GHZ product as the copy construct

This note shows the factorisation structure (via the SVD) of the GHZ prdocut – that is, the copy construct.
http://www.comlab.ox.ac.uk/activities/quantum/course/

In[1]:=
```
GHZ := {{1 , 0}, {0, 0}, {0, 0}, {0, 1}}
```

In[2]:=
```
MatrixForm[GHZ]
```

Out[2]//MatrixForm=

$$\begin{pmatrix} 1 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 1 \end{pmatrix}$$

In[3]:=
```
{s, v, d} = SingularValueDecomposition[GHZ]
```

Out[3]=
```
{{{0, 1, 0, 0}, {0, 0, 0, 1}, {0, 0, 1, 0}, {1, 0, 0, 0}},
 {{1, 0}, {0, 1}, {0, 0}, {0, 0}}, {{0, 1}, {1, 0}}}
```

```
MatrixForm[s]
```

Out[6]//MatrixForm=

$$\begin{pmatrix} 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 0 & 0 & 0 \end{pmatrix}$$

In[7]:=
```
MatrixForm[v]
```

Out[7]//MatrixForm=

$$\begin{pmatrix} 1 & 0 \\ 0 & 1 \\ 0 & 0 \\ 0 & 0 \end{pmatrix}$$

In[8]:=
```
MatrixForm[d]
```

Out[8]//MatrixForm=

$$\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$$