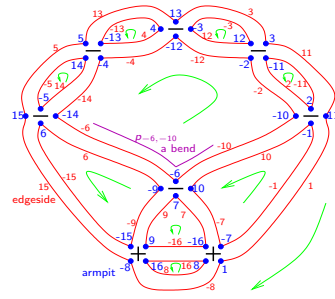
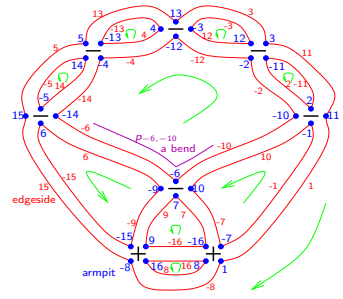


```
XingsByArmpits =
List@@PD[K] /.
x : X[i_, j_, k_, l_] =>
If[PositiveQ[x], X, [-i, j, k, -l],
X, [-j, k, l, -i]]
{X.[-1, 11, 2, -10], X.[-11, 3, 12, -2],
X.[-3, 13, 4, -12], X.[-13, 5, 14, -4],
X.[-5, 15, 6, -14], X.[-8, 16, 9, -15],
X.[-16, 8, 1, -7], X.[-9, 7, 10, -6]}
```



```
bends = Times @@ XingsByArmpits /.
_ [X] [a_, b_, c_, d_] =>
P[a,-d] P[b,-a] P[c,-b] P[d,-c]
P-16,7 P-15,-9 P-14,-6 P-13,4 P-12,-4 P-11,2
P-10,-2 P-9,6 P-8,15 P-7,-1 P-6,-10 P-5,14
P-4,-14 P-3,12 P-2,-12 P-1,10 P1,-8 P2,-11
P3,11 P4,-13 P5,13 P6,-15 P7,9 P8,16 P9,-16
P10,-7 P11,1 P12,-3 P13,3 P14,-5 P15,5 P16,8
faces = bends /. P[x_,y_,z_] => P[x,y,z]
P-13,4,-13 P-11,2,-11 P-5,14,-5 P-3,12,-3
P8,16,8 P6,-15,-9,6 P9,-16,7,9 P10,-7,-1,10
P-10,-2,-12,-4,-14,-6,-10 P1,-8,15,5,13,3,11,1
```



```
A = Table[0, Length@faces, Length@faces];
A // MatrixForm
```

$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{pmatrix}$$

```
Do[is = Position[faces, #][[1, 1]] & /@ List@@x;
A[[is, is]] += If[Head[x] === X,

$$\begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix} - \begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix}],
{x, XingsByArmpits}];$$

```

```
x = XingsByArmpits[[1]]
X.[-1, 11, 2, -10]
faces
```

```
P-13,4,-13 P-11,2,-11 P-5,14,-5 P-3,12,-3 P8,16,8 P6,-15,-9,6
P9,-16,7,9 P10,-7,-1,10 P-10,-2,-12,-4,-14,-6,-10 P1,-8,15,5,13,3,11,1
is = Position[faces, #][[1, 1]] & /@ List@@x
{8, 10, 2, 9}
```

```
A[[is, is]] += If[Head[x] === X,

$$\begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix} - \begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix}],$$

```

```
A // MatrixForm

$$\begin{pmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -v & 0 & 0 & 0 & 0 & -1 & -u & -u \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 0 & 0 & 0 & 0 & -v & -u & -u \\ 0 & -u & 0 & 0 & 0 & 0 & -u & -1 & -1 \\ 0 & -u & 0 & 0 & 0 & 0 & -u & -1 & -1 \end{pmatrix}$$

```

Recall, is = {8, 10, 2, 9}

```
Do[is = Position[faces, #][[1, 1]] & /@ List@@x;
A[[is, is]] += If[Head[x] === X,

$$\begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix} - \begin{pmatrix} v & u & 1 & u \\ u & 1 & u & 1 \\ 1 & u & v & u \\ u & 1 & u & 1 \end{pmatrix}],
{x, Rest@XingsByArmpits}]$$

```

```
A // MatrixForm

$$\begin{pmatrix} -2v & 0 & -1 & -1 & 0 & 0 & 0 & 0 & -2u & -2u \\ 0 & -2v & 0 & -1 & 0 & 0 & 0 & -1 & -2u & -2u \\ -1 & 0 & -2v & 0 & 0 & -1 & 0 & 0 & -2u & -2u \\ -1 & -1 & 0 & -2v & 0 & 0 & 0 & 0 & -2u & -2u \\ 0 & 0 & 0 & 0 & 2 & 1 & 2u & 1 & 0 & 2u \\ 0 & 0 & -1 & 0 & 1 & 1-2v & 0 & -1 & -2u & 0 \\ 0 & 0 & 0 & 0 & 2u & 0 & -1+2v & 0 & -1 & 2 \\ 0 & -1 & 0 & 0 & 1 & -1 & 0 & 1-2v & -2u & 0 \\ -2u & -2u & -2u & -2u & 0 & -2u & -1 & -2u & -6 & -5 \\ -2u & -2u & -2u & -2u & 2u & 0 & 2 & 0 & -5 & -5+2v \end{pmatrix}$$

```