Complex Networks: Quiz #6

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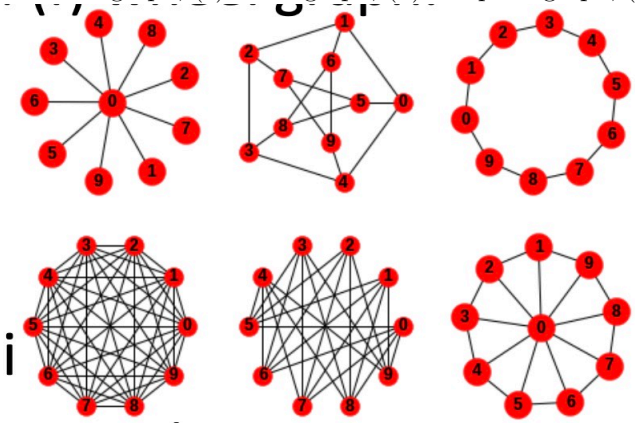
Problem 1

Make a program of computing (i) transitivity and (ii) mean local clustering coefficient of (a) star graph, (b) Petersen graph, (c) circle graph, (d) complete graph, (e) complete bipartite graph, and (f) wheel graph.



Answer 1

Use the bulid in function to compute the transitivity and mean local clustering coefficient:

```
import networkx as nx
import matplotlib.pyplot as plt

star = nx.star_graph(9)
plt.subplot(231)
nx.draw(star, node_size=400, node_color='red', with_labels=True, font_weight='bold')
print("Transitivity of star:",nx.transitivity(star))
print("mean local clustering coefficient of star:",nx.average_clustering(star))


petersen = nx.petersen_graph()
plt.subplot(232)
nx.draw_shell(petersen, nlist=[range(5, 10), range(5)], node_size=200, node_color='red',
                                                with_labels=True, font_weight='bold')
print("Transitivity of petersen:",nx.transitivity(petersen))
print("mean local clustering coefficient of petersen:",nx.average_clustering(petersen))


cycle = nx.cycle_graph(10)
plt.subplot(233)
nx.draw_spring(cycle, node_size=400, node_color='red', with_labels=True, font_weight='bold')
print("Transitivity of cycle:",nx.transitivity(cycle))
print("mean local clustering coefficient of cycle:",nx.average_clustering(cycle))



K_10 = nx.complete_graph(10)
plt.subplot(234)
nx.draw_circular(K_10, node_size=200, node_color='red', with_labels=True, font_weight='bold')
print("Transitivity of K_10:",nx.transitivity(K_10))
print("mean local clustering coefficient of K_10:",nx.average_clustering(K_10))


K_5_5 = nx.complete_bipartite_graph(5, 5)
plt.subplot(235)
nx.draw_circular(K_5_5, nlist=[range(5, 10), range(5)], node_size=200, node_color='red',
                                                with_labels=True, font_weight='bold')
```

```
print("Transitivity of K_5_5:",nx.transitivity(K_5_5))
print("mean local clustering coefficient of K_5_5:",nx.average_clustering(K_5_5))



wheel = nx.wheel_graph(10)
plt.subplot(236)
nx.draw(wheel, node_size=400, node_color='red', with_labels=True, font_weight='bold')
print("Transitivity of wheel:",nx.transitivity(wheel))
print("mean local clustering coefficient of wheel:",nx.average_clustering(wheel))
```

The resule is as follows:

```
Transitivity of star: 0
mean local clustering coefficient of star: 0.0

Transitivity of petersen: 0
mean local clustering coefficient of petersen: 0.0

Transitivity of cycle: 0
mean local clustering coefficient of cycle: 0.0

Transitivity of K_10: 1.0
mean local clustering coefficient of K_10: 1.0

Transitivity of K_5_5: 0
mean local clustering coefficient of K_5_5: 0.0

Transitivity of wheel: 0.42857142857142855
mean local clustering coefficient of wheel: 0.6250000000000001
```