Random Position

- random(low,high) – generates float value between low and high

  ```
  {
    float x = random(0,width);
    ellipse(x,height/2,30,30);
  }
  ```

- noise(t) – generates float value between 0 and 1 (use map to scale)

  t is an animation variable. The value used for initializing t affects the sequence of numbers generated; the size of the increment for t affects the smoothness of the values (smaller = smoother).

  ```
  {
    float x = map(noise(t),0,1,15,width-15);
    ellipse(x,height/2,30,30);
  }
  t = t + .01;
  ```

Constrained Motion

- line (ramp) – w, h are determined by the dimensions of the ramp, (x_0,y_0) by the position of the ramp and the object moving along it
  - $x = x_0 + t\,w$
  - $y = y_0 + t\,h$
- circle – (c_x,c_y) is the center of the circle, r is the radius
  - $x = c_x + r \cos t$
  - $y = c_y + r \sin t$

t is an animation variable. It is typically initialized to 0 to start at the beginning of the path.

```
{
  float x = 10 + t*100;       // using ramp equations
  float y = 20 + t*50;
  ellipse(x,y,30,30);
}
t = t + .01;
```

At the End of Class

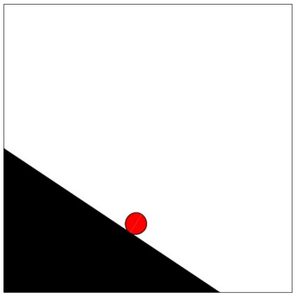
Hand in whatever you have done during class, even if a sketch is incomplete.

- Make sure each sketch is named as directed and has a comment with the names of your group. Also be sure to save your sketches! (in Linux, this should be in your sketchbook **~/cs120/sketchbook**)
- Copy the entire directory for each sketch (not only the `.pde` file) into your handin directory (**/classes/cs120/handin/*username***). You only need to hand in one copy for the group. (If you are running Processing on your computer instead of using the Linux virtual desktop, you will need to use FileZilla to copy the sketches.)

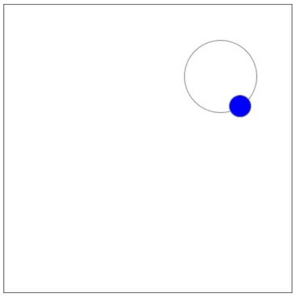
Exercises

For all sketches, be sure to **include a comment with the names of your group at the beginning of the sketch.**

1. Create a sketch named **sketch_241007a** and copy-and-paste the contents of the “for #1” sketch posted on the schedule page into your sketch. Run it to see what it does, then modify it to make the ellipse slide down the ramp.



2. Create a sketch named **sketch_241007b** with a small ellipse moving in a circle, as shown. (You don't need to draw the light gray circle – it's just to show what the movement should be.) Aim for the proportions shown in the picture.



3. Create a sketch named **sketch_241007c** with two small ellipses – a red one whose horizontal position is random (within the left half of the window), and a blue one whose horizontal position is determined by Perlin noise (within the right half of the window). Choose an increment for the Perlin noise that gives a smooth but not too slow effect.

If you have time –

- Save a copy of your sketch from #2 as **sketch_241007d**, then modify the copy so that the small ellipse spirals in to the center of the gray circle. How can you do that? (What else is changing besides t?)
- Save a copy of your sketch from #3 as **sketch_241007e**, then modify the copy so that both x and y are random (for the red ellipse) or determined by Perlin noise (for the blue ellipse). For Perlin noise, you will need two separate t animation variables, one for x and one for y, initialized to different values.

If you still have time –

- These ideas aren't limited to motion and position. Create a new sketch named **sketch_241007f** which explores some of these possibilities. For example, have the width and height of a rectangle or ellipse vary according to circular motion or have the color determined by Perlin noise.
- Combine acceleration/deceleration with constrained motion – have the ellipse accelerate as it moves down the ramp, or create a pendulum which swings back and forth in a circular path (speeding up as it gets to the bottom of the swing and slowing as it reaches the ends of the swing). Create a new sketch named **sketch_241007g**.