

腾讯CDC(用户研究与体验设计部)

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CSS TIME

Duration?



Duration

定义动画完成一个周期需要多少秒或毫秒。



Delay?



Delay

定义动画什么时候开始。



动画描述：盒子竖直移动，从下到上，移动40px

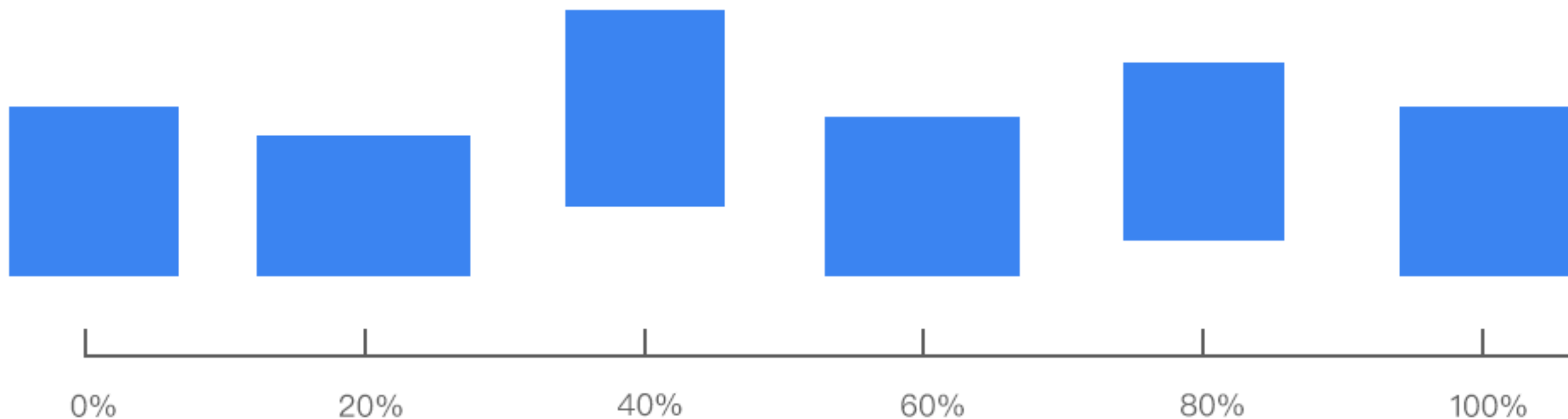
a_block_move



```
-webkit-animation:a_block_move 0.3s 0.3s linear both;
```



动画描述：盒子弹跳运动，从下到上，幅度40px



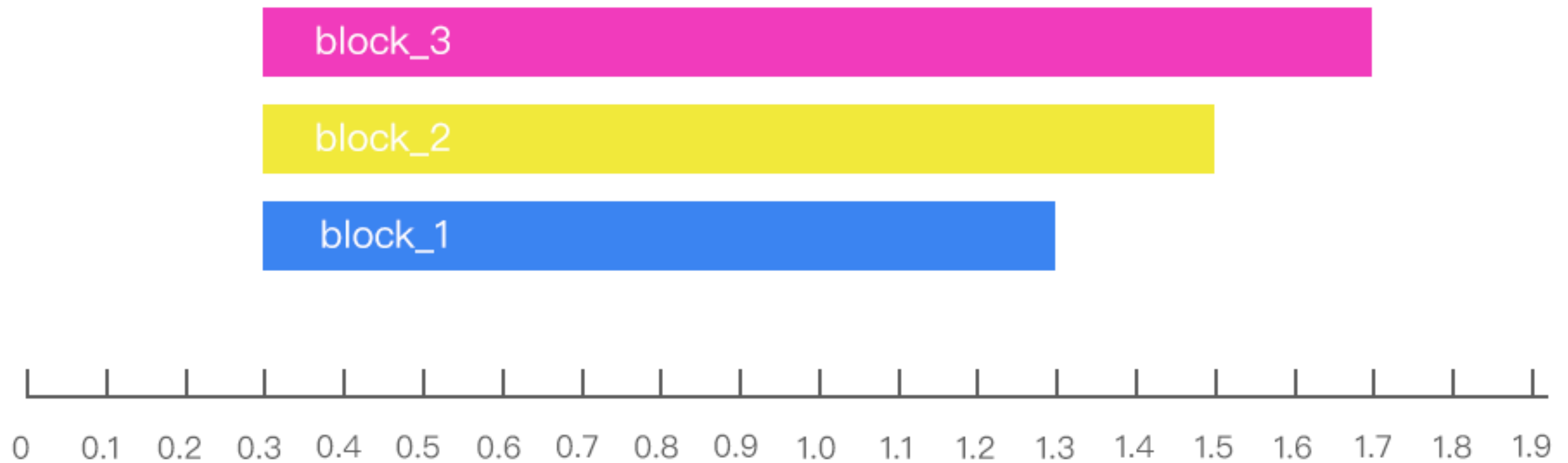
时间帧分配:

```
-webkit-animation:a_block_jump 1s 0.3s linear both;
```

```
@-webkit-keyframes a_block_jump{  
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}  
  20%{ -webkit-transform:scale(1.13,0.87) translate(0,0px);}  
  40%{ -webkit-transform:scale(0.92,1.08) translate(0,-40px);}  
  60%{ -webkit-transform:scale(1.05,0.95) translate(0,0px);}  
  80%{ -webkit-transform:scale(0.98,1.02) translate(0,-20px);}  
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}  
}
```



动画描述：波浪弹跳盒子



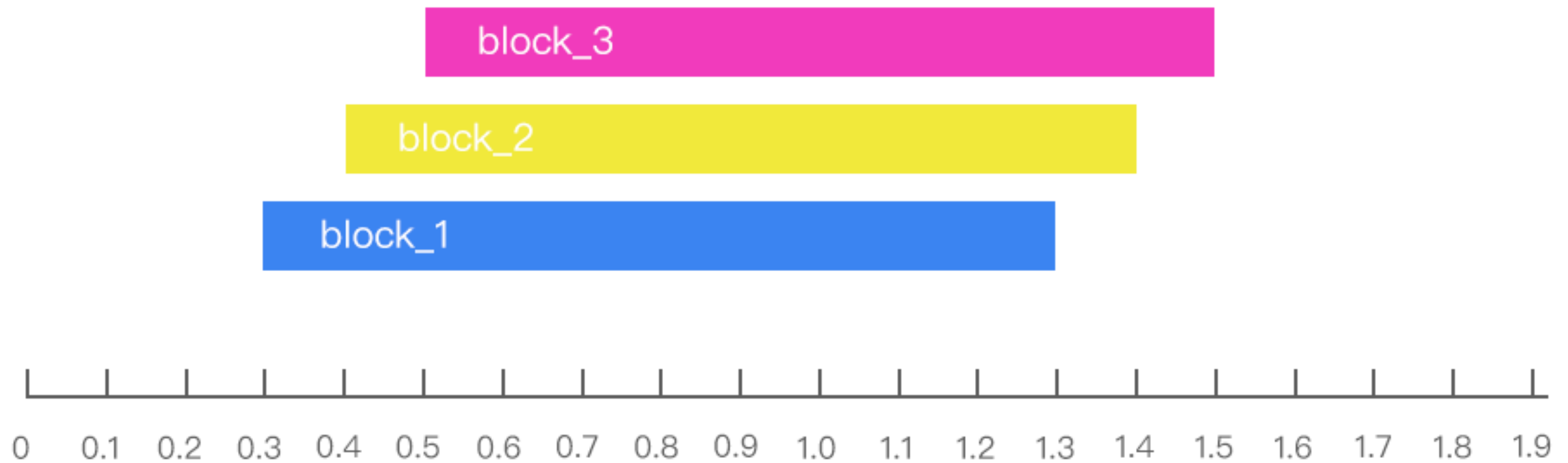
```
.block_1.block_jump{ -webkit-animation:a_block_jump 1.0s 0.3s linear both;  
.block_2.block_jump{ -webkit-animation:a_block_jump 1.2s 0.3s linear both;  
.block_3.block_jump{ -webkit-animation:a_block_jump 1.4s 0.3s linear both;
```



动画描述：循环波浪弹跳盒子，由于存在时间差，导致波浪错位，效果失败



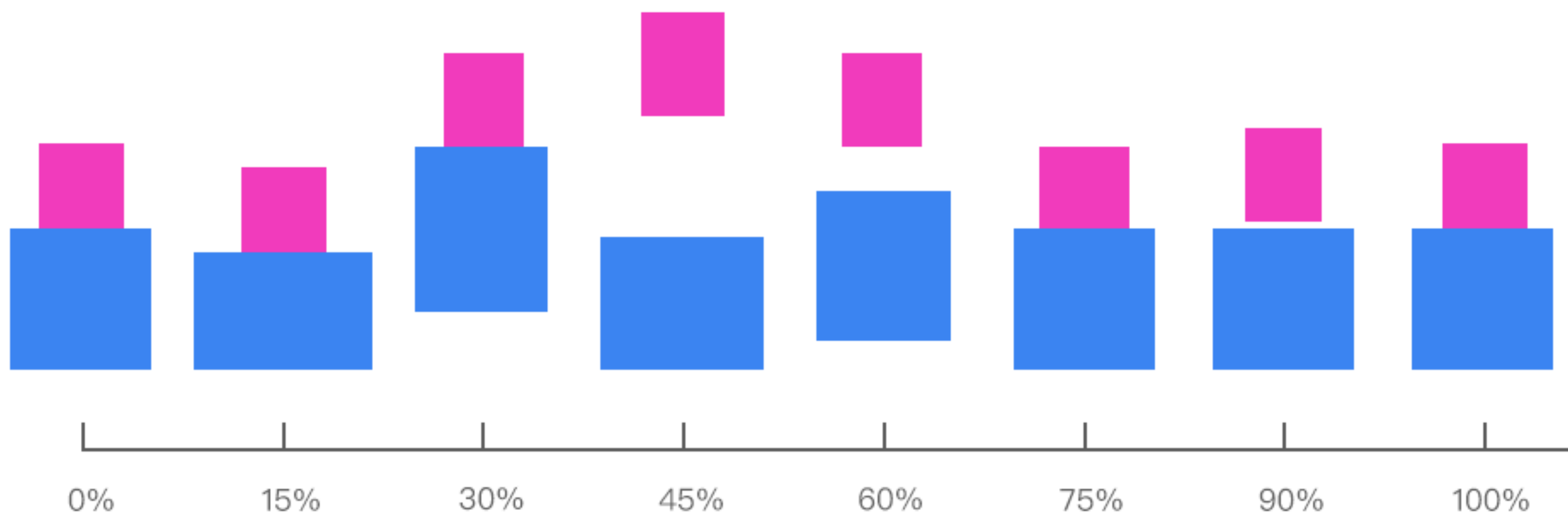
动画描述：用Delay制造时间差，动画循环时间统一



```
.block_1.block_infin{ -webkit-animation:a_block_jump 1.0s 0.3s linear both infinite;  
.block_2.block_infin{ -webkit-animation:a_block_jump 1.0s 0.4s linear both infinite;  
.block_3.block_infin{ -webkit-animation:a_block_jump 1.0s 0.5s linear both infinite;
```



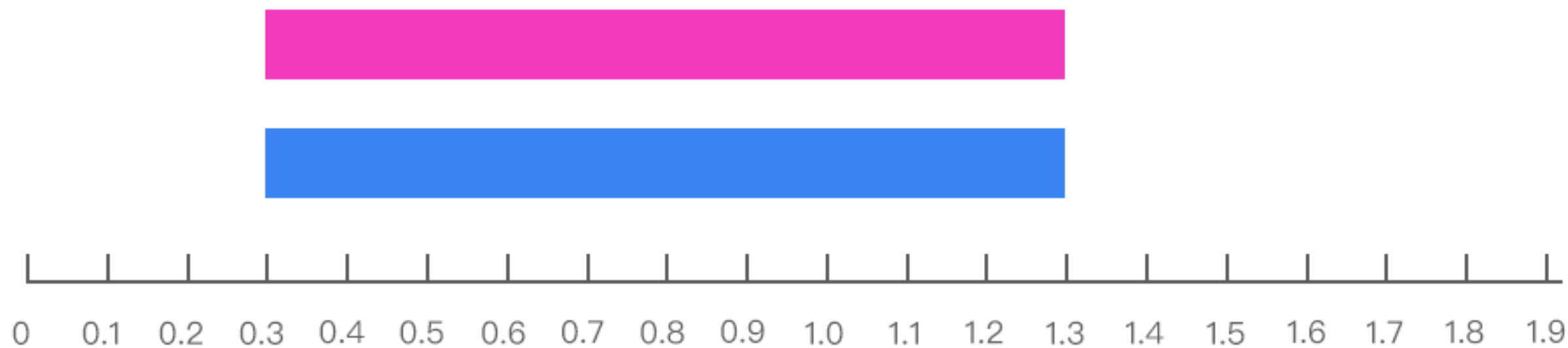

动画描述：双盒弹跳联动，关键点呼应



```
.block_area .block_bottom{ -webkit-animation:a_block_bottom_jump 1s 0.3s linear both infinite; }
.block_area .block_up{ -webkit-animation:a_block_up_jump 1s 0.3s linear both infinite; }
```

```
@-webkit-keyframes a_block_bottom_jump{
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}
  15%{ -webkit-transform:scale(1.13,0.87) translate(0,0px);}
  30%{ -webkit-transform:scale(0.92,1.08) translate(0,-40px);}
  45%{ -webkit-transform:scale(1.05,0.95) translate(0,0px);}
  60%{ -webkit-transform:scale(0.98,1.02) translate(0,-20px);}
  75%{ -webkit-transform:scale(1,1) translate(0,0px);}
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}
}
```

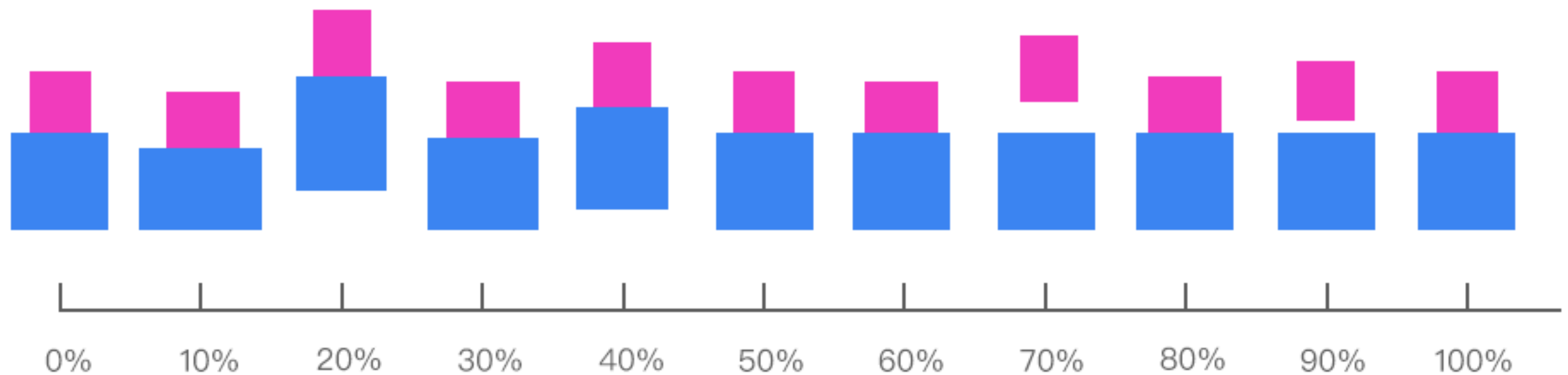
```
@-webkit-keyframes a_block_up_jump{
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}
  15%{ -webkit-transform:scale(1,1) translate(0,19px);}
  30%{ -webkit-transform:scale(0.98,1.02) translate(0,-54px);}
  45%{ -webkit-transform:scale(0.96,1.04) translate(0,-70px);}
  60%{ -webkit-transform:scale(0.98,1.02) translate(0,-54px);}
  75%{ -webkit-transform:scale(1.02,0.98) translate(0,0px);}
  90%{ -webkit-transform:scale(0.99,1.01) translate(0,-5px);}
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}
}
```



```
.block_area .block_bottom{ -webkit-animation:a_block_bottom_jump 1s 0.3s linear both infinite; }  
.block_area .block_up{ -webkit-animation:a_block_up_jump 1s 0.3s linear both infinite; }
```



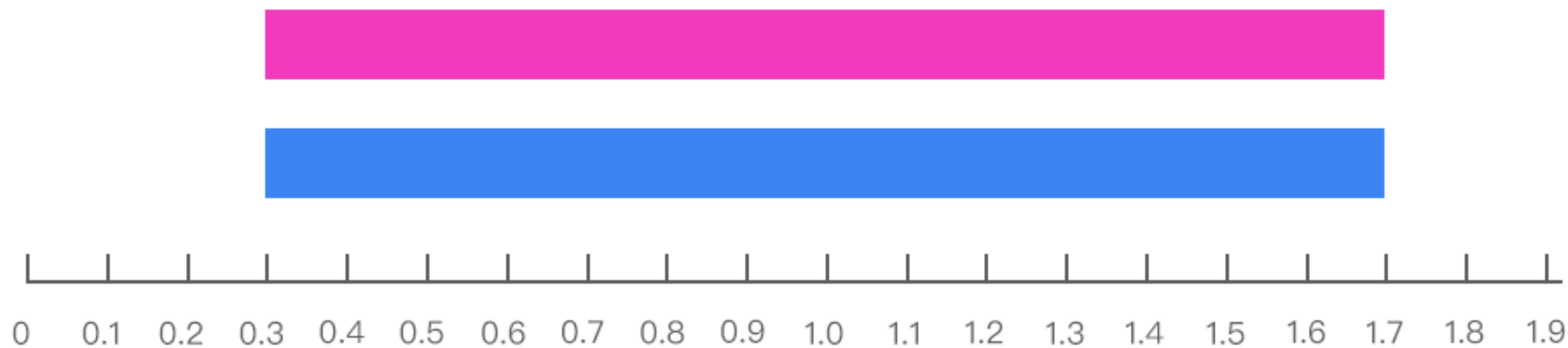
动画描述：双盒弹跳联动，关键点顺接



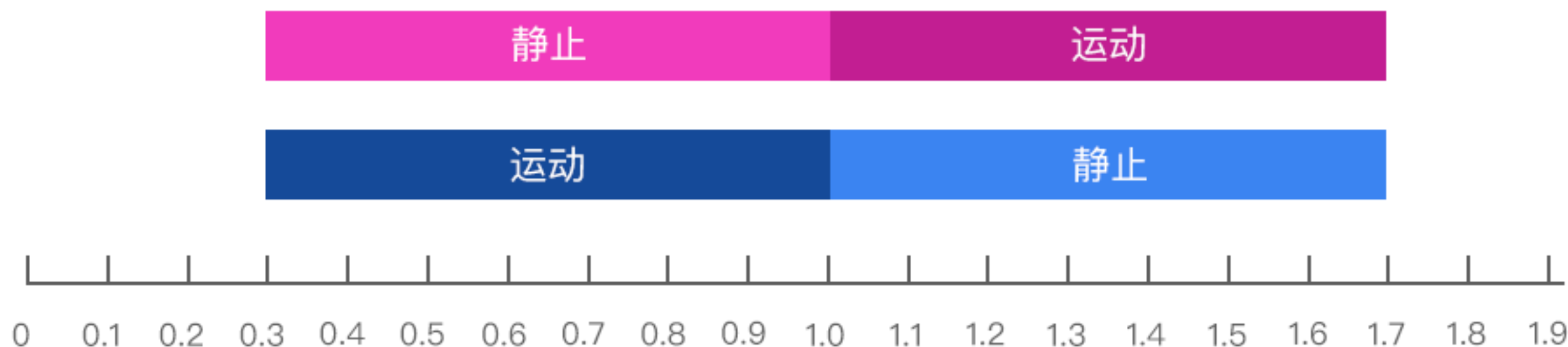
```
.block_outter{ -webkit-animation:a_block_outter_jump_2 1.4s 0.3s linear infinite; }
.block_outter .block_up{ -webkit-animation:a_block_inner_jump_2 1.4s 0.3s linear infinite; }
```

```
@-webkit-keyframes a_block_outter_jump{
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}
  10%{ -webkit-transform:scale(1.13,0.87) translate(0,0px);}
  20%{ -webkit-transform:scale(0.92,1.08) translate(0,-40px);}
  30%{ -webkit-transform:scale(1.05,0.95) translate(0,0px);}
  40%{ -webkit-transform:scale(0.98,1.02) translate(0,-20px);}
  50%{ -webkit-transform:scale(1,1) translate(0,0px);}
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}
}
```

```
@-webkit-keyframes a_block_inner_jump{
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}
  50%{ -webkit-transform:scale(1,1) translate(0,0px);}
  60%{ -webkit-transform:scale(1.13,0.87) translate(0,0px);}
  70%{ -webkit-transform:scale(0.92,1.08) translate(0,-40px);}
  80%{ -webkit-transform:scale(1.05,0.95) translate(0,0px);}
  90%{ -webkit-transform:scale(0.98,1.02) translate(0,-20px);}
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}
}
```



```
.block_outter{ -webkit-animation:a_block_outter_jump 1.4s 0.3s linear infinite; }  
.block_outter .block_up{ -webkit-animation:a_block_inner_jump 1.4s 0.3s linear infinite; }
```



```
@-webkit-keyframes a_block_outter_jump{
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}
  10%{ -webkit-transform:scale(1.13,0.87) translate(0,0px);}
  20%{ -webkit-transform:scale(0.92,1.08) translate(0,-40px);}
  30%{ -webkit-transform:scale(1.05,0.95) translate(0,0px);}
  40%{ -webkit-transform:scale(0.98,1.02) translate(0,-20px);}
  50%{ -webkit-transform:scale(1,1) translate(0,0px);}
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}
}
```

```
@-webkit-keyframes a_block_inner_jump{
  0%{ -webkit-transform:scale(1,1) translate(0,0px);}
  50%{ -webkit-transform:scale(1,1) translate(0,0px);}
  60%{ -webkit-transform:scale(1.13,0.87) translate(0,0px);}
  70%{ -webkit-transform:scale(0.92,1.08) translate(0,-40px);}
  80%{ -webkit-transform:scale(1.05,0.95) translate(0,0px);}
  90%{ -webkit-transform:scale(0.98,1.02) translate(0,-20px);}
  100%{ -webkit-transform:scale(1,1) translate(0,0px);}
}
```

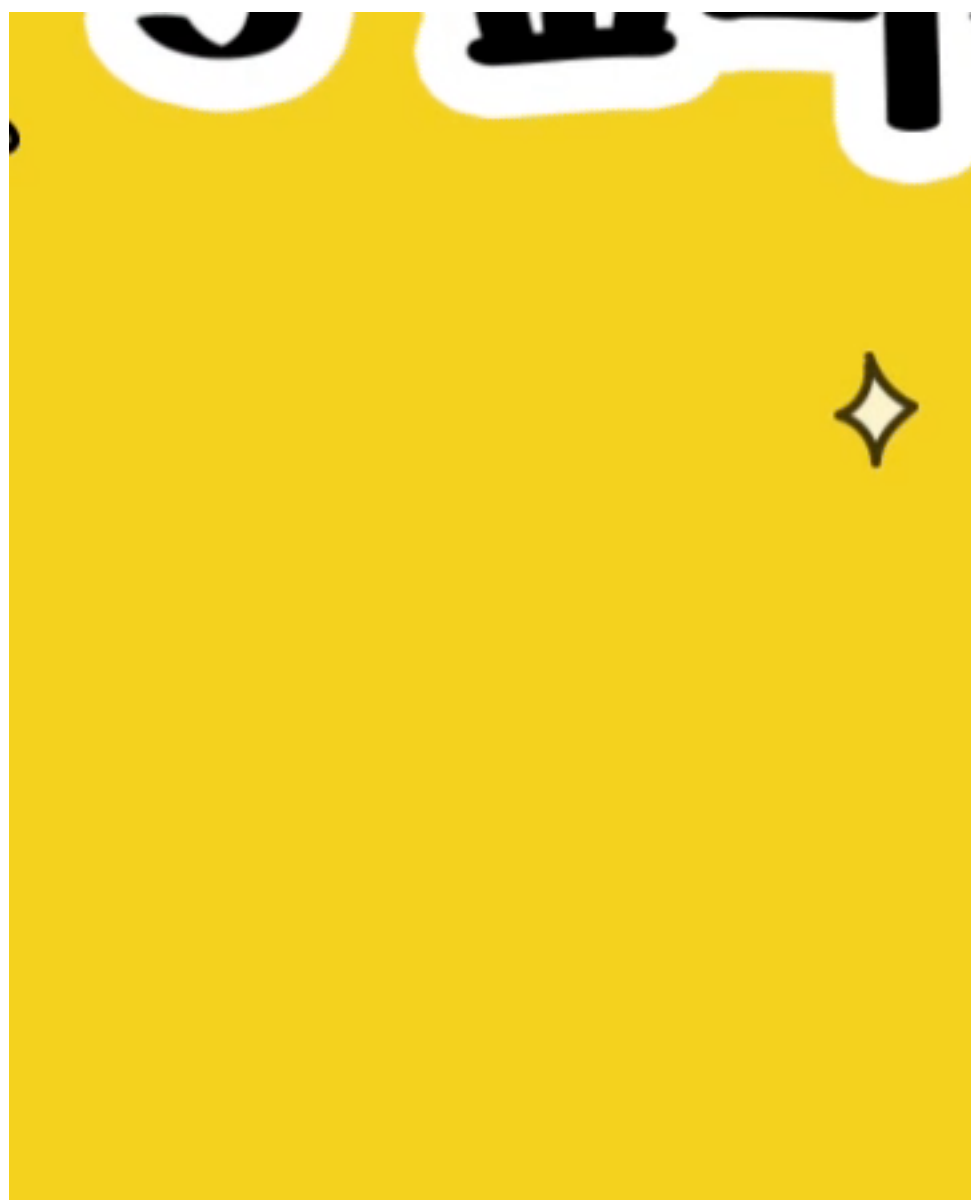


动画联动实例版 – Ipengoo

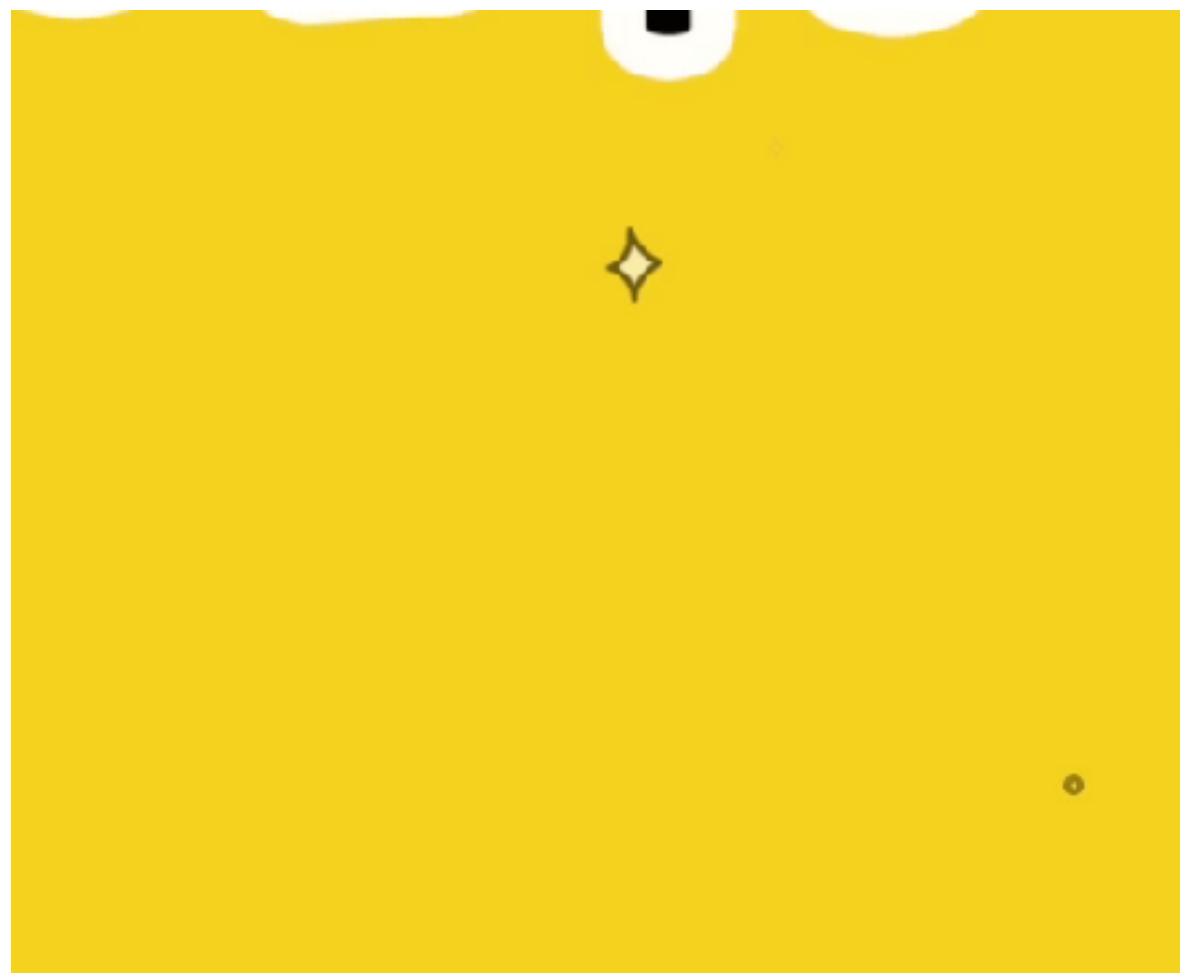




```
<div class="star_main">
  <div class="star_3"></div>
  <div class="ipengoo_1">
    <div class="ipengoo"></div>
    <div class="hand_area">
      <div class="hand"></div>
      <div class="mail"></div>
    </div>
    <span class="eye eye_1"></span>
    <span class="eye eye_2"></span>
  </div>
  <div class="ipengoo_2">
    <div class="hand_area">
      <div class="hand"></div>
      <div class="mail_hook">
        <div class="mail"></div>
      </div>
    </div>
    <span class="eye eye_1"></span>
    <span class="eye eye_2"></span>
  </div>
  <div class="mail_box">
    <div class="mouse"></div>
  </div>
</div>
```



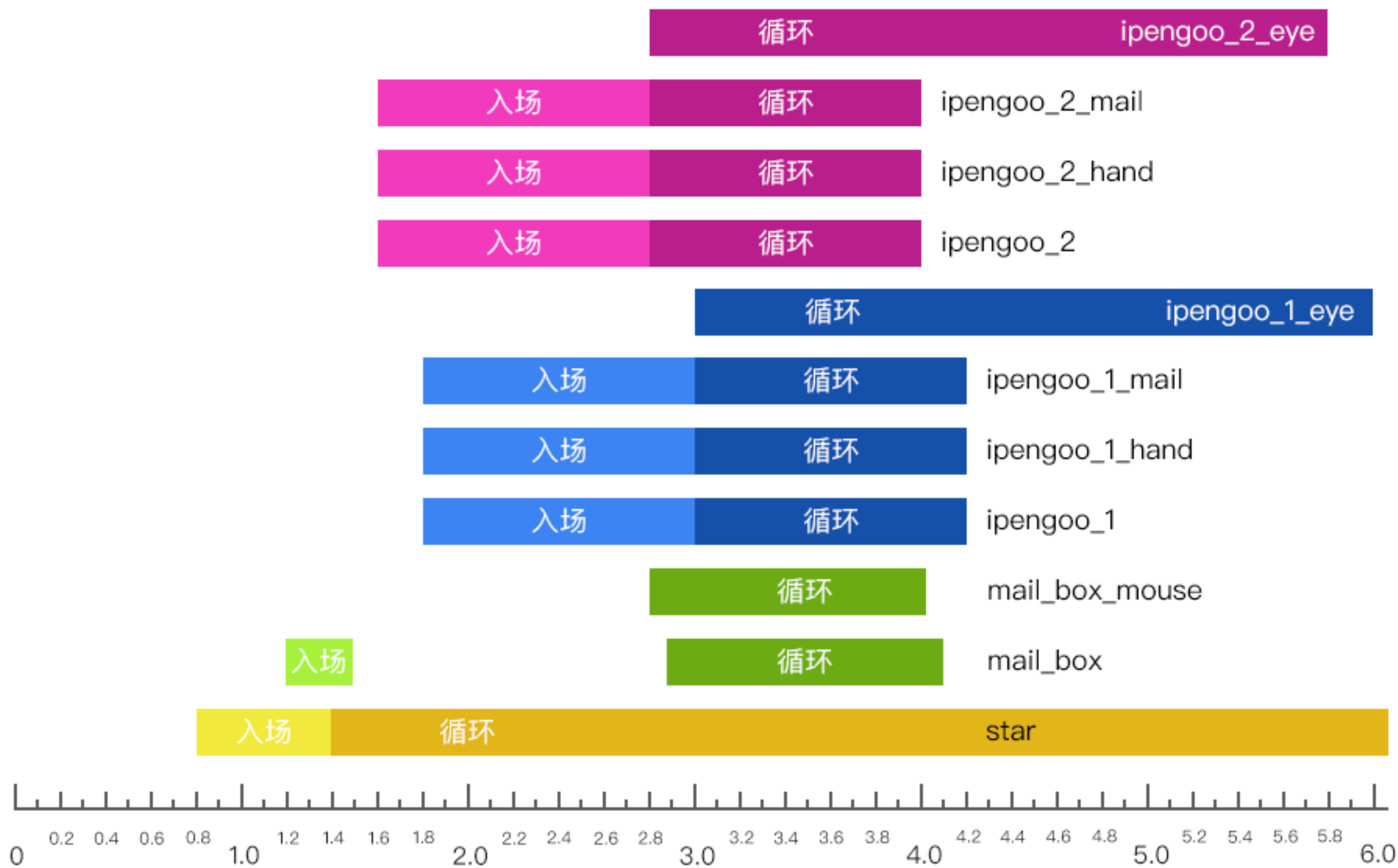
```
.star_main{
  -webkit-animation:
    a_star_3_show 0.6s 0.8s ease both,
    a_star_float_infin 5s 1.4s linear infinite alternate;
}
.star_main .mail_box{
  -webkit-animation:
    a_mail_box_show 0.3s 1.2s ease-in-out both,
    a_mail_box_infin 1.2s 2.9s linear infinite;
  -webkit-transform-origin:48% 100%;
}
.star_main .mail_box .mouse{
  -webkit-animation:
    a_mail_box_mouse 1.2s 2.8s linear infinite;
  -webkit-transform-origin:50% 5%;
}
```



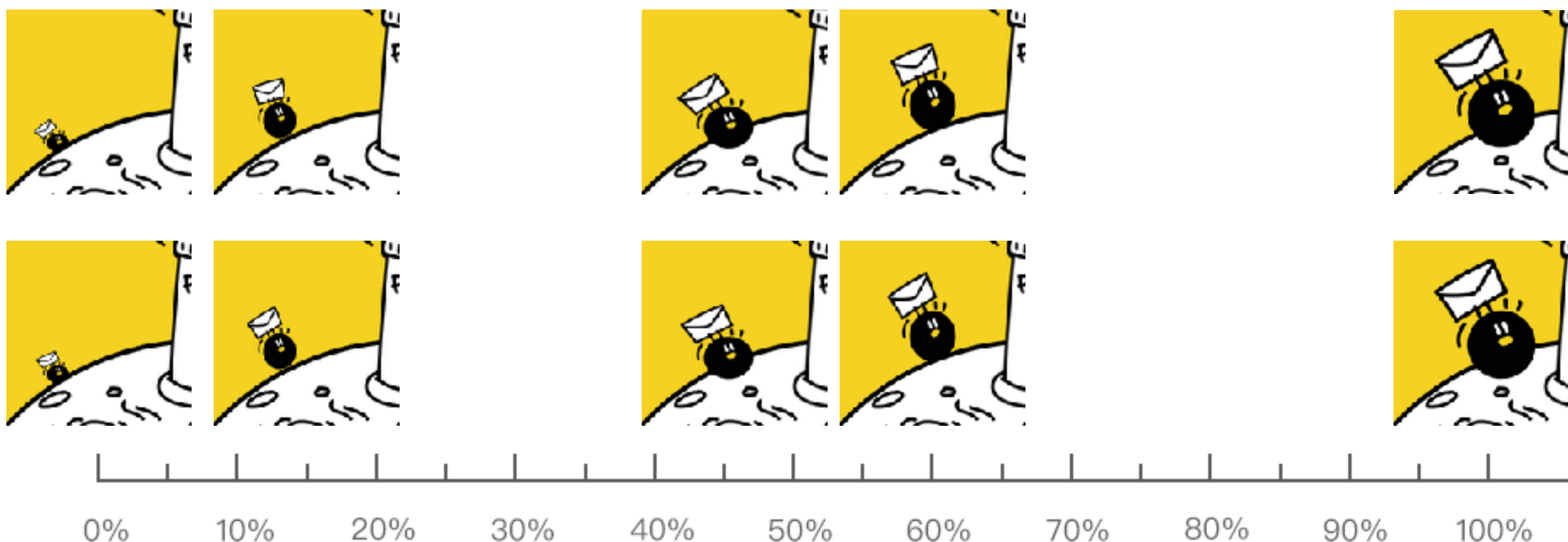
```
.ipengoo_2{
  -webkit-animation:
    a_ipengoo_2 1.2s 1.6s linear both,
    a_ipengoo_2_infin 1.2s 2.8s linear infinite;
  -webkit-transform-origin:58% 100%;
}
.ipengoo_2 .hand_area{
  -webkit-animation:
    a_ipengoo_2_hand 1.2s 1.6s linear both,
    a_ipengoo_2_hand_infin 1.2s 2.8s linear infinite;
  -webkit-transform-origin:10% 100%;
}
.ipengoo_2 .mail{
  -webkit-animation:
    a_ipengoo_2_mail 1.2s 1.6s linear both,
    a_ipengoo_2_mail_infin 1.2s 2.8s linear infinite;
  -webkit-transform-origin:90% 66%;
}
.ipengoo_2 .eye{
  -webkit-animation:
    a_ipengoo_2_eye_infin 3s 2.8s linear infinite;
}
```



```
.ipengoo_1{
  -webkit-animation:
    a_ipengoo_1 1.2s 1.8s linear both,
    a_ipengoo_1_infin 1.2s 3.0s linear infinite;
  -webkit-transform-origin:58% 100%;
}
.ipengoo_1 .hand_area{
  -webkit-animation:
    a_ipengoo_1_hand 1.2s 1.8s linear both,
    a_ipengoo_1_hand_infin 1.2s 3.0s linear infinite;
  -webkit-transform-origin:52% 100%;
}
.ipengoo_1 .mail{
  -webkit-animation:
    a_ipengoo_1_mail 1.2s 1.8s linear both,
    a_ipengoo_1_mail_infin 1.2s 3.0s linear infinite;
  -webkit-transform-origin:52% 100%;
}
.ipengoo_1 .eye{
  -webkit-animation:
    a_ipengoo_1_eye_infin 3s 3.0s linear infinite;
}
```







动画描述：增加附属动画，放大动作幅度

```
@-webkit-keyframes a_ipengoo_1{
  0%{ -webkit-transform: translate(-40px,3px) scale(0.33,0.27); opacity: 0;}
  15%{ -webkit-transform: translate(-30px,-8px) scale(0.48,0.52); opacity: 1;}
  45%{ -webkit-transform: translate(-15px,0px) scale(0.72,0.62); opacity: 1;}
  60%{ -webkit-transform: translate(-10px,-14px) scale(0.67,0.74); opacity: 1;}
  100%{ -webkit-transform: translate(0px,0px) scale(1,1); opacity: 1;}
}
```

```
@-webkit-keyframes a_ipengoo_1_hand{
  0%{ -webkit-transform: rotate(-10deg);}
  15%{ -webkit-transform: rotate(10deg);}
  50%{ -webkit-transform: rotate(-5deg);}
  65%{ -webkit-transform: rotate(5deg);}
  100%{ -webkit-transform: rotate(0deg);}
}
```

```
@-webkit-keyframes a_ipengoo_1_mail{
  0%{ -webkit-transform: rotate(-5deg);}
  15%{ -webkit-transform: rotate(5deg);}
  50%{ -webkit-transform: rotate(-3deg);}
  65%{ -webkit-transform: rotate(3deg);}
  100%{ -webkit-transform: rotate(0deg);}
}
```




动画描述：预留间隔时间，让动画视感得以缓冲

```
@-webkit-keyframes a_ipengoo_1_infin{
  0%{ -webkit-transform: scale(1,1) translate(0,0);}
  16%{ -webkit-transform: scale(1.06,0.94) translate(0,1px);}
  32%{ -webkit-transform: scale(0.95,1.04) translate(0,-3px);}
  48%{ -webkit-transform: scale(1.03,0.98) translate(0,0);}
  64%{ -webkit-transform: scale(0.98,1.02) translate(0,-1px);}
  80%{ -webkit-transform: scale(1,1) translate(0,0);}
  100%{ -webkit-transform: scale(1,1) translate(0,0);}
}

@-webkit-keyframes a_ipengoo_1_hand_infin{
  0%{ -webkit-transform: rotate(0deg);}
  16%{ -webkit-transform: rotate(-4deg);}
  32%{ -webkit-transform: rotate(3deg);}
  48%{ -webkit-transform: rotate(-2deg);}
  64%{ -webkit-transform: rotate(1deg);}
  80%{ -webkit-transform: rotate(0deg);}
  100%{ -webkit-transform: rotate(0deg);}
}

@-webkit-keyframes a_ipengoo_1_mail_infin{
  0%{ -webkit-transform: rotate(0deg);}
  16%{ -webkit-transform: rotate(-3deg);}
  32%{ -webkit-transform: rotate(2deg);}
  48%{ -webkit-transform: rotate(-2deg);}
  64%{ -webkit-transform: rotate(1deg);}
  80%{ -webkit-transform: rotate(0deg);}
  100%{ -webkit-transform: rotate(0deg);}
}
```



节奏感！随机感？



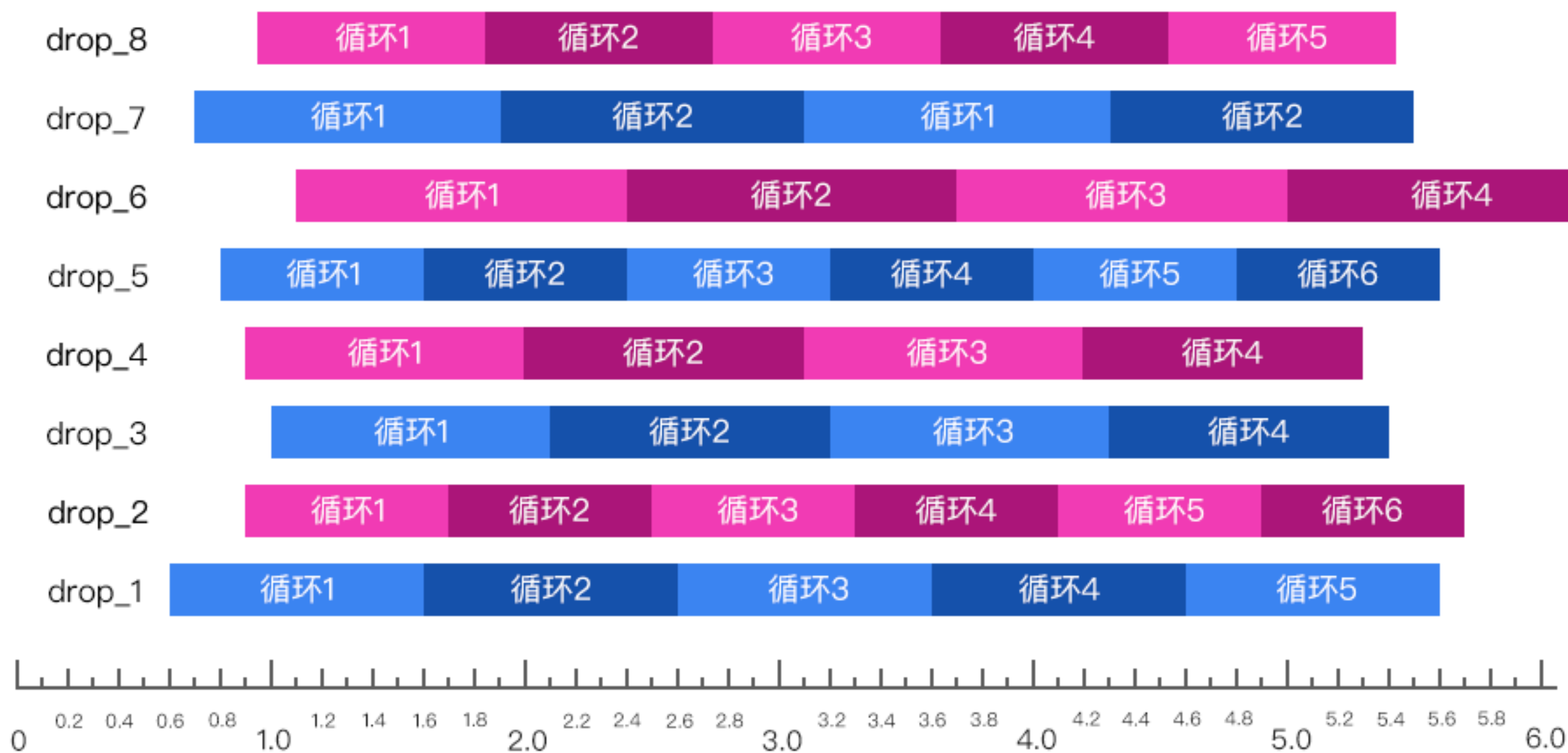
```
@-webkit-keyframes a_drop_1{
  0%{ opacity:0; -webkit-transform:translate(0,0) scale(1,1);}
  20%{ opacity:1; -webkit-transform:translate(0,30px) scale(1,2);}
  45%{ opacity:1; -webkit-transform:translate(0,79px) scale(1,2);}
  50%{ opacity:1; -webkit-transform:translate(0,81px) scale(1,1);}
  53%{ opacity:1; -webkit-transform:translate(0,81px) scale(1,1);}
  60%{ opacity:1; -webkit-transform:translate(-4px,70px) scale(1,1);}
  65%{ opacity:1; -webkit-transform:translate(-8px,65px) scale(1,1);}
  70%{ opacity:1; -webkit-transform:translate(-12px,62px) scale(1,1);}
  75%{ opacity:1; -webkit-transform:translate(-16px,65px) scale(1,1);}
}

.drop_1{ -webkit-animation:a_drop_1 1s 0.6s linear both infinite; }
.drop_2{ -webkit-animation:a_drop_1 0.8s 0.9s linear both infinite; }
.drop_3{ -webkit-animation:a_drop_1 1.1s 1.0s linear both infinite; }
.drop_4{ -webkit-animation:a_drop_1 1.1s 0.9s linear both infinite; }

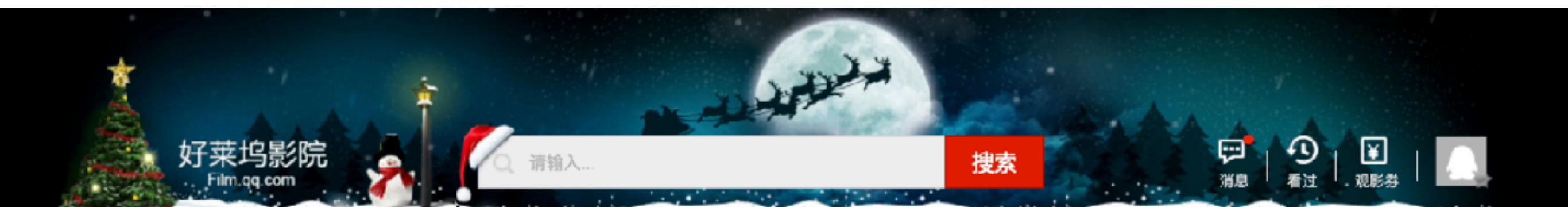
.drop_5{ -webkit-animation:a_drop_2 0.8s 0.8s linear both infinite; }
.drop_6{ -webkit-animation:a_drop_2 1.3s 1.1s linear both infinite; }
.drop_7{ -webkit-animation:a_drop_2 1.2s 0.7s linear both infinite; }
.drop_8{ -webkit-animation:a_drop_2 0.9s 0.95s linear both infinite; }

@-webkit-keyframes a_drop_2{
  45%{ opacity:1; -webkit-transform:translate(0,79px) scale(1,2);}
  50%{ opacity:1; -webkit-transform:translate(0,81px) scale(1,1);}
  53%{ opacity:1; -webkit-transform:translate(0,81px) scale(1,1);}
  60%{ opacity:1; -webkit-transform:translate(4px,70px) scale(1,1);}
  65%{ opacity:1; -webkit-transform:translate(8px,65px) scale(1,1);}
  70%{ opacity:1; -webkit-transform:translate(12px,62px) scale(1,1);}
  75%{ opacity:1; -webkit-transform:translate(16px,65px) scale(1,1);}
  80%{ opacity:1; -webkit-transform:translate(20px,70px) scale(1,1);}
  85%{ opacity:1; -webkit-transform:translate(24px,81px) scale(1,1);}
  90%{ opacity:0.8; -webkit-transform:translate(28px,96px) scale(1,1);}
  95%{ opacity:0.6; -webkit-transform:translate(32px,116px) scale(1,1);}
  100%{ opacity:0; -webkit-transform:translate(36px,146px) scale(1,1);}
}
```

动画描述画黏粒粒动落斜面跟延两边反弹随机感



动画描述：除非时间是各粒子时间的最小公倍数，否则不会回归到初始状态，从而产生随机感



动画描述：其它参考案例，雪花飘落



动画 快? 慢? 时间基数?



0.1s



0.2s



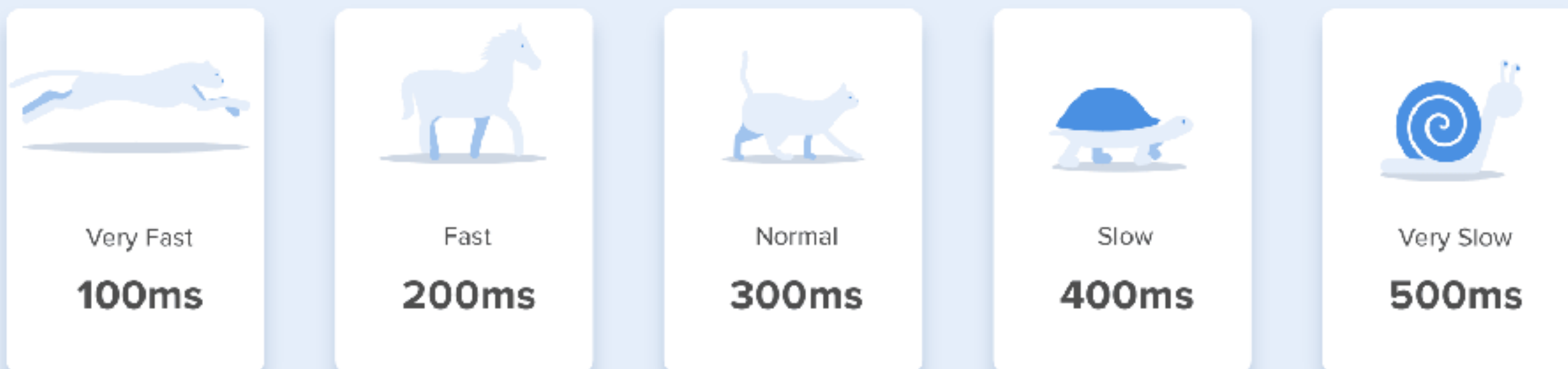
0.3s



0.4s



0.5s



Hover effects, fading, scaling

Large moves, complex easing



移动端

移动端的过渡时长通常在 **300ms** 内，根据情况可做如下调整：

1. 幅度大、复杂的、全屏过渡动画可能需要更长的持续时间，可以长达 **375ms**
2. 元素进入屏幕需要的时长为 **225ms**
3. 元素离开屏幕需要的时长为 **195ms**
4. 超过 **400ms** 的过渡动画可能会感觉太慢。

平板

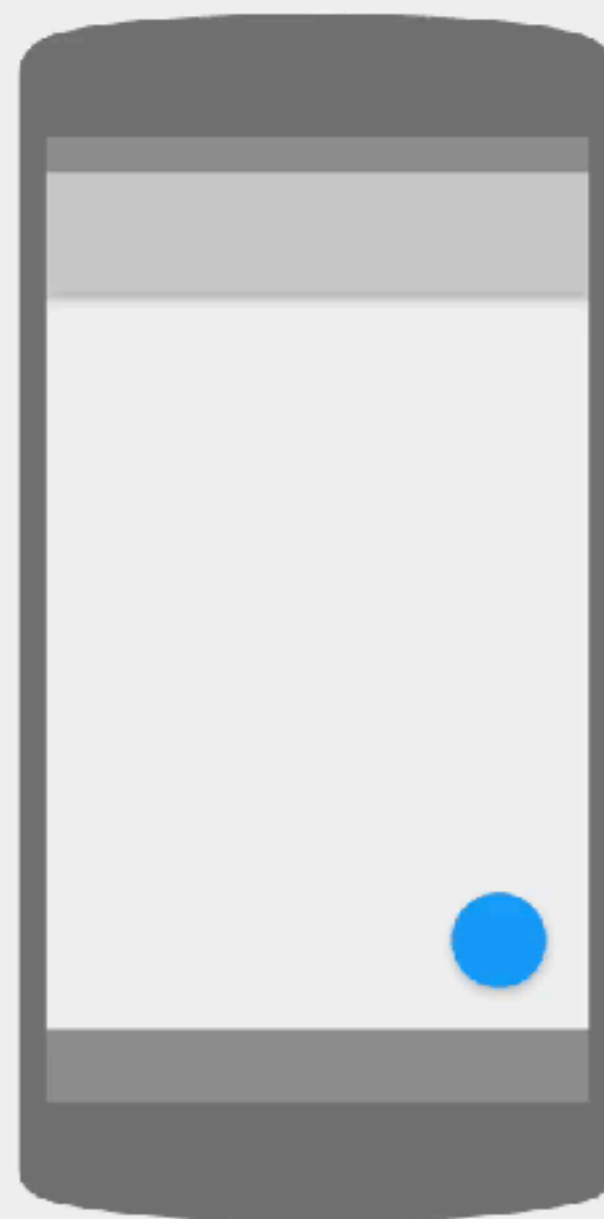
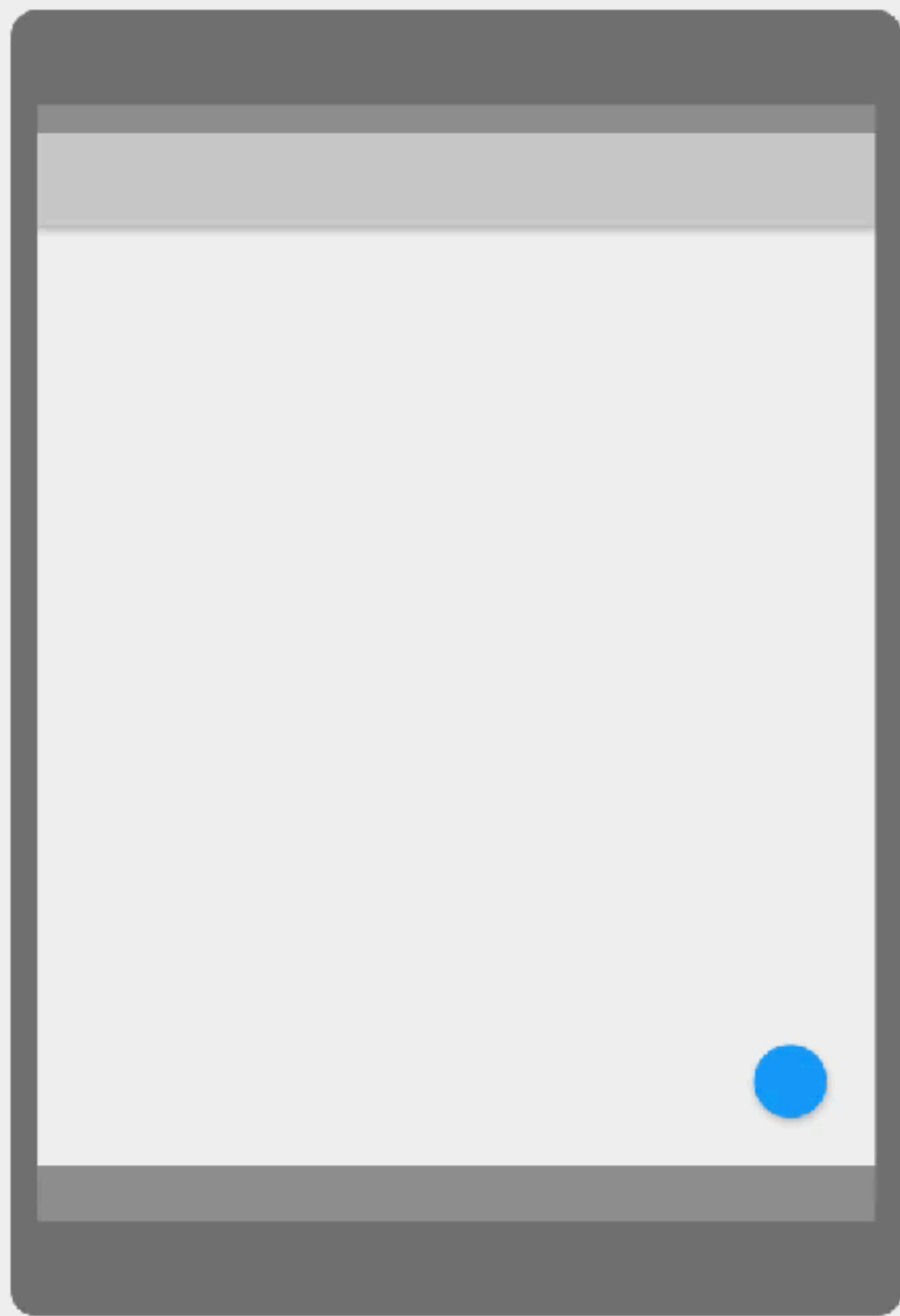
平板上的过渡时长会比手机上的 **长30%**。

例如，在手机上需要 300ms 的过渡，在平板上需要增加到 **390ms**。

可穿戴设备

可穿戴设备上的过渡时长会比手机上的 **短30%**。

例如，在手机上需要 300ms 的过渡，在可穿戴设备上需要减少到 **210ms**。



分享大纲

1. 常用属性
 - 移动盒子
2. K帧分配
 - 弹跳盒子
3. 时间延长
 - 波浪弹跳盒子
4. 顺序延迟
 - 循环波浪弹跳盒子
5. 节奏感
 - 联动呼应弹跳双盒子
 - 联动顺接弹跳双盒子
 - lpengoo 企鹅动画分析
6. 随机感
 - 粒子下降反弹实例
 - 雪花飘落实例
7. 时长衡定
 - 0.3S分水岭
 - 多终端的时长基数



“一切从实际出发”



“孔老夫子确实说过这句话”



感谢 Q&A