

Input Format Documentation

Overview

This document describes the input format for the Geometric Image Generation system. The input consists of hierarchical JSON configuration files that define how geometric shapes and layouts are generated.

File Structure

The input system follows a hierarchical file structure with reference-based composition. Here is an example:

```
1 | input/
2 |   └─ base.json                # Main configuration file
3 |   └─ basic_attributes_distribution.json  # Global attribute distributions
4 |   └─ panel1/                  # Panel-specific configurations
5 |       └─ element1.json        # Element configuration
6 |       └─ element2.json        # Element configuration
7 |       └─ element3.json        # Element configuration
8 |       └─ element1/            # Nested element configurations for element1
9 |           └─ element1.json    # Next level element config
```

Configuration Hierarchy

1. Base Configuration (base.json)

The main configuration file that defines the overall structure and global settings.

Required Fields:

- `layout`: Array of two integers `[rows, cols]` defining the panel grid layout
- `canvas_width`: Float value for canvas width (default: 20.0)
- `canvas_height`: Float value for canvas height (default: 20.0)
- `opacity`: Float value between 0 and 1 for shape fill opacity
- `panel_configs`: Array of panel configuration objects

Example:

```
1 | {
2 |   "layout": [1, 1],
3 |   "canvas_width": 20.0,
4 |   "canvas_height": 20.0,
5 |   "opacity": 0.5,
6 |   "panel_configs": [
7 |     {
8 |       "panel_id": 1,
9 |       "composition_type": {
10 |         "chaining": 1.0
11 |       },
12 |       "chaining_image_config": {
```

```

13         "element_num": 3,
14         "chain_shape": "line",
15         "draw_chain": true,
16         "chain_level": "bottom",
17         "interval": 0.4,
18         "rotation": 0,
19         "sub_elements": [
20             {
21                 "$ref": "../panel1/element1.json"
22             }
23         ]
24     }
25 }
26 ]
27 }

```

2. Global Attributes Distribution (basic_attributes_distribution.json)

Defines probability distributions for various visual attributes that apply globally unless overridden.

Available Distributions:

Color Distribution (color_distribution)

Array of 11 floats representing probabilities for each color:

- Index 0: white
- Index 1: black
- Index 2: red
- Index 3: green
- Index 4: blue
- Index 5: cyan
- Index 6: magenta
- Index 7: yellow
- Index 8: purple
- Index 9: brown
- Index 10: orange

Lightness Distribution (lightness_distribution)

Array of 10 floats for lightness levels:

- Index 0: lightness20
- Index 1: lightness25
- Index 2: lightness33
- Index 3: lightness40

- Index 4: lightness50
- Index 5: lightness60
- Index 6: lightness67
- Index 7: lightness75
- Index 8: lightness80
- Index 9: lightness100

Background Lightness Distribution (`background_lightness_distribution`)

Same structure as lightness distribution, but specifically for background elements.

Pattern Distribution (`pattern_distribution`)

Array of 13 floats for fill patterns:

- Index 0: blank
- Index 1: horizontal lines
- Index 2: vertical lines
- Index 3: northeast lines
- Index 4: northwest lines
- Index 5: grid
- Index 6: crosshatch
- Index 7: dots
- Index 8: crosshatch dots
- Index 9: five pointed stars
- Index 10: six pointed stars
- Index 11: bricks
- Index 12: checkerboard

Pattern Color Distribution (`pattern_color_distribution`)

Array of 11 floats representing probabilities for pattern colors:

- Index 0: pattern white
- Index 1: pattern black
- Index 2: pattern red
- Index 3: pattern green
- Index 4: pattern blue
- Index 5: pattern cyan
- Index 6: pattern magenta
- Index 7: pattern yellow
- Index 8: pattern purple

- Index 9: pattern brown
- Index 10: pattern orange

Pattern Lightness Distribution (`pattern_lightness_distribution`)

Array of 10 floats for pattern lightness levels:

- Index 0: pattern lightness 20
- Index 1: pattern lightness 25
- Index 2: pattern lightness 33
- Index 3: pattern lightness 40
- Index 4: pattern lightness 50
- Index 5: pattern lightness 60
- Index 6: pattern lightness 67
- Index 7: pattern lightness 75
- Index 8: pattern lightness 80
- Index 9: pattern lightness 100

Outline Distribution (`outline_distribution`)

Array of 12 floats for outline styles:

- Index 0: solid
- Index 1: dotted
- Index 2: densely dotted
- Index 3: loosely dotted
- Index 4: dashed
- Index 5: densely dashed
- Index 6: loosely dashed
- Index 7: dash dot
- Index 8: densely dash dot
- Index 9: dash dot dot
- Index 10: densely dash dot dot
- Index 11: loosely dash dot dot

Outline Color Distribution (`outline_color_distribution`)

Array of 11 floats representing probabilities for outline colors:

- Index 0: outline white
- Index 1: outline black
- Index 2: outline red
- Index 3: outline green

- Index 4: outline blue
- Index 5: outline cyan
- Index 6: outline magenta
- Index 7: outline yellow
- Index 8: outline purple
- Index 9: outline brown
- Index 10: outline orange

Outline Lightness Distribution (outline_lightness_distribution)

Array of 10 floats for outline lightness levels:

- Index 0: outline lightness 20
- Index 1: outline lightness 25
- Index 2: outline lightness 33
- Index 3: outline lightness 40
- Index 4: outline lightness 50
- Index 5: outline lightness 60
- Index 6: outline lightness 67
- Index 7: outline lightness 75
- Index 8: outline lightness 80
- Index 9: outline lightness 100

Outline Thickness Distribution (outline_thickness_distribution)

Array of 8 floats for outline thickness levels:

- Index 0: no outline
- Index 1: ultra thin
- Index 2: very thin
- Index 3: thin
- Index 4: semi thick
- Index 5: thick
- Index 6: very thick
- Index 7: ultra thick

Shape Distribution (shape_distribution)

Array of 9 floats for shape types:

- Index 0: line segment
- Index 1: circle
- Index 2: triangle

- Index 3: square
- Index 4: pentagon
- Index 5: hexagon
- Index 6: rectangle
- Index 7: right triangle
- Index 8: arbitrary closed shape

Example:

```

1  {
2    "color_distribution": [0.0, 0.25, 0.1, 0.1, 0.1, 0.1, 0.1, 0.1, 0.05, 0.05, 0.05],
3    "pattern_color_distribution": [0.1, 0.3, 0.1, 0.1, 0.1, 0.05, 0.05, 0.05, 0.05,
0.05, 0.05],
4    "pattern_lightness_distribution": [0.15, 0.15, 0.15, 0.15, 0.15, 0.1, 0.05, 0.05,
0.025, 0.025],
5    "outline_color_distribution": [0.05, 0.4, 0.1, 0.1, 0.1, 0.05, 0.05, 0.05, 0.05,
0.025, 0.025],
6    "outline_lightness_distribution": [0.2, 0.2, 0.15, 0.15, 0.1, 0.08, 0.05, 0.04,
0.02, 0.01],
7    "outline_thickness_distribution": [0.2, 0.05, 0.1, 0.3, 0.2, 0.1, 0.04, 0.01],
8    "shape_distribution": [0.0, 0.5, 0.5, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0]
9  }

```

3. Panel and Element Configurations

Panel and element configurations share the same structure but at different hierarchy levels.

Common Fields:

Composition Type (`composition_type`)

Defines the generation strategy as a probability distribution:

```

1  {
2    "composition_type": {
3      "simple": 0.3,
4      "chaining": 0.4,
5      "enclosing": 0.3
6    }
7  }

```

Available composition types:

- `simple`: Single shape generation
- `chaining`: Chain-based arrangement
- `enclosing`: Nested/surrounding arrangements
- `border`: Border and corner placement
- `random`: Random distribution

- `radial`: Radial arrangement around center
- `parallel`: Parallel arrangement

Generator-Specific Configurations

Each composition type can have its own configuration object:

Simple Image Config (`simple_image_config`)

For single shape generation:

```

1  {
2      "simple_image_config": {
3          "aspect_ratio": {
4              "min": 0.5,
5              "max": 2.0
6          }
7      }
8  }
```

Chaining Image Config (`chaining_image_config`)

For chain-based arrangements:

```

1  {
2      "chaining_image_config": {
3          "element_num": 3,
4          "chain_shape": "line",      // "line", "bezier", "circle"
5          "draw_chain": true,
6          "chain_level": "bottom",    // "bottom", "top"
7          "interval": 0.4,
8          "rotation": 0,
9          "control_point_distribution": { // Only used when chain_shape is "bezier"
10             "x_range": [-0.125, 0.125],
11             "y_range": [-0.5, 0.5],
12             "pivot_points": [-0.75, -0.25, 0.25, 0.75]
13         },
14         "sub_elements": [...]
15     }
16 }
```

Fields:

- `element_num`: Number of elements to arrange in the chain
- `chain_shape`: Shape of the chain path - "line", "bezier", or "circle"
- `draw_chain`: Whether to draw the chain path itself
- `chain_level`: Z-order of the chain relative to elements - "bottom" or "top"
- `interval`: Spacing between elements along the chain
- `rotation`: Rotation angle of the entire chain arrangement

- `control_point_distribution`: (Optional) Used only when `chain_shape` is "bezier" to control the Bézier curve shape
 - `x_range`: Array of two floats defining the horizontal range for control point offsets
 - `y_range`: Array of two floats defining the vertical range for control point offsets
 - `pivot_points`: Array of floats defining normalized positions along the curve where control points are placed
- `sub_elements`: Array of child element configurations

Enclosing Image Config (`enclosing_image_config`)

For nested arrangements:

```

1  {
2      "enclosing_image_config": {
3          "enclose_level": 2,
4          "sub_elements": [...]
5      }
6  }
```

Border Image Config (`border_image_config`)

For border placement:

```

1  {
2      "border_image_config": {
3          "position_probabilities": [0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 0.5, 1.0],
4          "element_scaling": 0.2,
5          "approach_factor": 1.0,
6          "shade_probability": 0.7,
7          "sub_elements": [...]
8      }
9  }
```

Random Image Config (`random_image_config`)

For random distribution:

```

1  {
2      "random_image_config": {
3          "centralization": 0.5,
4          "element_num": 5
5      }
6  }
```

Each of these configuration objects (excluding `simple_image_config`) can carry an attribute `sub_elements`, which is an array of child elements' configurations (can be included as json file references, see explanation below). The exact meaning of each index is dependent on the composition type.

Reference System

The configuration system supports JSON references using `$ref` to create modular, reusable configurations:

```
1  {
2    "sub_elements": [
3      {
4        "$ref": "../panel1/element1.json"
5      },
6      {
7        "$ref": "../panel1/element2.json"
8      }
9    ]
10 }
```

Reference Resolution:

- Relative paths are resolved from the current file's location
- References can point to files at any level in the hierarchy, but it's suggested to keep the file / path naming convention: sub parts of a particular element or panel are to be kept in a folder, with same name and level of the element / panel.
- Circular references should be avoided

Configuration Inheritance

The attributes in the system follows a hierarchical inheritance model:

1. **Global Distributions:** Defined in `basic_attributes_distribution.json`. It is same level as item 2 **Base Configuration**, and will be merged together during runtime.
2. **Base Configuration:** Global settings in `base.json`
3. **Panel Configuration:** Panel-specific overrides
4. **Element Configuration:** Element-specific overrides
5. **More Nested Element Configuration:** Deeper level overrides, if exist

Lower levels can override higher level settings. If a distribution or setting is not defined at a lower level, it inherits from the parent level.

Validation Rules

1. **Probability Arrays:** All distribution arrays must sum to 1.0 or be normalized automatically
2. **Required Fields:** Each level must specify a `composition_type`
3. **Generator Consistency:** If a composition type is specified, its corresponding config object should be present
4. **Reference Validity:** All `$ref` paths must point to valid, accessible files
5. **Numerical Ranges:** Values like `opacity`, `interval`, `rotation` must be within valid ranges

Example Complete Configuration

Here's a minimal but complete configuration example:

base.json:

```
1  {
2    "layout": [1, 1],
3    "canvas_width": 20.0,
4    "canvas_height": 20.0,
5    "opacity": 0.5,
6    "panel_configs": [
7      {
8        "composition_type": {"simple": 1.0},
9        "simple_image_config": {}
10     }
11   ]
12 }
```

This creates a single panel with one simple shape using global attribute distributions.

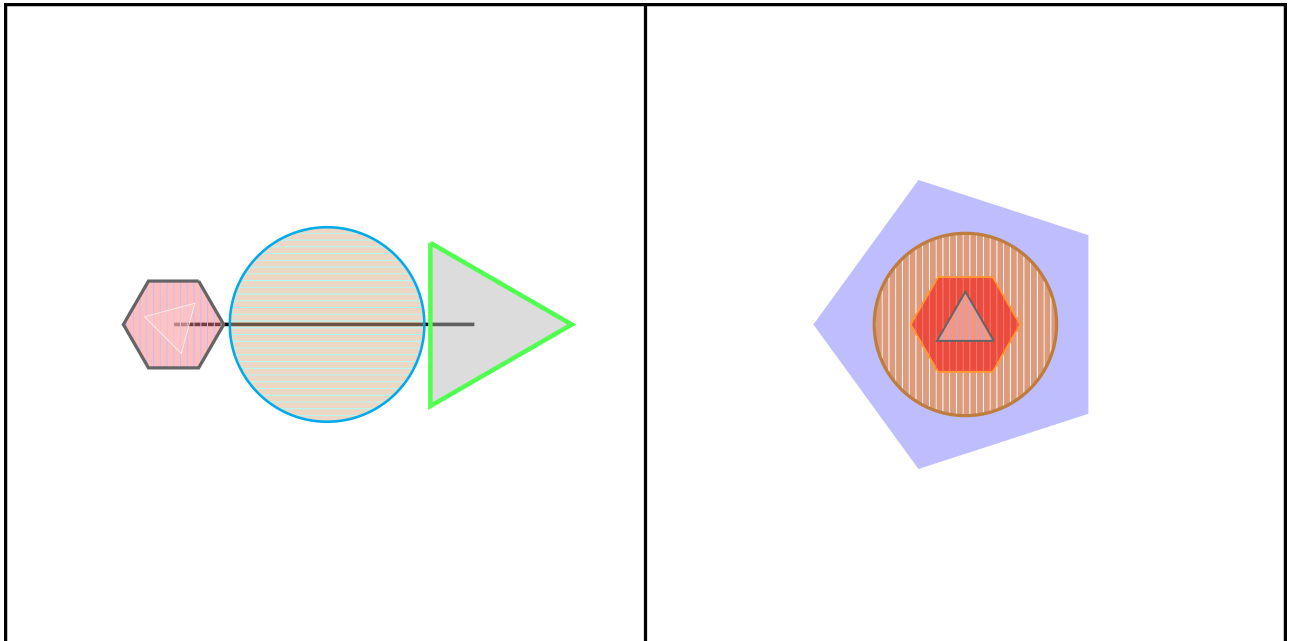
Best Practices

1. **Modular Design:** Use separate files for different elements to promote reusability
2. **Clear Hierarchy:** Organize configurations logically with intuitive file names
3. **Balanced Distributions:** Ensure probability distributions reflect desired output characteristics
4. **Documentation:** Include comments or maintain separate documentation for complex configurations
5. **Validation:** Test configurations with small generation runs before large-scale generation

Examples

1. Input: [input1.zip](#)

Output:



2. Input:

```
1  {
2    "layout": [
3      2,
4      2
5    ],
6    "canvas_width": 40.0,
7    "canvas_height": 40.0,
8    "opacity": 0.5,
9    "panel_configs": [
10     {
11       "panel_id": 1,
12       "composition_type": {
13         "chaining": 1.0
14       },
15       "chaining_image_config": {
16         "element_num": 3,
17         "chain_shape": "line",
18         "draw_chain": true,
19         "chain_level": "bottom",
20         "interval": 0.4,
21         "rotation": 0,
22         "sub_elements": [
23           {
24             "id": 1,
25             "composition_type": {
26               "enclosing": 1.0
27             },
28             "enclosing_image_config": {
29               "enclose_level": 2,
30               "sub_elements": [
31                 {
32                   "composition_type": {
```

```

33         "simple": 1.0
34     },
35     "simple_image_config": {},
36     "shape_distribution": [
37         0.0,
38         0.5,
39         0.5,
40         0.0,
41         0.0,
42         0.0,
43         0.0,
44         0.0,
45         0.0
46     ]
47     }
48 ]
49 }
50 },
51 {
52     "composition_type": {
53         "simple": 1.0
54     },
55     "simple_image_config": {}
56 },
57 {
58     "composition_type": {
59         "simple": 1.0
60     },
61     "simple_image_config": {}
62 }
63 ]
64 }
65 },
66 {
67     "panel_id": 2,
68     "composition_type": {
69         "enclosing": 1.0
70     },
71     "enclosing_image_config": {
72         "enclose_level": 3,
73         "sub_elements": [
74             {
75                 "id": 2,
76                 "composition_type": {
77                     "enclosing": 1.0
78                 },
79                 "enclosing_image_config": {
80                     "enclose_level": 2,
81                     "sub_elements": [
82                         {
83                             "id": 3,
84                             "composition_type": {
85                                 "simple": 1.0

```

```

86         },
87         "simple_image_config": {}
88     }
89 ]
90 }
91 }
92 ]
93 }
94 },
95 {
96     "panel_id": 3,
97     "composition_type": {
98         "enclosing": 1.0
99     },
100     "enclosing_image_config": {
101         "enclose_level": 3,
102         "sub_elements": [
103             {
104                 "id": 2,
105                 "composition_type": {
106                     "enclosing": 1.0
107                 },
108                 "enclosing_image_config": {
109                     "enclose_level": 2,
110                     "sub_elements": [
111                         {
112                             "id": 3,
113                             "composition_type": {
114                                 "simple": 1.0
115                             },
116                             "simple_image_config": {}
117                         }
118                     ]
119                 }
120             }
121         ]
122     }
123 },
124 {
125     "panel_id": 4,
126     "composition_type": {
127         "enclosing": 1.0
128     },
129     "enclosing_image_config": {
130         "enclose_level": 3,
131         "sub_elements": [
132             {
133                 "id": 2,
134                 "composition_type": {
135                     "enclosing": 1.0
136                 },
137                 "enclosing_image_config": {
138                     "enclose_level": 2,

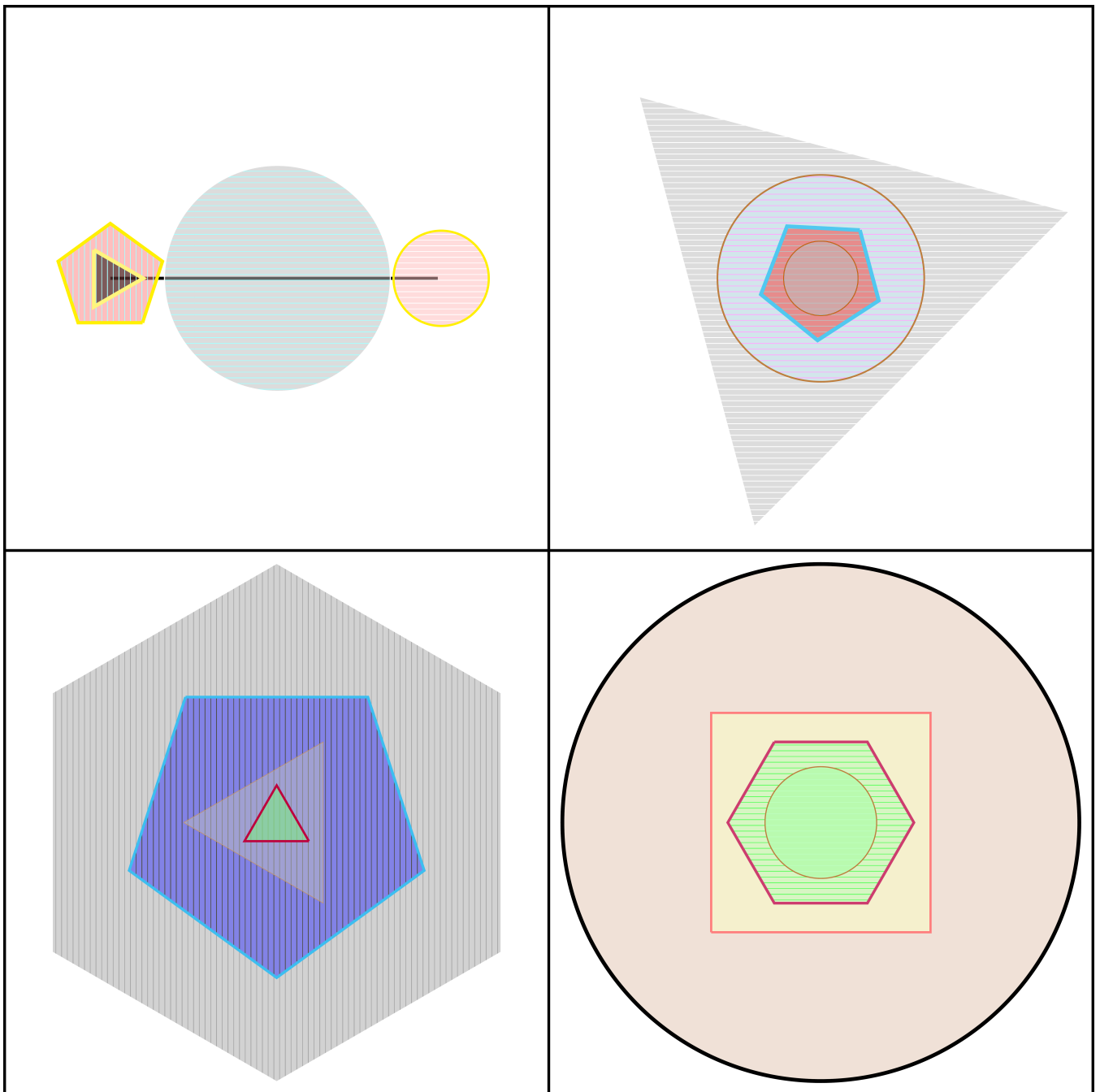
```

```
139         "sub_elements": [  
140             {  
141                 "id": 3,  
142                 "composition_type": {  
143                     "simple": 1.0  
144                 },  
145                 "simple_image_config": {}  
146             }  
147         ]  
148     }  
149 }  
150 ]  
151 }  
152 }  
153 ],  
154 "color_distribution": [  
155     0.0,  
156     0.25,  
157     0.1,  
158     0.1,  
159     0.1,  
160     0.1,  
161     0.1,  
162     0.1,  
163     0.05,  
164     0.05,  
165     0.05  
166 ],  
167 "lightness_distribution": [  
168     0.0,  
169     0.2,  
170     0.2,  
171     0.1,  
172     0.1,  
173     0.1,  
174     0.02,  
175     0.02,  
176     0.02,  
177     0.02,  
178     0.22  
179 ],  
180 "background_lightness_distribution": [  
181     1.0,  
182     0.0,  
183     0.0,  
184     0.0,  
185     0.0,  
186     0.0,  
187     0.0,  
188     0.0,  
189     0.0,  
190     0.0,  
191     0.0
```

```
192 ],
193 "pattern_distribution": [
194     0.4,
195     0.3,
196     0.3,
197     0.0,
198     0.0,
199     0.0,
200     0.0,
201     0.0,
202     0.0,
203     0.0,
204     0.0,
205     0.0,
206     0.0
207 ],
208 "pattern_color_distribution": [
209     0.1,
210     0.3,
211     0.1,
212     0.1,
213     0.1,
214     0.05,
215     0.05,
216     0.05,
217     0.05,
218     0.05,
219     0.05
220 ],
221 "pattern_lightness_distribution": [
222     0.15,
223     0.15,
224     0.15,
225     0.15,
226     0.15,
227     0.1,
228     0.05,
229     0.05,
230     0.025,
231     0.025
232 ],
233 "outline_distribution": [
234     1.0,
235     0.0,
236     0.0,
237     0.0,
238     0.0,
239     0.0,
240     0.0,
241     0.0,
242     0.0,
243     0.0,
244     0.0,
```

```
245         0.0
246     ],
247     "outline_color_distribution": [
248         0.05,
249         0.4,
250         0.1,
251         0.1,
252         0.1,
253         0.05,
254         0.05,
255         0.05,
256         0.05,
257         0.025,
258         0.025
259     ],
260     "outline_lightness_distribution": [
261         0.2,
262         0.2,
263         0.15,
264         0.15,
265         0.1,
266         0.08,
267         0.05,
268         0.04,
269         0.02,
270         0.01
271     ],
272     "outline_thickness_distribution": [
273         0.2,
274         0.05,
275         0.1,
276         0.3,
277         0.2,
278         0.1,
279         0.04,
280         0.01
281     ],
282     "shape_distribution": [
283         0.0,
284         0.5,
285         0.5,
286         0.0,
287         0.0,
288         0.0,
289         0.0,
290         0.0,
291         0.0
292     ]
293 }
```

Output:



3. Input:

```

1  {
2    "layout": [
3      1,
4      1
5    ],
6    "canvas_width": 20.0,
7    "canvas_height": 20.0,
8    "opacity": 0.5,
9    "panel_configs": [
10     {
11       "panel_id": 1,
12       "composition_type": {

```

```

13         "chaining": 1.0
14     },
15     "chaining_image_config": {
16         "element_num": 5,
17         "chain_shape": "bezier",
18         "draw_chain": true,
19         "chain_level": "bottom",
20         "interval": 0.4,
21         "rotation": 0,
22         "control_point_distribution": {
23             "x_range": [
24                 -0.125,
25                 0.125
26             ],
27             "y_range": [
28                 -0.5,
29                 0.5
30             ],
31             "pivot_points": [
32                 -0.75,
33                 -0.25,
34                 0.25,
35                 0.75
36             ]
37         },
38         "sub_elements": [
39             {
40                 "id": 1,
41                 "composition_type": {
42                     "enclosing": 1.0
43                 },
44                 "enclosing_image_config": {
45                     "enclose_level": 2,
46                     "sub_elements": [
47                         {
48                             "composition_type": {
49                                 "simple": 1.0
50                             },
51                             "simple_image_config": {},
52                             "shape_distribution": [
53                                 0.0,
54                                 0.5,
55                                 0.5,
56                                 0.0,
57                                 0.0,
58                                 0.0,
59                                 0.0,
60                                 0.0,
61                                 0.0
62                             ]
63                         }
64                     ]
65                 }

```

```

66         },
67         {
68             "composition_type": {
69                 "simple": 1.0
70             },
71             "simple_image_config": {}
72         },
73         {
74             "composition_type": {
75                 "simple": 1.0
76             },
77             "simple_image_config": {}
78         },
79         {
80             "composition_type": {
81                 "simple": 1.0
82             },
83             "simple_image_config": {}
84         },
85         {
86             "composition_type": {
87                 "simple": 1.0
88             },
89             "simple_image_config": {}
90         }
91     ]
92 }
93 }
94 ],
95 "color_distribution": [
96     0.0,
97     0.25,
98     0.1,
99     0.1,
100    0.1,
101    0.1,
102    0.1,
103    0.1,
104    0.05,
105    0.05,
106    0.05
107 ],
108 "lightness_distribution": [
109     0.0,
110     0.2,
111     0.2,
112     0.1,
113     0.1,
114     0.1,
115     0.02,
116     0.02,
117     0.02,
118     0.02,

```

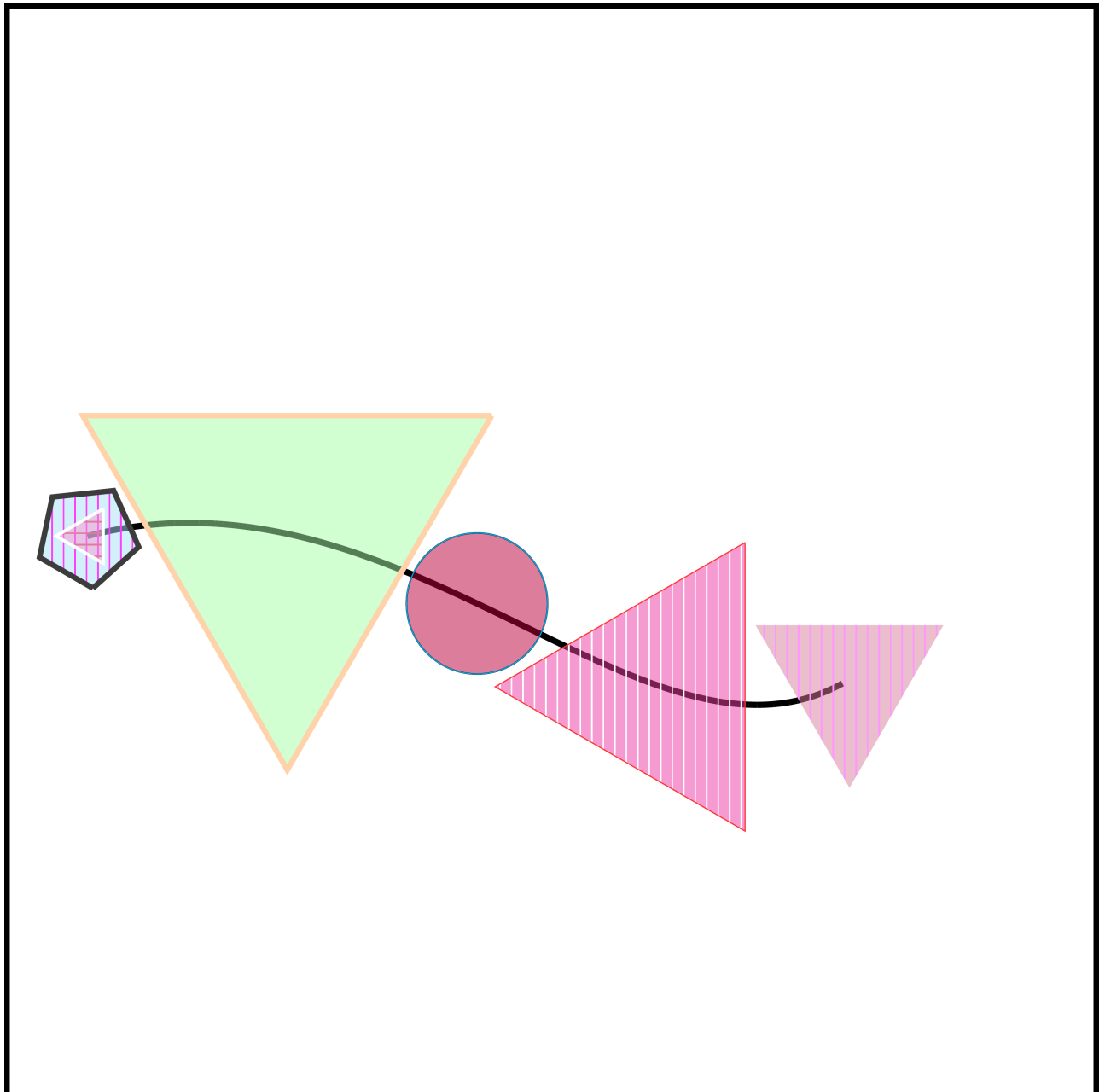
```
119         0.22
120     ],
121     "background_lightness_distribution": [
122         1.0,
123         0.0,
124         0.0,
125         0.0,
126         0.0,
127         0.0,
128         0.0,
129         0.0,
130         0.0,
131         0.0,
132         0.0
133     ],
134     "pattern_distribution": [
135         0.4,
136         0.3,
137         0.3,
138         0.0,
139         0.0,
140         0.0,
141         0.0,
142         0.0,
143         0.0,
144         0.0,
145         0.0,
146         0.0,
147         0.0
148     ],
149     "pattern_color_distribution": [
150         0.1,
151         0.3,
152         0.1,
153         0.1,
154         0.1,
155         0.05,
156         0.05,
157         0.05,
158         0.05,
159         0.05,
160         0.05
161     ],
162     "pattern_lightness_distribution": [
163         0.15,
164         0.15,
165         0.15,
166         0.15,
167         0.15,
168         0.1,
169         0.05,
170         0.05,
171         0.025,
```

```
172         0.025
173     ],
174     "outline_distribution": [
175         1.0,
176         0.0,
177         0.0,
178         0.0,
179         0.0,
180         0.0,
181         0.0,
182         0.0,
183         0.0,
184         0.0,
185         0.0,
186         0.0
187     ],
188     "outline_color_distribution": [
189         0.05,
190         0.4,
191         0.1,
192         0.1,
193         0.1,
194         0.05,
195         0.05,
196         0.05,
197         0.05,
198         0.025,
199         0.025
200     ],
201     "outline_lightness_distribution": [
202         0.2,
203         0.2,
204         0.15,
205         0.15,
206         0.1,
207         0.08,
208         0.05,
209         0.04,
210         0.02,
211         0.01
212     ],
213     "outline_thickness_distribution": [
214         0.2,
215         0.05,
216         0.1,
217         0.3,
218         0.2,
219         0.1,
220         0.04,
221         0.01
222     ],
223     "shape_distribution": [
224         0.0,
```

```

225         0.5,
226         0.5,
227         0.0,
228         0.0,
229         0.0,
230         0.0,
231         0.0,
232         0.0
233     ]
234 }
```

Output:



4. Input:

```

1  {
2    "layout": [
3      1,
4      1
```

```

5 ],
6 "canvas_width": 20.0,
7 "canvas_height": 20.0,
8 "opacity": 0.5,
9 "panel_configs": [
10     {
11         "panel_id": 1,
12         "composition_type": {
13             "random": 1.0
14         },
15         "random_image_config": {
16             "element_num": 5,
17             "centralization": 0.5,
18             "sub_elements": [
19                 {
20                     "id": 1,
21                     "composition_type": {
22                         "enclosing": 1.0
23                     },
24                     "enclosing_image_config": {
25                         "enclose_level": 2,
26                         "sub_elements": [
27                             {
28                                 "composition_type": {
29                                     "simple": 1.0
30                                 },
31                                 "simple_image_config": {},
32                                 "shape_distribution": [
33                                     0.0,
34                                     0.5,
35                                     0.5,
36                                     0.0,
37                                     0.0,
38                                     0.0,
39                                     0.0,
40                                     0.0,
41                                     0.0
42                                 ]
43                             }
44                         ]
45                     }
46                 },
47                 {
48                     "composition_type": {
49                         "simple": 1.0
50                     },
51                     "simple_image_config": {}
52                 },
53                 {
54                     "composition_type": {
55                         "simple": 1.0
56                     },
57                     "simple_image_config": {}

```

```

58         },
59         {
60             "composition_type": {
61                 "simple": 1.0
62             },
63             "simple_image_config": {}
64         },
65         {
66             "composition_type": {
67                 "simple": 1.0
68             },
69             "simple_image_config": {}
70         }
71     ]
72 }
73 }
74 ],
75 "color_distribution": [
76     0.0,
77     0.25,
78     0.1,
79     0.1,
80     0.1,
81     0.1,
82     0.1,
83     0.1,
84     0.05,
85     0.05,
86     0.05
87 ],
88 "lightness_distribution": [
89     0.0,
90     0.2,
91     0.2,
92     0.1,
93     0.1,
94     0.1,
95     0.02,
96     0.02,
97     0.02,
98     0.02,
99     0.22
100 ],
101 "background_lightness_distribution": [
102     1.0,
103     0.0,
104     0.0,
105     0.0,
106     0.0,
107     0.0,
108     0.0,
109     0.0,
110     0.0,

```



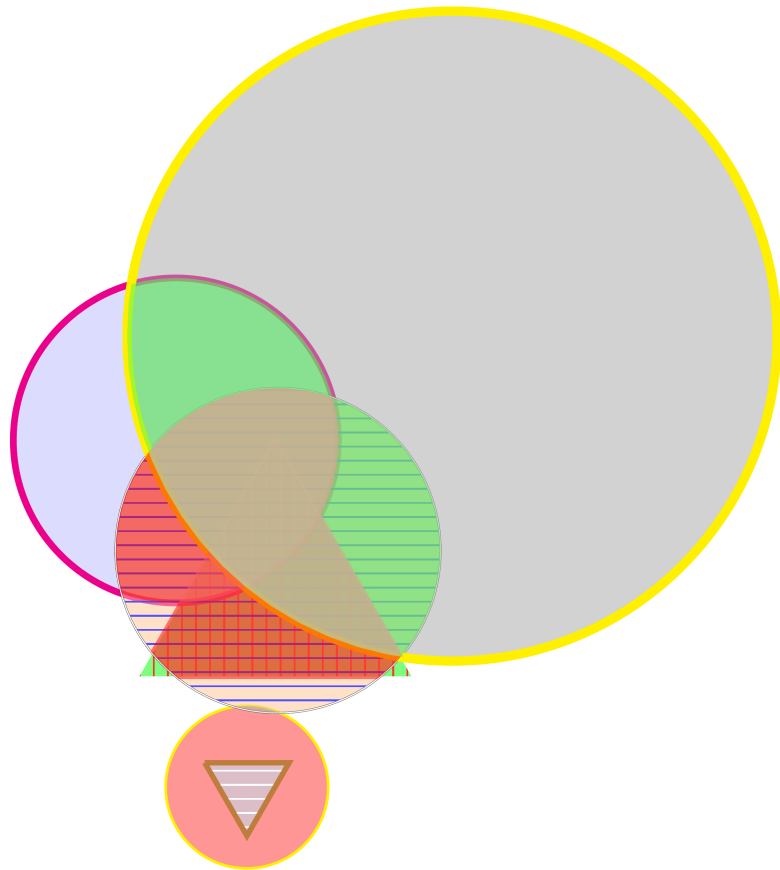
```
111         0.0,
112         0.0
113     ],
114     "pattern_distribution": [
115         0.4,
116         0.3,
117         0.3,
118         0.0,
119         0.0,
120         0.0,
121         0.0,
122         0.0,
123         0.0,
124         0.0,
125         0.0,
126         0.0,
127         0.0
128     ],
129     "pattern_color_distribution": [
130         0.1,
131         0.3,
132         0.1,
133         0.1,
134         0.1,
135         0.05,
136         0.05,
137         0.05,
138         0.05,
139         0.05,
140         0.05
141     ],
142     "pattern_lightness_distribution": [
143         0.15,
144         0.15,
145         0.15,
146         0.15,
147         0.15,
148         0.1,
149         0.05,
150         0.05,
151         0.025,
152         0.025
153     ],
154     "outline_distribution": [
155         1.0,
156         0.0,
157         0.0,
158         0.0,
159         0.0,
160         0.0,
161         0.0,
162         0.0,
163         0.0,
```

```

164         0.0,
165         0.0,
166         0.0
167     ],
168     "outline_color_distribution": [
169         0.05,
170         0.4,
171         0.1,
172         0.1,
173         0.1,
174         0.05,
175         0.05,
176         0.05,
177         0.05,
178         0.025,
179         0.025
180     ],
181     "outline_lightness_distribution": [
182         0.2,
183         0.2,
184         0.15,
185         0.15,
186         0.1,
187         0.08,
188         0.05,
189         0.04,
190         0.02,
191         0.01
192     ],
193     "outline_thickness_distribution": [
194         0.2,
195         0.05,
196         0.1,
197         0.3,
198         0.2,
199         0.1,
200         0.04,
201         0.01
202     ],
203     "shape_distribution": [
204         0.0,
205         0.5,
206         0.5,
207         0.0,
208         0.0,
209         0.0,
210         0.0,
211         0.0,
212         0.0
213     ]
214 }

```

Output:



5. Input:

```
1  {
2    "layout": [
3      1,
4      1
5    ],
6    "canvas_width": 20.0,
7    "canvas_height": 20.0,
8    "opacity": 0.5,
9    "panel_configs": [
10     {
11       "panel_id": 1,
12       "composition_type": {
13         "enclosing": 1.0
```

```

14     },
15     "enclosing_image_config": {
16         "enclose_level": 2,
17         "sub_elements": [
18             {
19                 "id": 1,
20                 "composition_type": {
21                     "chaining": 1.0
22                 },
23                 "chaining_image_config": {
24                     "element_num": 3,
25                     "chain_shape": "bezier",
26                     "draw_chain": true,
27                     "chain_level": "bottom",
28                     "interval": 0.4,
29                     "rotation": 0,
30                     "control_point_distribution": {
31                         "x_range": [
32                             -0.125,
33                             0.125
34                         ],
35                         "y_range": [
36                             -0.5,
37                             0.5
38                         ],
39                         "pivot_points": [
40                             -0.75,
41                             -0.25,
42                             0.25,
43                             0.75
44                         ]
45                     },
46                     "sub_elements": [
47                         {
48                             "composition_type": {
49                                 "simple": 1.0
50                             },
51                             "simple_image_config": {},
52                             "shape_distribution": [
53                                 0.0,
54                                 0.5,
55                                 0.5,
56                                 0.0,
57                                 0.0,
58                                 0.0,
59                                 0.0,
60                                 0.0,
61                                 0.0
62                             ]
63                         },
64                         {
65                             "composition_type": {
66                                 "simple": 1.0

```

```

67         },
68         "simple_image_config": {}
69     },
70     {
71         "composition_type": {
72             "simple": 1.0
73         },
74         "simple_image_config": {}
75     }
76 ]
77 }
78 }
79 ]
80 }
81 }
82 ],
83 "color_distribution": [
84     0.0,
85     0.25,
86     0.1,
87     0.1,
88     0.1,
89     0.1,
90     0.1,
91     0.1,
92     0.05,
93     0.05,
94     0.05
95 ],
96 "lightness_distribution": [
97     0.0,
98     0.2,
99     0.2,
100    0.1,
101    0.1,
102    0.1,
103    0.02,
104    0.02,
105    0.02,
106    0.02,
107    0.22
108 ],
109 "background_lightness_distribution": [
110    1.0,
111    0.0,
112    0.0,
113    0.0,
114    0.0,
115    0.0,
116    0.0,
117    0.0,
118    0.0,
119    0.0,

```

```
120         0.0
121     ],
122     "pattern_distribution": [
123         0.4,
124         0.3,
125         0.3,
126         0.0,
127         0.0,
128         0.0,
129         0.0,
130         0.0,
131         0.0,
132         0.0,
133         0.0,
134         0.0,
135         0.0
136     ],
137     "pattern_color_distribution": [
138         0.1,
139         0.3,
140         0.1,
141         0.1,
142         0.1,
143         0.05,
144         0.05,
145         0.05,
146         0.05,
147         0.05,
148         0.05
149     ],
150     "pattern_lightness_distribution": [
151         0.15,
152         0.15,
153         0.15,
154         0.15,
155         0.15,
156         0.1,
157         0.05,
158         0.05,
159         0.025,
160         0.025
161     ],
162     "outline_distribution": [
163         1.0,
164         0.0,
165         0.0,
166         0.0,
167         0.0,
168         0.0,
169         0.0,
170         0.0,
171         0.0,
172         0.0,
```

```

173         0.0,
174         0.0
175     ],
176     "outline_color_distribution": [
177         0.05,
178         0.4,
179         0.1,
180         0.1,
181         0.1,
182         0.05,
183         0.05,
184         0.05,
185         0.05,
186         0.025,
187         0.025
188     ],
189     "outline_lightness_distribution": [
190         0.2,
191         0.2,
192         0.15,
193         0.15,
194         0.1,
195         0.08,
196         0.05,
197         0.04,
198         0.02,
199         0.01
200     ],
201     "outline_thickness_distribution": [
202         0.2,
203         0.05,
204         0.1,
205         0.3,
206         0.2,
207         0.1,
208         0.04,
209         0.01
210     ],
211     "shape_distribution": [
212         0.0,
213         0.5,
214         0.5,
215         0.0,
216         0.0,
217         0.0,
218         0.0,
219         0.0,
220         0.0
221     ]
222 }

```

Output:

