

Pensieve header: Drawing the n-dimensional cube $Q[n]$ and Hamilton circuits in it.

```
V[n_] := V[n] = StringJoin @@@ Tuples[{"0", "1"}, n];
```

```
V[3]
```

```
{000, 001, 010, 011, 100, 101, 110, 111}
```

```
EE[n_] := Flatten[Table[
  StringInsert[v, "*", k],
  {v, V[n-1]}, {k, n}
]];

```

```
EE[3]
```

```
{*00, 0*0, 00*, *01, 0*1, 01*, *10, 1*0, 10*, *11, 1*1, 11*}
```

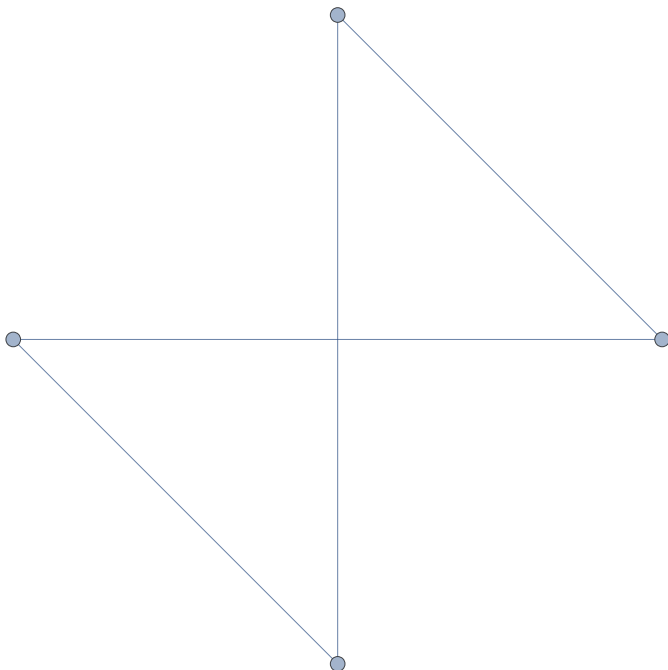
```
Q[n_] := Graph[
  V[n],
  Table[
    StringReplace[ee, "*" -> "0"] ↔ StringReplace[ee, "*" -> "1"],
    {ee, EE[n]}
  ]
];

```

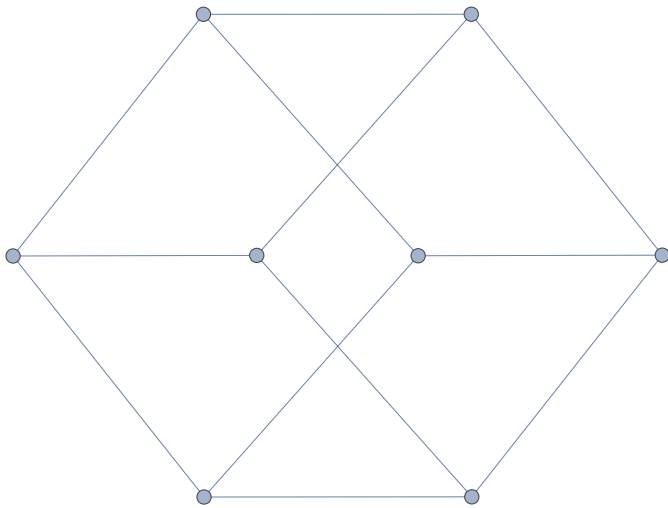
```
Q[1]
```



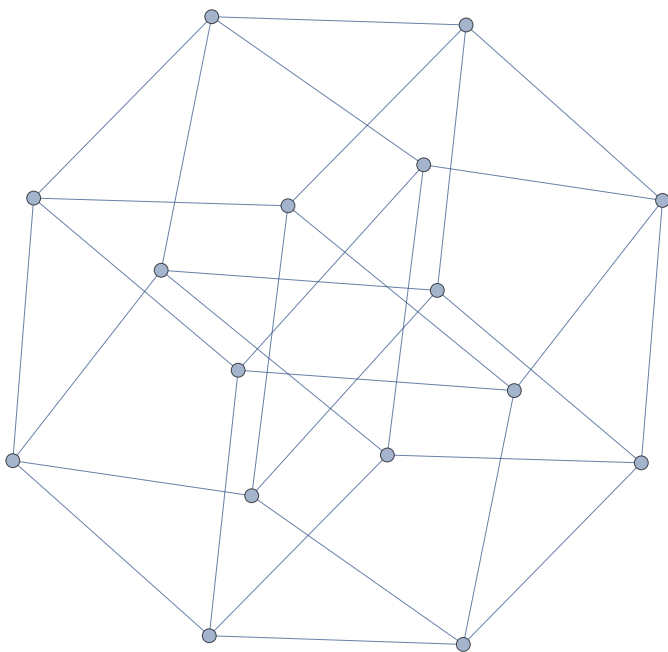
```
Q[2]
```



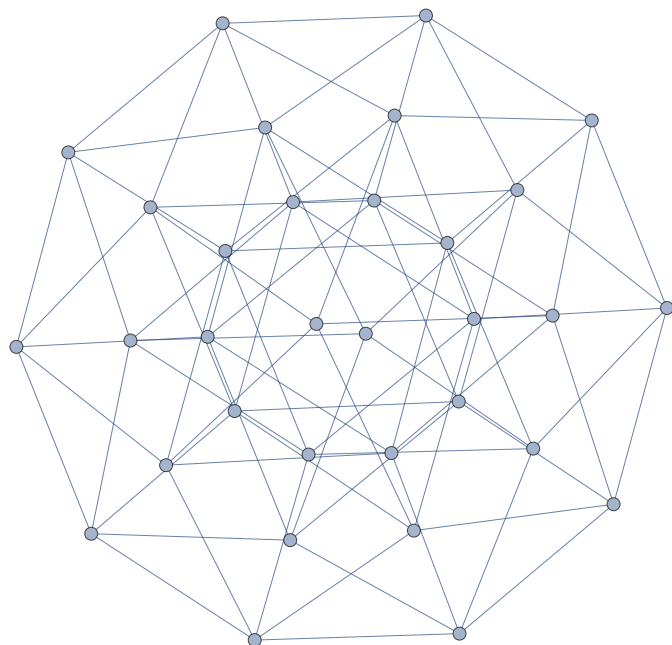
$Q[3]$



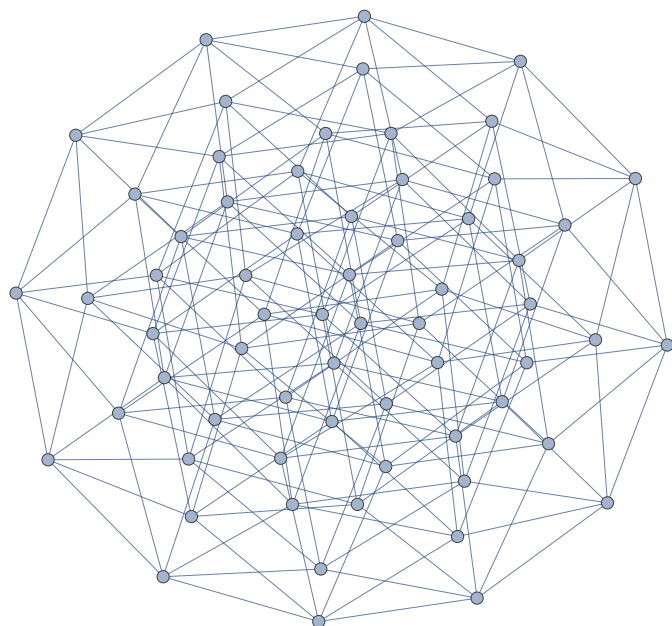
$Q[4]$



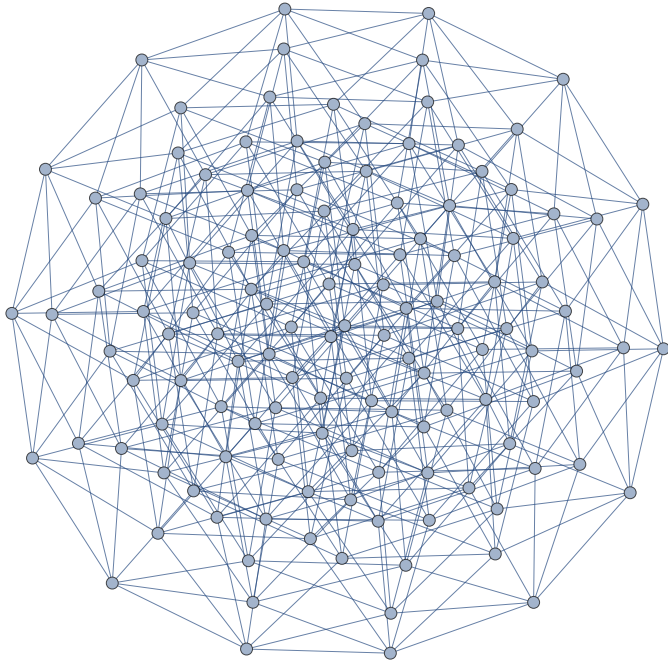
Q[5]



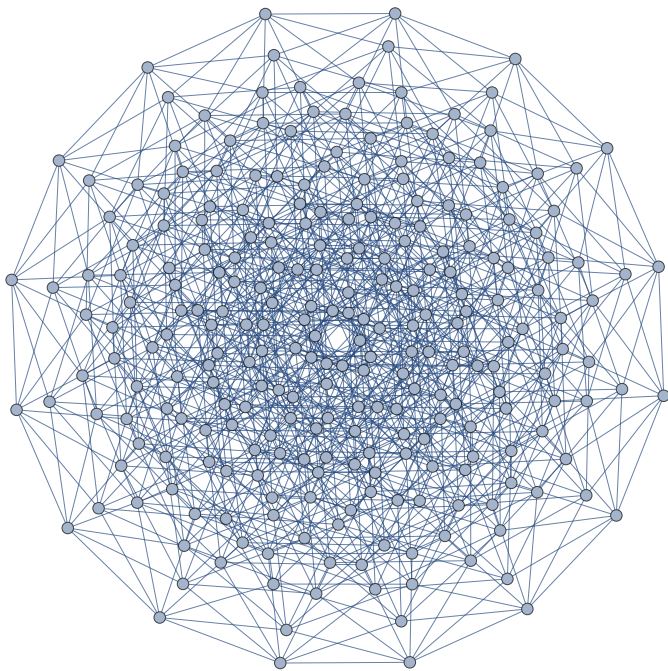
Q[6]



$Q[7]$



$Q[8]$

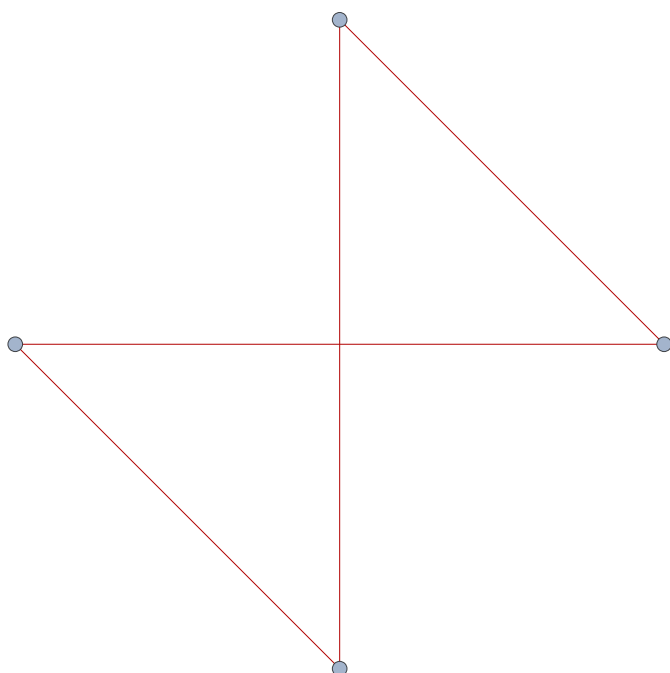


```

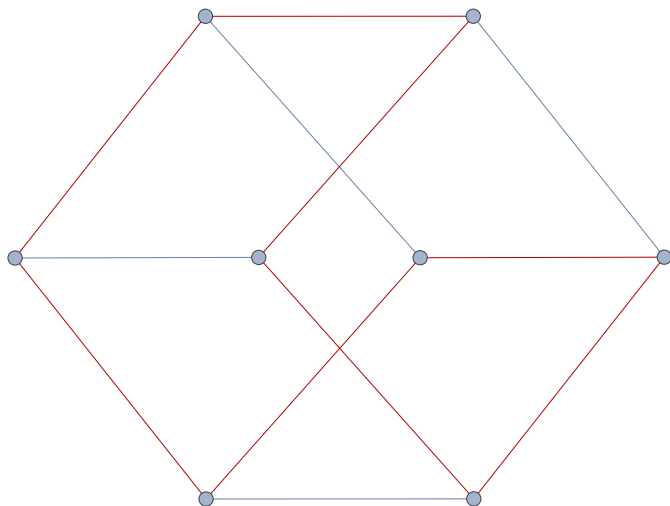
HC[2] = {"00", "01", "11", "10", "00"};
HC[n_] := Module[{γ, γp, v},
  γ = HC[n - 1];
  {v0, v1} = Take[γ, 2];
  γp = Drop[γ, 1];
  Join[{# <> "0"} & /@ γp, {# <> "1"} & /@ Reverse@γp, {v1 <> "0"}]
];
HC[3]
{010, 110, 100, 000, 001, 101, 111, 011, 010}

ShowHC[n_] := HighlightGraph[Q[n], UndirectedEdge @@@ Partition[HC[n], 2, 1]];
ShowHC[2]

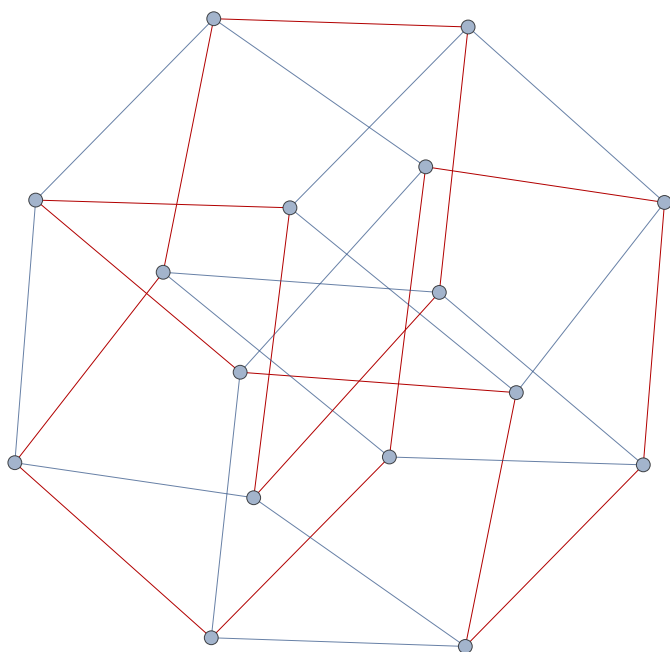
```



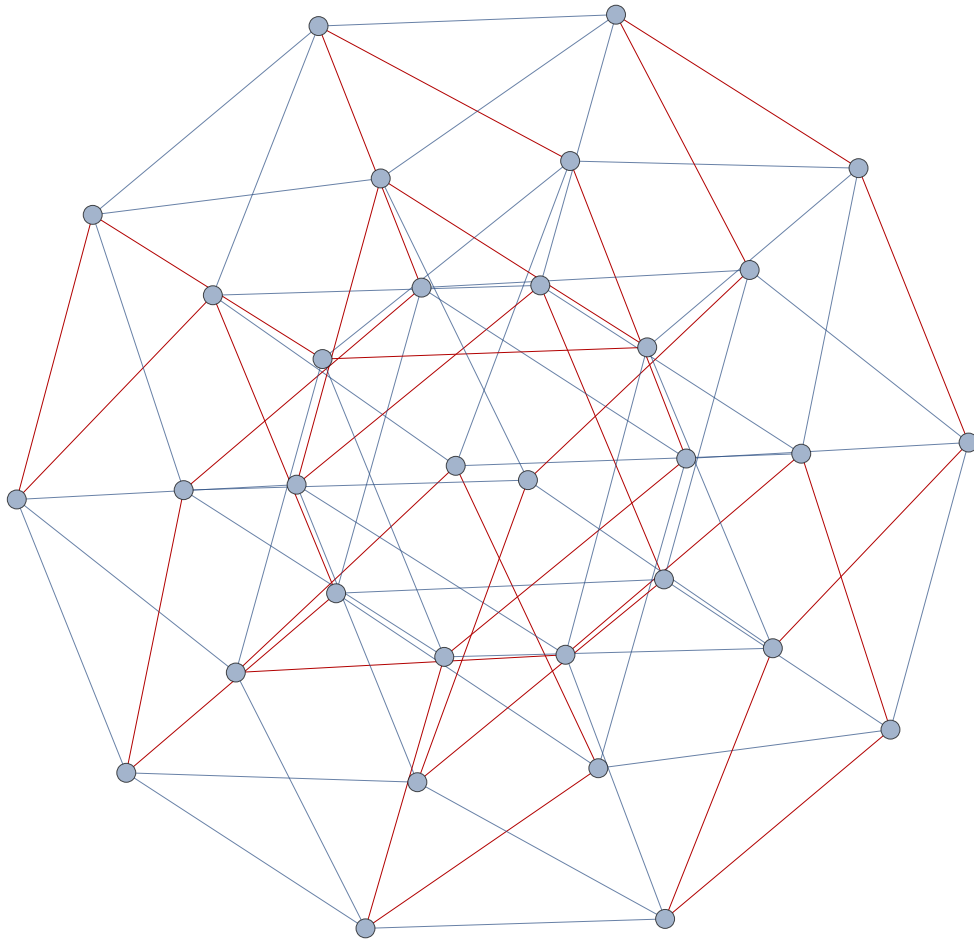
ShowHC [3]



ShowHC [4]



ShowHC [5]



```
QQ[n_] := Graph[
  V[n],
  Table[
    StringReplace[ee, "*" → "0"] ↔ StringReplace[ee, "*" → "1"],
    {ee, EE[n]}
  ],
  EdgeStyle → Black
];
QQ[4]
```

