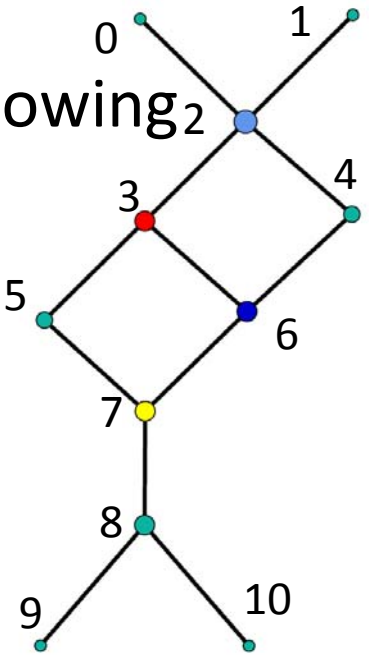
Quiz 5



Make a program of computing (i) and (ii) of the following centralities (1-6). Show the code and its outputs.

(i) centrality values of all nodes in the right graph

(ii) the most central node

1. Degree centrality
2. Betweenness centrality
3. Closeness centrality
4. Eigenvector centrality
5. PageRank
6. Katz centrality

- You can use built-in functions of networkX
- Submit from Tokyo Tech OCW-i
- Deadline: ??:??(Japan Standard Time) on Dec. 19(Wed)

```
import networkx as nx
import matplotlib.pyplot as plt
import numpy as np
import pprint

G = nx.Graph()
G.add_nodes_from(range(0,10))
G.add_edges_from([(0,2),(1,2),(2,3),(2,4),(3,5),(3,6),(4,6),(5,7),(6,7),(7,8),(8,9),(8,10)])
plt.figure(figsize=(5, 5))
nx.draw_spring(G, node_size=400, node_color='red', with_labels=True, font_weight='bold')
#A = nx.adjacency_matrix(G).todense()
#A = np.array(A, dtype = np.float64)
#print("degree centrality:",list(nx.degree_centrality(G).values()))
v = list(nx.degree_centrality(G).values())
s = ("     degree centrality: "+', '.join(['%.2f']*len(v))) % tuple(v)
print(s, "biggest:", np.argmax(v))
```

```
degree centrality: 0.10, 0.10, 0.40, 0.30, 0.20, 0.20, 0.30, 0.30, 0.30, 0.10, 0.10 biggest: 2
```