Using Random Numbers to Create Art

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A random number is a number chosen by chance.

Key property: Each choice is independent of previous choices.

Which feels more random?

List A:
4, 3, 2, 2, 3, 3, 3, 3, 2, 4, 3, 4, 4, 4, 4, 1, 3, 3, 4, 3, 3, 1, 3, 1, 4, 1, 1, 1, 3, 3, 1, 1, 4, 3, 3, 2, 3, 1, 1, 1, 3, 4, 3, 1

List B:
1, 3, 4, 2, 1, 1, 3, 3, 2, 4, 1, 2, 3, 1, 3, 4, 4, 2, 1, 4, 2, 3, 4, 1, 3, 1, 2, 3, 4, 1, 3, 4, 2, 2, 3, 1, 3, 1, 4, 2, 3, 1, 4, 2
Generating Random Numbers

- Flip a coin
- Roll a die
- Tables in books
- Noise from outer space (random.org)
- Use a computer?
Mathematics + Art

Bathsheba Sculpture

Henry Segerman

- Repetition
- Symmetry
- Geometry
- Higher Dimensions
Use a computer to program an algorithm:

- Specify objects
Use a computer to program an **algorithm**:

- Specify **objects**
- Give **rules** for placement
Use a computer to program an algorithm:

• Specify objects

• Give rules for placement

• Add randomness
A **spline** is a piecewise function that is a smooth curve and approximates given data points.
These points were generated using different randomization techniques.

Which is the most random?

Which is the most beautiful?
Random Jewelry

- Choose random points that are not too close
- Choose random size tori
- Export and print on a 3D printer
The **Voronoi Diagram** for a set of points is the division of the region into pieces based on closeness.

Beautiful things happen when the set of points is random.
Voronoi Diagrams
Random Growth

Create bumps at random places
Add bumps together
Wrap around a cylinder
Choose random partitions of a triangle’s boundary:

Do it many times:
Thanks!  Questions?
Real-time Art!?