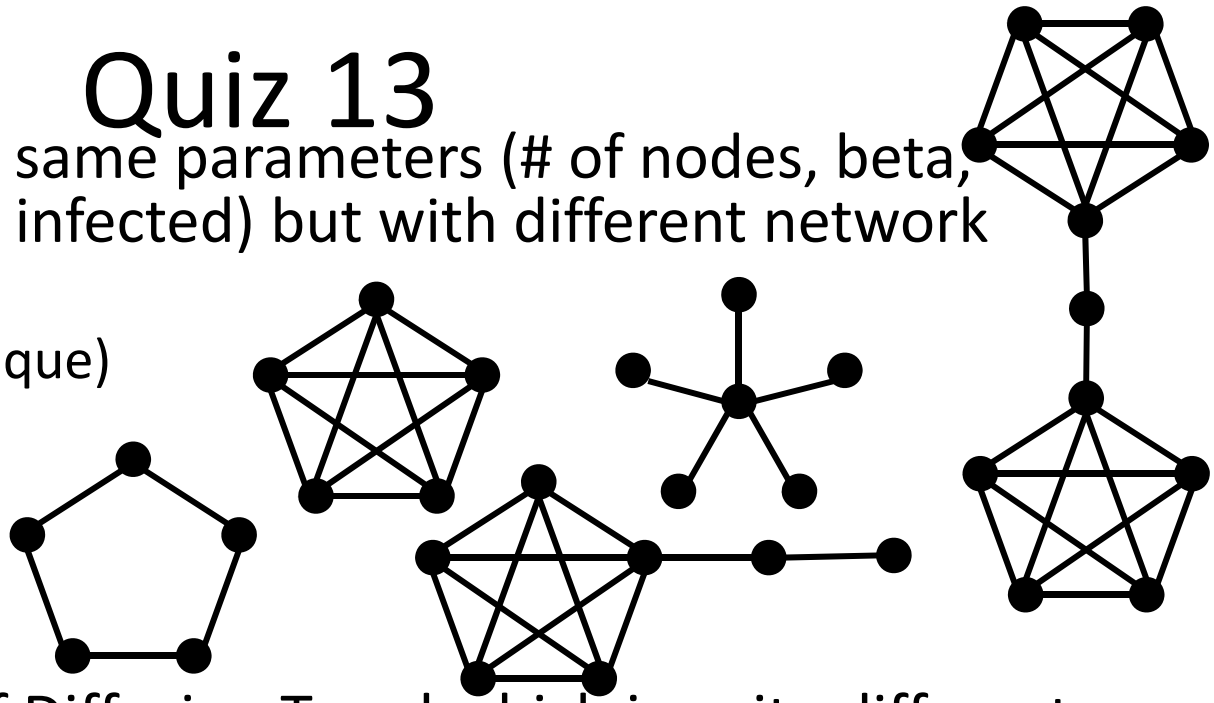
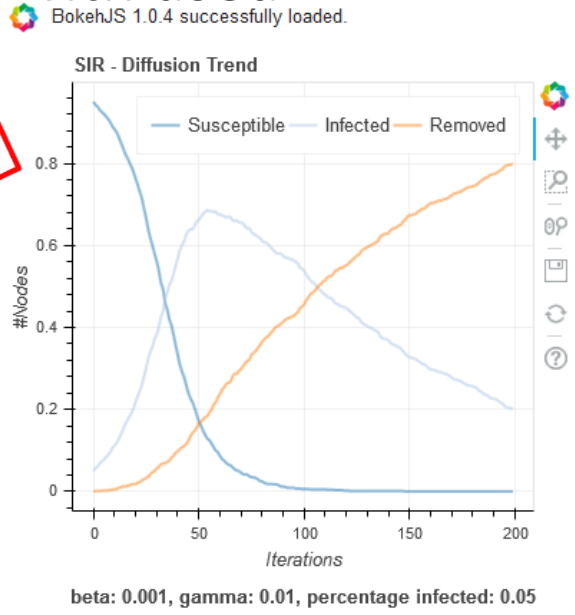
Quiz 13

1. Do simulations with same parameters (# of nodes, beta, gamma, percentage infected) but with different network structures such as:
    1. complete graph (clique)
    2. star graph
    3. cycle graph
    4. barbell graph
    5. lollipop graph



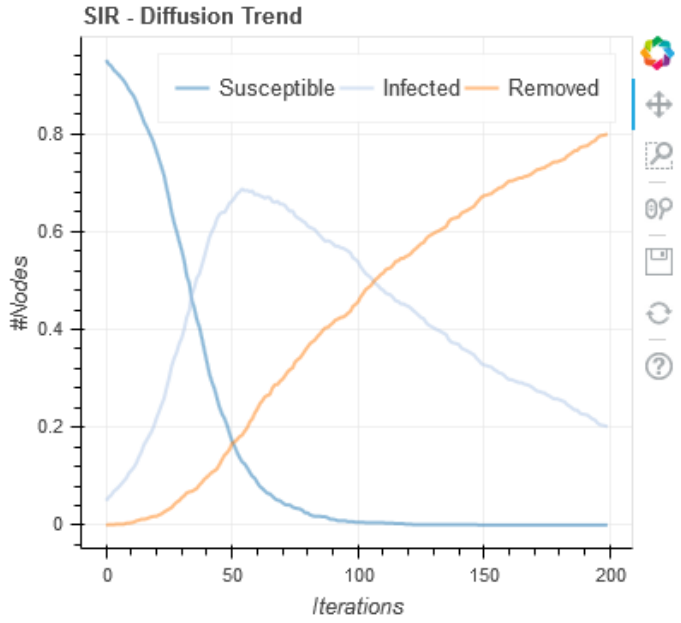
2. Show an example of Diffusion Trend which is quite different from that of Erdos-Renyi network (together with used network structure).

- Submit from Tokyo Tech OCW-i
- Deadline: ??:??(Japan Standard Time) on Jan. 30(Wed)
- Files should be MS Word, PDF or Zipped Jupyter notebook.

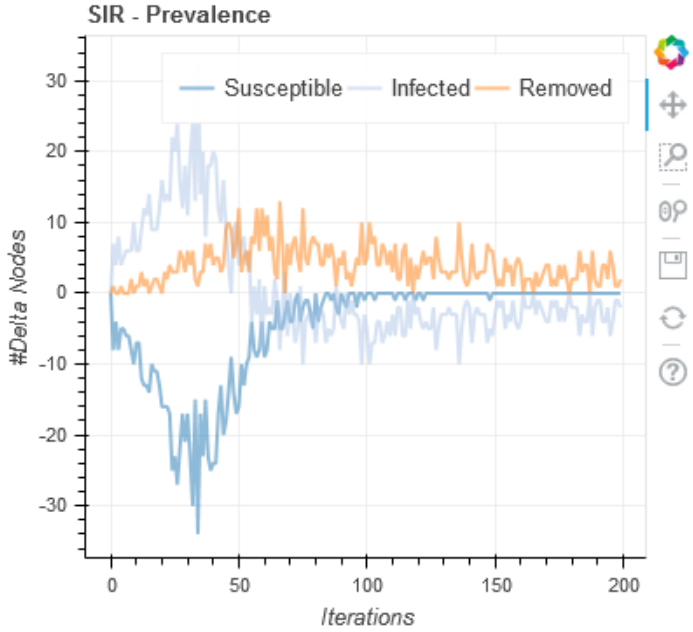


```
!pip install -q ndlib
!pip install -q bokeh

import networkx as nx
import matplotlib.pyplot as plt
import numpy as np
import ndlib.models.epidemics.SIRModel as sir

# Network Definition
g = nx.erdos_renyi_graph(1000, 0.1)

# Model Selection
model = sir.SIRModel(g)

import ndlib.models.ModelConfig as mc

# Model Configuration
config = mc.Configuration()
config.add_model_parameter('beta', 0.001)
config.add_model_parameter('gamma', 0.01)
config.add_model_parameter("percentage_infected", 0.05)
model.set_initial_status(config)

# Simulation
iterations = model.iteration_bunch(200)
trends = model.build_trends(iterations)

# Visualization
from bokeh.io import output_notebook, show
output_notebook() # there will be no output without this
from ndlib.viz.bokeh.DiffusionTrend import DiffusionTrend

# Diffusion trend
viz = DiffusionTrend(model, trends)
p = viz.plot(width=400, height=400)
show(p)

# Prevalence plot
from ndlib.viz.bokeh.DiffusionPrevalence import DiffusionPrevalence
viz2 = DiffusionPrevalence(model, trends)
p2 = viz2.plot(width=400, height=400)
show(p2)
```

BokehJS 1.0.4 successfully loaded.

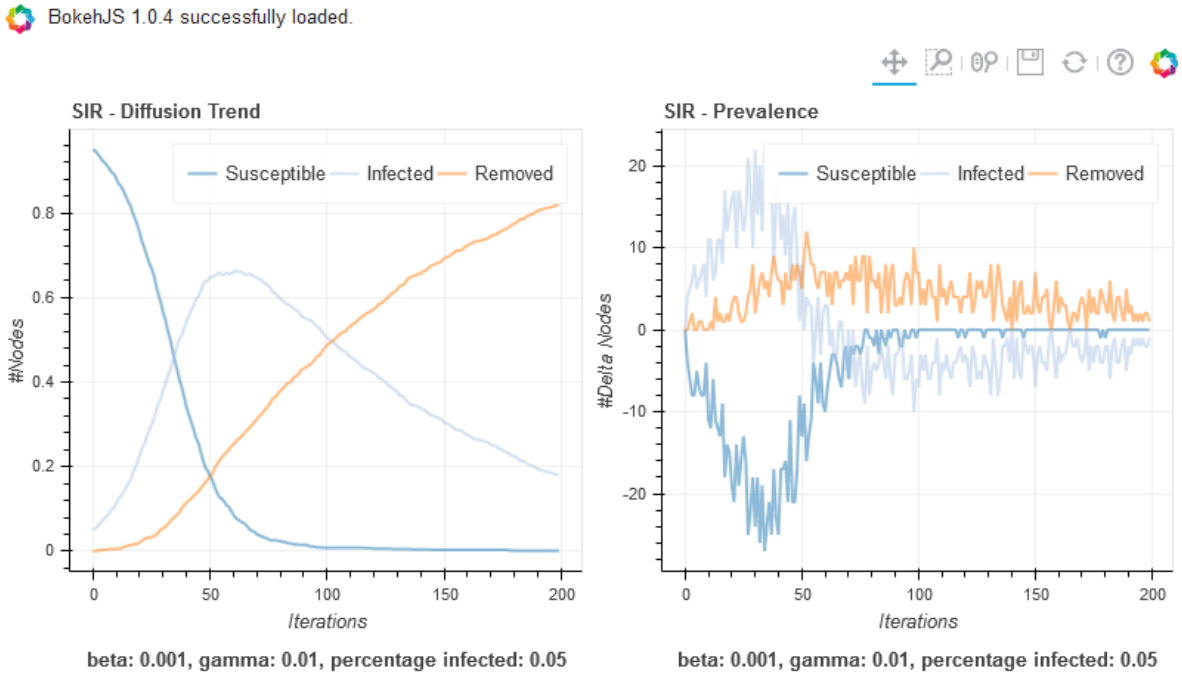


beta: 0.001, gamma: 0.01, percentage infected: 0.05



beta: 0.001, gamma: 0.01, percentage infected: 0.05

star graph



complete graph