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import pandas as pd
import networkx as nx
import matplotlib.pyplot as plt
import os
downloads_path = os.path.join(os.path.expanduser("~"), "Downloads")

# Constructs the full file path
file_path = os.path.join(downloads_path, "Tennis_Graph.csv")
try:
    data = pd.read_csv(file_path, encoding='utf-8')
except UnicodeDecodeError:
    try:
        data = pd.read_csv(file_path, encoding='latin-1')
    except UnicodeDecodeError:
        data = pd.read_csv(file_path, encoding='cp1252')
# Creates a NetworkX graph object
G = nx.Graph()
# Adds nodes (players) to the graph
players = set(data['Player1 Name'].tolist() + data['Player2 Name'].tolist())
G.add_nodes_from(players)
# Adds edges (matches) to the graph
for index, row in data.iterrows():
    player1 = row['Player1 Name']
    player2 = row['Player2 Name']
    matches = row['Matches']
    G.add_edge(player1, player2, weight=matches)
# Draws the network chart
pos = nx.spring_layout(G) # Choose a layout for the nodes
nx.draw(G, pos, with_labels=False, node_color='skyblue', edge_color='gray',
font_size=8, node_size=50)
plt.axis('off')
plt.show()

# Extracts node data
nodes = [[n, G.nodes[n]] for n in G.nodes()]
nodes_df = pd.DataFrame(nodes, columns=['Node', 'Attributes'])
# Extracts edge data
edges = [[u, v, G.edges[u, v]]
for u, v in G.edges()]
edges_df = pd.DataFrame(edges, columns=['Source', 'Target', 'Attributes'])
# Saves node data and edge data as CSV files
nodes_df.to_csv('nodes.csv', index=False)

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edges_df.to_csv('edges.csv', index=False)
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