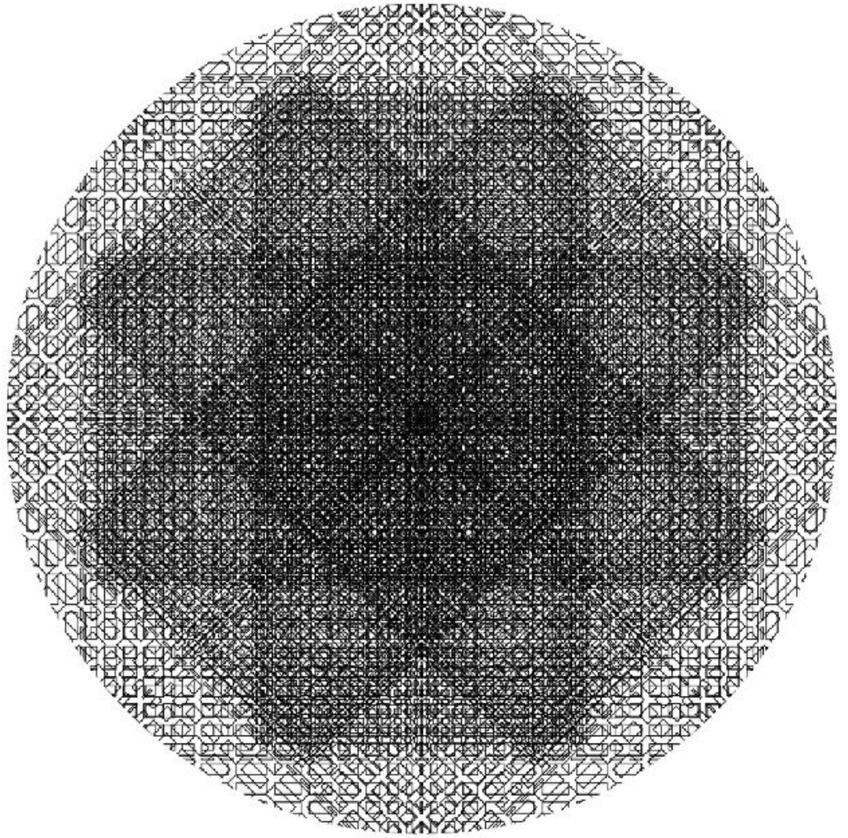
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & adjustment of flowering time 3
& dispersal - center repeat



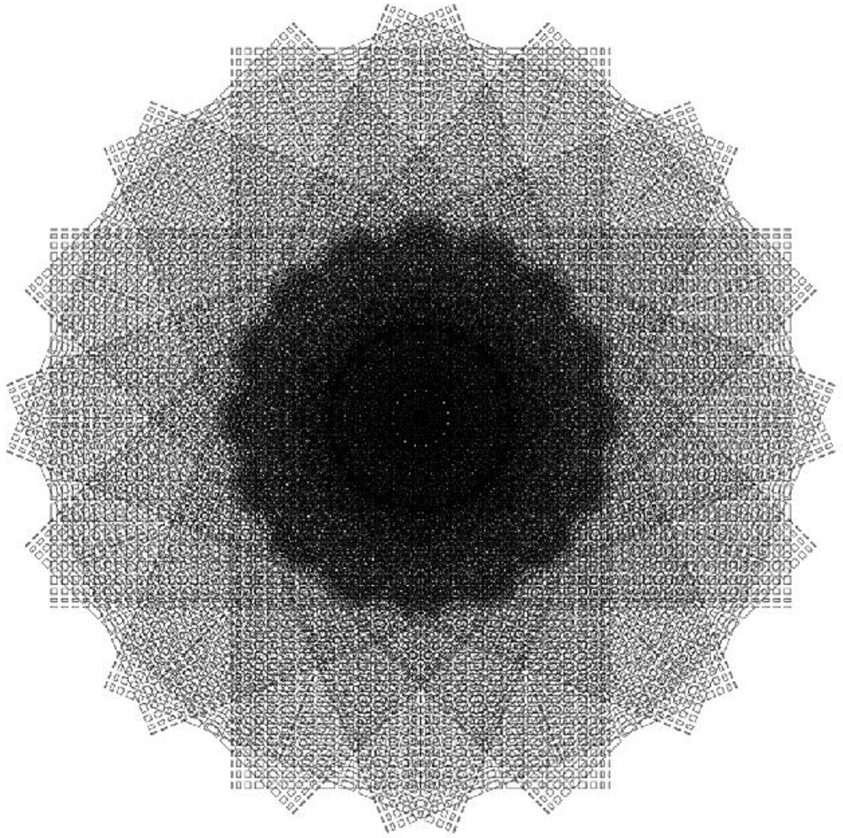
Withdrawal basic dot



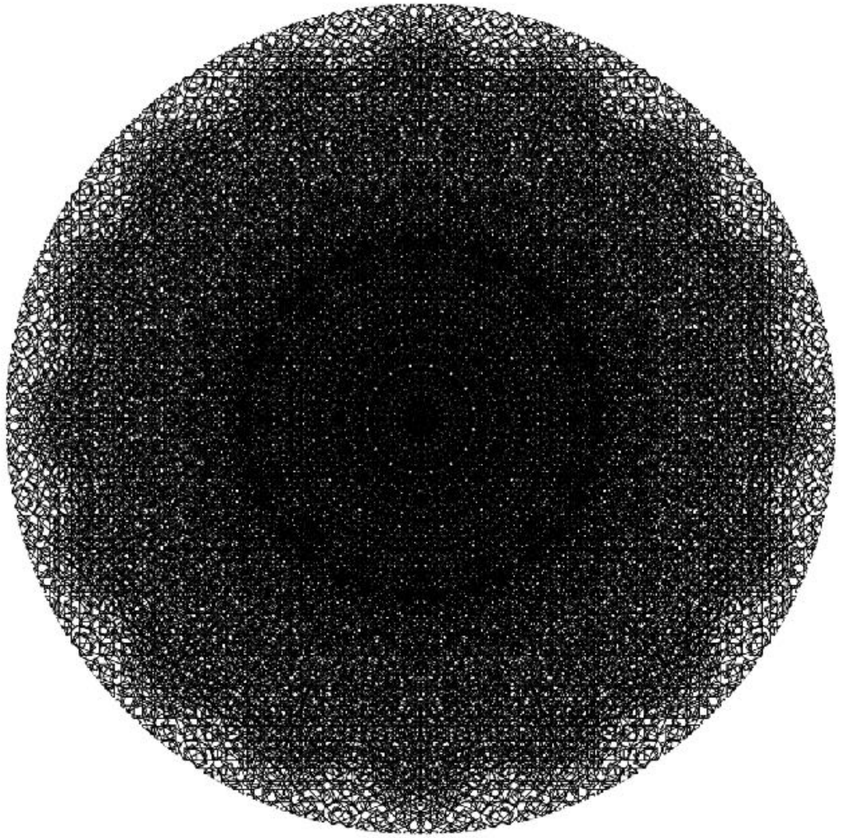
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & adjustment of flowering time 4.1
& dispersal - center repeat



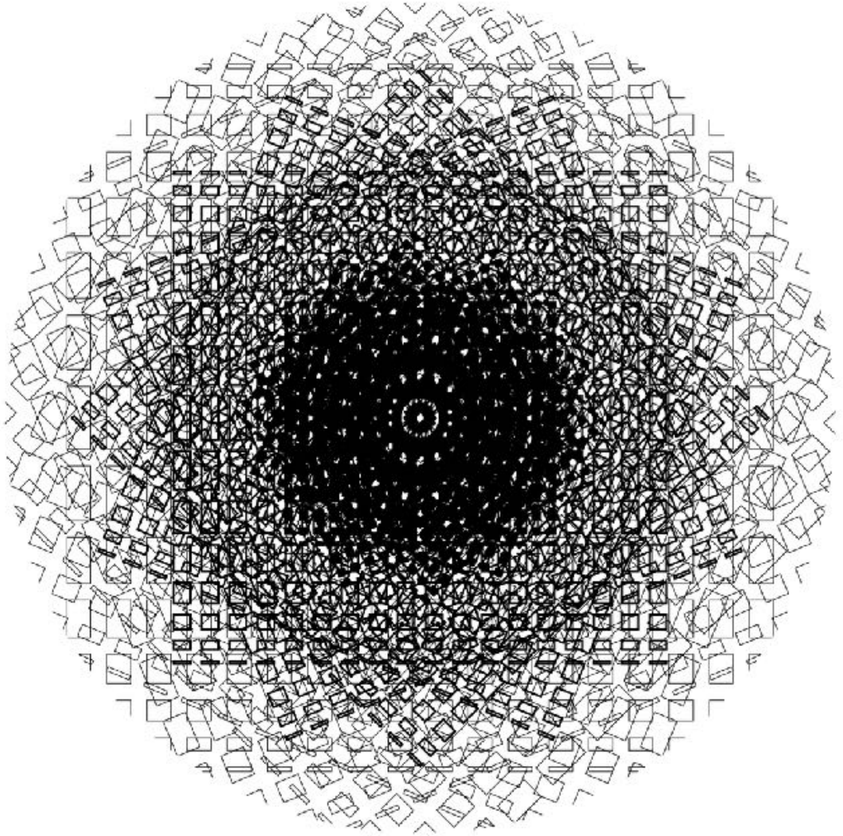
Withdrawal basic dot



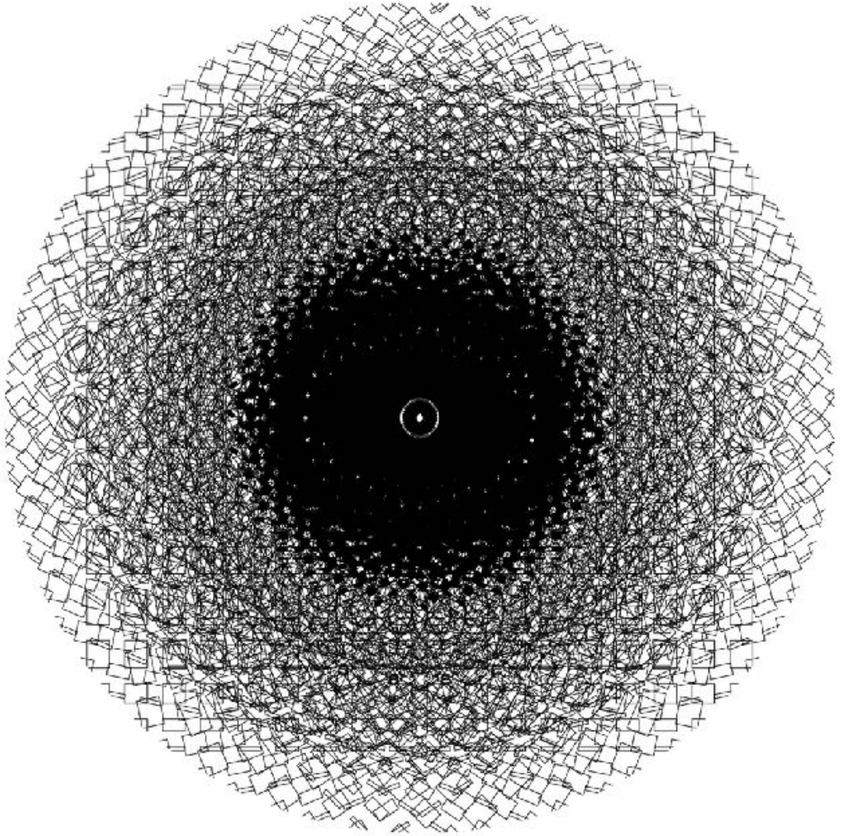
PhyB function (functions of itself & LANGUAGE-related):
adjustment of biological clock & adjustment of flowering time 4.2
& dispersal - center repeat



Withdrawal basic dot



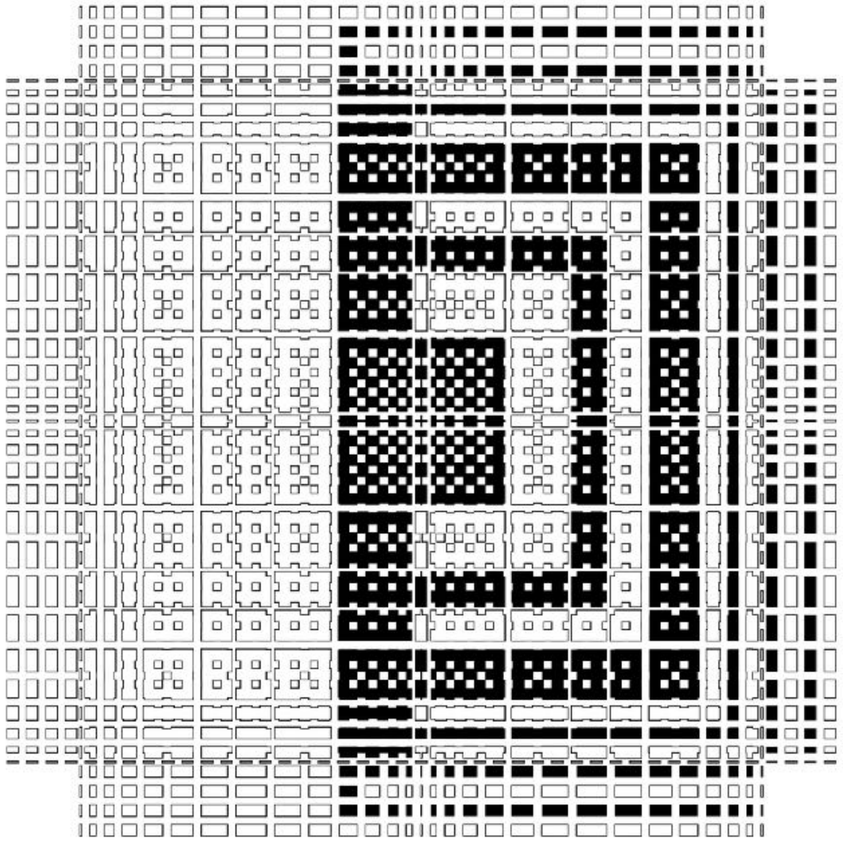
PhyB function (functions of itself & LANGUAGE-related & enhance LANGUAGE meaning):
adjustment of flowering time 2 & dispersal - center repeat



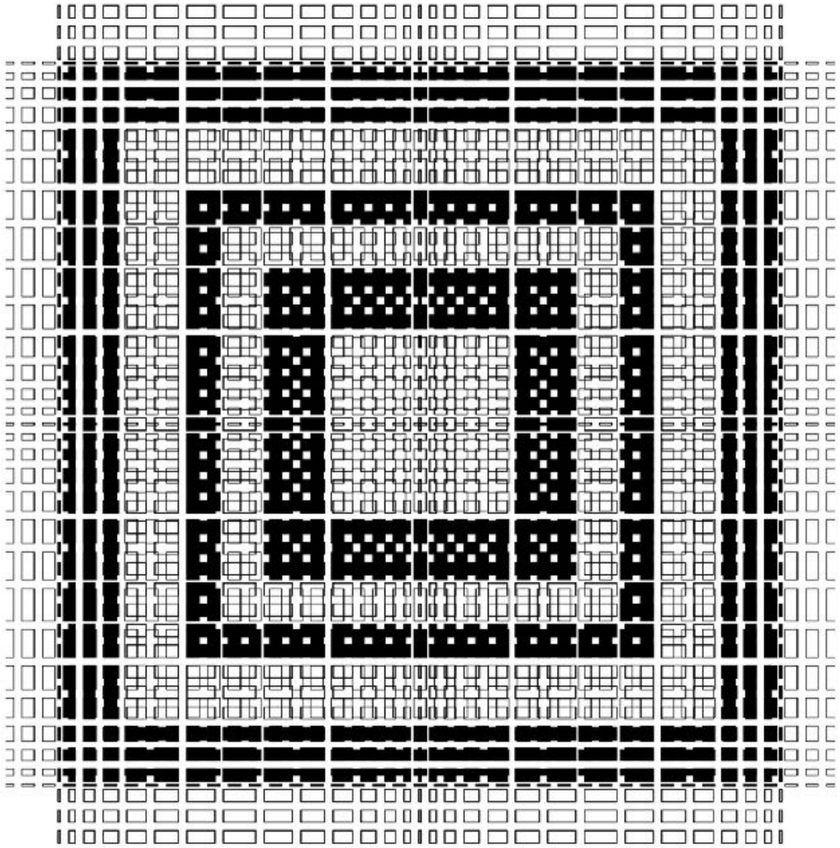
PhyB function (functions of itself & LANGUAGE-related & enhance LANGUAGE meaning):
adjustment of flowering time 3 & dispersal - center repeat

How to extend.

如何延伸。



PhyB function (functions of itself & enhance LANGUAGE meaning):
adjustment of biological clock & adjustment of flowering time 1



Different extension directions

Moire

I've been trying to make the encoded PhyB graphics emphasize a meaning closer to the words "Language" —which is the meaning “extension/development".
So in the further research, I found that how PhyB expresses a specific function is not active, but is based on its response to the external environment,or its cooperation with other photoreceptors.

Extending from the printing dots, I import the concept of moire – two images overlap to produce an pattern, and it changes when the placement angle changes. This second layer of image can represent the external environment (light) or a function of the second photoreceptor that works with it.

There are two types of moire:
1. Moire Stop–motion animation
2. Moire pattern.

我一直在尝试让编码的PhyB图形，其含义更接近于与“Language”想通的含义——“延伸/发展”。
于是在深入研究中，我发现，PhyB如何表达某一种特定功能的方式，不是主动表达，而是基于对外界环境的反应，以及与其他光受体的配合。

从印刷网点的角度延伸，我引入摩尔纹的概念 —— 两个图像重叠产生图像，随着放置角度的变化，图案也会随之发生变化。这个第二层图像，可以代表外界的环境（光），或者是与之配合的第二种光受体的某个功能。

有两种摩尔纹:
1.光栅动画
2.摩尔纹

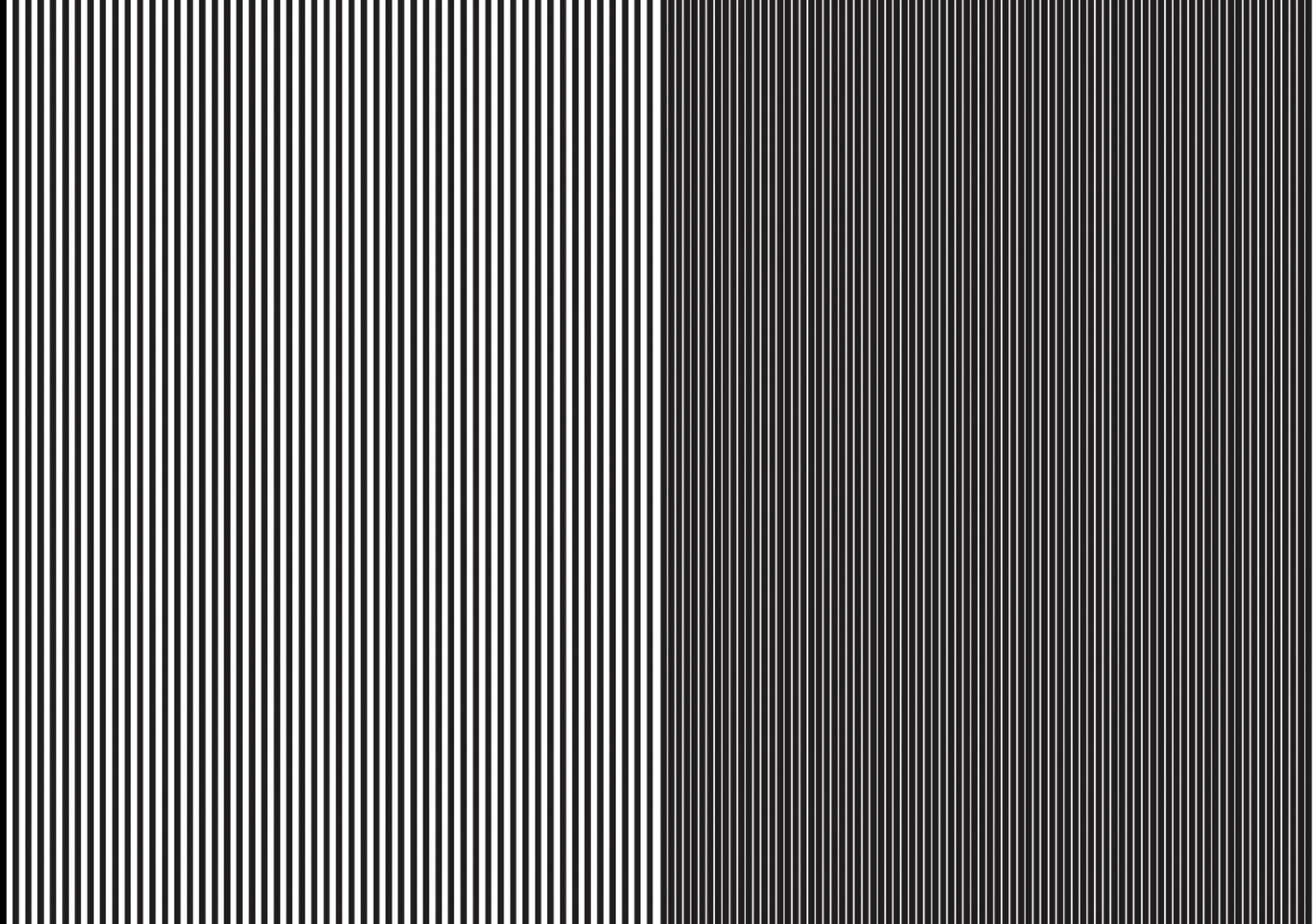
Moire

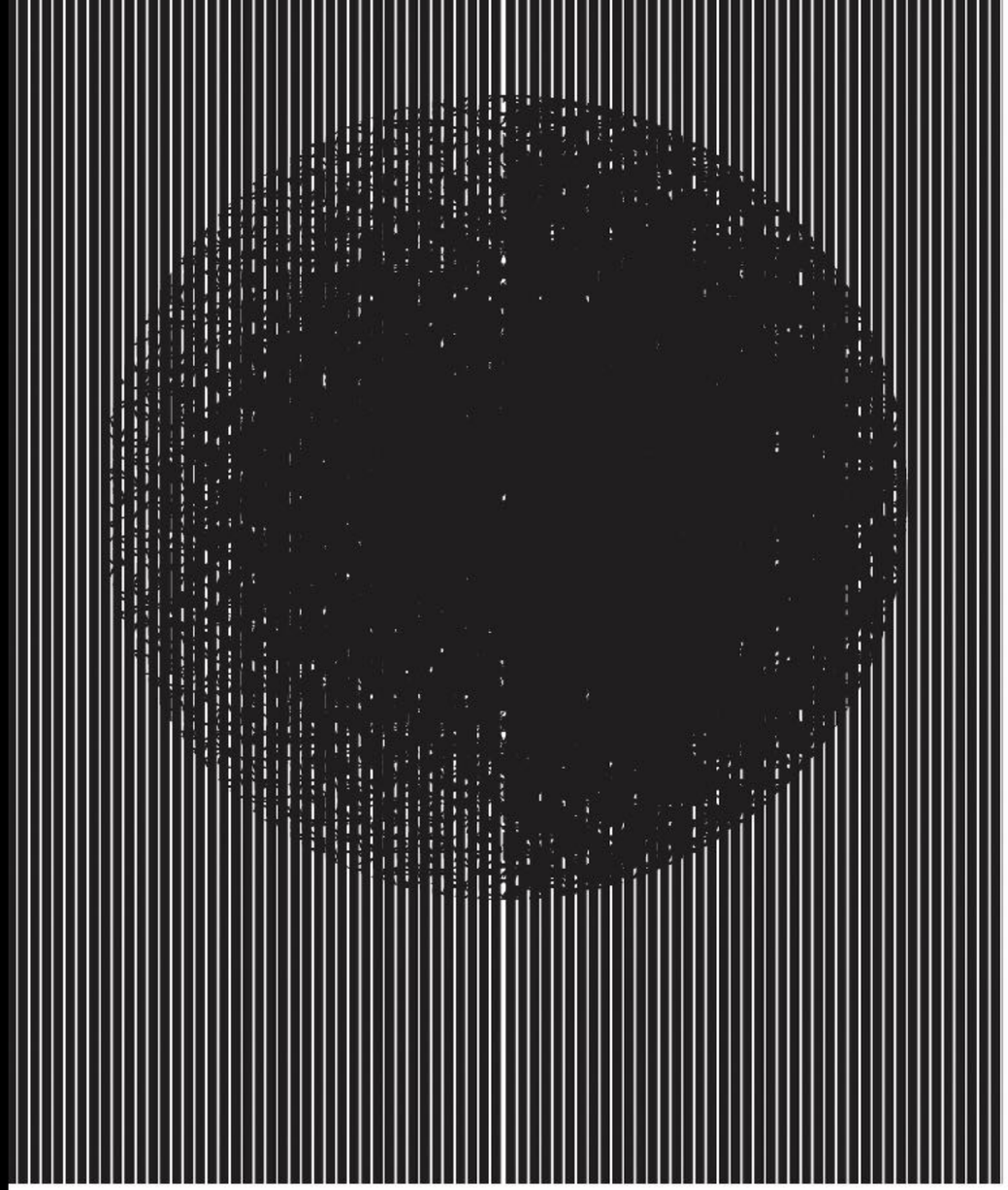
Stop-motion animation

2 frames/5 frames

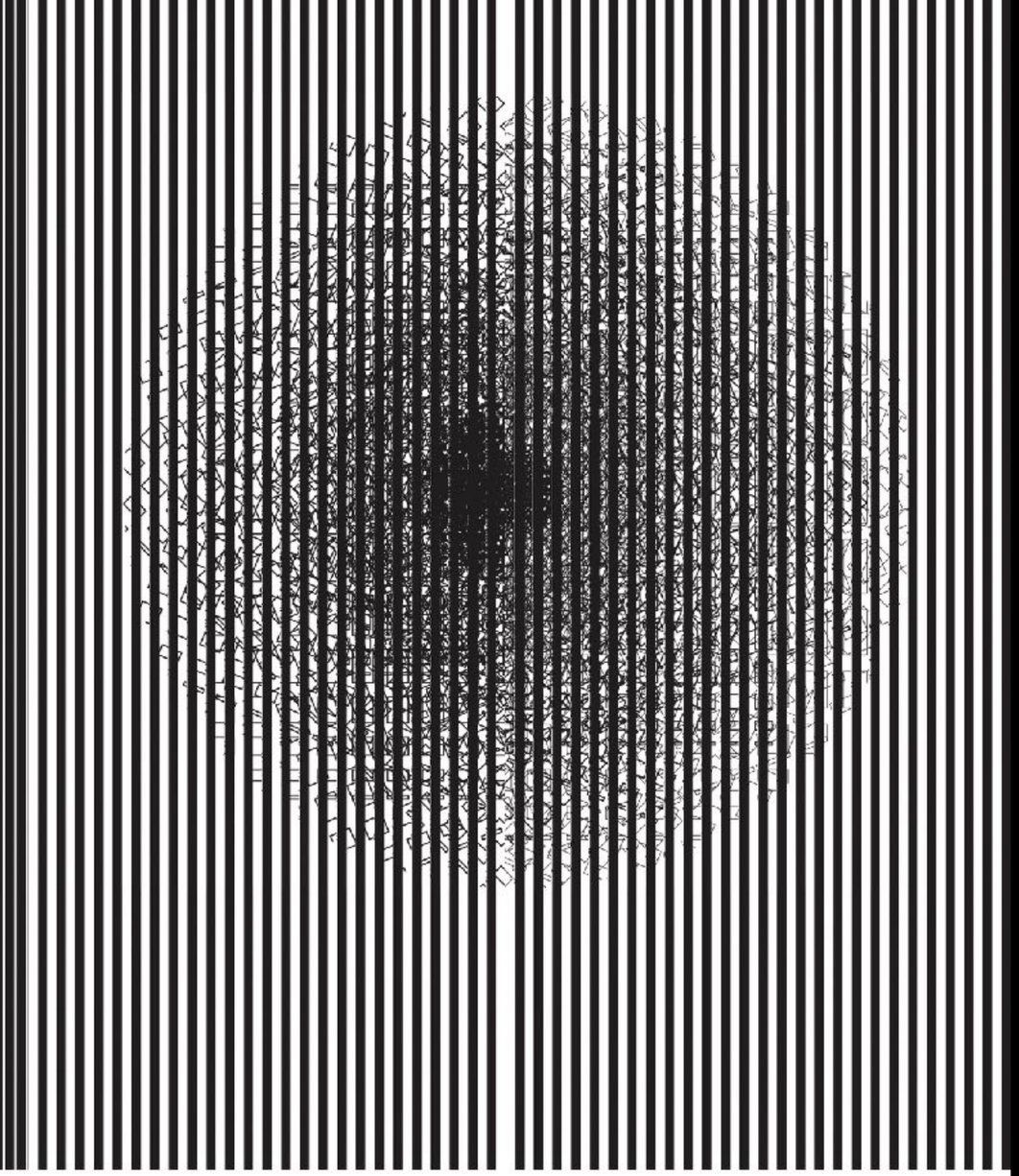
Different intervals and shapes of grating can represent different environments (light), put them on the moire pattern of PhyB, it activates the meaning of “development/ extension".
Also, I make the graphics produced by overlap grow or dispersed.

不同间隔和形状的光栅可以代表不同的环境（光），在他的作用下，PhyB激活“发展/延伸”的含义。同样的，我让叠加产生的图形也是生长或扩散的。

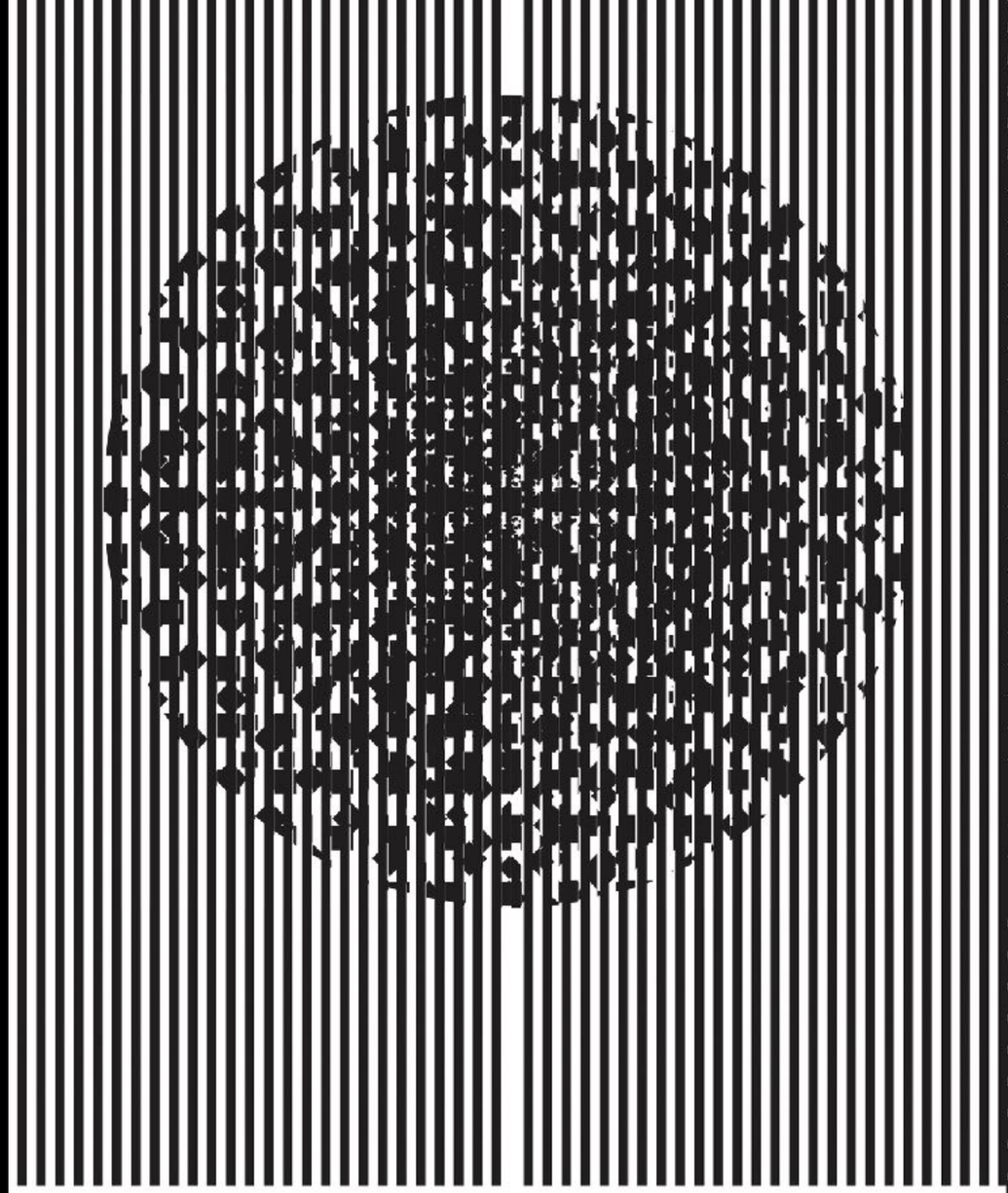




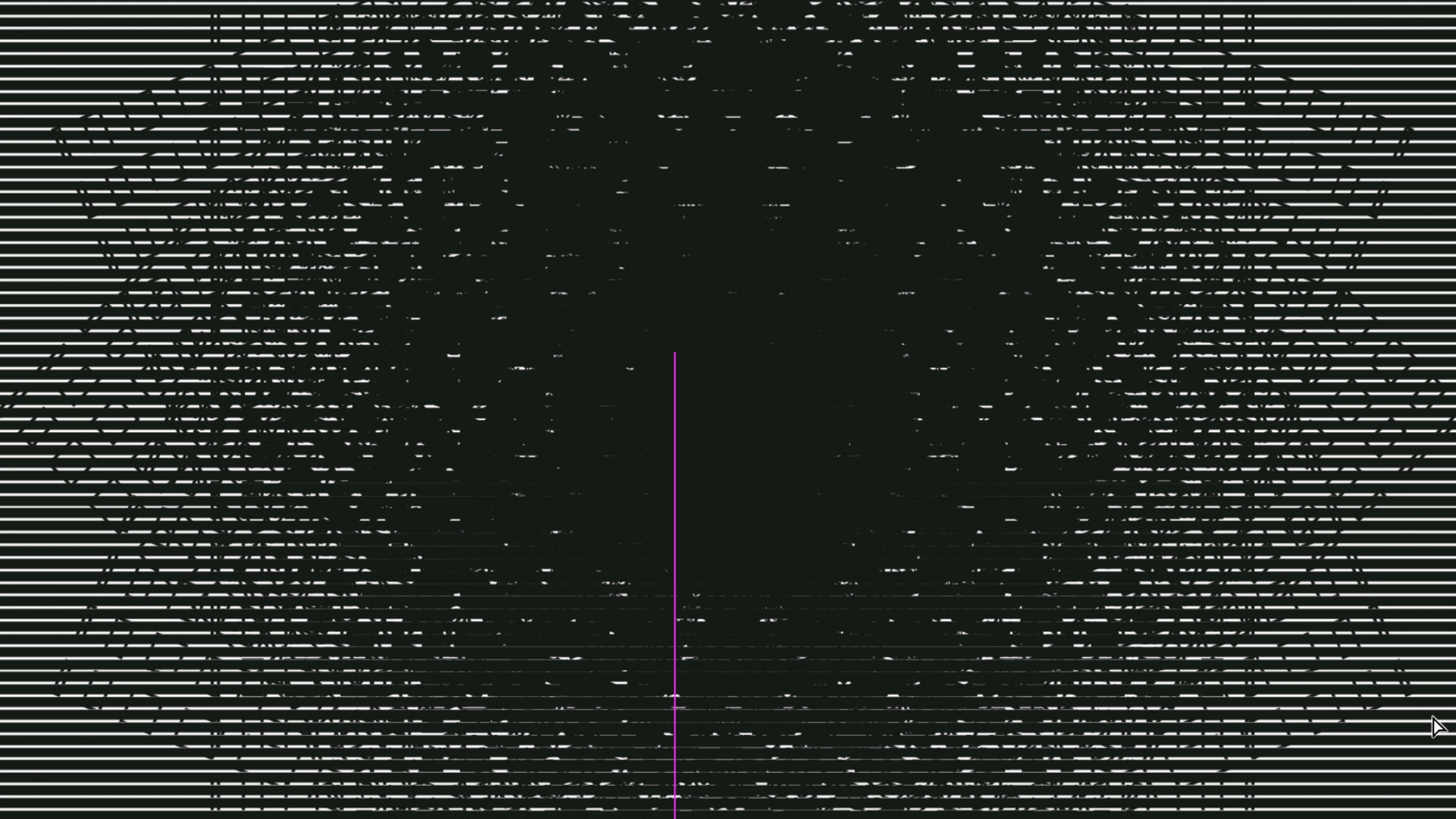
PhyB function (functions of itself
& LANGUAGE-related / Grating dynamics):
adjustment of flowering time 2 & dispersal - center repeat

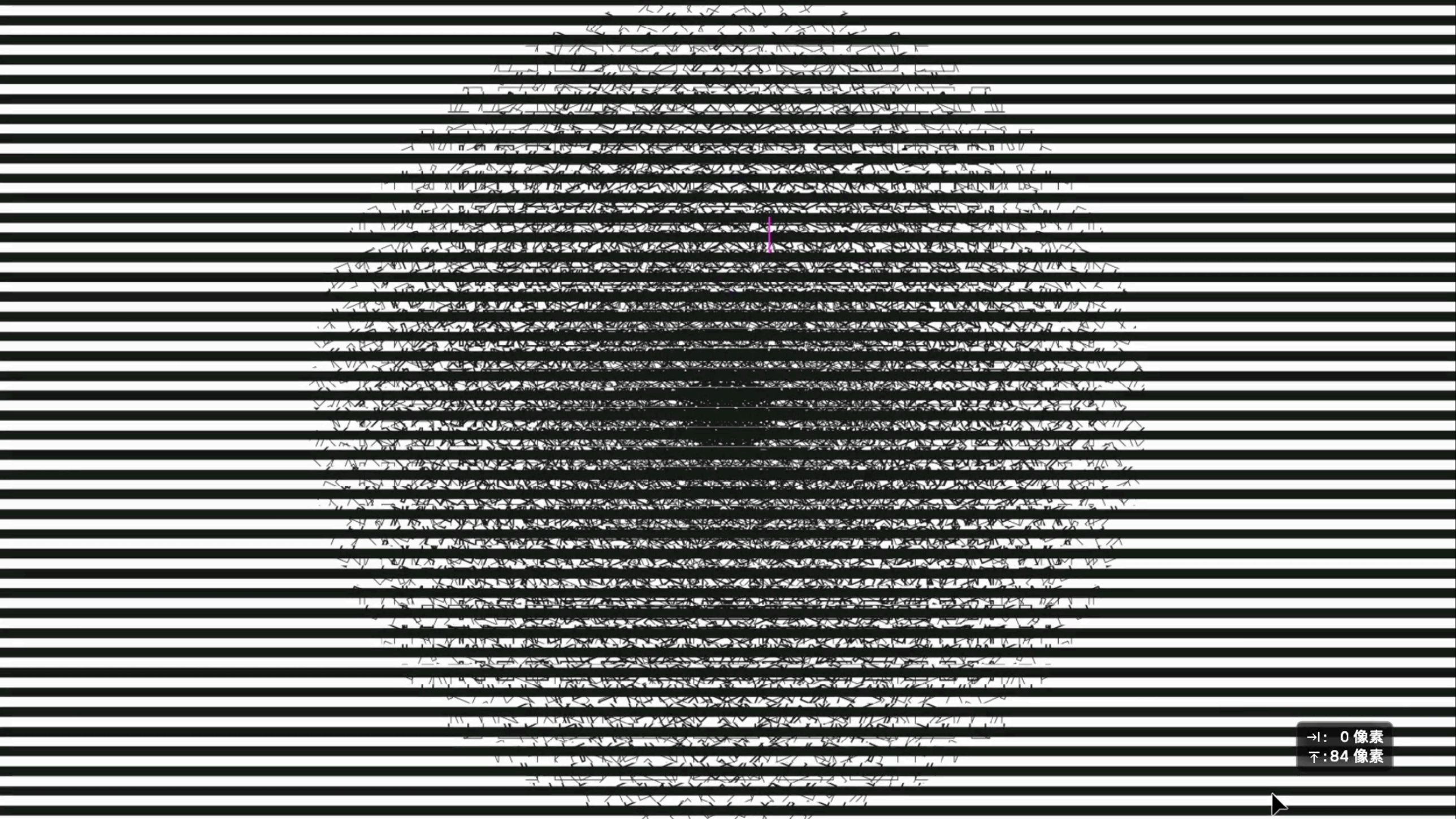


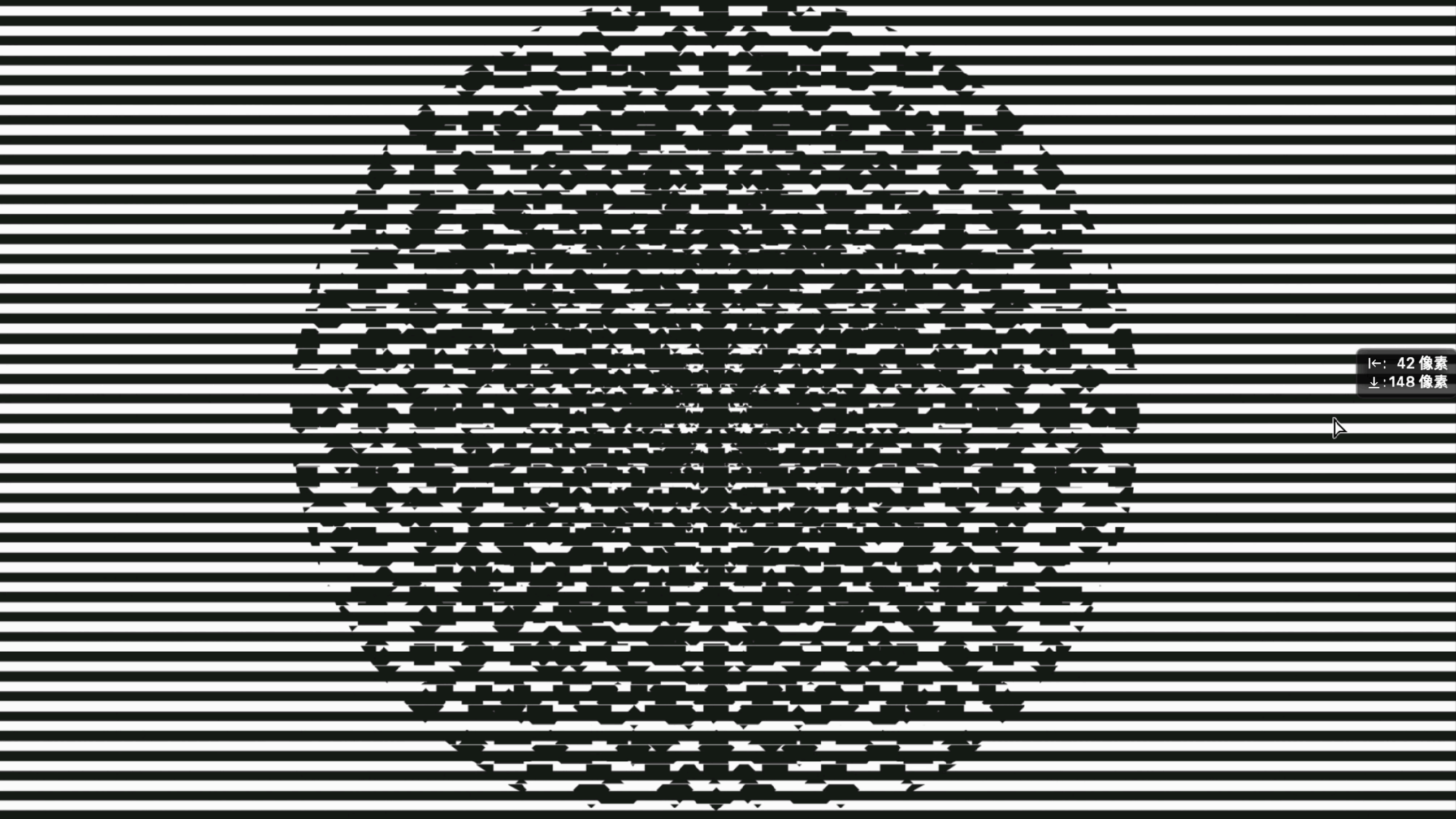
PhyB function (functions of itself & LANGUAGE-related & enhance
LANGUAGE meaning / Grating dynamics):
adjustment of flowering time 2 & dispersal - center repeat



PhyB function (LANGUAGE-related / Grating dynamics):
development/extension (dispersal - center repeat 2)



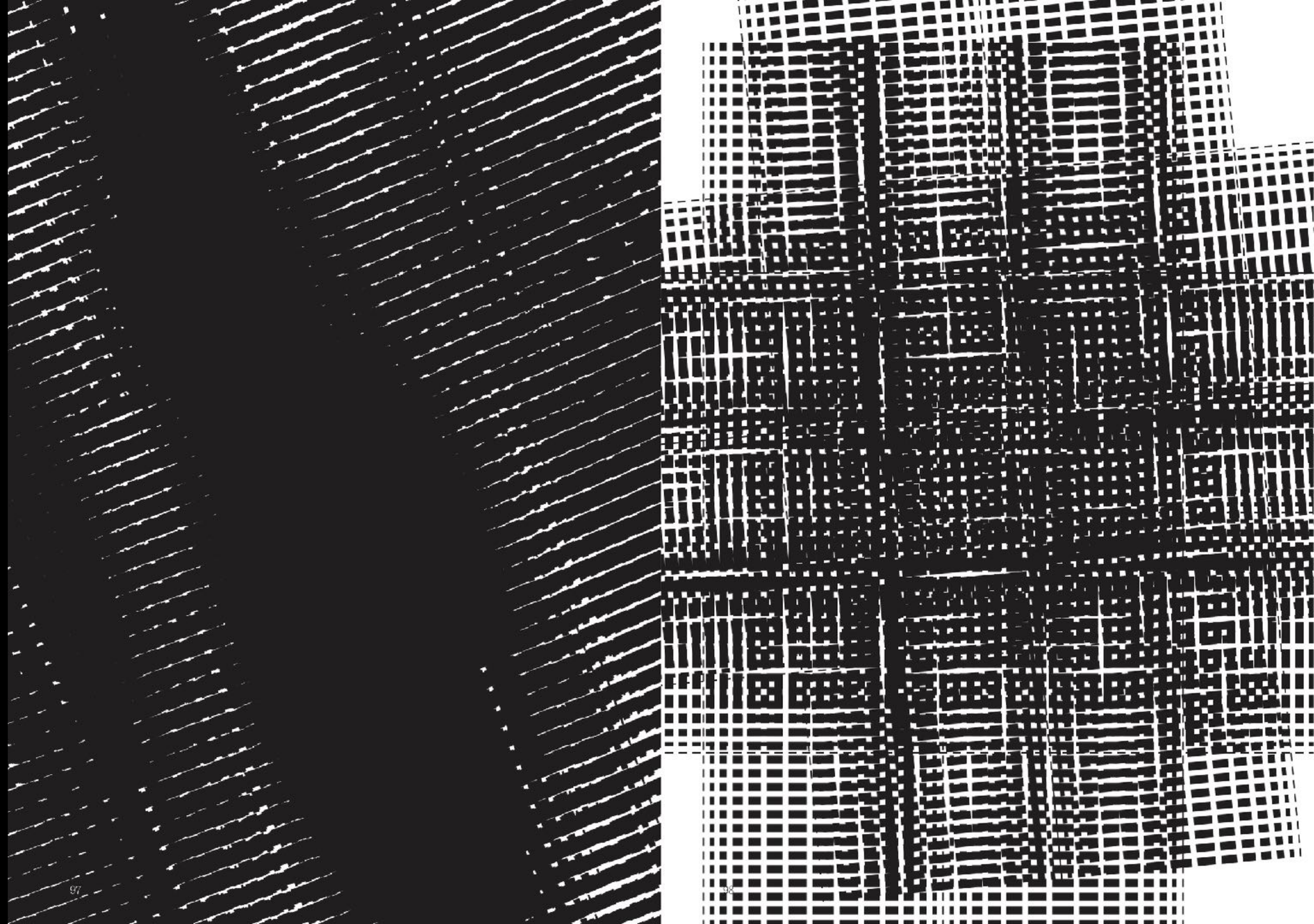

→I: 0 像素
↑:84 像素

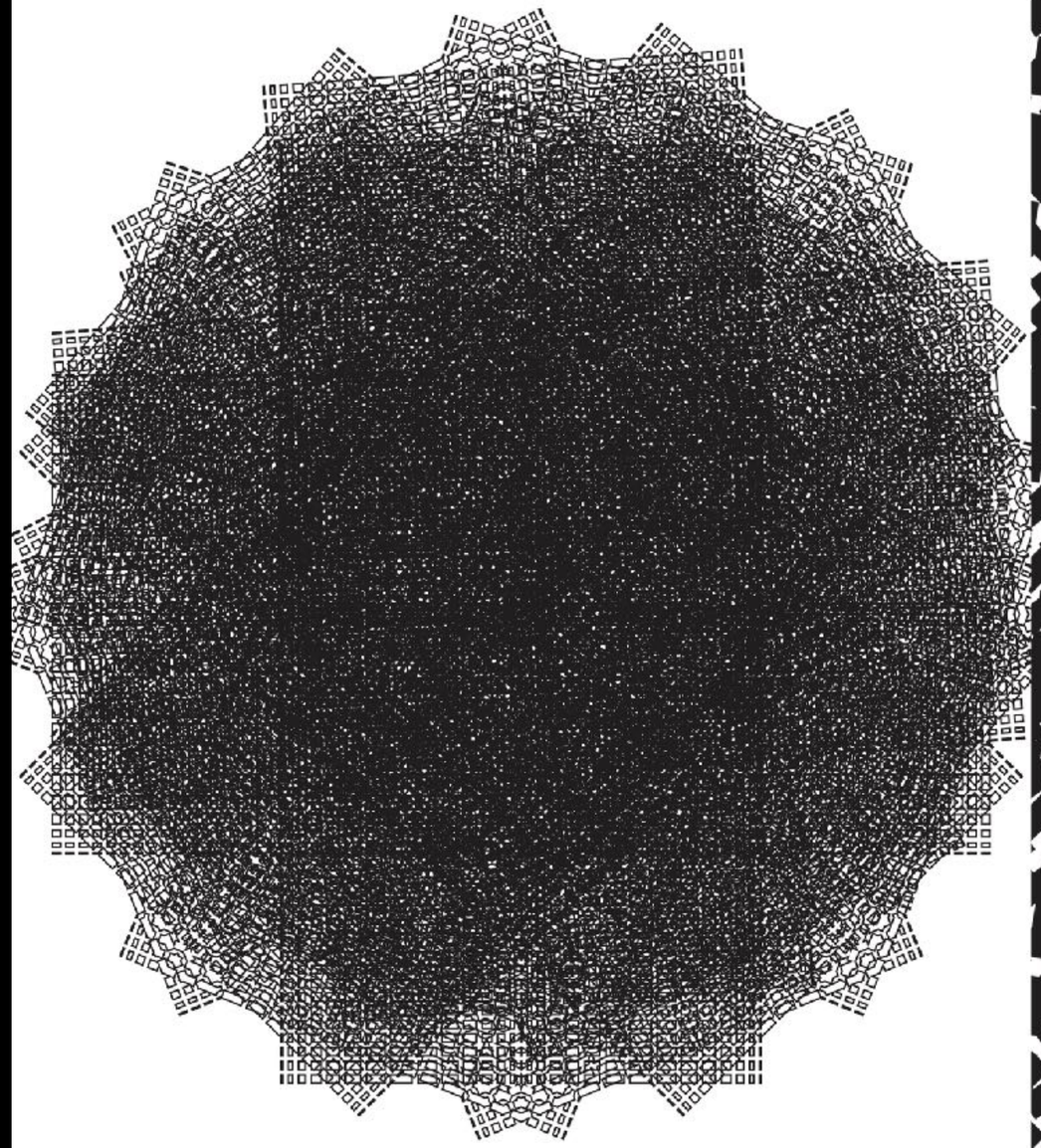

42 像素
148 像素

Moire Pattern

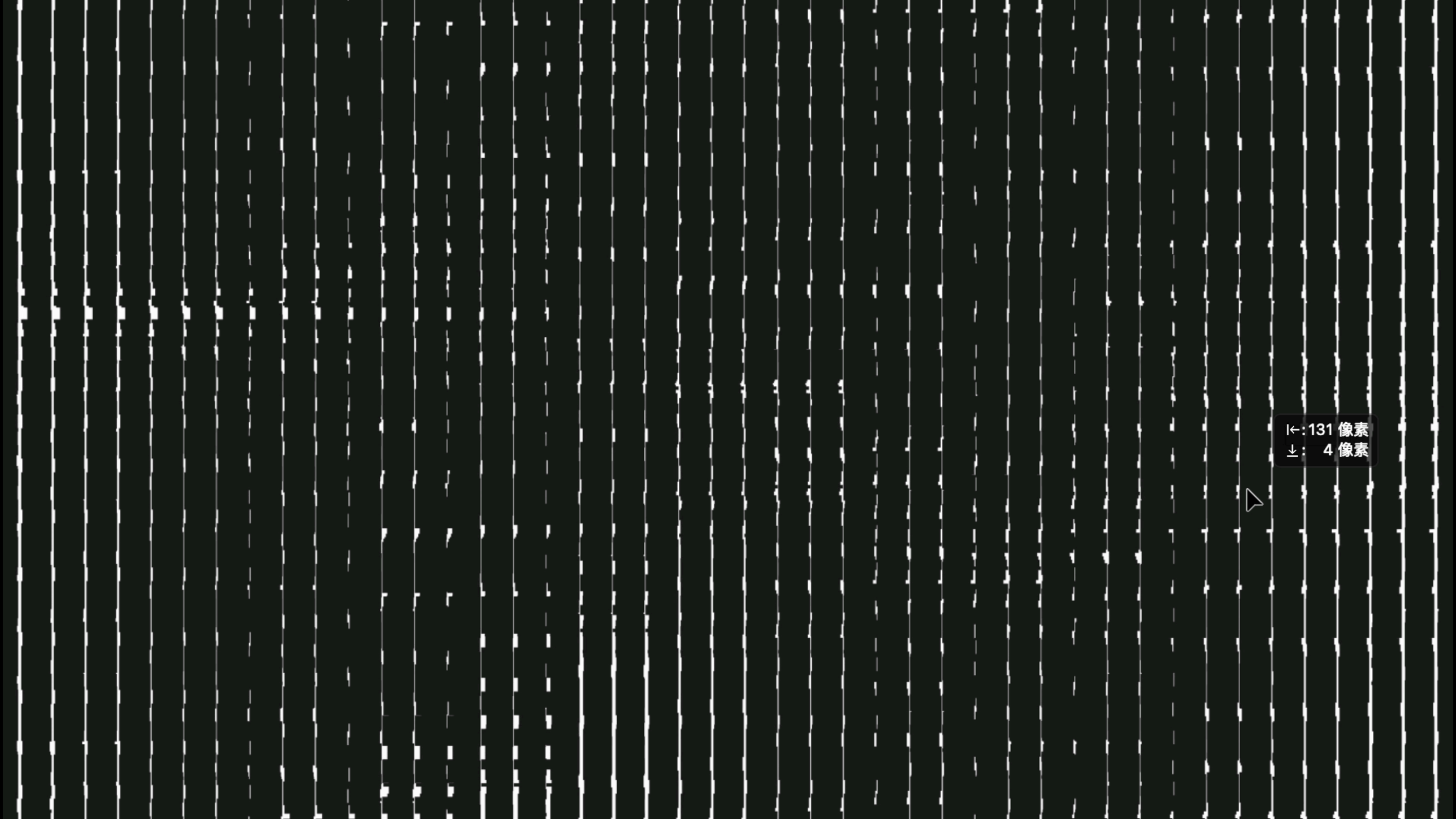
When a PhyB moire pattern is overlap on itself，it creates an upward or dispersal pattern. Slightly adjusting the angle of the other one will also change it. It can represent the interaction between two photoreceptors and activate the meaning of “development/ extension".

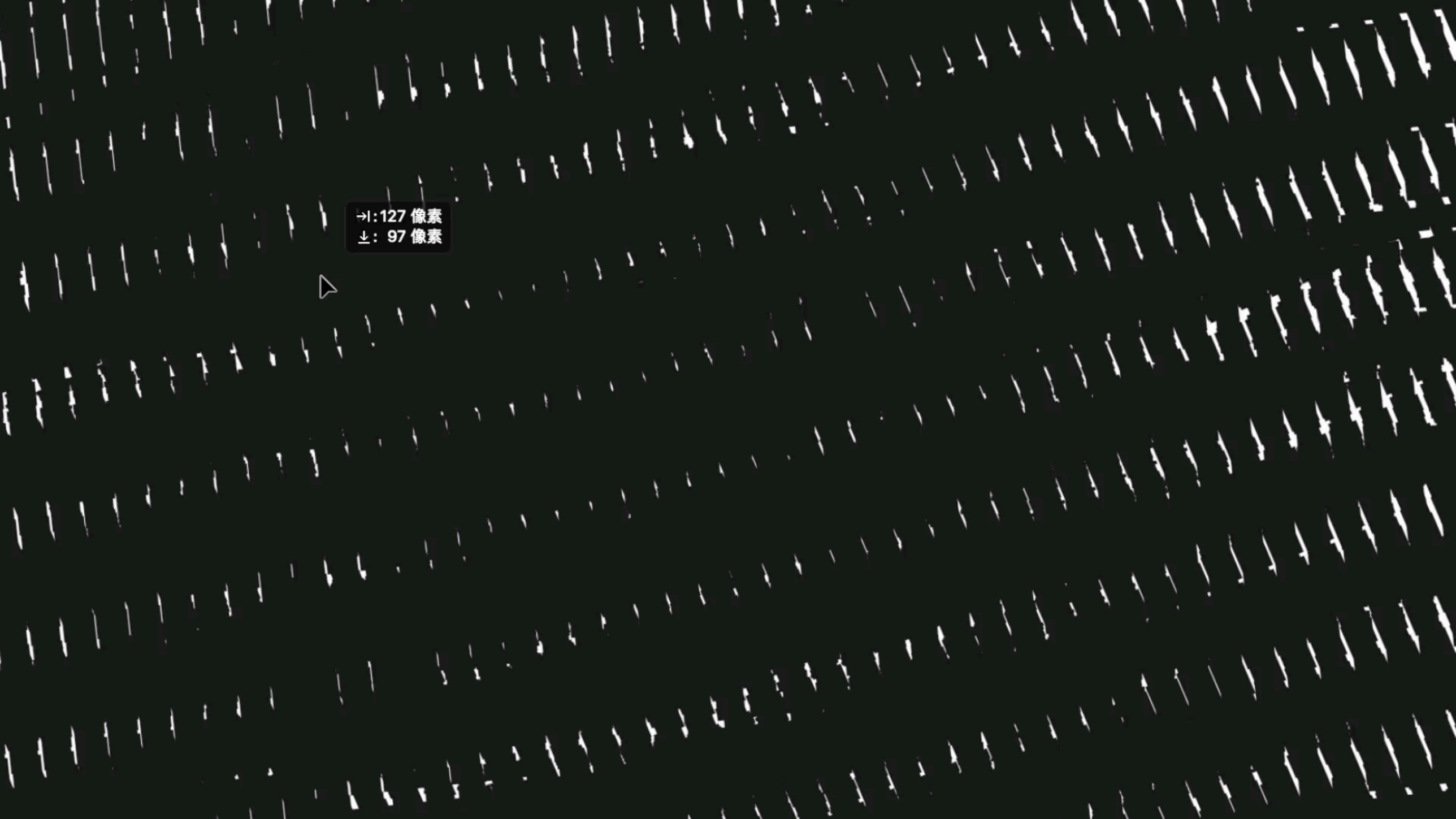
当一个PhyB的摩尔纹叠加自身，会产生向上或者扩散趋势的图形。对另一个图形的摆放角度稍加调整，图形大小也会改变。他可以代表两个光受体的互相作用激活了“发展/延伸”的含义。





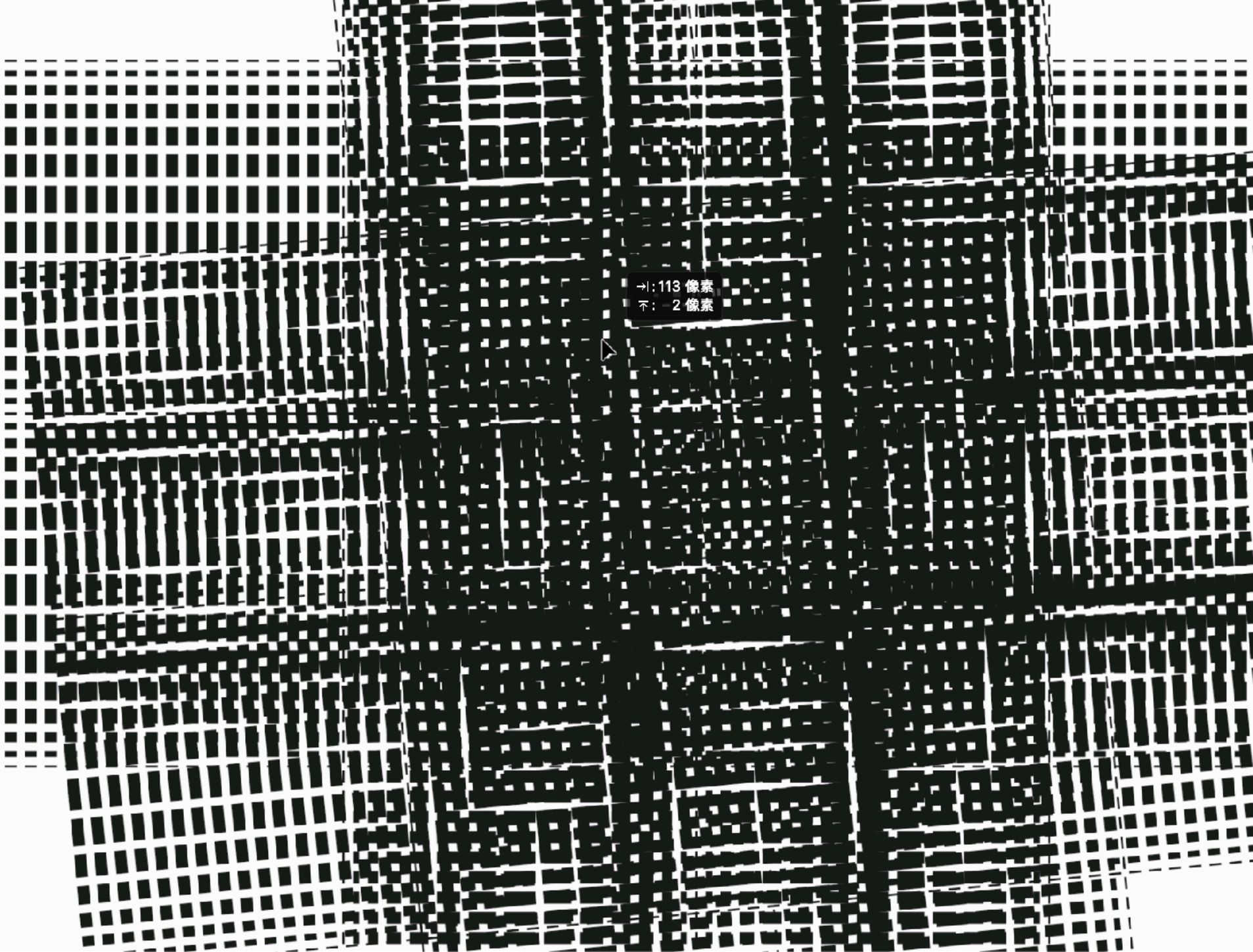
PhyB (functions itself & LANGUAGE-related / Moire dynamics):
adjustment of biological clock & adjustment of flowering time 4.2

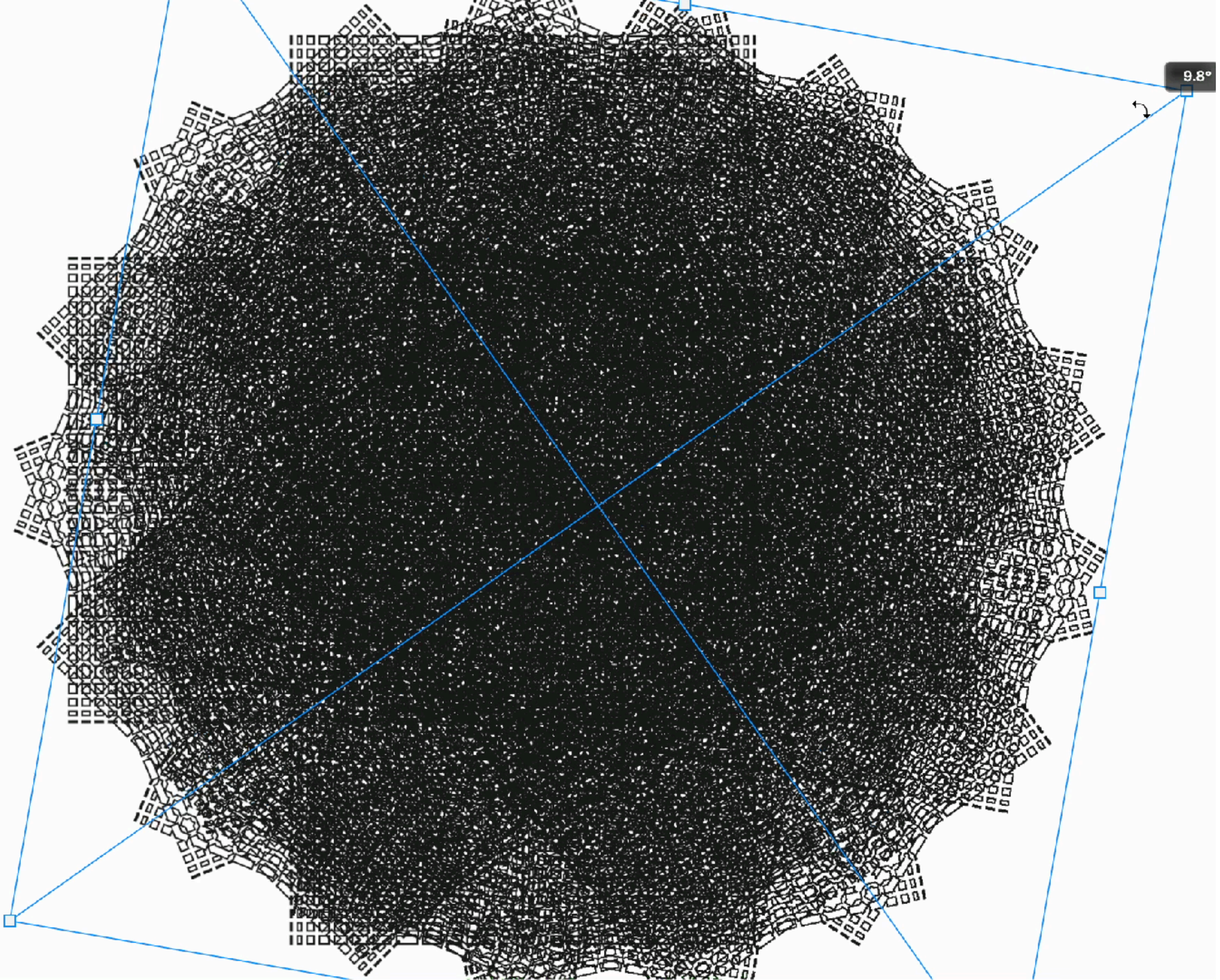

131 像素
4 像素

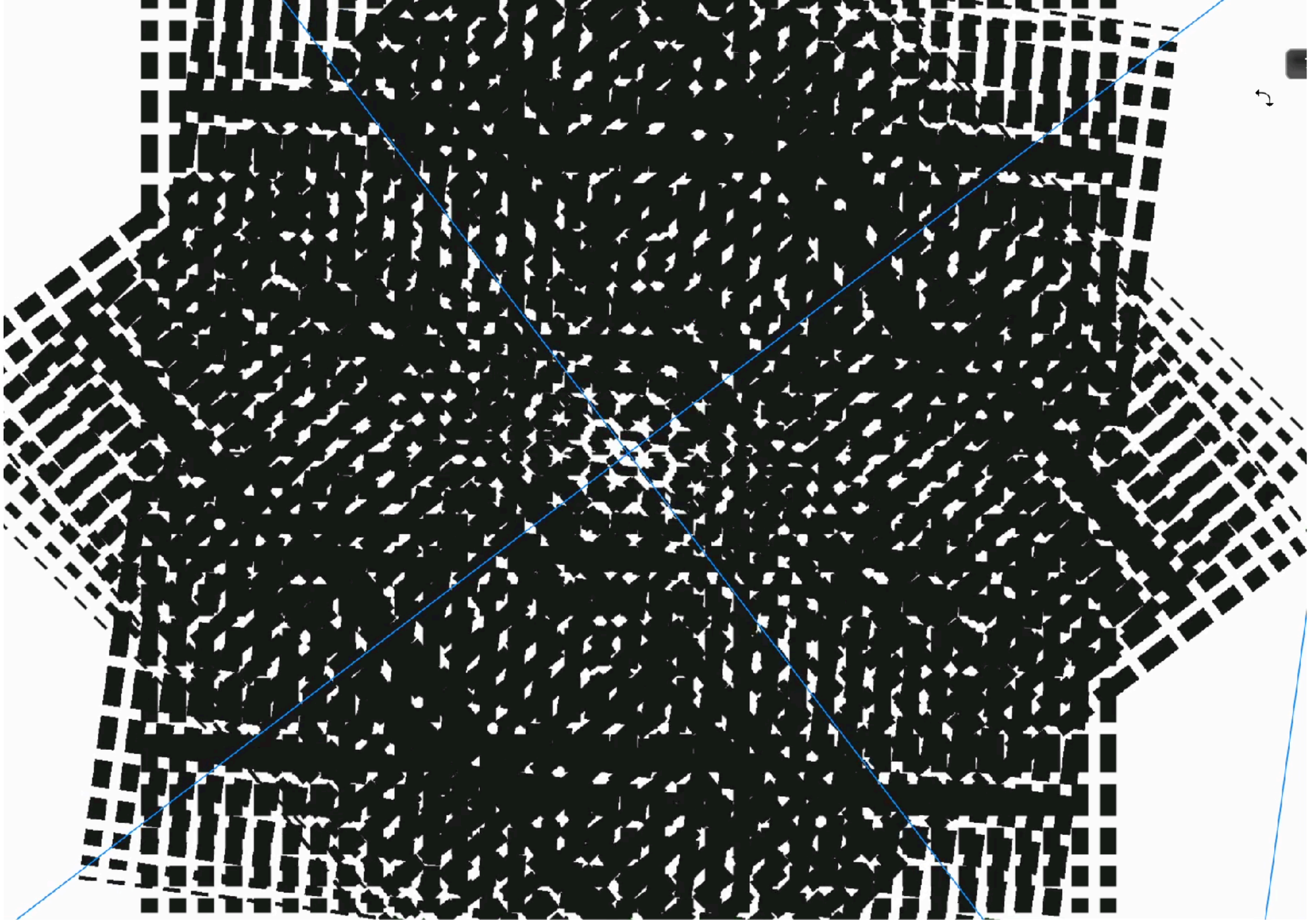

→|: 127 像素
↓: 97 像素

As you can be seen from the moire pattern video, it shows two opposite and reversible dynamics of growth/fall,dispersal/contraction, all respond to the moving of another layer. This can also reflect the changes of phyB in different contexts – it can emphasize the function of "extension/development" under a certain action.

摩尔纹的视频可以看出，它展现出了生长–下落，扩散–收缩，两种相反且可逆的动态，一切由移动另一个图层的动作决定。这也可以体现phyB在不同语境或者操作下的变化 —— 你可以通过某一动作强调“延伸/发展”的功能。

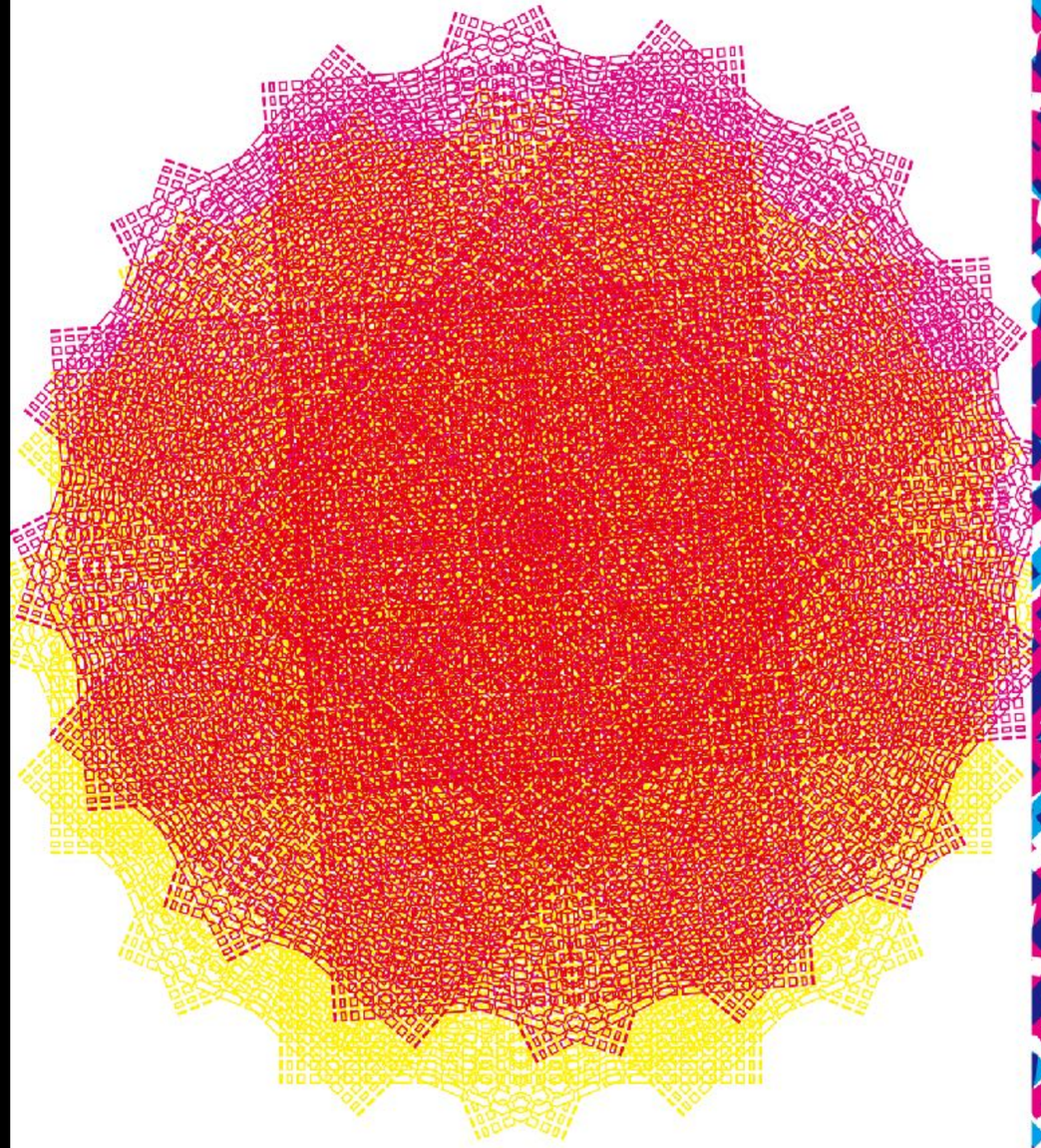



9.8°

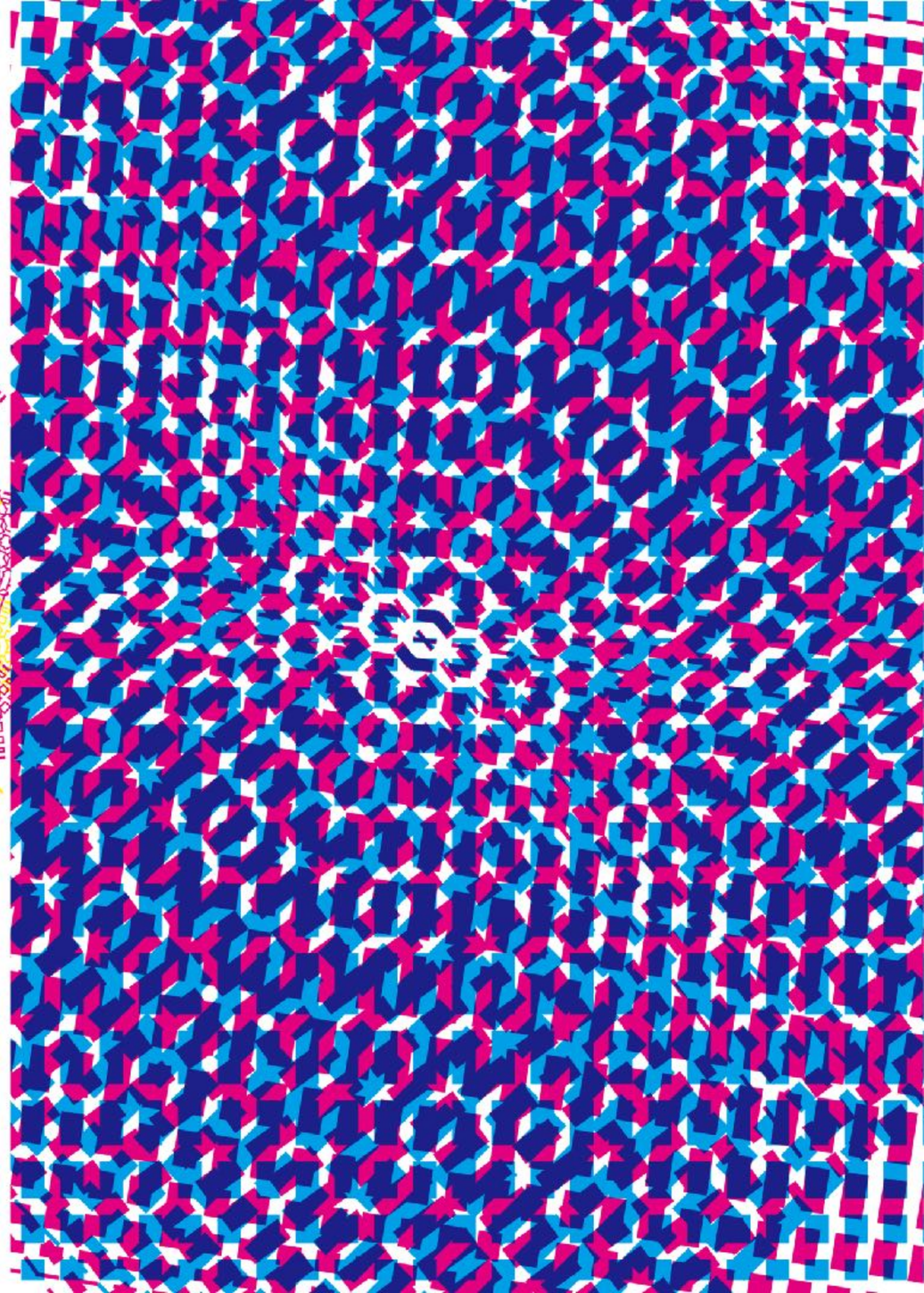


Finally, the way the moir é patterns overlap in angles reminds me of the color grid of printing, but this attempt would lose the dynamic effect of the moire pattern.

最后，摩尔纹互相叠加并且斜着的样子让我想到印刷的颜色叠加，但这个尝试会失去摩尔纹的动态效果



PhyB (functions itself & LANGUAGE-related / Print dots):
adjustment of biological clock & adjustment of flowering time 4.2



The last, I used four of the dots to simulate the interaction of four different photoreceptors (similar to the CMYK color dots, which are overlap to produce different colors) ,to echo the fact that the photoreceptors are the visual language of plants.

再下一次尝试中 我使用了其中的四个圆点去模拟四种蛋白的互相作用（类似于cmyk四个颜色网点互相的叠加产生的不同的颜色），以呼应光感蛋白是植物的视觉语言。

