```
> combo:=(a,s,t,c)->LinearAlgebra[RowOperation](a,[t,s],c);
> swap:=(a,s,t)->LinearAlgebra[RowOperation](a,[t,s]);
> mult:=(a,t,c)->LinearAlgebra[RowOperation](a,t,c);
>
  xmaple -b /user/turd/documents/maple/laylinalg.mla;
```

$$combo := (a, s, t, c) \rightarrow LinearAlgebra_{RowOperation}(a, [t, s], c)$$

$$swap := (a, s, t) \rightarrow LinearAlgebra_{RowOperation}(a, [t, s])$$

$$mult := (a, t, c) \rightarrow LinearAlgebra_{RowOperation}(a, t, c)$$

laylinalg (version 5.0) -- A Maple Package containing Commands and Data for use with Linear Algebra and Its Applications, Fifth Edition, 2016, by David C. Lay, Steven R. Lay, and Judi J. McDonald

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$$xmaple - \left(\frac{b}{user\ turd\ documents\ maple\ laylinalg} \right).mla \tag{1}$$

```
> Vector([S,O,R]),Vector([R,Y,H]),Vector([I,L,L]),Vector([R,S,A]),
  Vector([I,S,T]),Vector([H,E,B]),Vector([E,S,T]);
```

$$\begin{bmatrix} S \\ O \\ R \end{bmatrix}, \begin{bmatrix} R \\ Y \\ H \end{bmatrix}, \begin{bmatrix} I \\ L \\ L \end{bmatrix}, \begin{bmatrix} R \\ S \\ A \end{bmatrix}, \begin{bmatrix} I \\ S \\ T \end{bmatrix}, \begin{bmatrix} H \\ E \\ B \end{bmatrix}, \begin{bmatrix} E \\ S \\ T \end{bmatrix} \tag{2}$$

```
> Vector([18,14,17]),Vector([17,24,7]),Vector([8,11,11]),Vector(
  [17,18,0]),Vector([8,18,19]),Vector([7,4,1]),Vector([4,18,19]);
```

$$\begin{bmatrix} 18 \\ 14 \\ 17 \end{bmatrix}, \begin{bmatrix} 17 \\ 24 \\ 7 \end{bmatrix}, \begin{bmatrix} 8 \\ 11 \\ 11 \end{bmatrix}, \begin{bmatrix} 17 \\ 18 \\ 0 \end{bmatrix}, \begin{bmatrix} 8 \\ 18 \\ 19 \end{bmatrix}, \begin{bmatrix} 7 \\ 4 \\ 1 \end{bmatrix}, \begin{bmatrix} 4 \\ 18 \\ 19 \end{bmatrix} \tag{3}$$

```
> Z1:=Matrix([<1,10,0>,<0,20,1>,<2,15,2>]);
```

$$Z1 := \begin{bmatrix} 1 & 0 & 2 \\ 10 & 20 & 15 \\ 0 & 1 & 2 \end{bmatrix} \tag{4}$$

```
> Z2:=Z1^(-1)mod 26;
```

$$Z2 := \begin{bmatrix} 15 & 22 & 2 \\ 14 & 22 & 3 \\ 6 & 15 & 12 \end{bmatrix} \tag{5}$$

```
> V1:=Z1.Vector([18,14,17])mod 26;
```

$$V1 := \begin{bmatrix} 0 \\ 13 \\ 22 \end{bmatrix} \tag{6}$$

```
> V2:=Z1.Vector([17,24,7])mod 26;
```

$$V2 := \begin{bmatrix} 5 \\ 1 \\ 12 \end{bmatrix} \tag{7}$$

```
> V3:=Z1.Vector([8,11,11])mod 26;
```

$$V3 := \begin{bmatrix} 4 \\ 23 \\ 7 \end{bmatrix} \tag{8}$$

```
> V4:=Z1.Vector([17,18,0])mod 26;
```

$$V4 := \begin{bmatrix} 17 \\ 10 \\ 18 \end{bmatrix} \tag{9}$$

```
> V5:=Z1.Vector([8,18,19])mod 26;
```

$$V5 := \begin{bmatrix} 20 \\ 23 \\ 4 \end{bmatrix} \tag{10}$$

```
> V6:=Z1.Vector([7,4,1])mod 26;
```

$$V6 := \begin{bmatrix} 9 \\ 9 \\ 6 \end{bmatrix} \tag{11}$$

```
> V7:=Z1.Vector([4,18,19])mod 26;
```

$$V7 := \begin{bmatrix} 16 \\ 9 \\ 4 \end{bmatrix} \tag{12}$$

```
> Vector([0,13,22]),Vector([5,1,12]),Vector([4,23,7]),Vector([17,
  10,18]),Vector([20,23,4]),Vector([9,9,6]),Vector([16,9,4]);
```

$$\begin{bmatrix} 0 \\ 13 \\ 22 \end{bmatrix}, \begin{bmatrix} 5 \\ 1 \\ 12 \end{bmatrix}, \begin{bmatrix} 4 \\ 23 \\ 7 \end{bmatrix}, \begin{bmatrix} 17 \\ 10 \\ 18 \end{bmatrix}, \begin{bmatrix} 20 \\ 23 \\ 4 \end{bmatrix}, \begin{bmatrix} 9 \\ 9 \\ 6 \end{bmatrix}, \begin{bmatrix} 16 \\ 9 \\ 4 \end{bmatrix} \tag{13}$$

```
> Vector([A,N,W]),Vector([F,B,M]),Vector([E,X,H]),Vector([R,K,S]),
  Vector([U,X,E]),Vector([J,J,G]),Vector([Q,J,E]);
```

$$\begin{bmatrix} A \\ N \\ W \end{bmatrix}, \begin{bmatrix} F \\ B \\ M \end{bmatrix}, \begin{bmatrix} E \\ X \\ H \end{bmatrix}, \begin{bmatrix} R \\ K \\ S \end{bmatrix}, \begin{bmatrix} U \\ X \\ E \end{bmatrix}, \begin{bmatrix} J \\ J \\ G \end{bmatrix}, \begin{bmatrix} Q \\ J \\ E \end{bmatrix} \tag{14}$$

```
> D1:=Z2.V1 mod 26;
```

$$\tag{15}$$

$$D1 := \begin{bmatrix} 18 \\ 14 \\ 17 \end{bmatrix} \qquad (15)$$

```
> D2:=Z2.V2 mod 26;
```

$$D2 := \begin{bmatrix} 17 \\ 24 \\ 7 \end{bmatrix} \qquad (16)$$

```
> D3:=Z2.V3 mod 26;
```

$$D3 := \begin{bmatrix} 8 \\ 11 \\ 11 \end{bmatrix} \qquad (17)$$

```
> D4:=Z2.V4 mod 26;
```

$$D4 := \begin{bmatrix} 17 \\ 18 \\ 0 \end{bmatrix} \qquad (18)$$

```
> D5:=Z2.V5 mod 26;
```

$$D5 := \begin{bmatrix} 8 \\ 18 \\ 19 \end{bmatrix} \qquad (19)$$

```
> D6:=Z2.V6 mod 26;
```

$$D6 := \begin{bmatrix} 7 \\ 4 \\ 1 \end{bmatrix} \qquad (20)$$

```
> D7:=Z2.V7 mod 26;
```

$$D7 := \begin{bmatrix} 4 \\ 18 \\ 19 \end{bmatrix} \qquad (21)$$