In[52]:=
```
A = {{1, 2, -3}, {2, -1, -1}, {3, 2, 1}};
A // MatrixForm
b = {3, 11, -5};
b // MatrixForm
m1 = Length [A];
m2 = Length [b];
Table [AppendTo [A[[i]] , b[[i]]] , {i, m1}];
Print ["[A|b] = ", A // MatrixForm ]
r = RowReduce [A]
r // MatrixForm
A1 = r[[All , {1, 2, 3}]]
b1 = r[[All , 4]]
Print ["sol = ", LinearSolve [A1, b1] // MatrixForm ]
```

Out[53]//MatrixForm=

$$\begin{pmatrix} 1 & 2 & -3 \\ 2 & -1 & -1 \\ 3 & 2 & 1 \end{pmatrix}$$

Out[55]//MatrixForm=

$$\begin{pmatrix} 3 \\ 11 \\ -5 \end{pmatrix}$$

$$[A|b] = \begin{pmatrix} 1 & 2 & -3 & 3 \\ 2 & -1 & -1 & 11 \\ 3 & 2 & 1 & -5 \end{pmatrix}$$

Out[60]= {{1, 0, 0, 2}, {0, 1, 0, -4}, {0, 0, 1, -3}}

Out[61]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & -4 \\ 0 & 0 & 1 & -3 \end{pmatrix}$$

Out[62]= {{1, 0, 0}, {0, 1, 0}, {0, 0, 1}}

Out[63]= {2, -4, -3}

$$sol = \begin{pmatrix} 2 \\ -4 \\ -3 \end{pmatrix}$$

In[131]:=
```
ClearAll
```

Out[131]= ClearAll

In[132]:=
```
A = {{1, 3, 1}, {1, -2, -1}, {2, 1, 2}};
```

In[133]:=
```
A // MatrixForm
b = {10, 6, 10};
b // MatrixForm
m1 = Length[A];
m2 = Length[b];
Table[AppendTo[A[[i]], b[[i]]], {i, m1}];
Print["[A|b] = ", A // MatrixForm ]
r = RowReduce[A]
r // MatrixForm
A1 = r[[All, {1, 2, 3}]]
b1 = r[[All, 4]]
Print["sol = ", LinearSolve[A1, b1] // MatrixForm ]
```

Out[133]//MatrixForm=

$$\begin{pmatrix} 1 & 3 & 1 \\ 1 & -2 & -1 \\ 2 & 1 & 2 \end{pmatrix}$$

Out[135]//MatrixForm=

$$\begin{pmatrix} 10 \\ 6 \\ 10 \end{pmatrix}$$

$$[A|b] = \begin{pmatrix} 1 & 3 & 1 & 10 \\ 1 & -2 & -1 & 6 \\ 2 & 1 & 2 & 10 \end{pmatrix}$$

Out[140]= {{1, 0, 0, 7}, {0, 1, 0, 2}, {0, 0, 1, -3}}

Out[141]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 7 \\ 0 & 1 & 0 & 2 \\ 0 & 0 & 1 & -3 \end{pmatrix}$$

Out[142]= {{1, 0, 0}, {0, 1, 0}, {0, 0, 1}}

Out[143]= {7, 2, -3}

$$sol = \begin{pmatrix} 7 \\ 2 \\ -3 \end{pmatrix}$$

In[117]:=
```
ClearAll
```

Out[117]= ClearAll

In[118]:=
```
A = {{1, 1, 1}, {2, -3, 1}, {-1, 2, -1}};
```

In[119]:=
```
A // MatrixForm
b = {4, 2, -1};
b // MatrixForm
m1 = Length [A];
m2 = Length [b];
Table [AppendTo [A[[i]] , b[[i]]] , {i, m1}];
Print ["[A|b] = ", A // MatrixForm ]
r = RowReduce [A]
r // MatrixForm
A1 = r[[All , {1, 2, 3}]]
b1 = r[[All , 4]]
Print ["sol = ", LinearSolve [A1, b1] // MatrixForm ]
```

Out[119]//MatrixForm=

$$\begin{pmatrix} 1 & 1 & 1 \\ 2 & -3 & 1 \\ -1 & 2 & -1 \end{pmatrix}$$

Out[121]//MatrixForm=

$$\begin{pmatrix} 4 \\ 2 \\ -1 \end{pmatrix}$$

$$[A|b] = \begin{pmatrix} 1 & 1 & 1 & 4 \\ 2 & -3 & 1 & 2 \\ -1 & 2 & -1 & -1 \end{pmatrix}$$

Out[126]= {{1, 0, 0, 2}, {0, 1, 0, 1}, {0, 0, 1, 1}}

Out[127]//MatrixForm=

$$\begin{pmatrix} 1 & 0 & 0 & 2 \\ 0 & 1 & 0 & 1 \\ 0 & 0 & 1 & 1 \end{pmatrix}$$

Out[128]= {{1, 0, 0}, {0, 1, 0}, {0, 0, 1}}

Out[129]= {2, 1, 1}

$$sol = \begin{pmatrix} 2 \\ 1 \\ 1 \end{pmatrix}$$