In[1]:=
```
(*tut 1A, Q5*)
invA = {{1, 3, 0}, {0, 1, 1}, {1, -1, 4}};
invB = {{2, 1, 1}, {0, 0, -2}, {1, 1, -1}};
Print["(AB)^{-1} = inv[B].inv[A]= ", invB.invA // MatrixForm];
```

```
(AB)^{-1} = inv[B].inv[A]=
```
$$\begin{pmatrix} 3 & 6 & 5 \\ -2 & 2 & -8 \\ 0 & 5 & -3 \end{pmatrix}$$

In[163]:=
```
(*tut 1A, Q7*)
A = {{-1, -1, -1}, {0, 1, 0}, {0, 0, 1}};
Print["A=", A // MatrixForm];
Print["A^2=", A.A // MatrixForm];
Print["A^3=", A.A.A // MatrixForm];
Print["A^3=A, hence A has period of 2"];

B = {{0, 1, 0}, {0, 0, 1}, {-1, -1, -1}};
Print["B=", B // MatrixForm];
Print["B^2=", B.B // MatrixForm];
Print["B^3=", B.B.B // MatrixForm];
Print["B^4=", B.B.B.B // MatrixForm];
Print["B^5=", B.B.B.B.B // MatrixForm];
Print["B^5=B, hence B has period of 4"];

c = {{0, 1, 0}, {-1, -1, -1}, {0, 0, 1}};
Print["C=", c // MatrixForm];
Print["C^2=", c.c // MatrixForm];
Print["C^3=", c.c.c // MatrixForm];
Print["C^4=", c.c.c.c // MatrixForm];
Print["C^4=C, hence C has period of 3"];
```

$$A = \begin{pmatrix} -1 & -1 & -1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$A^2 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$A^3 = \begin{pmatrix} -1 & -1 & -1 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

A^3=A, hence A has period of 2

$$B = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -1 & -1 \end{pmatrix}$$

$$B^2 = \begin{pmatrix} 0 & 0 & 1 \\ -1 & -1 & -1 \\ 1 & 0 & 0 \end{pmatrix}$$

$$B^3 = \begin{pmatrix} -1 & -1 & -1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{pmatrix}$$

$$B^4 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$B^5 = \begin{pmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -1 & -1 \end{pmatrix}$$

B^5=B, hence B has period of 4

$$C = \begin{pmatrix} 0 & 1 & 0 \\ -1 & -1 & -1 \\ 0 & 0 & 1 \end{pmatrix}$$

$$C^2 = \begin{pmatrix} -1 & -1 & -1 \\ 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$C^3 = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

$$C^4 = \begin{pmatrix} 0 & 1 & 0 \\ -1 & -1 & -1 \\ 0 & 0 & 1 \end{pmatrix}$$

C^4=C, hence C has period of 3