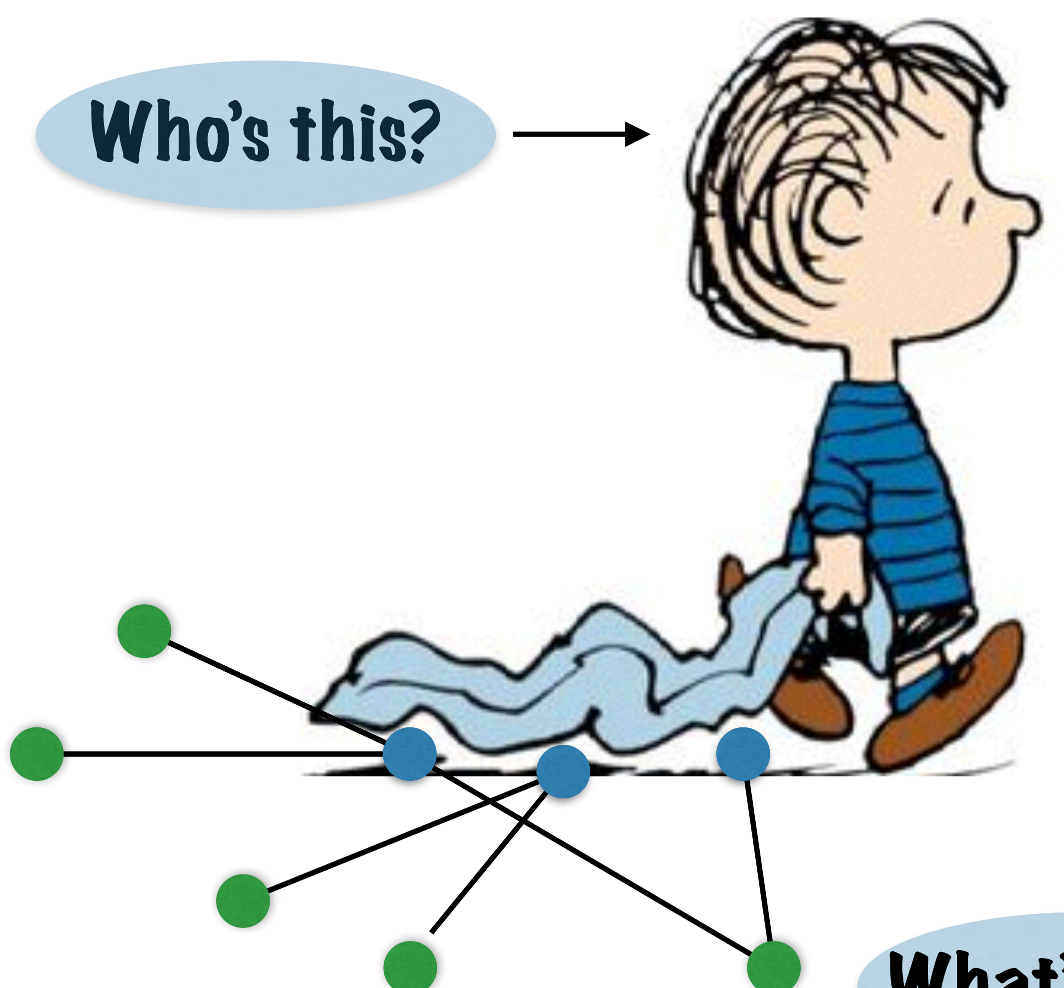
Approximation algorithms, vertex cover, and linear programming

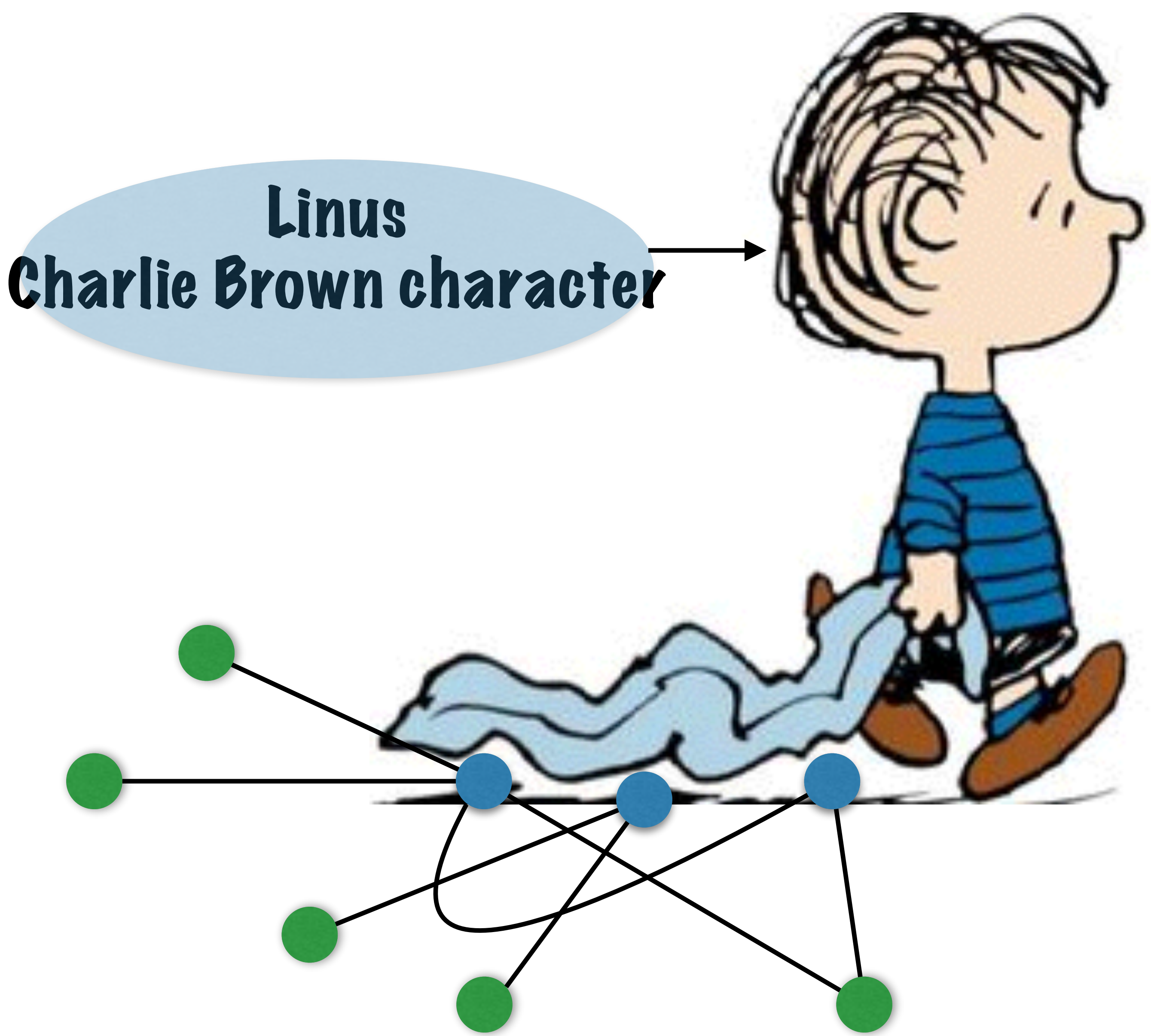
Who's this?



$$
\begin{aligned}
&\min c_1x_1 + c_2x_2 + \cdots + c_nx_n\\
&\text{such that}\\
&\begin{cases}
a_{11}x_1 + a_{12}x_2 + \cdots + a_{1n}x_n & \geq b_1\\
a_{21}x_1 + a_{22}x_2 + \cdots + a_{2n}x_n & \geq b_2\\
\cdots & \\
a_{m1}x_1 + a_{m2}x_2 + \cdots + a_{mn}x_n & \geq b_m\\
\forall i: \quad 0 \leq x_i \leq 1 & \\
\forall i: \quad x_i \ \underline{\text{real number}} &
\end{cases}
\end{aligned}
$$

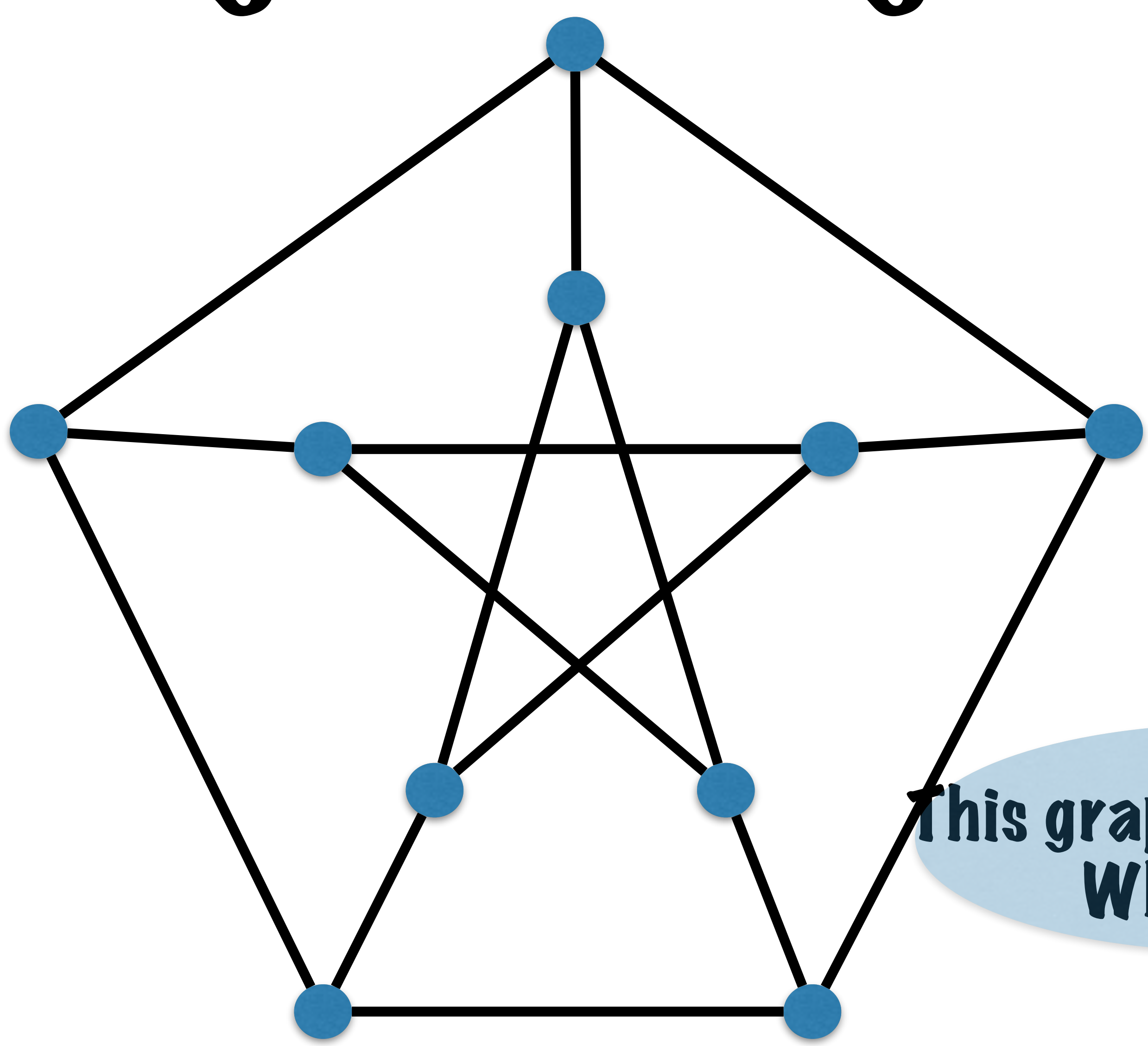
What's that?

Vertex Cover

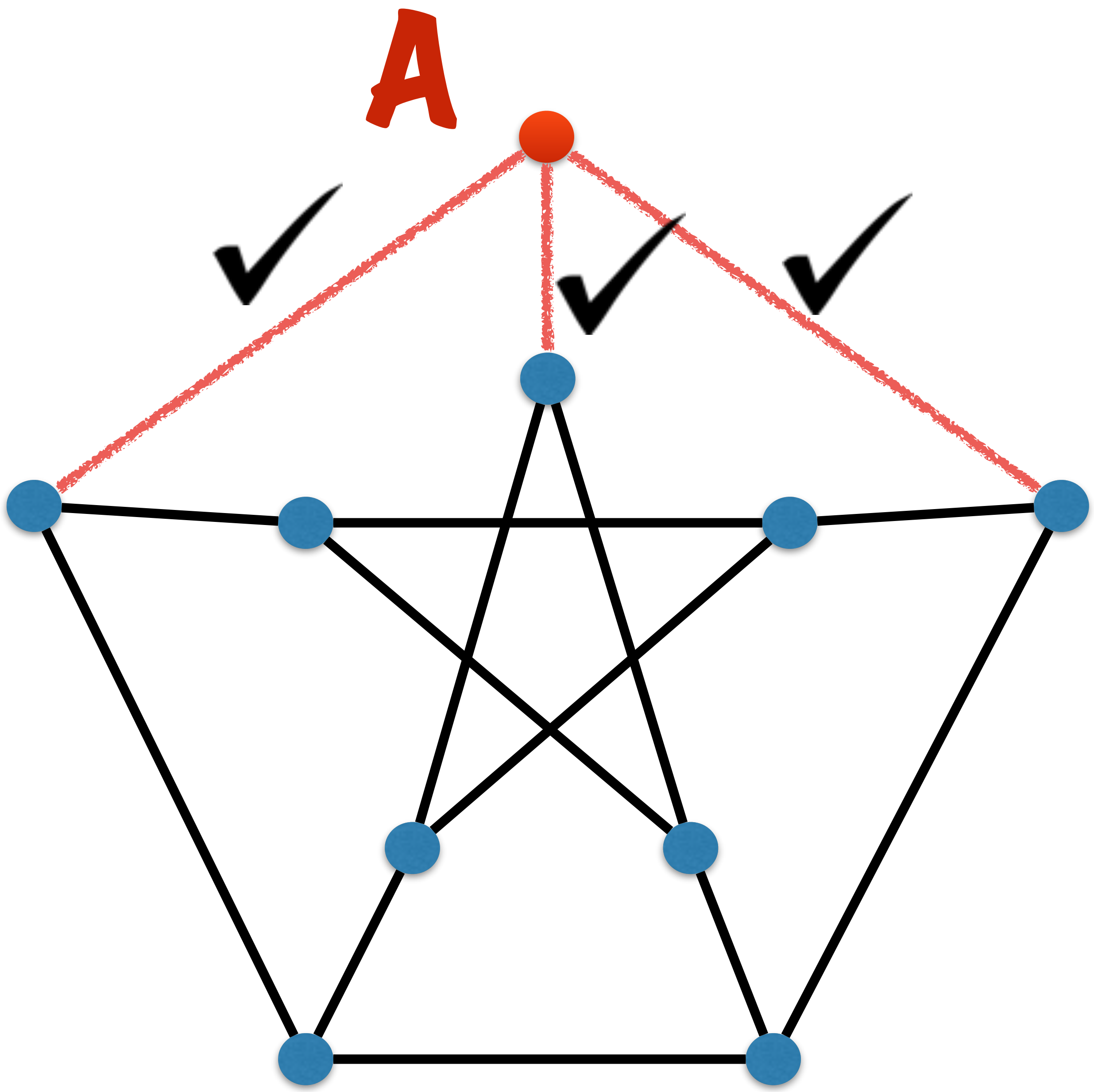


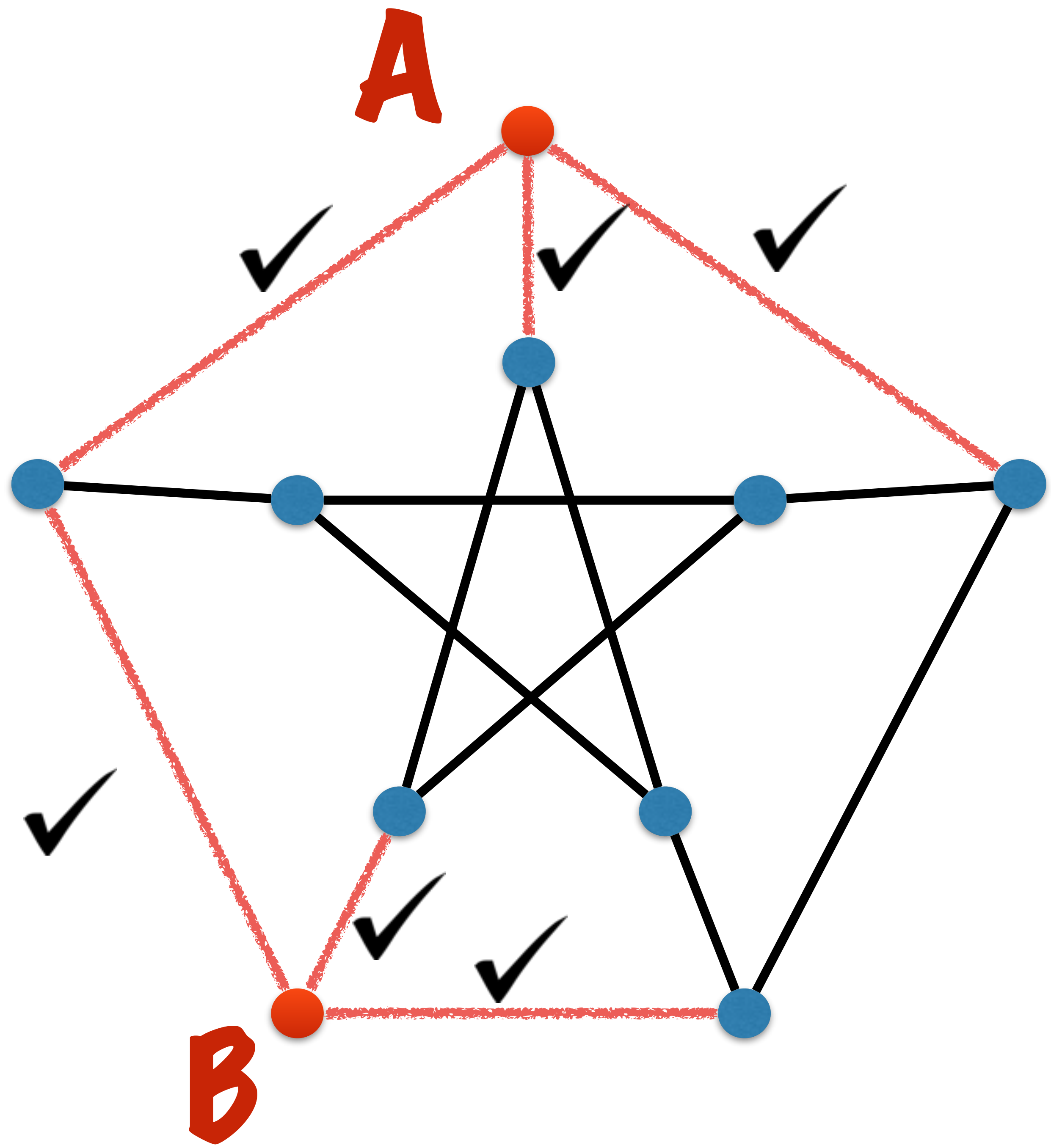
Vertex cover

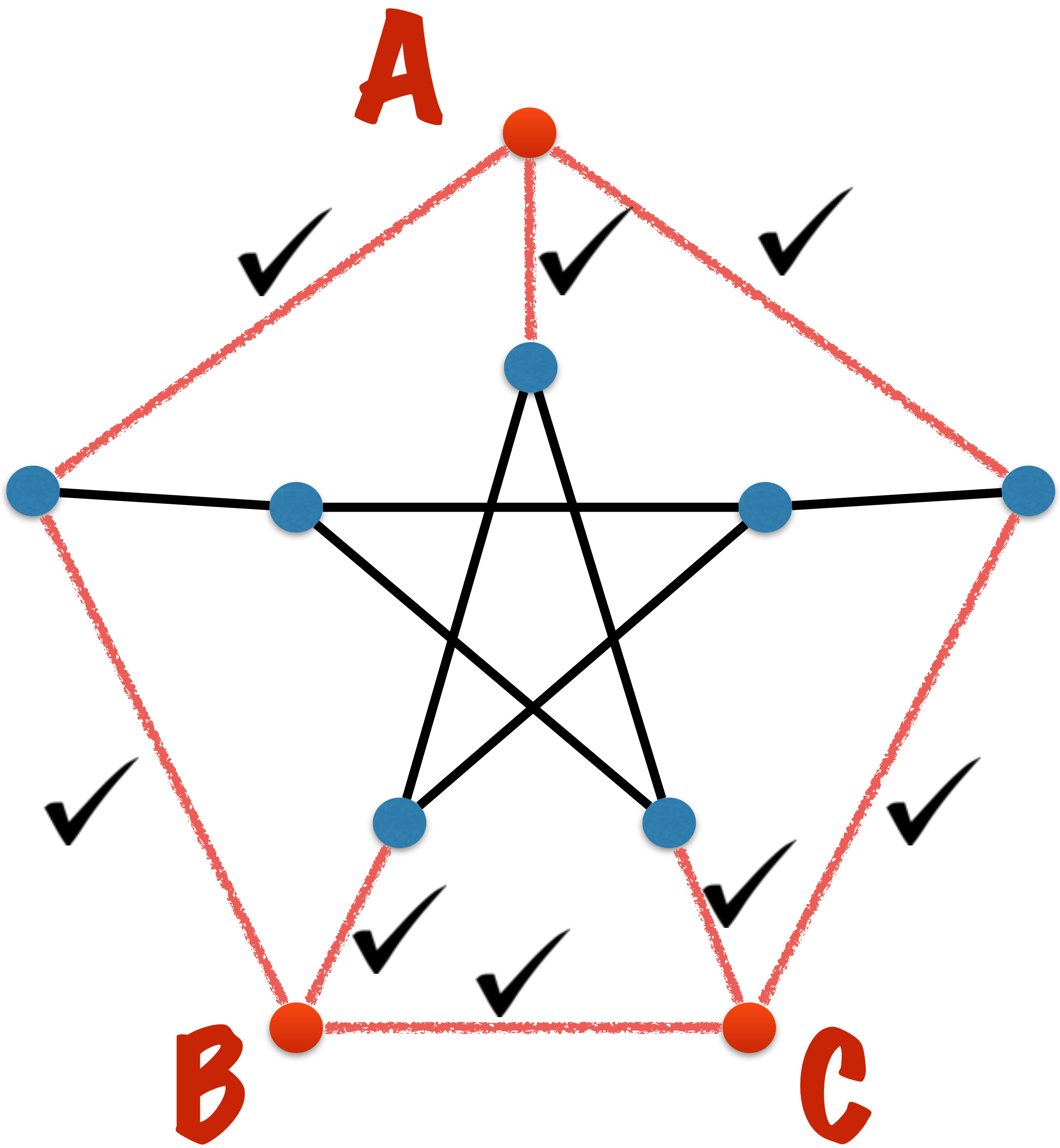
Given graph with vertex weights, cover edges with lightest vertices

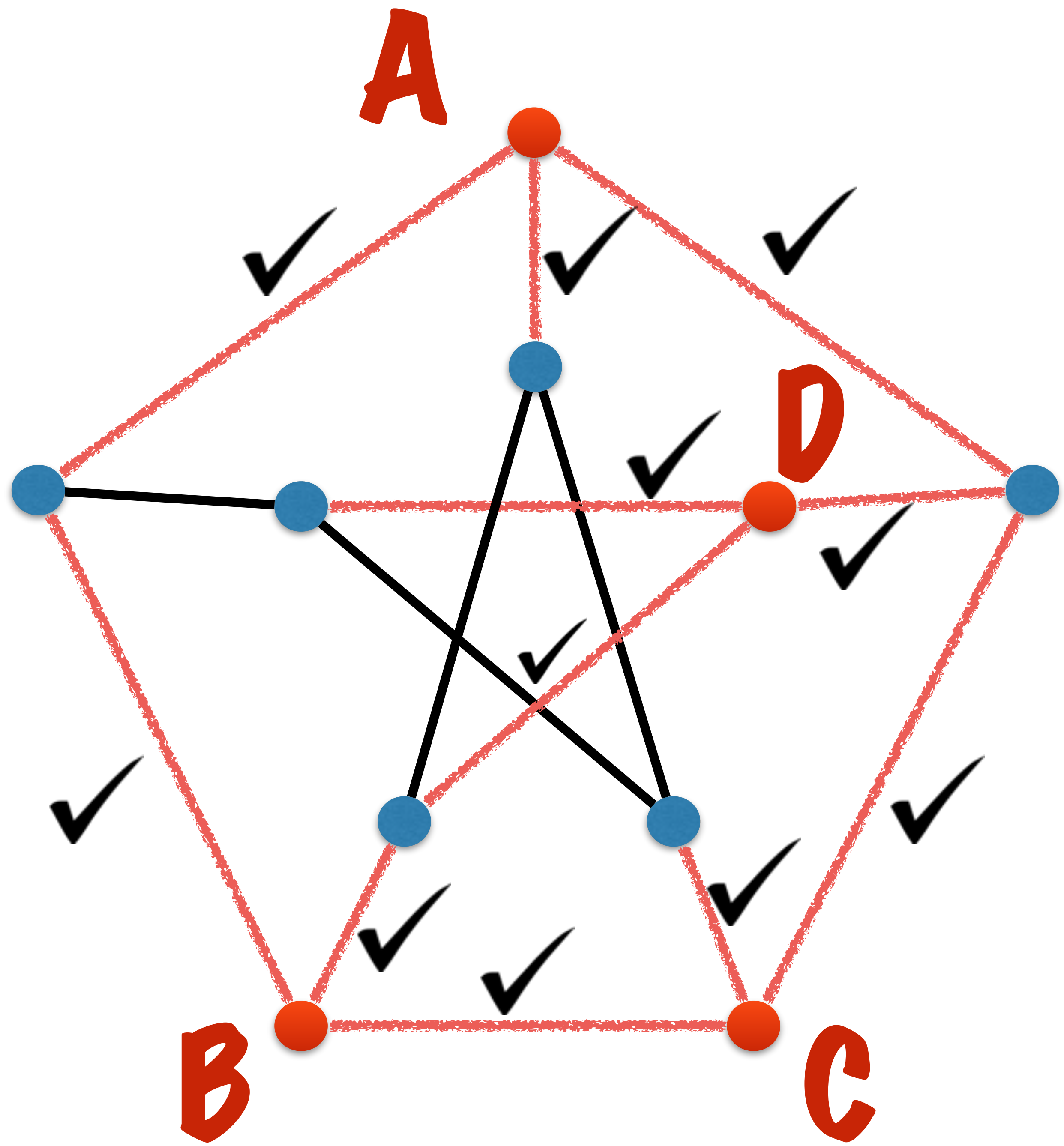


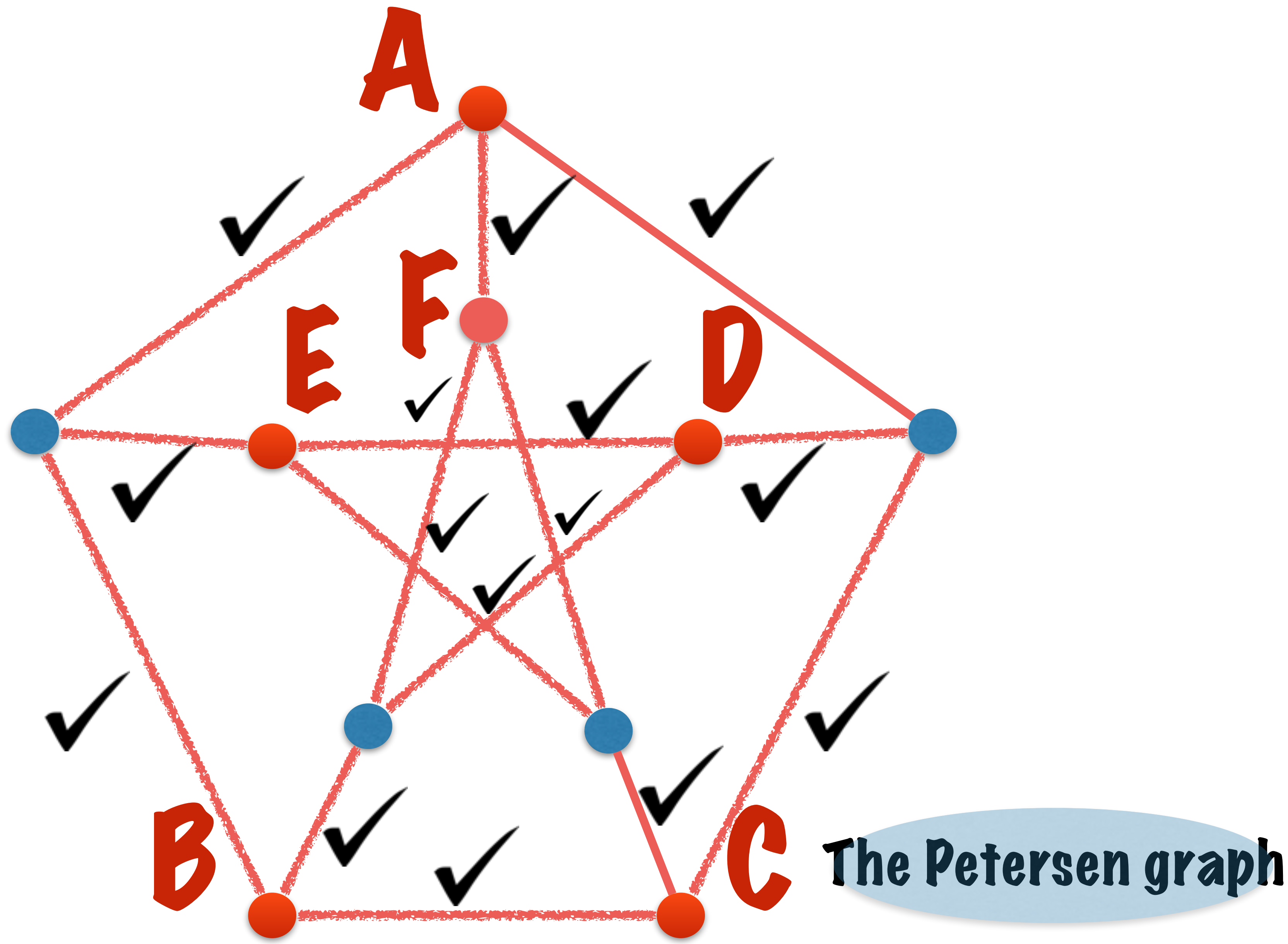
This graph has a name. What is it?


A

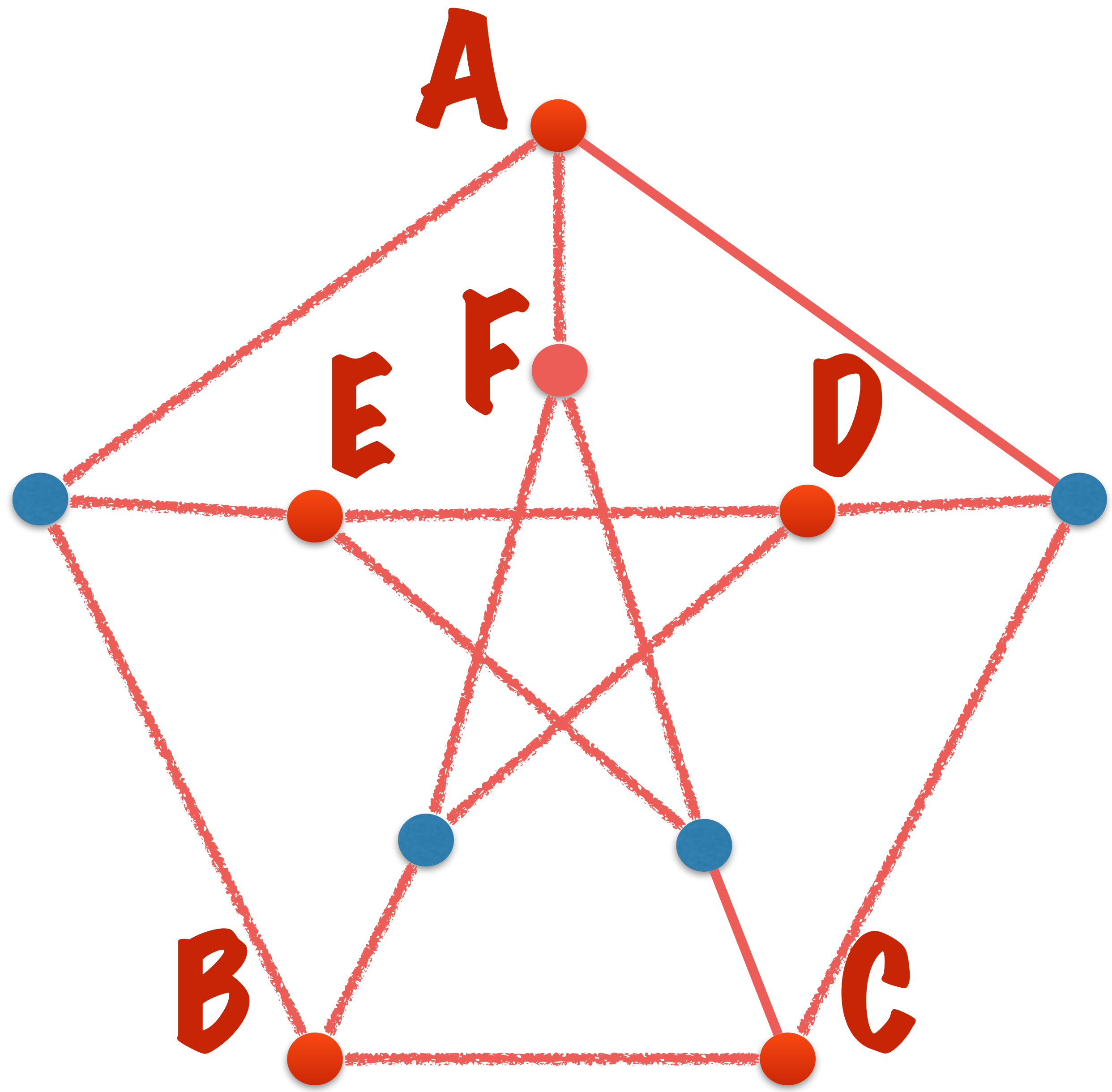

A
B


A
B
C


A
D
B
C



Vertex weights: 1.
Cover edges with 6 vertices.
Optimal : cannot cover with 5



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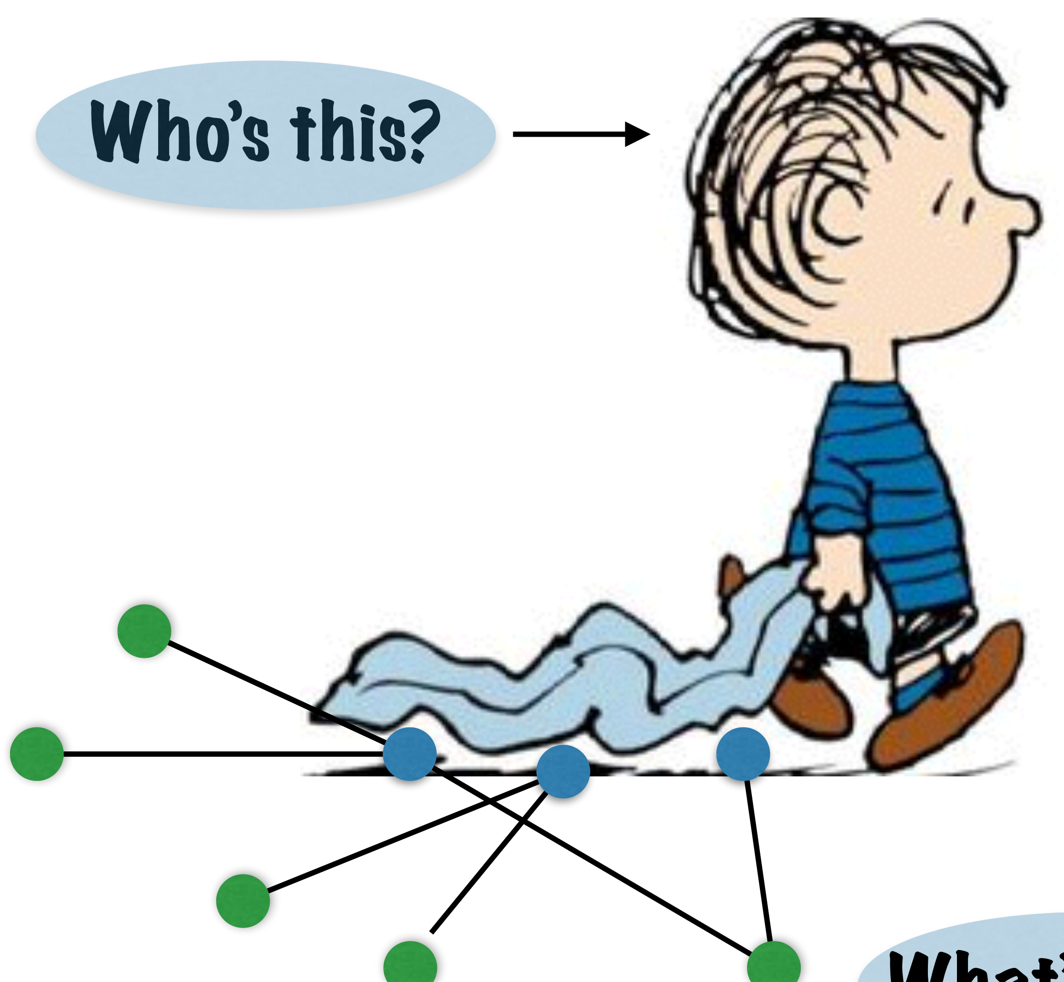

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