



HoP101: Session 4

More building

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```
import random

# A B C D E

# 0 -> susceptible
# 1 -> infected
# 2 -> recovered

# T = 0

state = [0, 0, 0, 1, 0]

# If you are susceptible, and have a infected neighbour, you have a 50% chance of being infected
k = 0.5 # chance of infection

# If you are recovered, you have a ___ % of recovery given that it takes 10 days to recover
d = 10 # days to recover
r = 1/d # chance of recovery

print(0, [4, 1, 0])
```

0 [4, 1, 0]

```
T = 1 # Time instance

while T < 100:
    new_state = state.copy()

    if state[0] == 0:
        if state[1] == 1:
            if random.random() < k:
                new_state[0] = 1

    if state[len(state) - 1] == 0:
        if state[len(state) - 2] == 1:
            if random.random() < k:
                new_state[len(state) - 1] = 1

    i = 1
```

```

while i < len(state) - 1:
    if state[i] == 0:
        prob = 1 - (1 - k * (state[i-1] == 1)) * (1 - k * (state[i + 1] == 1)) # probabil
        if random.random() < prob:
            new_state[i] = 1

    i = i + 1

i = 0
while i < len(state):
    if state[i] == 1:
        if random.random() < r:
            new_state[i] = 2

    i = i + 1

state = new_state.copy()

i = 0
nums = [0, 0, 0]
while i < len(state):
    nums[state[i]] += 1
    i += 1

print(nums[0], nums[1], nums[2], sep=", ")

T = T + 1

```



```

if state[0] == 0:
    if state[1] == 1:
        if random.random() < k:
            new_state[0] = 1

if state[len(state) - 1] == 0:
    if state[len(state) - 2] == 1:
        if random.random() < k:
            new_state[len(state) - 1] = 1

i = 1
while i < len(state) - 1:
    if state[i] == 0:
        prob = 1 - (1 - k * (state[i-1] == 1)) * (1 - k * (state[i + 1] == 1)) # probabil
        if random.random() < prob:
            new_state[i] = 1

    i = i + 1

i = 0
while i < len(state):
    if state[i] == 1:
        if random.random() < r:
            new_state[i] = 2

    i = i + 1

state = new_state.copy()

i = 0
nums = [0, 0, 0]
while i < len(state):
    nums[state[i]] += 1
    i += 1

print(math.log(nums[0] + 1), math.log(nums[1] + 1), math.log(nums[2] + 1), sep=", ")

T = T + 1

```

Run in the command prompt/terminal:

python main.py > data.csv

and open data.csv in Excel to plot the data and observe the curve!