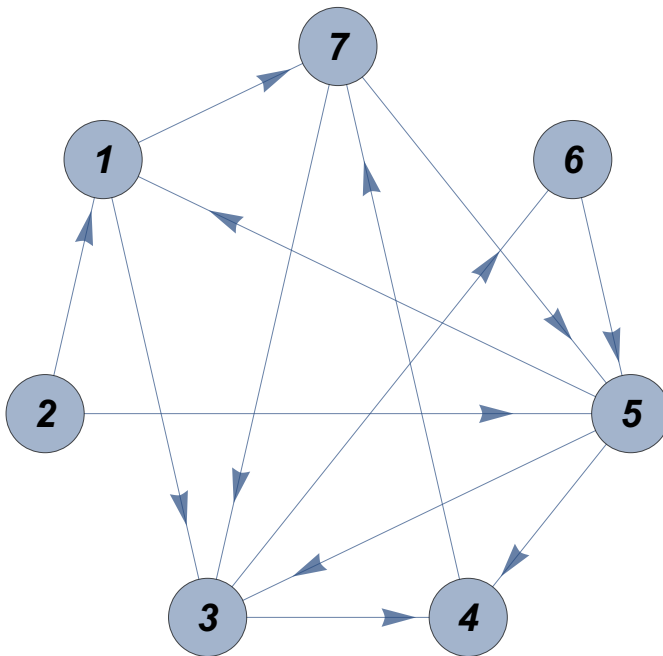


```

In[241]:= inFileName = StringJoin[{NotebookDirectory[], "input.txt"}];
fileStream = OpenRead[inFileName];
vertex = Read[fileStream, {Word, Number}][[2]];
edge = Read[fileStream, {Word, Number}][[2]];
edges = ReadList[fileStream, Expression, edge];
array = Array[0 &, vertex];
listInput = ReadList[fileStream, String];
For[i = 1, i ≤ vertex, i++, array[[i]] =
    ToExpression[StringSplit[listInput[[i]], {"b", "_", "/*", "*/*"}][[2]]];
verticesList = Array[# &, vertex];
edgesList = Table[edges[[i, 1]] → edges[[i, 2]], {i, edge}];
Close[fileStream];
graph = Graph[verticesList, edgesList, GraphLayout → "CircularEmbedding",
    VertexSize → 0.3, VertexLabels → Placed["Name", Center],
    VertexLabelStyle → Directive[Bold, Italic, 20],
    EdgeShapeFunction → GraphElementData["Arrow", "ArrowSize" → 0.05]]
equations = Array[0 &, vertex];
vars = Array[0 &, edge];
For[i = 1, i ≤ edge, i++, equations[[edges[[i, 1]]]] =
    equations[[edges[[i, 1]]]] + Subscript[x, edges[[i, 1]] → edges[[i, 2]]];
equations[[edges[[i, 2]]]] = equations[[edges[[i, 2]]]] -
    Subscript[x, edges[[i, 1]] → edges[[i, 2]]];
vars[[i]] = Subscript[x, edges[[i, 1]] → edges[[i, 2]]];
Solve[equations == array, vars]
equations == array /. % // Simplify
Row[{equations // MatrixForm, array // MatrixForm}, "="]

```

Out[252]=



Solve: Equations may not give solutions for all "solve" variables.

Out[256]= $\{ \{ x_{2 \rightarrow 5} \rightarrow 4 - x_{2 \rightarrow 1}, x_{5 \rightarrow 1} \rightarrow -7 + x_{1 \rightarrow 3} + x_{1 \rightarrow 7} - x_{2 \rightarrow 1}, x_{5 \rightarrow 4} \rightarrow 7 - x_{3 \rightarrow 4} + x_{4 \rightarrow 7}, x_{6 \rightarrow 5} \rightarrow -1 + x_{3 \rightarrow 6}, x_{7 \rightarrow 3} \rightarrow 1 - x_{1 \rightarrow 3} + x_{3 \rightarrow 4} + x_{3 \rightarrow 6} - x_{5 \rightarrow 3}, x_{7 \rightarrow 5} \rightarrow -1 + x_{1 \rightarrow 3} + x_{1 \rightarrow 7} - x_{3 \rightarrow 4} - x_{3 \rightarrow 6} + x_{4 \rightarrow 7} + x_{5 \rightarrow 3} \} \}$

Out[257]= {True}

$$\text{Out[258]=} \left(\begin{array}{c} x_{1 \rightarrow 3} + x_{1 \rightarrow 7} - x_{2 \rightarrow 1} - x_{5 \rightarrow 1} \\ x_{2 \rightarrow 1} + x_{2 \rightarrow 5} \\ -x_{1 \rightarrow 3} + x_{3 \rightarrow 4} + x_{3 \rightarrow 6} - x_{5 \rightarrow 3} - x_{7 \rightarrow 3} \\ -x_{3 \rightarrow 4} + x_{4 \rightarrow 7} - x_{5 \rightarrow 4} \\ -x_{2 \rightarrow 5} + x_{5 \rightarrow 1} + x_{5 \rightarrow 3} + x_{5 \rightarrow 4} - x_{6 \rightarrow 5} - x_{7 \rightarrow 5} \\ -x_{3 \rightarrow 6} + x_{6 \rightarrow 5} \\ -x_{1 \rightarrow 7} - x_{4 \rightarrow 7} + x_{7 \rightarrow 3} + x_{7 \rightarrow 5} \end{array} \right) = \left(\begin{array}{c} 7 \\ 4 \\ -1 \\ -7 \\ -2 \\ -1 \\ 0 \end{array} \right)$$