Task 1

Define `text←'three short words'`

Write an expression to count the number of "r"s (`'r'`) in `text`

```
      rs
3
```

Write an expression to count the number of spaces (`' '`) in `text`

```
      spaces
2
```

Write an expression to remove all spaces from `text`

```
      jam
threeshortwords
```

Task 2

Using `text`, write an expression to remove all "e"s and "o":

```
      no_vowels
thr shrt wrds
```

Using text, create this 3 row 5 column matrix:

```
      text_matrix
three
short
words
```

Using `text`, generate this character vector:

```
      text_ends
three words
```

Task 3

An identity matrix is an `n` by `n` matrix with 1s in the diagonal:

```
        id4   a 4 by 4 identity matrix
1 0 0 0
0 1 0 0
0 0 1 0
0 0 0 1
```

Write an expression for `id4` (try to make it as short as possible).

Write an expression to create an identity matrix for any `n`.

Task 4

Define `nums←1 3 0 4 6 3 0 3 3 5`

Write an expression to count the number of 3s in `nums`:

```
      threes
4
```

Write an expression to remove `0`s from `nums`:

```
      no_zeros
1 3 4 6 3 3 3 5
```

Task 5

Write an expression to remove every other number from `nums`:

```
1 0 6 0 3
```

Write an expression to remove every third number from `nums`:

```
1 3 4 6 0 3 5
```

Write an expression to **keep** every third number from `nums`:

```
1 4 0 5
```

Write an expression to keep every n'th number from `nums`. For example, for `n←4`:

```
1 6 3
```

Task 6

These are the temperatures for 7 days, Sunday through Saturday:

```
      t_allweek←11.7 8.6 9.7 14.2 6.7 11.8 9.2
```

Compute the average temperature for the week:

```
      t_mean
10.27142857
```

Round `t_allweek`:

```
12 9 10 14 7 12 9
```

Round `t_mean` to 1 decimal:

```
10.3
```

Task 7

How many days had a temperature between 8.0 and 10.0 degrees?

```
     temperate_days
3
```

Which days (1: Sunday, 2: Monday, ... , 7: Saturday) had a temperature between 8.0 and 10.0 degrees?

```
     temperate_days
2  3  7
```

Task 8

How much did the temperature change from each day to the next?

```
      t_change
¯3.1 1.1 4.5 ¯7.5 5.1 ¯2.6
      ⍴t_change
6
```

What is the average for each day with the next day ("2-day moving average")?

```
      smooth
10.15 9.15 11.95 10.45 9.25 10.5
      ⍴smooth
6
```

Task 9

Define:

```
daynames←5 3⍴'MonTueWedThuFri'
prices←3.50 7.99 4.25
sales←5 3⍴1 4 8 3 6 4 7 0 0 2 8 0 0 6 2
```

Select days where at least 2 different types of products were sold:

```
Mon
Tue
Thu
Fri
```

Task 10

Select days where less than 10 items total were sold:

```
Wed
Fri
```

Select the day that had the most profit:

```
Tue
```

Labelling the products 1, 2, and 3, which product made the most money this week?

```
2
```

Task 11

Select days where profit was below 30 or above 70

```
outliers
Tue
Wed
Thu
```

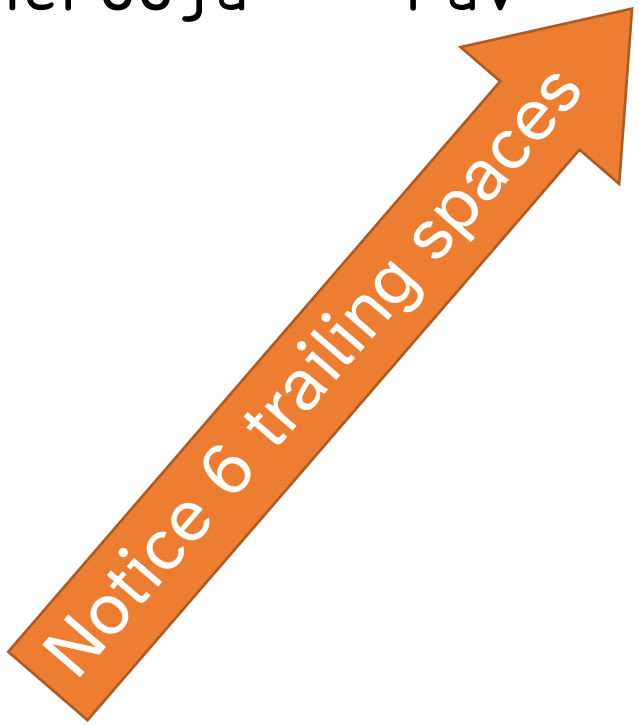
Select days where we sold at least 2 distinct products, and profit was under 60.

```
Fri
```

Task 12

Define `names` and `new_name`

```
names←5 9⍴'Hardeep  Ben       KatherinePooja    Pav       '
new_name ← 'David'
```



Catenate `new_name` below `names`
(you'll have to adjust the width of new_name) :

```
Hardeep
Ben
Katherine
Pooja
Pav
David
```

Task 13

Use take (↑) and/or drop (↓) to isolate the middle two names from names:

```
      middle_names
Katherine
Pooja
```

Use compress-first (⌿) to isolate the middle two names from names:

```
      middle_names
Katherine
Pooja
```

Task 14

Use take (↑) and/or drop (↓) and catenate-first (,) to **remove** the middle two names from names:

```
      middle_names
Katherine
Pooja
```

Use compress-first (⌿) to remove the middle two names from names:

```
      middle_names
Katherine
Pooja
```

Task 15 (bonus task)

Given a matrix of `names` of unknown size:

```
      ⍴⍴names   ⍝ a matrix has rank 2
2
```

And the character vector `new_name` of unknown length:

```
      ⍴⍴new_name   ⍝ a vector has rank 1
1
```

write an expression to catenate `new_name` to the **top** of `names`.

For example, if...

```
      names←2 3⍴'RamRaj'
      new_name←'Hardeep'
```

... the result should be:

```
Hardeep
Ram
Raj
```

For example, if...

```
      names←2 6⍴'Viti  Prisha'
      new_name←'Sai'
```

... the result should be:

```
Sai
Vita
Prisha
```