CS 101
Computer Programming and Utilization

Projects

Suyash P. Awate

Pong

- https://en.wikipedia.org/wiki/Pong

- https://www.youtube.com/watch

- Simulate ball motion within a closed polygonal space

- Simulated ball motion with 1 player
within rectangular space

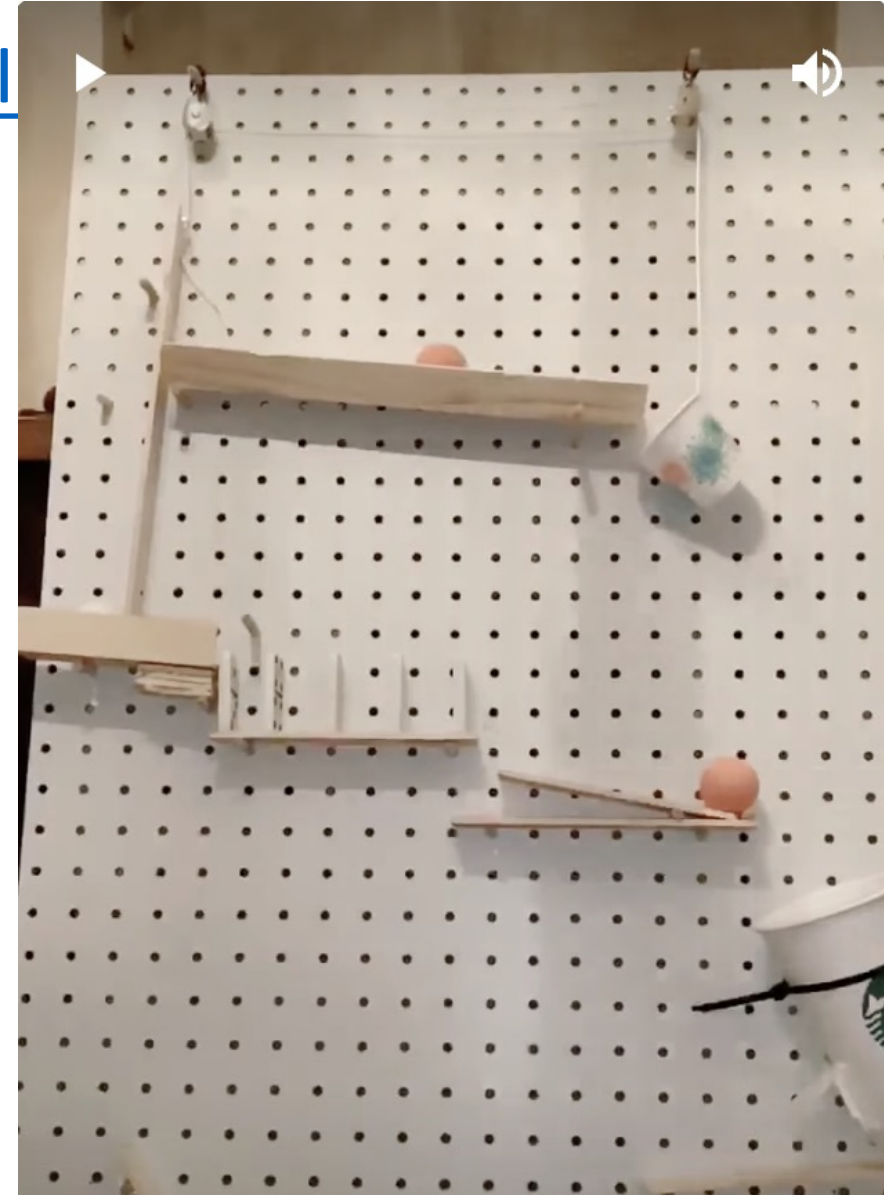- Simulated ball motion with 2 players
within rectangular space
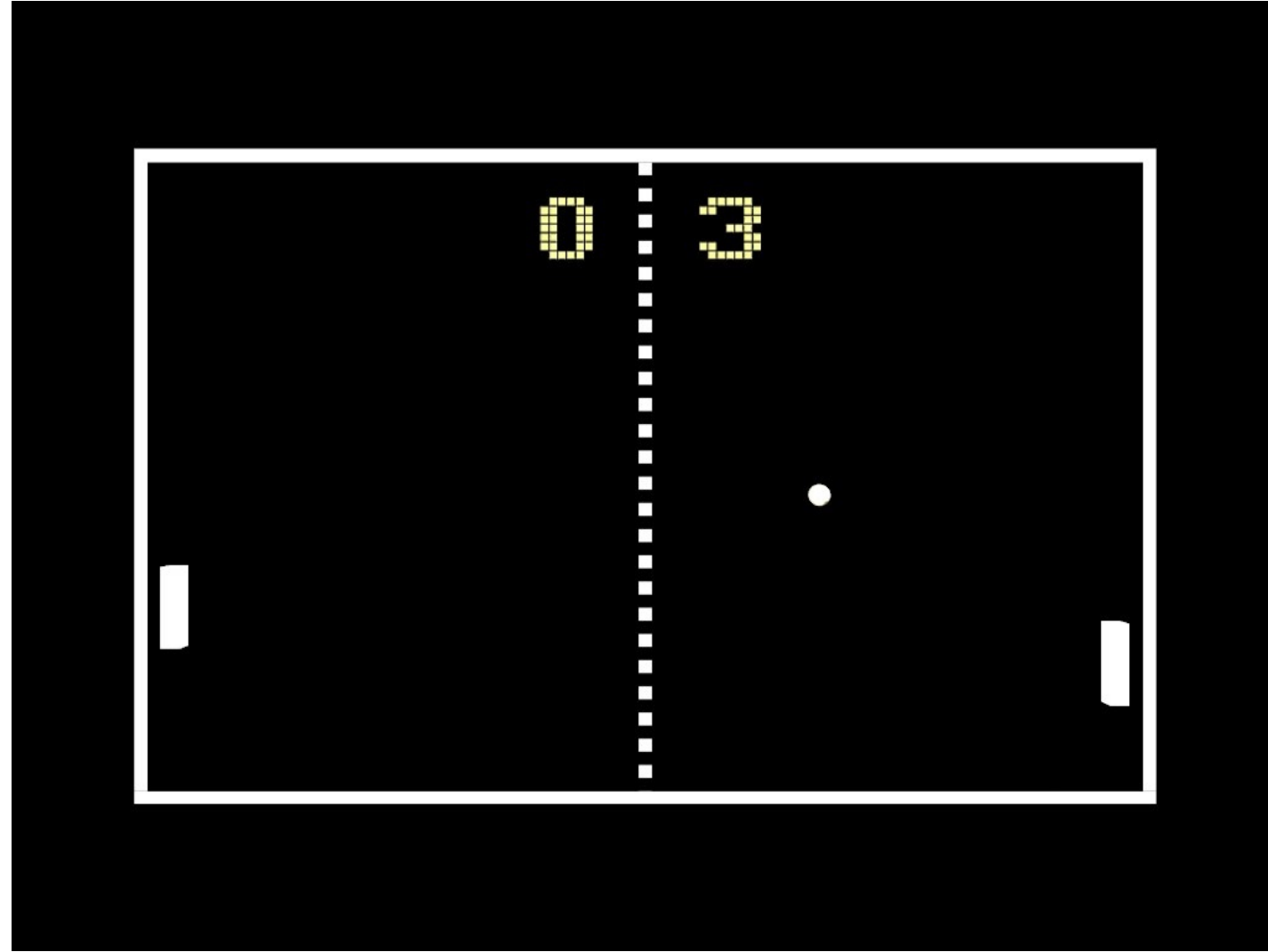
Projectiles, Slingshot

- Simulate projectile motion caused by a slingshot
- Make a game out of it, where the user uses the slingshot (direction and initial speed) to hit targets

Rube Goldberg machine

- https://en.wikipedia.org/wiki/Rube_Goldberg_machine
- https://www.youtube.com/shorts/dFn4YibYMI

PGM image files

- Reading PGM files

- Writing PGM files

- Simple manipulations of PGM files

- https://www.cs.swarthmore.edu/~lammert/cs35/s15/Labs/extras/01/pgm_info.html

- https://hinumduman.home.blog/2018/08/21/basic-operations-on-image-processing-using-pgm-file-formats/

- http://www.codeding.com/articles/pgm-image-manipulation

- Image compression using run-length encoding
  - https://en.wikipedia.org/wiki/Run-length_encoding

Heat Equation

- https://en.wikipedia.org/wiki/Heat_equation
- Simulate (the actual physics of) the heat equation
- http://math.uchicago.edu/~luis/pde/heat.html
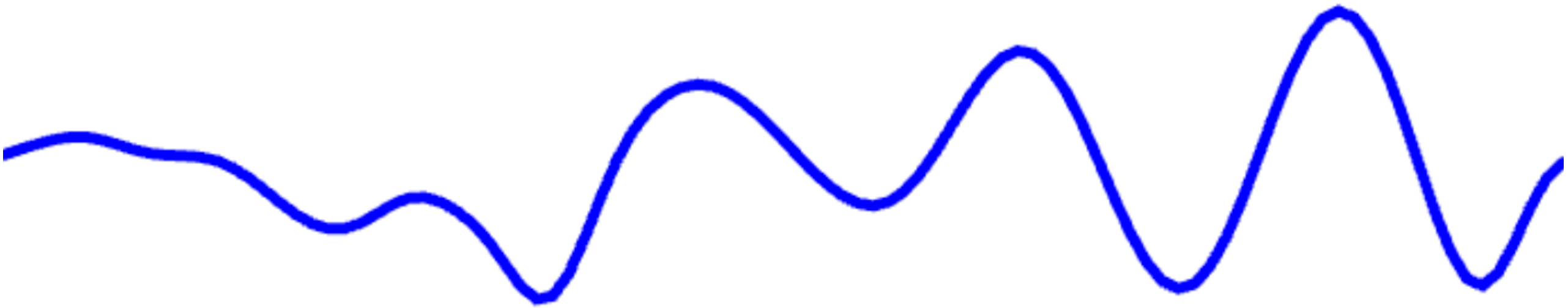
Random Walk, Brownian Motion

- https://en.wikipedia.org/wiki/Random_walk
- https://en.wikipedia.org/wiki/Brownian_motion
- Simulate (the actual mathematics of) a random walk in 1D
  - Simulate many random walks concurrently
- Simulate (the actual mathematics of) a random walk in 2D
 - Simulate many random walks concurrently
- http://www.physics.smu.edu/fattarus/randomwalk.html

Lights Rays, Rainbow

- Simulation (the actual physics of) light rays through a droplet creating a rainbow
- https://www.youtube.com/watch?v=dmNOmCQZRE8
- https://en.wikipedia.org/wiki/Rainbow#/media/File:Rainbow_single_reflection.svg
- https://en.wikipedia.org/wiki/Rainbow#/media/File:Raindrop_optics.jpg

Mirage

- Simulate (the actual physics of) the traversal of light rays indicating the creation of a mirage

- https://en.wikipedia.org/wiki/Mirage

- https://www.youtube.com/watch?v=TQM9HnHCkEc
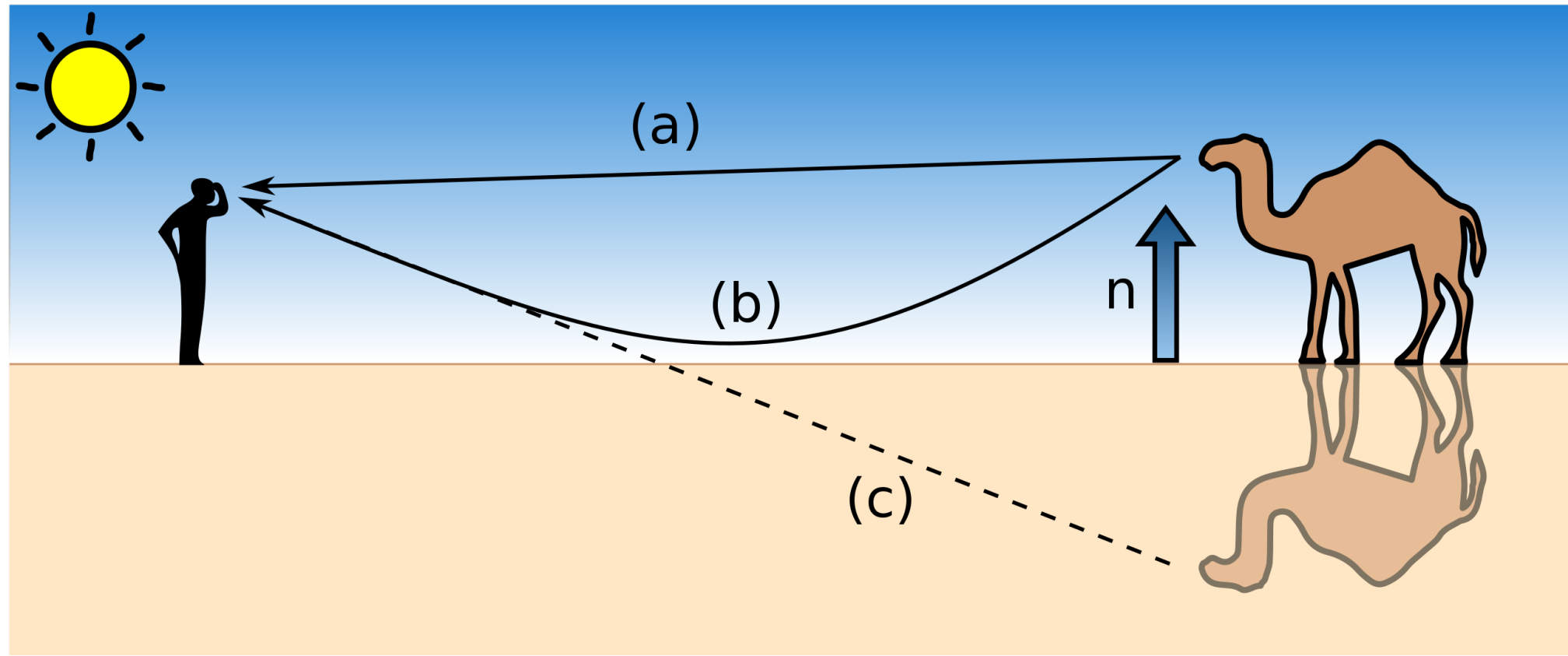
Pendulum Waves

- Simulate (the actual physics of) a pendulum
- Simulate (the actual physics of) multiple pendulums creating interesting patterns
- https://en.wikipedia.org/wiki/Pendulum_wave
- https://www.youtube.com/watch?v=3V5Nr0GBZSQ
- https://www.youtube.com/watch?v=yVkdfJ9PkRQ
- https://www.youtube.com/watch?v=_4ICFmAr_DQ