

So luong he truc toa do: 8

n =

8

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)1

C =

1 0 1 0 0 1 1 0

Quay quanh tuc nao x/y/z: z

Q =

z

Gia tri quay quanh truc: t1

t =

t1

T =

```
[ cos(t1), -sin(t1), 0, 0]
[ sin(t1),  cos(t1), 0, 0]
[      0,      0, 1, 0]
[      0,      0, 0, 1]
```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)0

C =

1 0 1 0 0 1 1 0

Dich chuyen theo truc x : 12

dx =

12

Dich chuyen theo truc y : 0

dy =

0

Dich chuyen theo truc z : l1

dz =

l1

T =

```
[ cos(t1), -sin(t1), 0, l2*cos(t1)]
[ sin(t1),  cos(t1), 0, l2*sin(t1)]
[      0,      0, 1,      l1]
[      0,      0, 0,      1]
```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)1

C =

```
1      0      1      0      0      1      1      0
```

Quay quanh tuc nao x/y/z: z

Q =

z

Gia tri quay quanh truc: t2

t =

t2

T =

```
[ cos(t1)*cos(t2) - sin(t1)*sin(t2), - cos(t1)*sin(t2) - cos(t2)*sin(t1), 0, l2*cos
(t1)]
[ cos(t1)*sin(t2) + cos(t2)*sin(t1),  cos(t1)*cos(t2) - sin(t1)*sin(t2), 0, l2*sin
(t1)]
[      0,      0, 1,
l1]
[      0,      0, 0,
1]
```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)0

C =

1 0 1 0 0 1 1 0

Dich chuyen theo truc x : 14

dx =

14

Dich chuyen theo truc y : 0

dy =

0

Dich chuyen theo truc z : 13

dz =

13

T =

```
[ cos(t1)*cos(t2) - sin(t1)*sin(t2), - cos(t1)*sin(t2) - cos(t2)*sin(t1), 0, 14*(cos
(t1)*cos(t2) - sin(t1)*sin(t2)) + 12*cos(t1)]
[ cos(t1)*sin(t2) + cos(t2)*sin(t1), cos(t1)*cos(t2) - sin(t1)*sin(t2), 0, 14*(cos
(t1)*sin(t2) + cos(t2)*sin(t1)) + 12*sin(t1)]
[
11 + 13]
[
1]
0, 0, 14
0, 0, 0
```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)1

C =

1 0 1 0 1 1 1 0

Quay quanh tuc nao x/y/z: z

Q =

z

Gia tri quay quanh truc: t3

t =

t3

```

T =

[ cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)), - cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) - sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)), 0, 14*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) + 12*cos(t1)]
[ cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)), cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)), 0, 14*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + 12*sin(t1)]
[
0,
0, 1, 11 + 13]
[
0,
0, 0, 1]

```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)0

```

C =

    1    0    1    0    1    0    1    0

```

Dich chuyen theo truc x : 15

```
dx =
```

```
15
```

Dich chuyen theo truc y : 0

```
dy =
```

```
0
```

Dich chuyen theo truc z : 0

```
dz =
```

```
0
```

```

T =

[ cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)), - cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) - sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)), 0, 14*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) + 12*cos(t1) + 15*cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))]

```

```
[ cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)), cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)), 0, 14*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + 12*sin(t1) + 15*cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)))]
[
0,
0, 1,
11 + 13]
[
0,
0, 0,
1]
```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)

C =

```
1 0 1 0 1 0 1 0
```

Quay quanh tuc nao x/y/z: z

Q =

z

Gia tri quay quanh truc: t4

t =

t4

T =

```
[ cos(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))) - sin(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))), - cos(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))) - sin(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))), 0, 14*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) + 12*cos(t1) + 15*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)))]
[ cos(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))) + sin(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))), cos(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))) - sin(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))), 0, 14*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + 12*sin(t1) + 15*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)))]
```

```
[
0,
0, 1,
11 + 13]
[
0,
0, 0,
1]
```

He truc so Chuyen vi cua he truc, 0/1 (0:Tinh tien, 1:Quay)0

C =

```
1      0      1      0      1      0      1      0
```

Dich chuyen theo truc x : 17

dx =

17

Dich chuyen theo truc y : 16

dy =

16

Dich chuyen theo truc z : -18

dz =

-18

T =

```
[ cos(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2)
cos(t2)*sin(t1))) - sin(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)
(cos(t1)*cos(t2) - sin(t1)*sin(t2))), - cos(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)
*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))) - sin(t4)*(cos(t3)*(cos(t1)
*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))), 0, 14
(cos(t1)*cos(t2) - sin(t1)*sin(t2)) + 12*cos(t1) - 16*(cos(t4)*(cos(t3)*(cos(t1)*si
n(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))) + sin(t4)*(co
s(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*si
n(t1)))) + 17*(cos(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)
*sin(t2) + cos(t2)*sin(t1))) - sin(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))
sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)))) + 15*(cos(t3)*(cos(t1)*cos(t2) - si
n(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)))]
```

```

sin(t1)*sin(t2))) + sin(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)) - sin(t3)*
(cos(t1)*sin(t2) + cos(t2)*sin(t1))), cos(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*
sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))) - sin(t4)*(cos(t3)*(cos(t1)*
sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))), 0, 14*
(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + 12*sin(t1) + 16*(cos(t4)*(cos(t3)*(cos(t1)*cos
(t2) - sin(t1)*sin(t2)) - sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1))) - sin(t4)*(cos
(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin
(t2)))) + 17*(cos(t4)*(cos(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)) + sin(t3)*(cos(t1)*
cos(t2) - sin(t1)*sin(t2))) + sin(t4)*(cos(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2))
sin(t3)*(cos(t1)*sin(t2) + cos(t2)*sin(t1)))) + 15*(cos(t3)*(cos(t1)*sin(t2) + co
s(t2)*sin(t1)) + sin(t3)*(cos(t1)*cos(t2) - sin(t1)*sin(t2)))]
[
0,
0, 1,
11 + 13 - 18]
[
0,
0, 0,
1]

```

ans =

```

[ cos(t1 + t2 + t3 + t4), -sin(t1 + t2 + t3 + t4), 0, 17*cos(t1 + t2 + t3 + t4)
16*sin(t1 + t2 + t3 + t4) + 14*cos(t1 + t2) + 12*cos(t1) + 15*cos(t1 + t2 + t3)]
[ sin(t1 + t2 + t3 + t4), cos(t1 + t2 + t3 + t4), 0, 16*cos(t1 + t2 + t3 + t4)
17*sin(t1 + t2 + t3 + t4) + 14*sin(t1 + t2) + 12*sin(t1) + 15*sin(t1 + t2 + t3)]
[
0, 0, 1]
11 + 13 - 18]
[
0, 0, 0]
1]

```

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