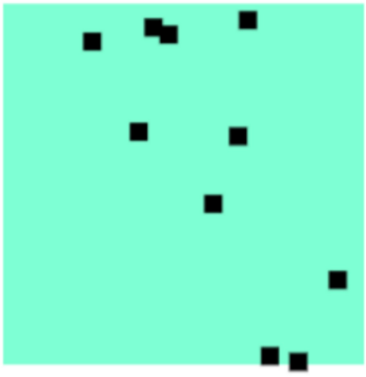
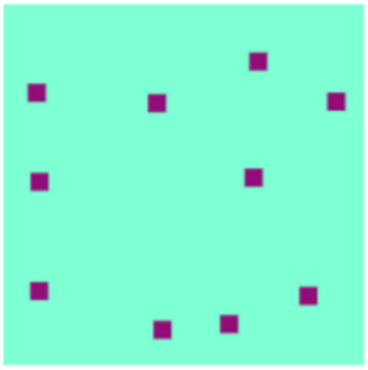
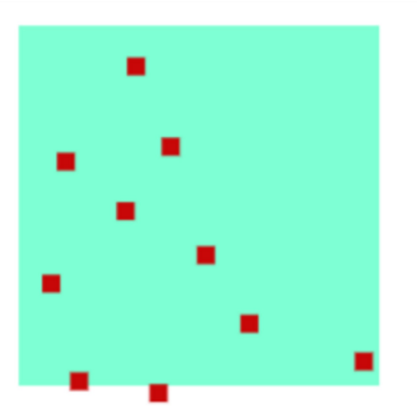
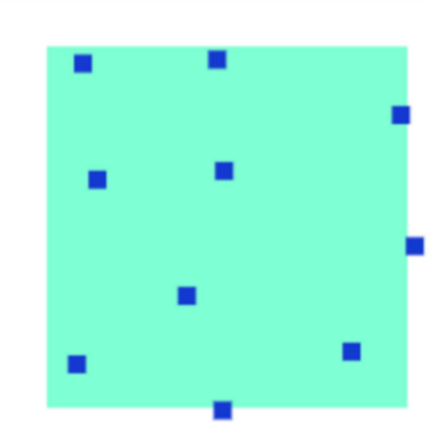
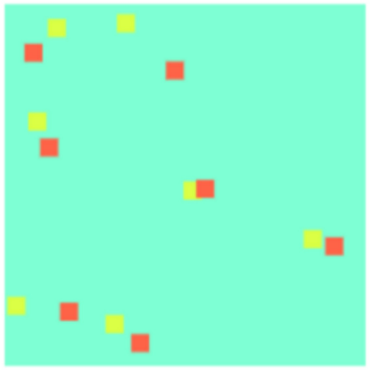
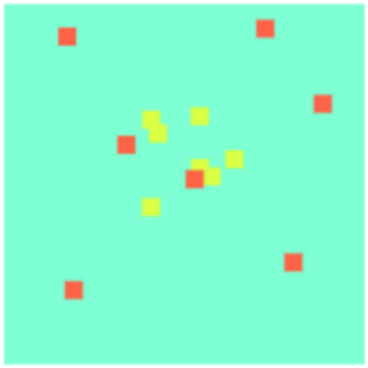
Advantages and Disadvantages of Each

Monday, January 14, 2019 2:40 PM

- Random
  - 
  - Advantages
    - Easy to code, fast to run
  - Disadvantages
    - **Some objects may be very close** (almost right next to each other)
    - Some objects may be very far
- Grid Placement and Jittering
  - 
  - Advantages
    - Runs fast
    - **Evenly spaced, pretty random**
  - Disadvantages
    - Appears a bit unrandom
    - Some bit white spaces
  - Algorithm
    - Initialize a grid of size nxn with numCells ~ numPoints
    - Place each point at a grid center randomly
    - Jitter each point randomly
- Poisson / Min-Max distance placement

- 
  - Advantages
    - **Direct control of min/max distance apart**
    - Very random
    - Evenly spaced (points are about the same dist apart)
  - Disadvantages
    - Have to toggle the min/max distance correctly (how to do it auto?)
    - Can run forever if max is too big
    - **May look like a "clump"** - all points in one area, other areas are white space
  - Algorithm
    - Generate each point to be a certain distance away from a previous point
    - If that point is too close to an already existing point, try again
    - Run until numPoints are generated

- Mitchell's Best Candidate
  - 
  - Advantages
    - **Easy to code, fast to run**
    - Looks random
    - **Evenly spaced**
    - Can work with irregular shapes
  - Disadvantages
    - Don't know the distance between each point?
- Physics Repulsion Simulation

- 
- 
    - Advantage
        - No points are very close together
        - No points are too close to the wall
        - Looks very random
        - **It's cool! It uses physics**
    - Disadvantage
        - Large white spaces in between particles may exist
        - **Variables are extremely sensitive** to tuning (timesteps, forcemax, numparticles, wallcharge), otherwise the particles have too little repulsive force or fly off the box
        - Algorithmically very slow, can cause lagging with a high number of points/time steps
        - Algorithm is hard to understand and error prone