```
In[•]:= SetOptions[SelectedNotebook[], PrintingStyleEnvironment → "Printout", ShowSyntaxStyles → True]; ClearAll["Global`*"]

In[•]:= MatrixForm[mat = Array[a, {4, 4}]]

Out[•]//MatrixForm=
⎛a[1, 1]  a[1, 2]  a[1, 3]  a[1, 4]⎞
⎜a[2, 1]  a[2, 2]  a[2, 3]  a[2, 4]⎟
⎜a[3, 1]  a[3, 2]  a[3, 3]  a[3, 4]⎟
⎝a[4, 1]  a[4, 2]  a[4, 3]  a[4, 4]⎠

In[•]:= loc = Join @@ Table[{i, j}, {i, 4}, {j, 4}]

Out[•]= {{1, 1}, {1, 2}, {1, 3}, {1, 4}, {2, 1}, {2, 2}, {2, 3}, {2, 4}, {3, 1}, {3, 2}, {3, 3}, {3, 4}, {4, 1}, {4, 2}, {4, 3}, {4, 4}}

In[•]:= nf = Nearest[Tuples@Range@Dimensions@mat → Flatten@mat];
        fourNeighbors[pt_] := nf[pt, {All, 1}][[2 ;; All]];

In[•]:= cond = Thread[Total /@ fourNeighbors /@ loc == 6]

Out[•]= {a[1, 2] + a[2, 1] == 6, a[1, 1] + a[1, 3] + a[2, 2] == 6, a[1, 2] + a[1, 4] + a[2, 3] == 6, a[1, 3] + a[2, 4] == 6, a[1, 1] + a[2, 2] + a[3, 1] == 6,
         a[1, 2] + a[2, 1] + a[2, 3] + a[3, 2] == 6, a[1, 3] + a[2, 2] + a[2, 4] + a[3, 3] == 6, a[1, 4] + a[2, 3] + a[3, 4] == 6,
         a[2, 1] + a[3, 2] + a[4, 1] == 6, a[2, 2] + a[3, 1] + a[3, 3] + a[4, 2] == 6, a[2, 3] + a[3, 2] + a[3, 4] + a[4, 3] == 6,
         a[2, 4] + a[3, 3] + a[4, 4] == 6, a[3, 1] + a[4, 2] == 6, a[3, 2] + a[4, 1] + a[4, 3] == 6, a[3, 3] + a[4, 2] + a[4, 4] == 6, a[3, 4] + a[4, 3] == 6}

In[•]:= var = Flatten@mat

Out[•]= {a[1, 1], a[1, 2], a[1, 3], a[1, 4], a[2, 1], a[2, 2], a[2, 3], a[2, 4], a[3, 1], a[3, 2], a[3, 3], a[3, 4], a[4, 1], a[4, 2], a[4, 3], a[4, 4]}

In[•]:= obj = Total@var

Out[•]= a[1, 1] + a[1, 2] + a[1, 3] + a[1, 4] + a[2, 1] + a[2, 2] + a[2, 3] + a[2, 4] + a[3, 1] + a[3, 2] + a[3, 3] + a[3, 4] + a[4, 1] + a[4, 2] + a[4, 3] + a[4, 4]

In[•]:= sol = Maximize[{obj, cond}, var]

Out[•]= {36, {a[1, 1] → 6, a[1, 2] → 0, a[1, 3] → 0, a[1, 4] → 6, a[2, 1] → 6, a[2, 2] → 0, a[2, 3] → 0,
           a[2, 4] → 6, a[3, 1] → 0, a[3, 2] → 0, a[3, 3] → 0, a[3, 4] → 0, a[4, 1] → 0, a[4, 2] → 6, a[4, 3] → 6, a[4, 4] → 0}}

In[•]:= Partition[var /. Last@sol, 4] // MatrixForm

Out[•]//MatrixForm=
⎛6  0  0  6⎞
⎜6  0  0  6⎟
⎜0  0  0  0⎟
⎝0  6  6  0⎠
```