Lists: Indexing and Slicing

List as an Object

	0	1	2	3	4	5	6	7	8	9	
[	‘M’,	‘o’,	‘z’,	‘z’,	‘a’,	‘r’,	‘e’,	‘l’,	‘l’,	‘a’	]
	−10	−9	−8	−7	-6	−5	−4	−3	−2	−1	

```
>>> x = [‘M’,‘o’,‘z’,‘z’,‘a’,‘r’,‘e’,‘l’,‘l’,a’]
>>> x.index(‘r’)
>>> 5
```

- list is an object
- what are list attributes?

variable name	delimiter	attribute	arguments
x	.	index	(‘r’)

Indexing for List Slicing

- each element is identified by its position
- slice – elements between two positions

```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
```

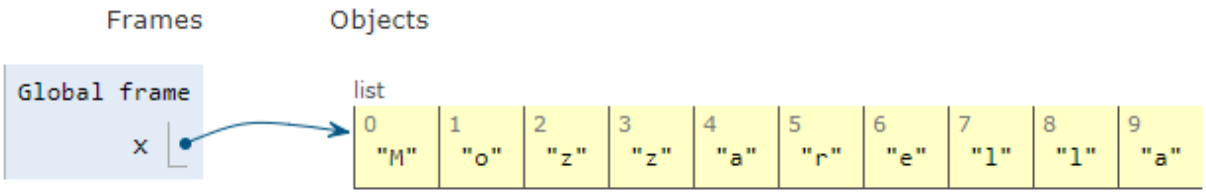
	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

- indexing starts at 0, ends at (length – 1)
- can refer to slices but positive or negative indices

List Slicing

	0	1	2	3	4	5	6	7	8	9	
[	‘M’,	‘o’,	‘z’,	‘z’,	‘a’,	‘r’,	‘e’,	‘l’,	‘l’,	‘a’	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

>>> x = [‘M’,‘o’,‘z’,‘z’,‘a’,‘r’,‘e’,‘l’,‘l’,a’]



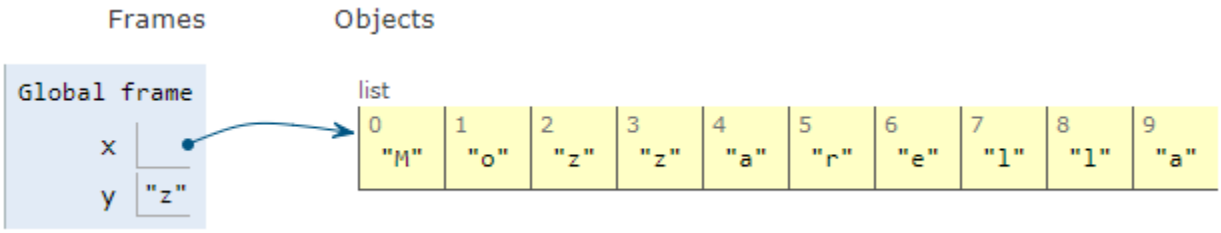
- slice operator:

variable	[	start	:	one past end	]
x		i		j	

Slicing with Single Index

	0	1	2	3	4	5	6	7	8	9	
[	‘M’,	‘o’,	‘z’,	‘z’,	‘a’,	‘r’,	‘e’,	‘l’,	‘l’,	‘a’	]
	−10	−9	−8	−7	-6	−5	−4	−3	−2	−1	

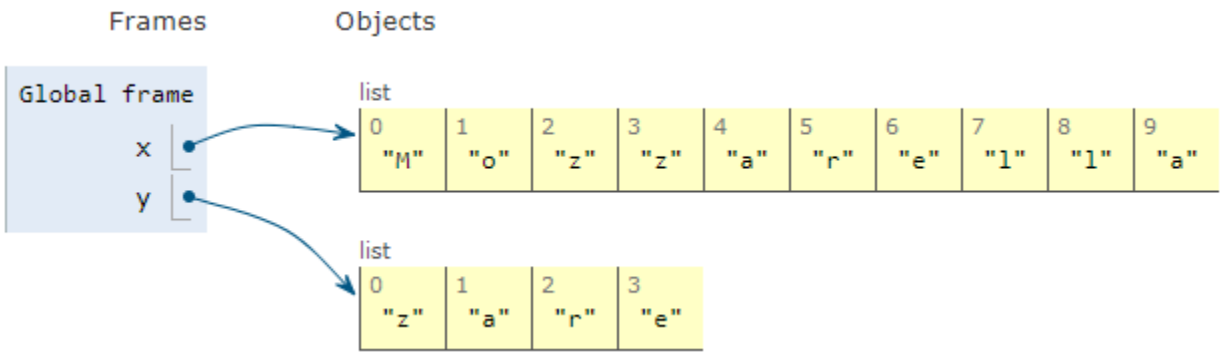
```
>>> x = [‘M’,‘o’,‘z’,‘z’,‘a’,‘r’,‘e’,‘l’,‘l’,a’]
>>> y = x[2]
>>> y
>>> z
```



Slicing with Positive Indices

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

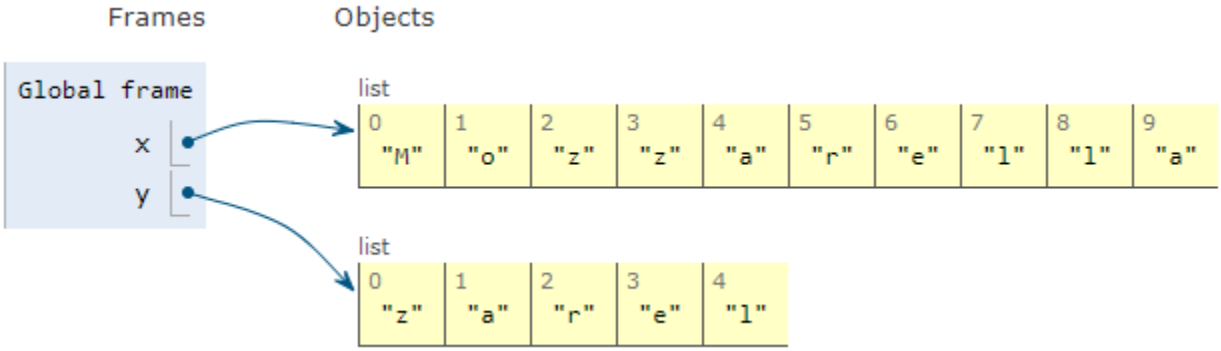
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[3 : 7]
>>> y
>>> [  'z', 'a', 'r', 'e' ]
```



Slicing w. Negative Indices

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

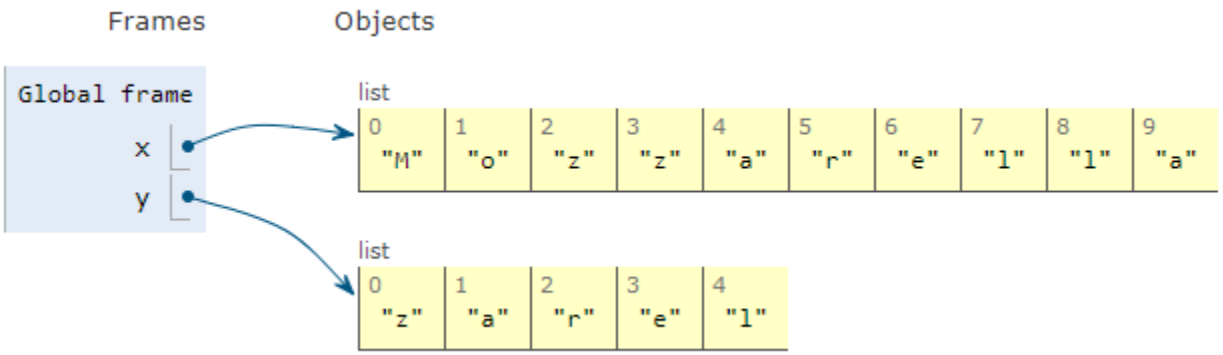
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[−7 : −2]
>>> y
>>> [ 'z', 'a', 'r', 'e', 'l' ]
```



Slicing with Positive and Negative Indices

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

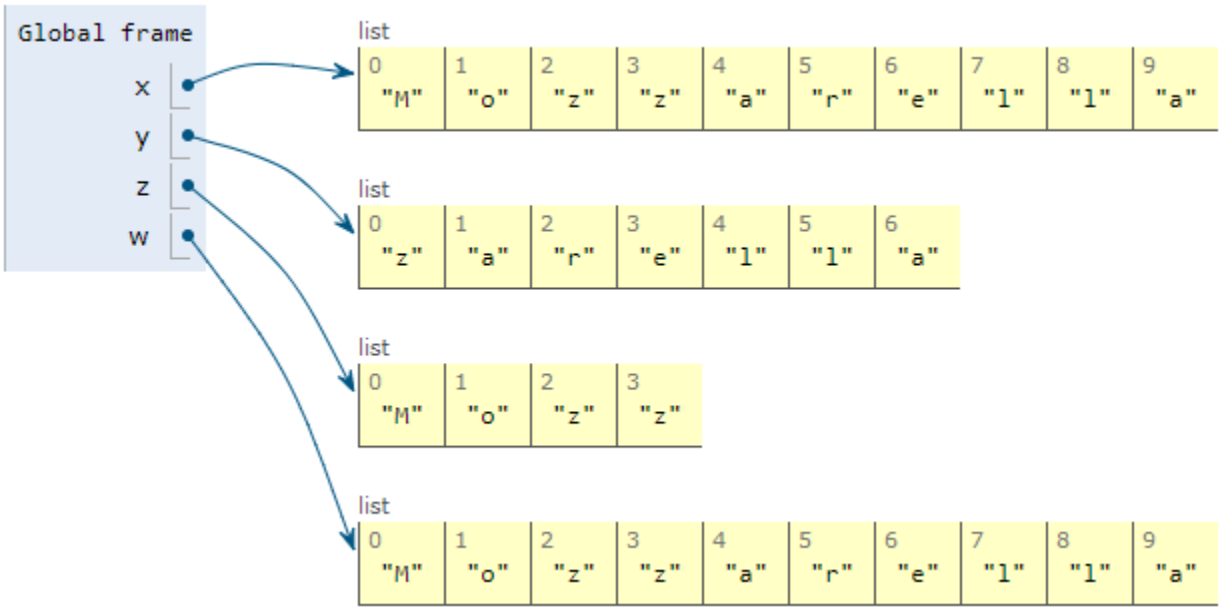
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[3 : −2]
>>> y
>>> [ 'z', 'a', 'r', 'e', 'l' ]
```



List Slicing w/o Start/End

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

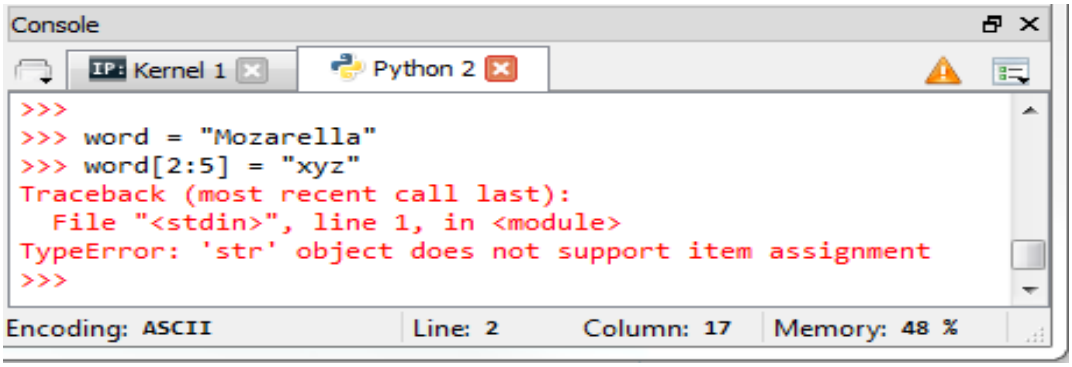
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[3 : ]
>>> z = x[ : 4]
>>> w = x[ : ]
```



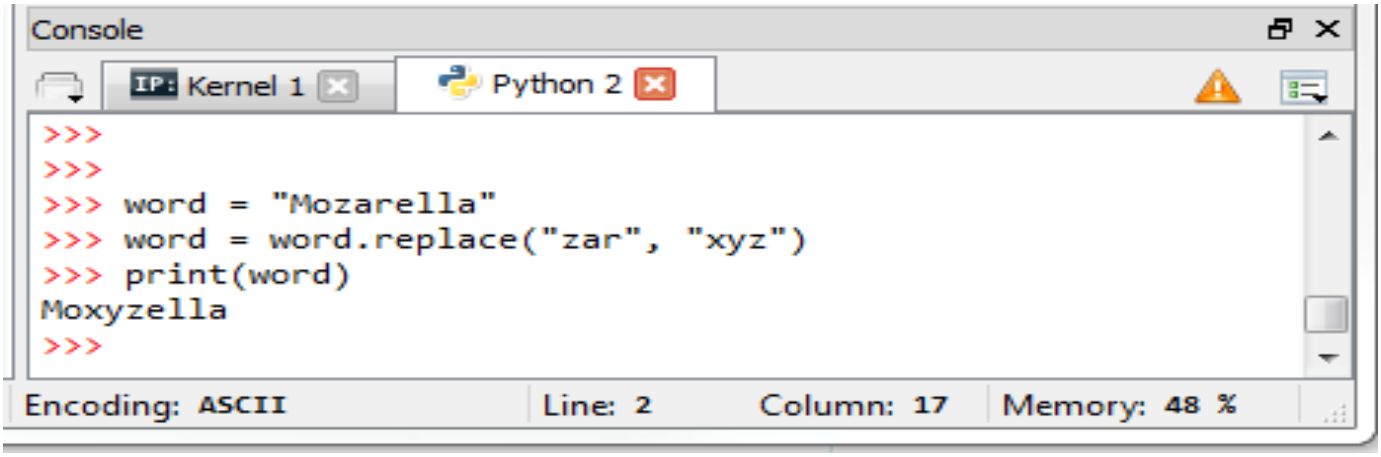
Valid vs. Invalid Slicing

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	-6	−5	−4	−3	−2	−1	

- why is this not legal?



- why is legal!



List Slicing: Quiz

	0	1	2	3	4	5	6	7	8	9	
[	‘M’,	‘o’,	‘z’,	‘z’,	‘a’,	‘r’,	‘e’,	‘l’,	‘l’,	‘a’	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

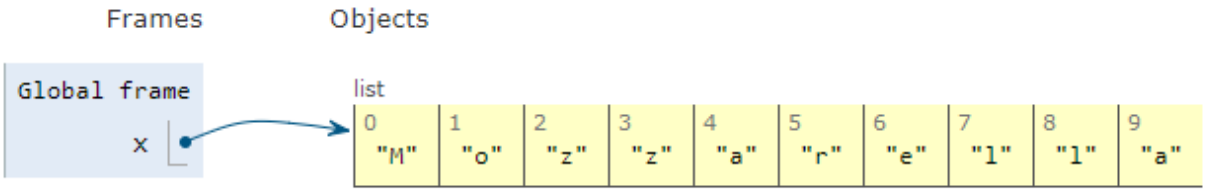
- what is the result of these operations?

```
>>> x = [‘M’,‘o’,‘z’,‘z’,‘a’,‘r’,‘e’,‘l’,‘l’,a’]
>>> y = x[−1]
>>> z = x[2 : 6]
>>> w = x[−7 : −3]
>>> v = x[ : ]
```

List Slicing: Quiz (cont'd)

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

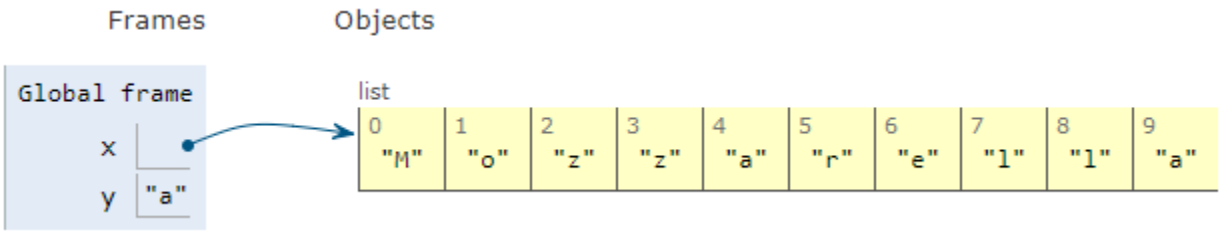
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
```



List Slicing: Quiz (cont'd)

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

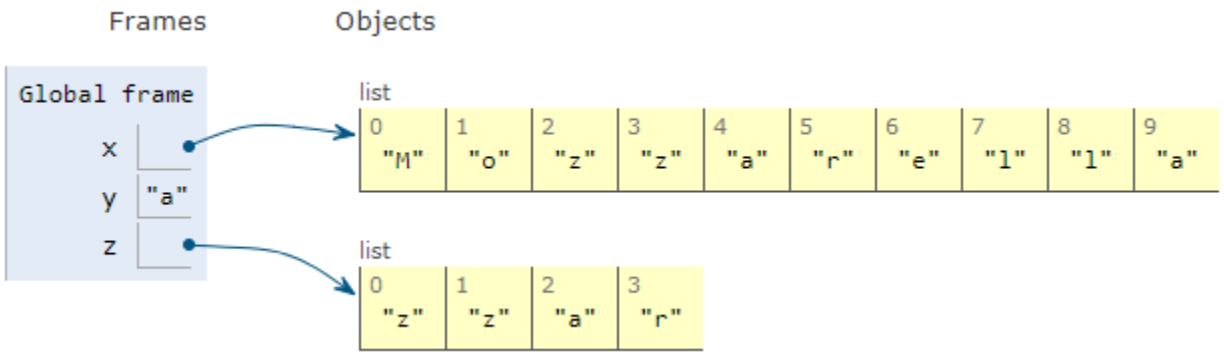
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[−1]
>>> a
```



List Slicing: Quiz (cont'd)

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

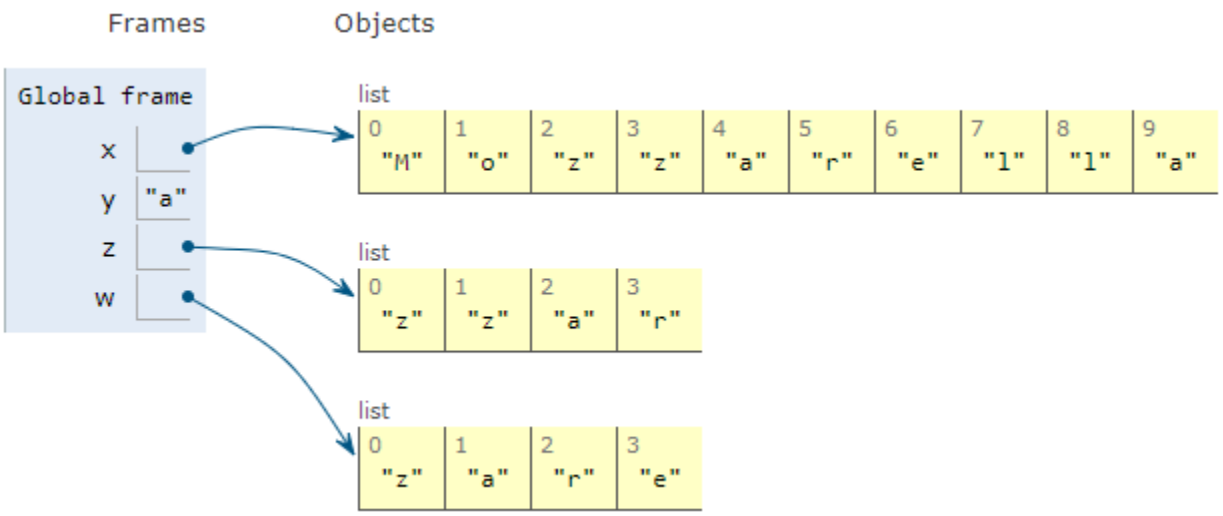
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[−1]
>>> z = x[2 : 6]
```



List Slicing: Quiz (cont'd)

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

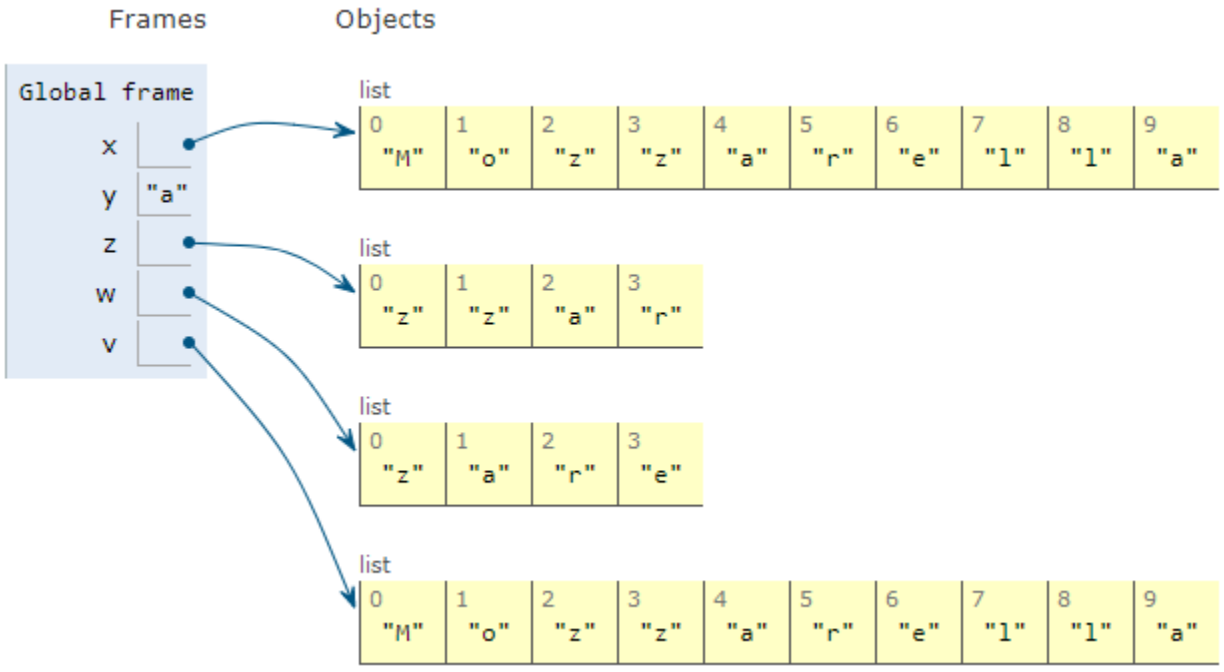
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[−1]
>>> z = x[2 : 6]
>>> w = x[−7 : −3]
```



List Slicing: Quiz (cont'd)

	0	1	2	3	4	5	6	7	8	9	
[	'M',	'o',	'z',	'z',	'a',	'r',	'e',	'l',	'l',	'a'	]
	−10	−9	−8	−7	−6	−5	−4	−3	−2	−1	

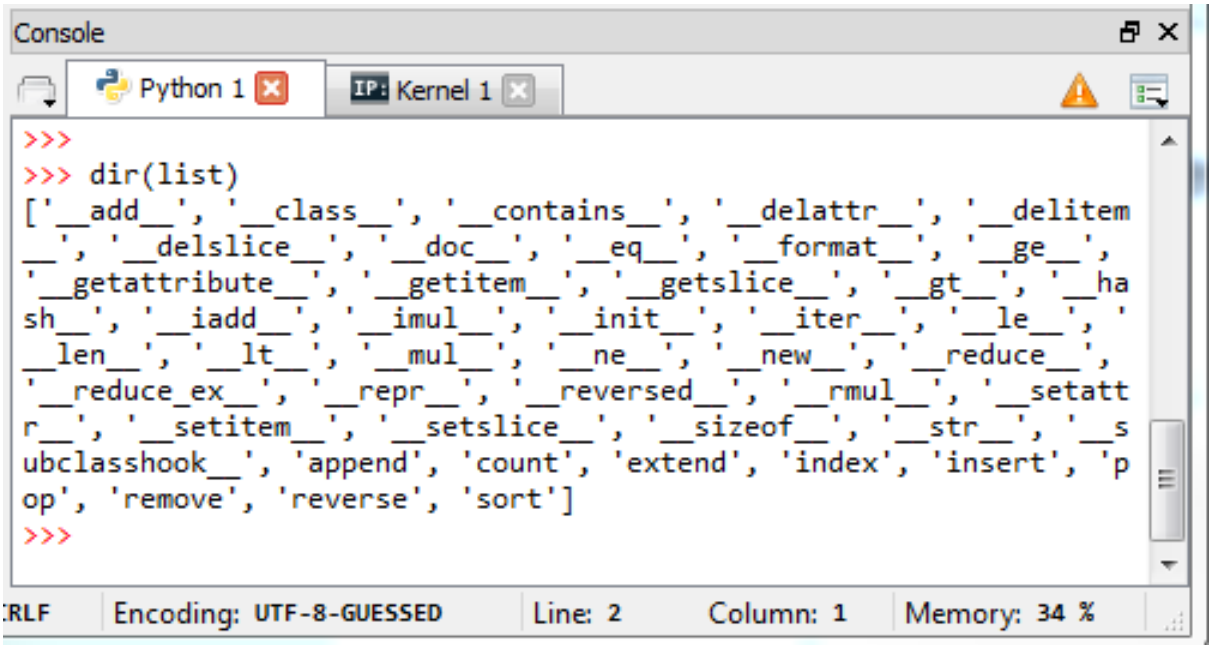
```
>>> x = ['M','o','z','z','a','r','e','l','l',a']
>>> y = x[−1]
>>> z = x[2 : 6]
>>> w = x[−7 : −3]
>>> v = x[ : ]
```



- example of a "shallow" copy

List Attributes

- use dir(list) command



- names starting with __ refer to “local” class names/methods

Review Problems

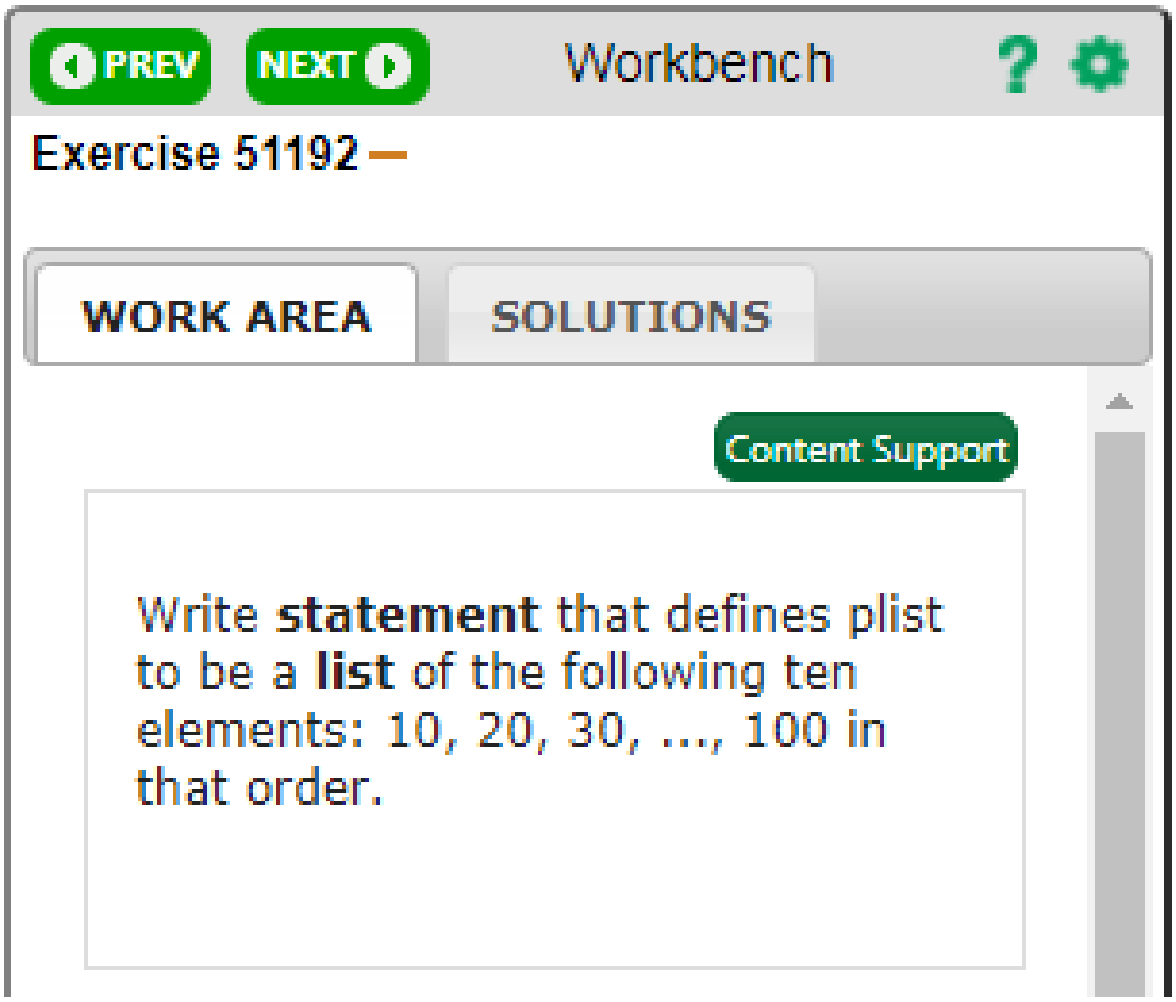
Interview Problem

- write a *for* loop to print elements in list and their positions

Interview Problem

- convert a list into other data types

Programming Exercise



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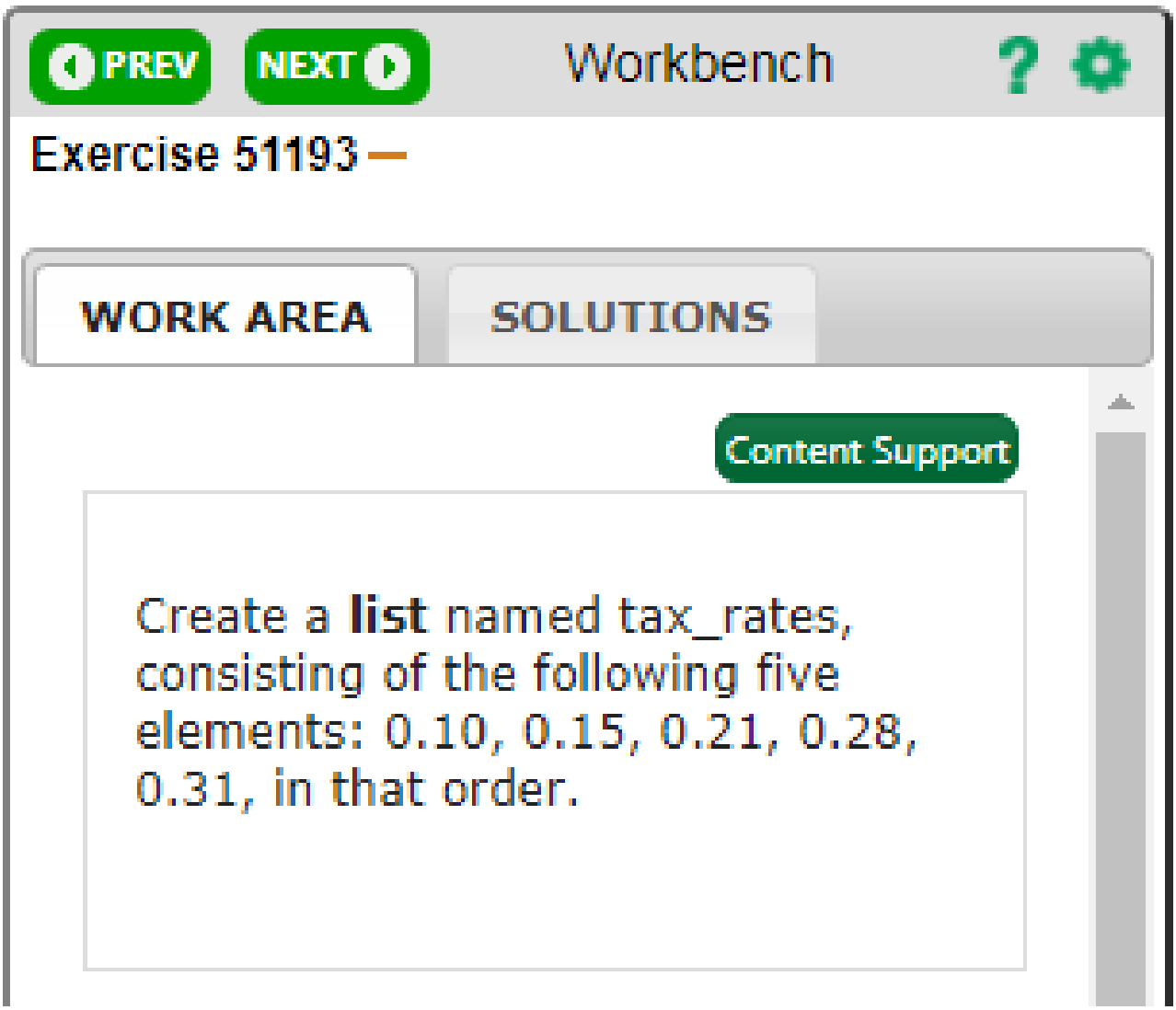
Programming Exercise



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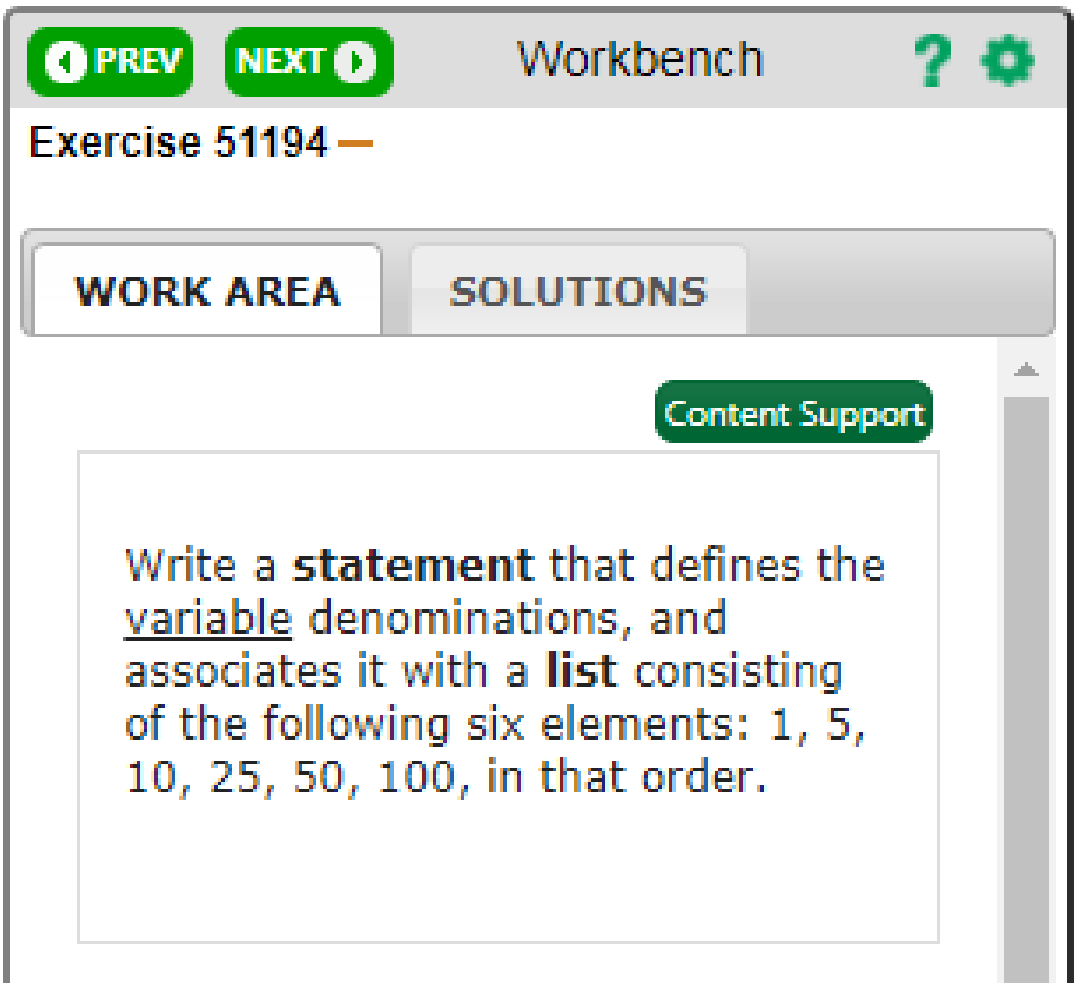

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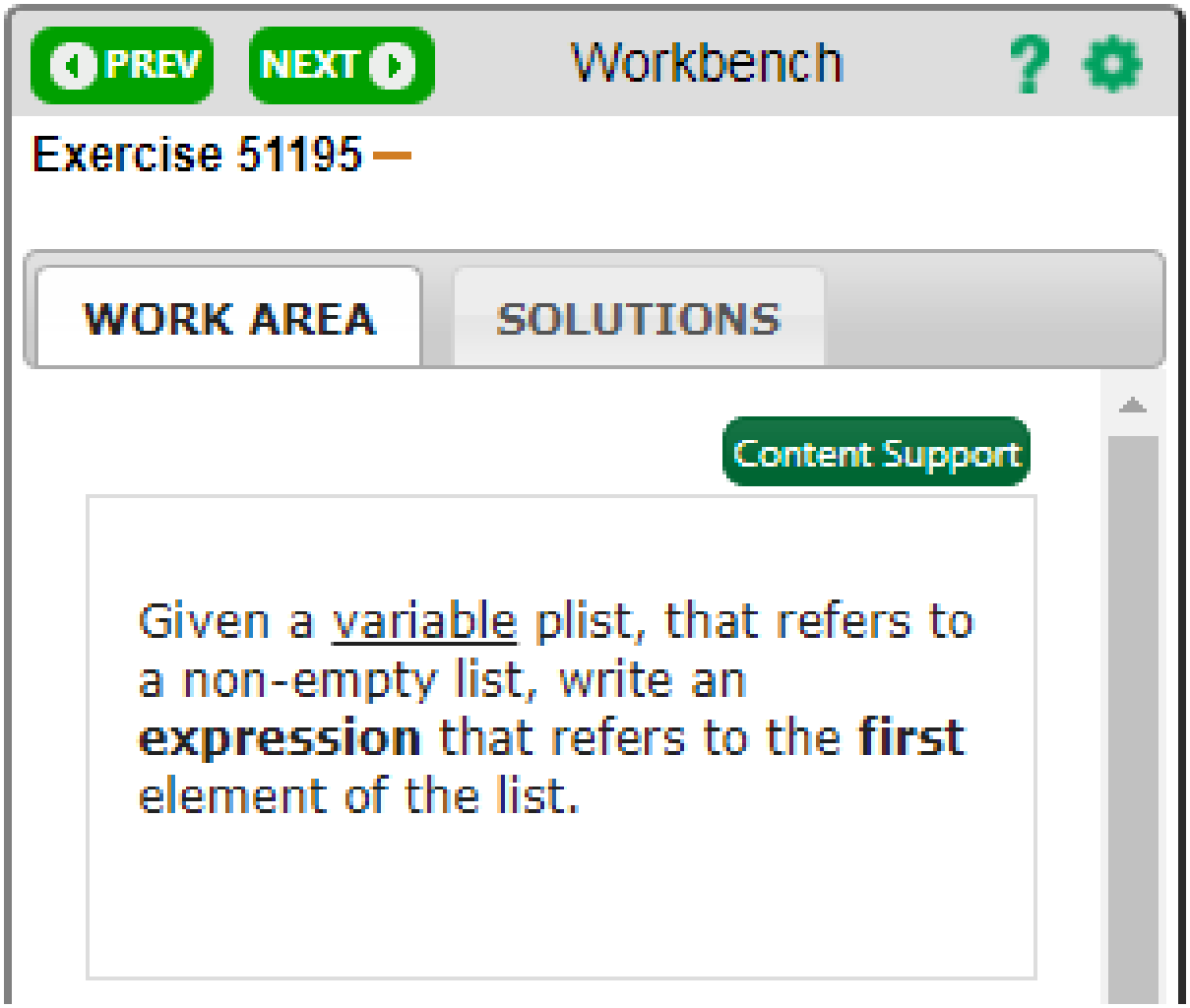

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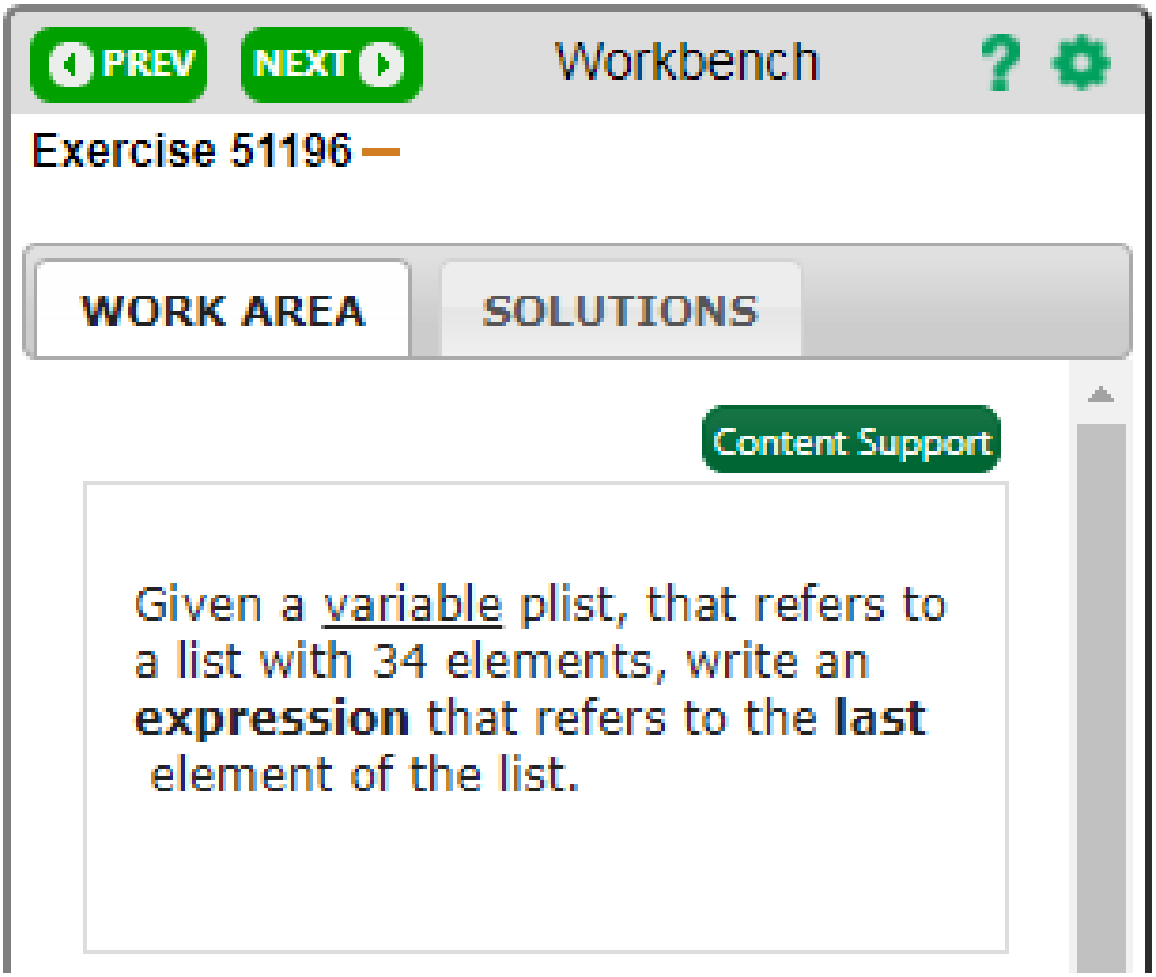

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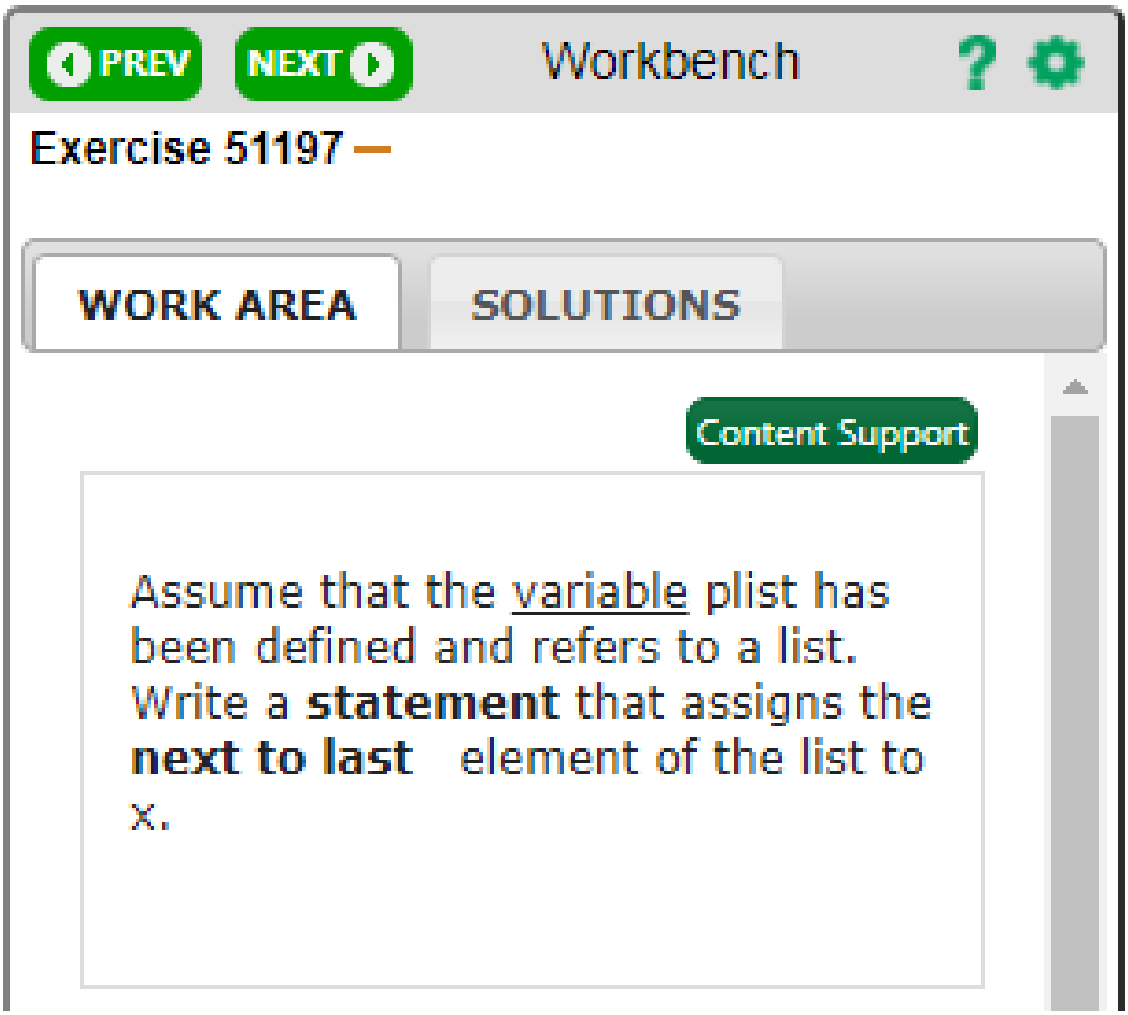

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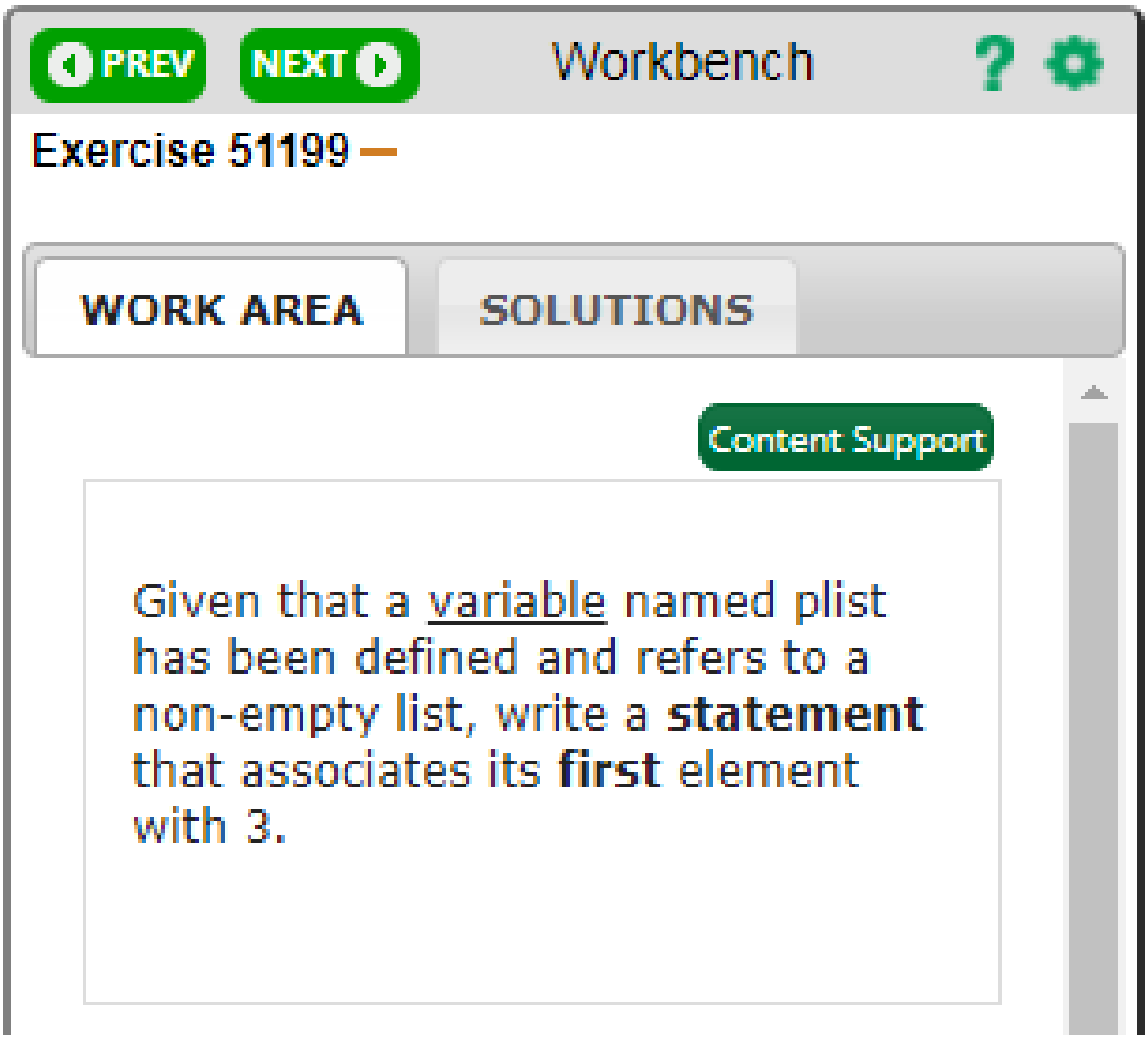

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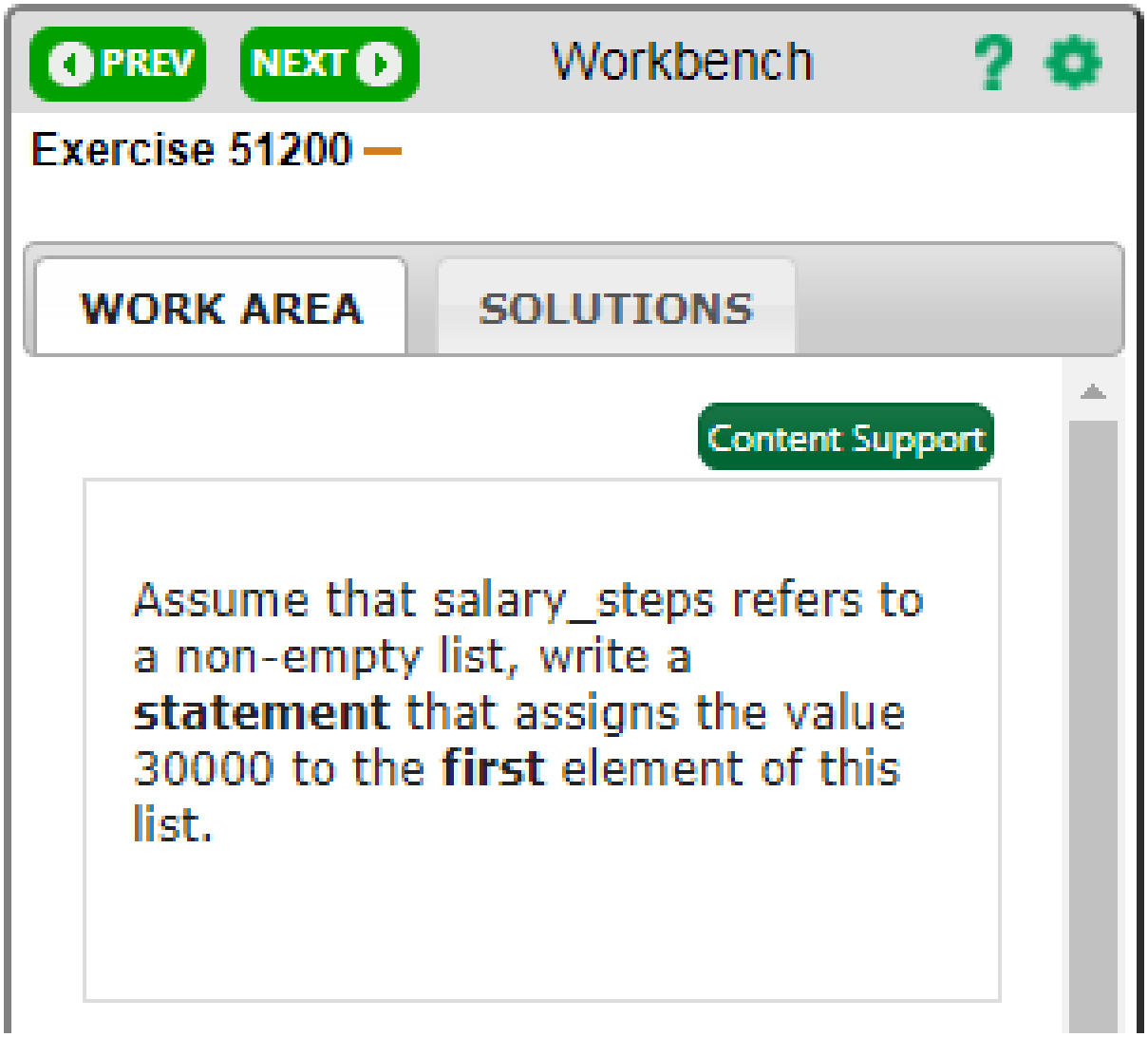

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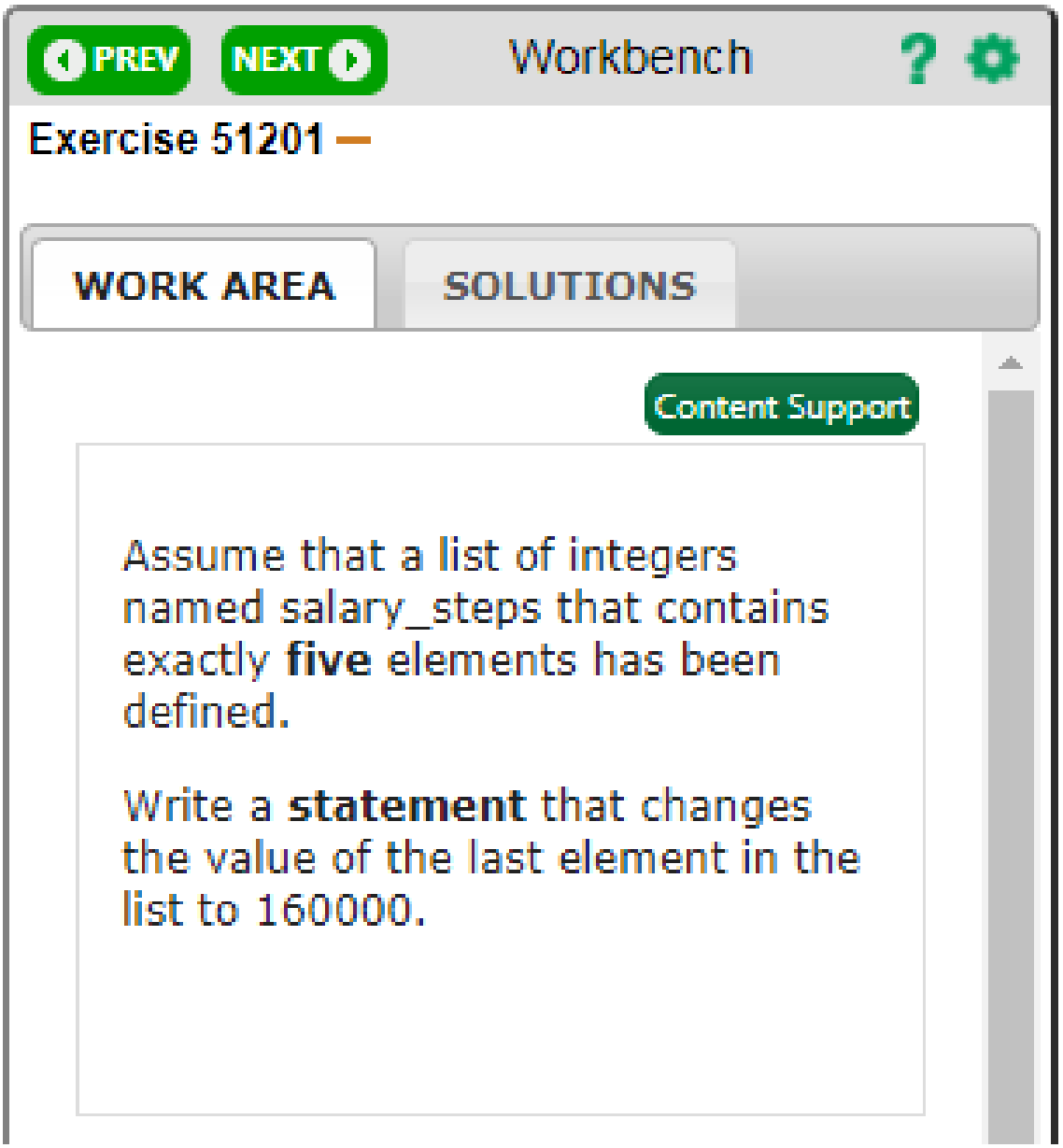

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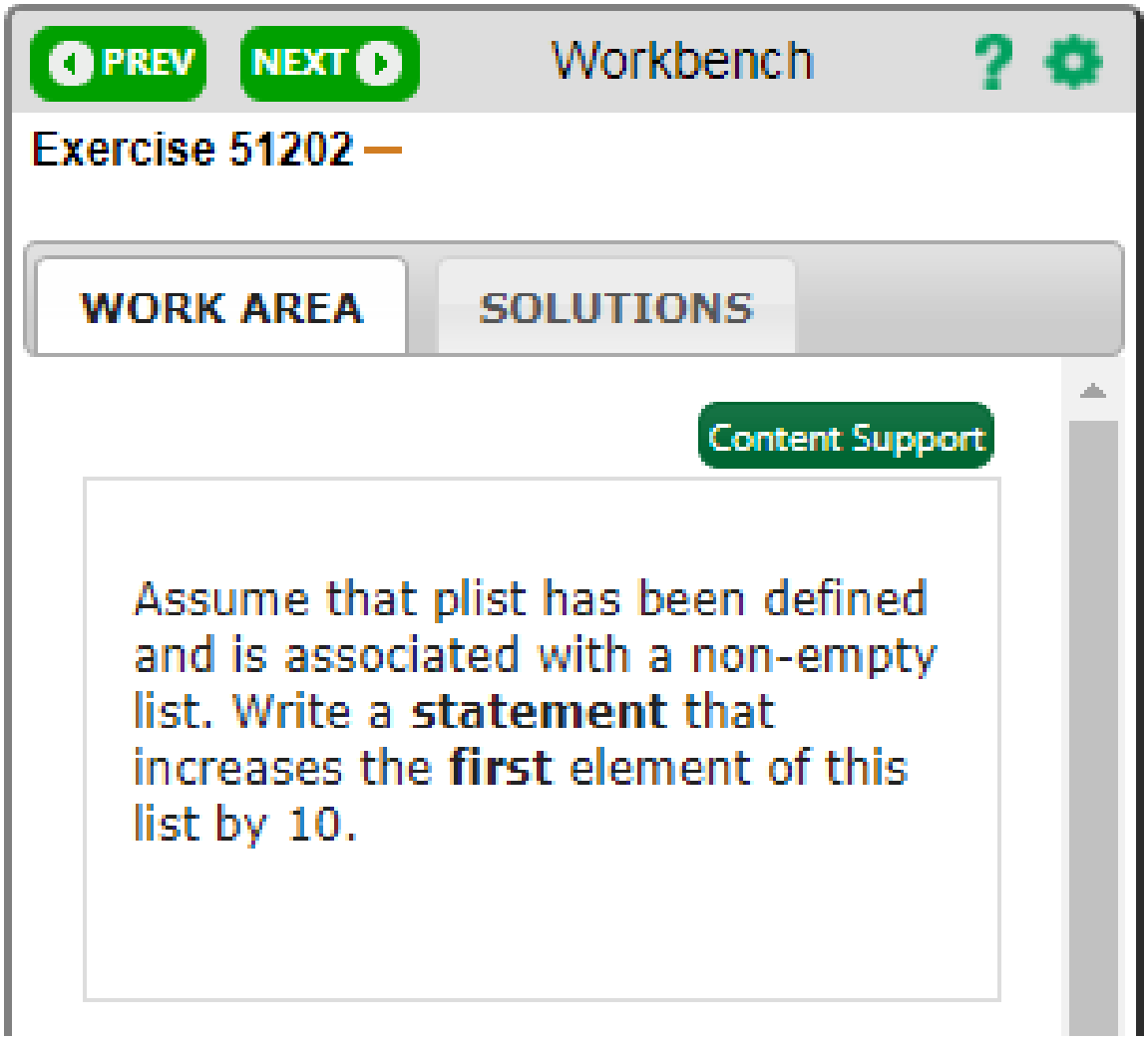

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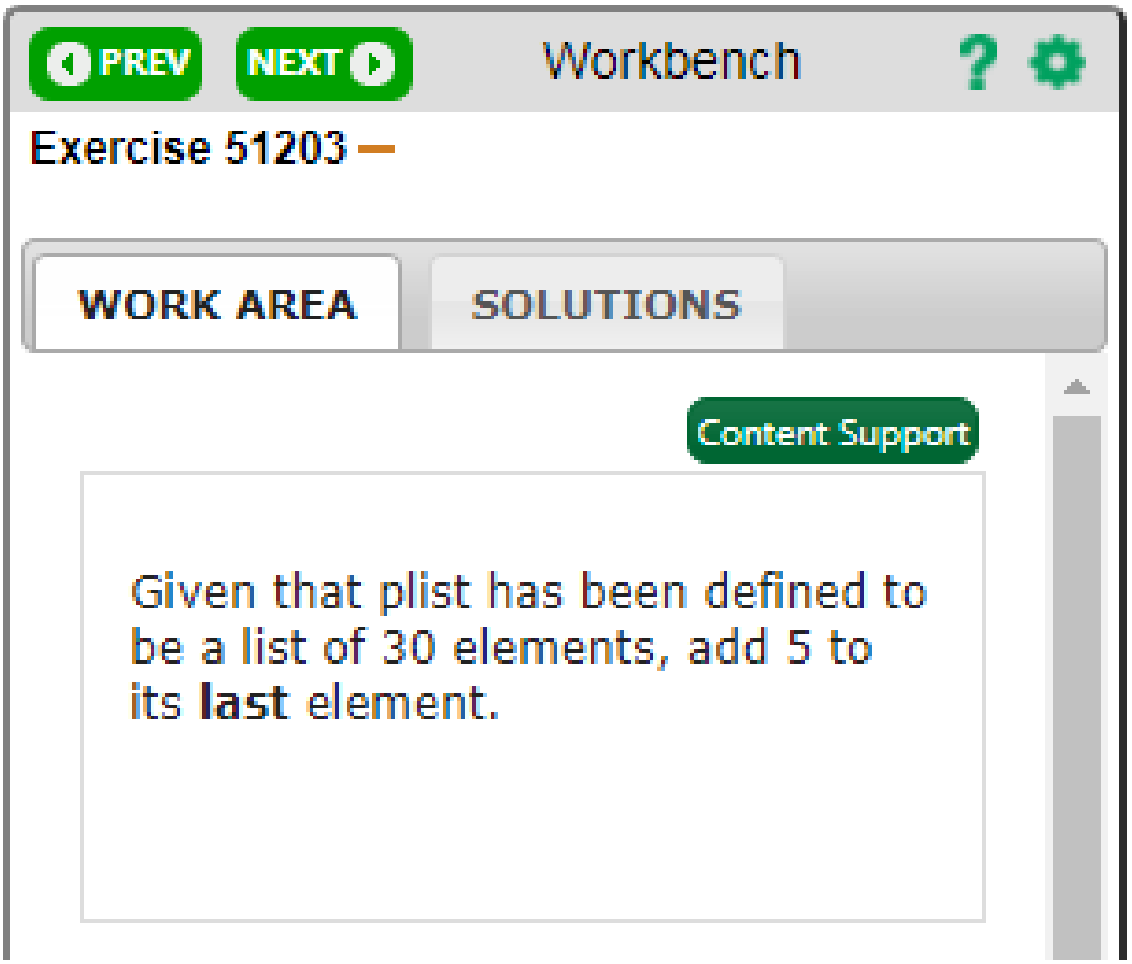

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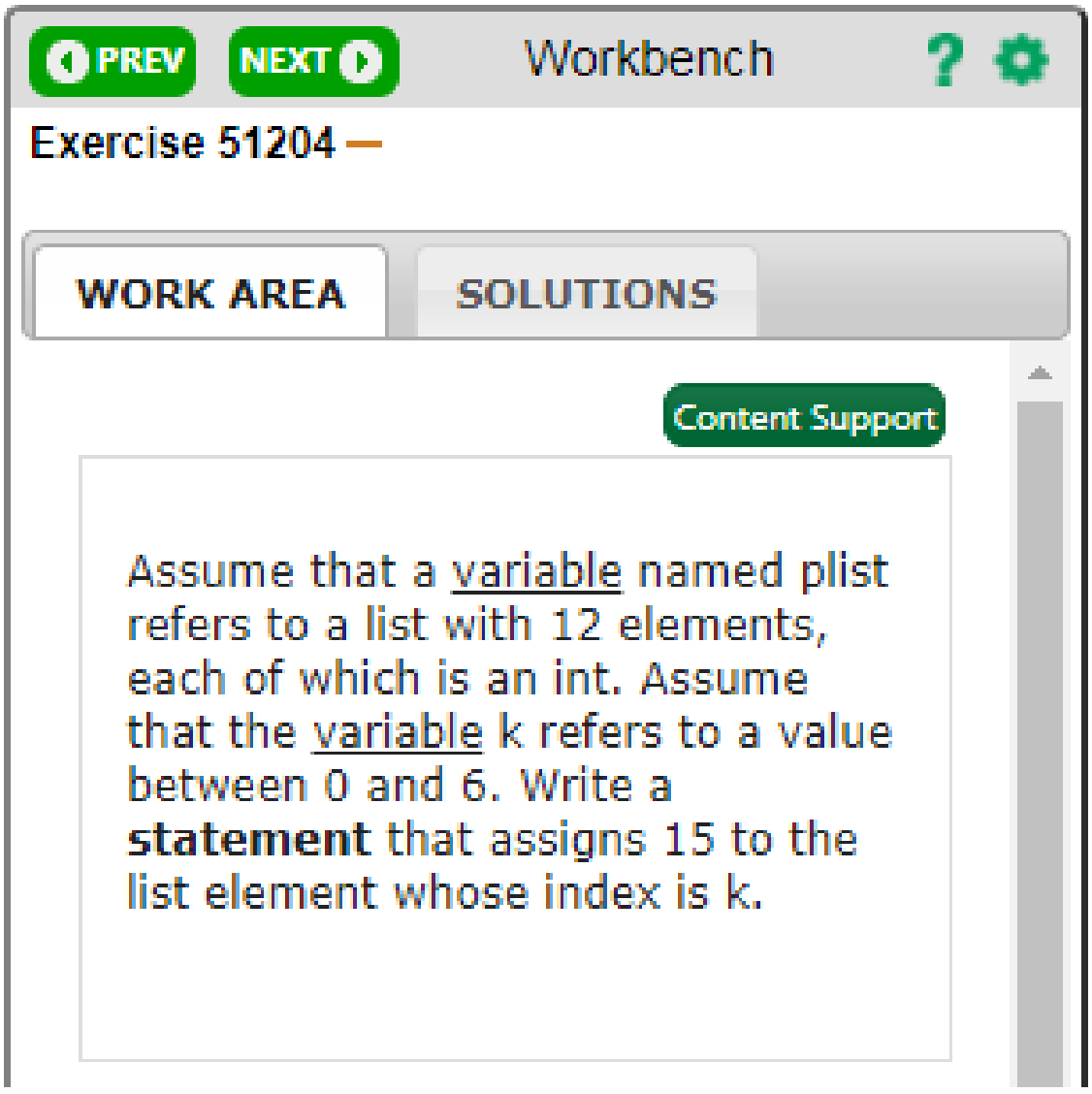

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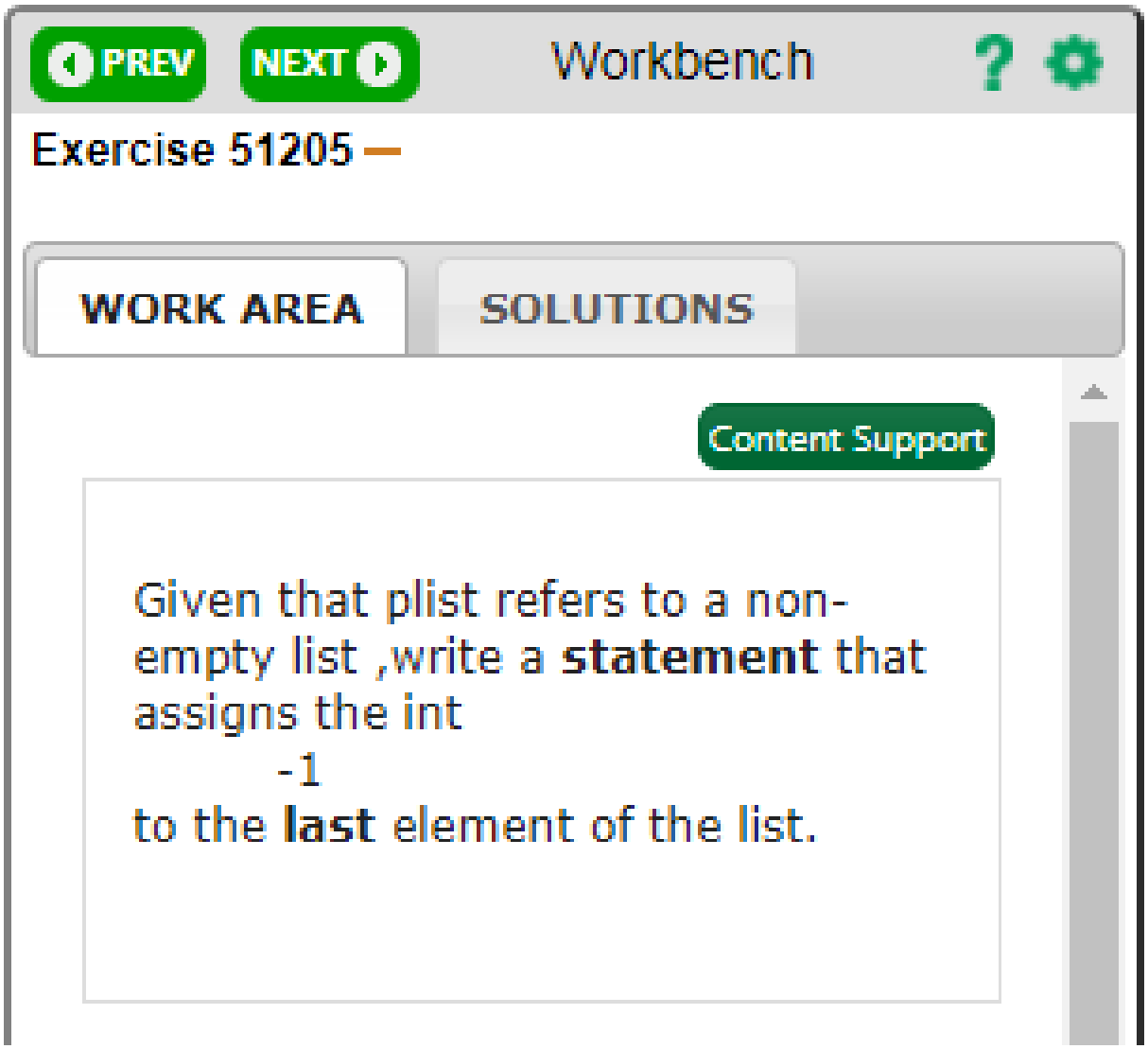

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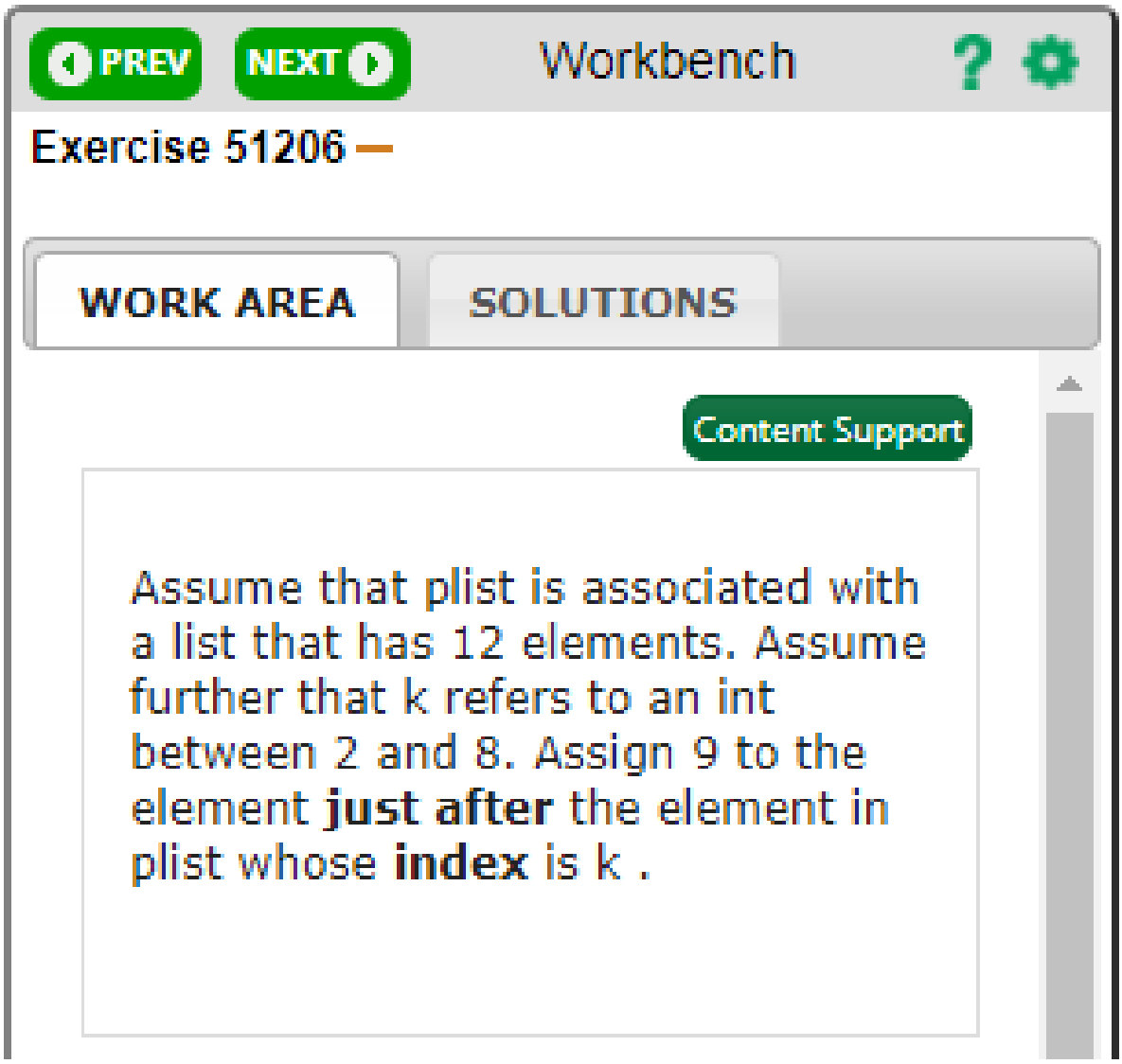

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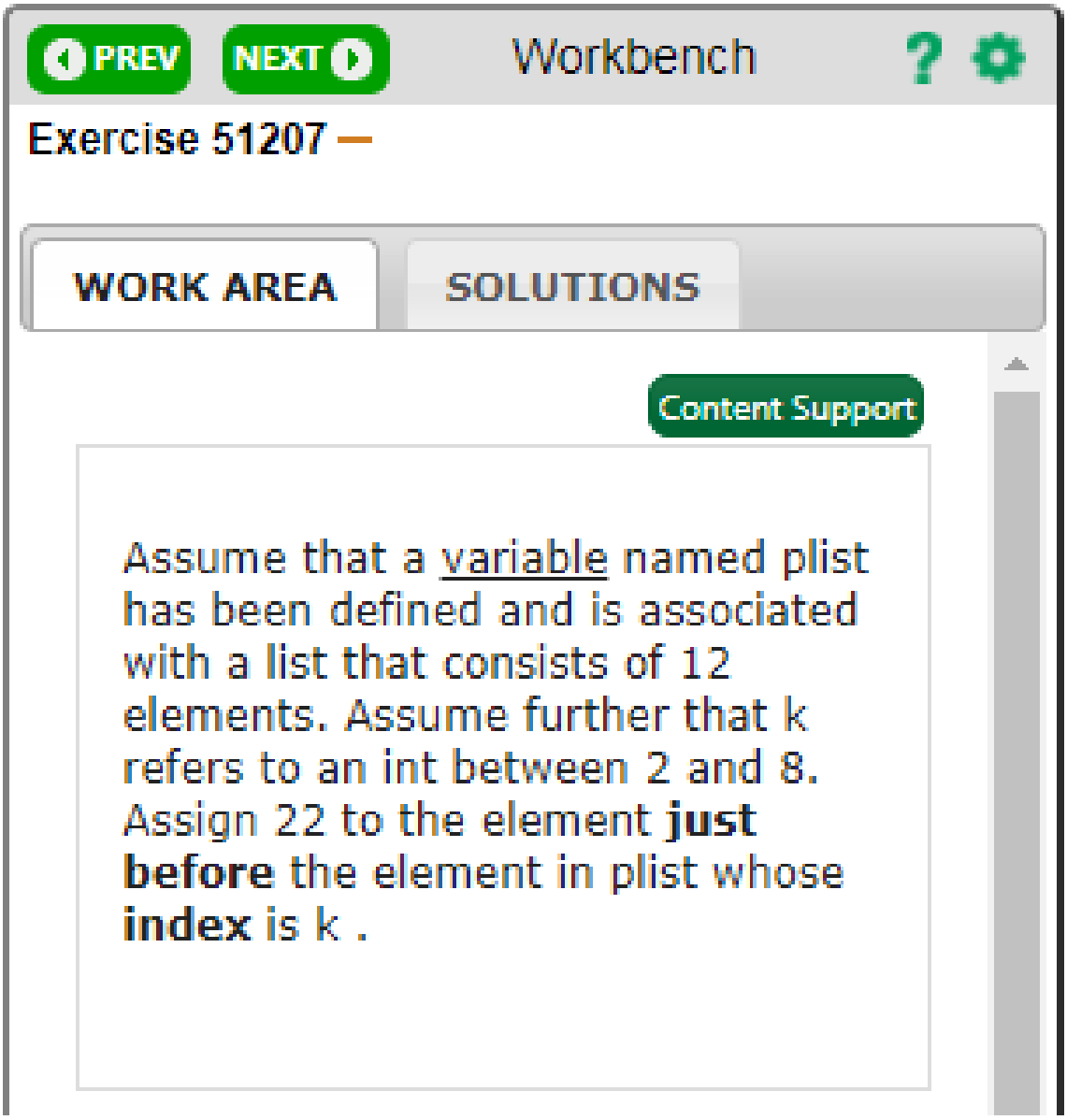

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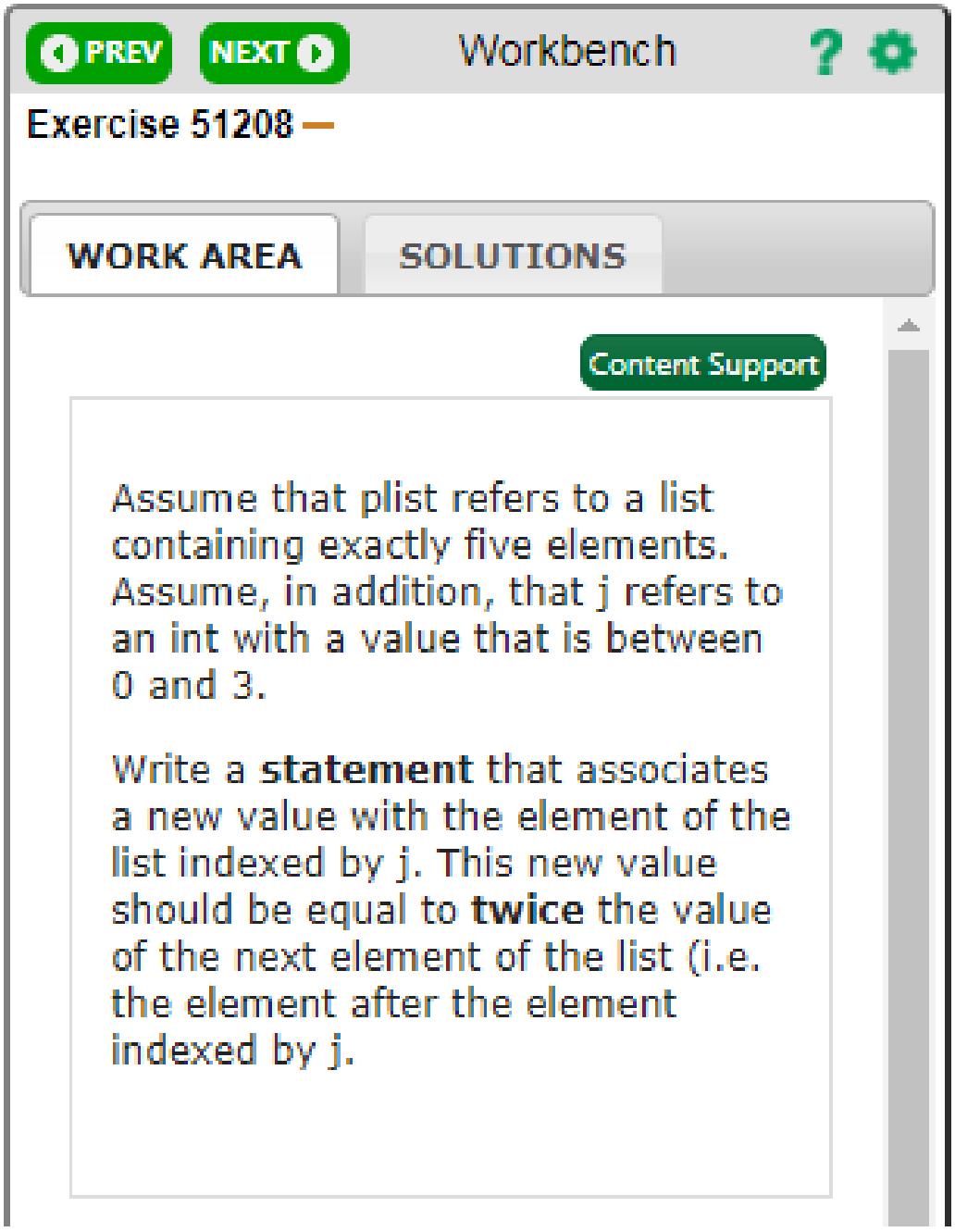

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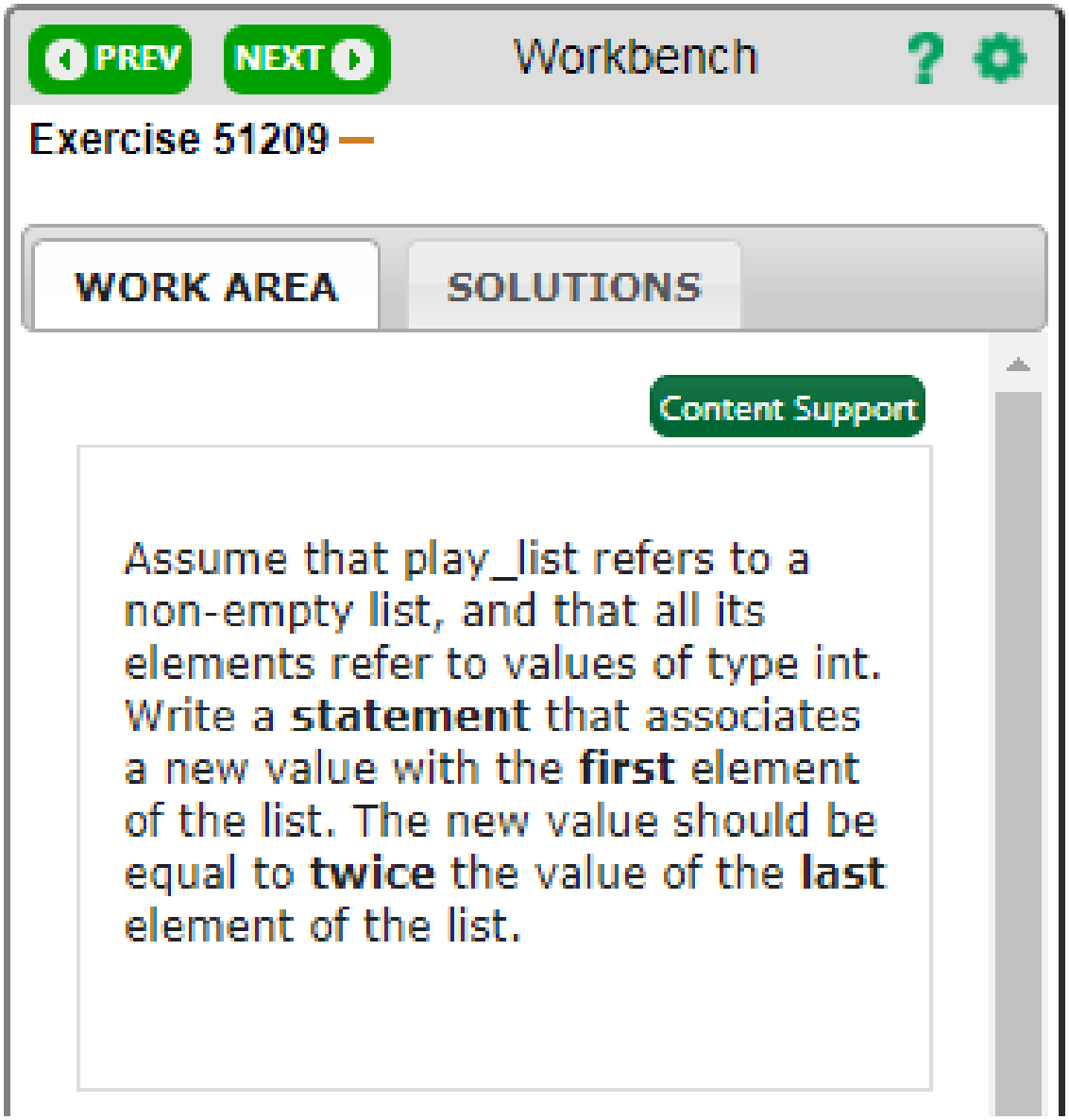

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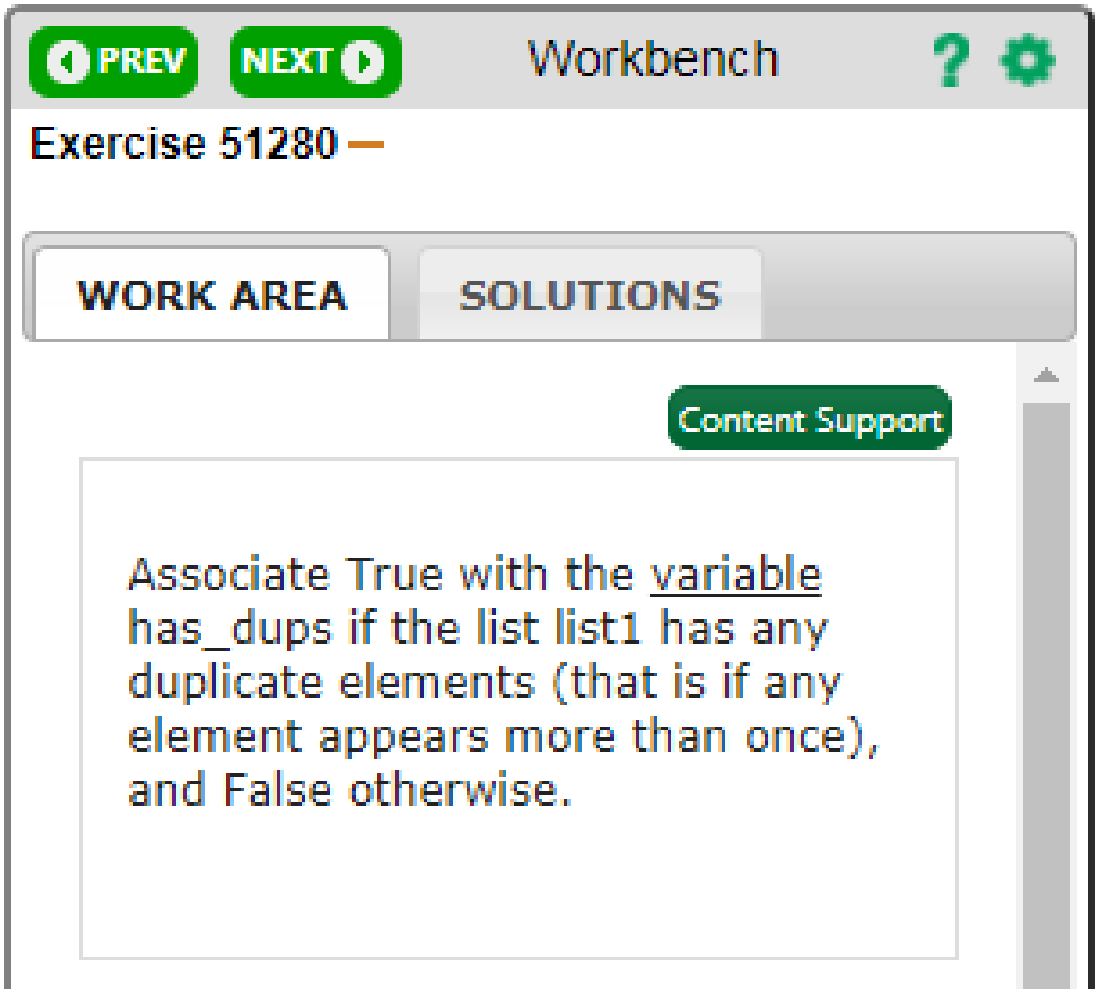

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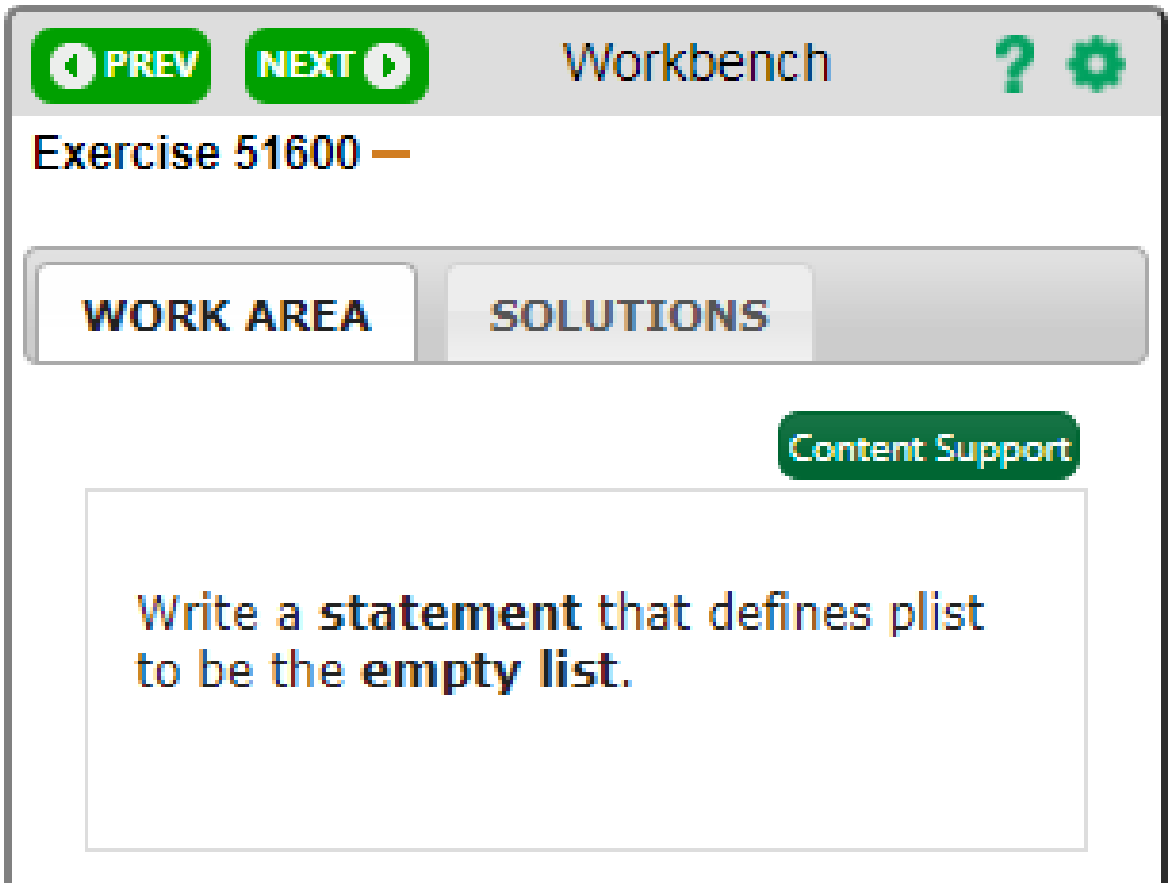

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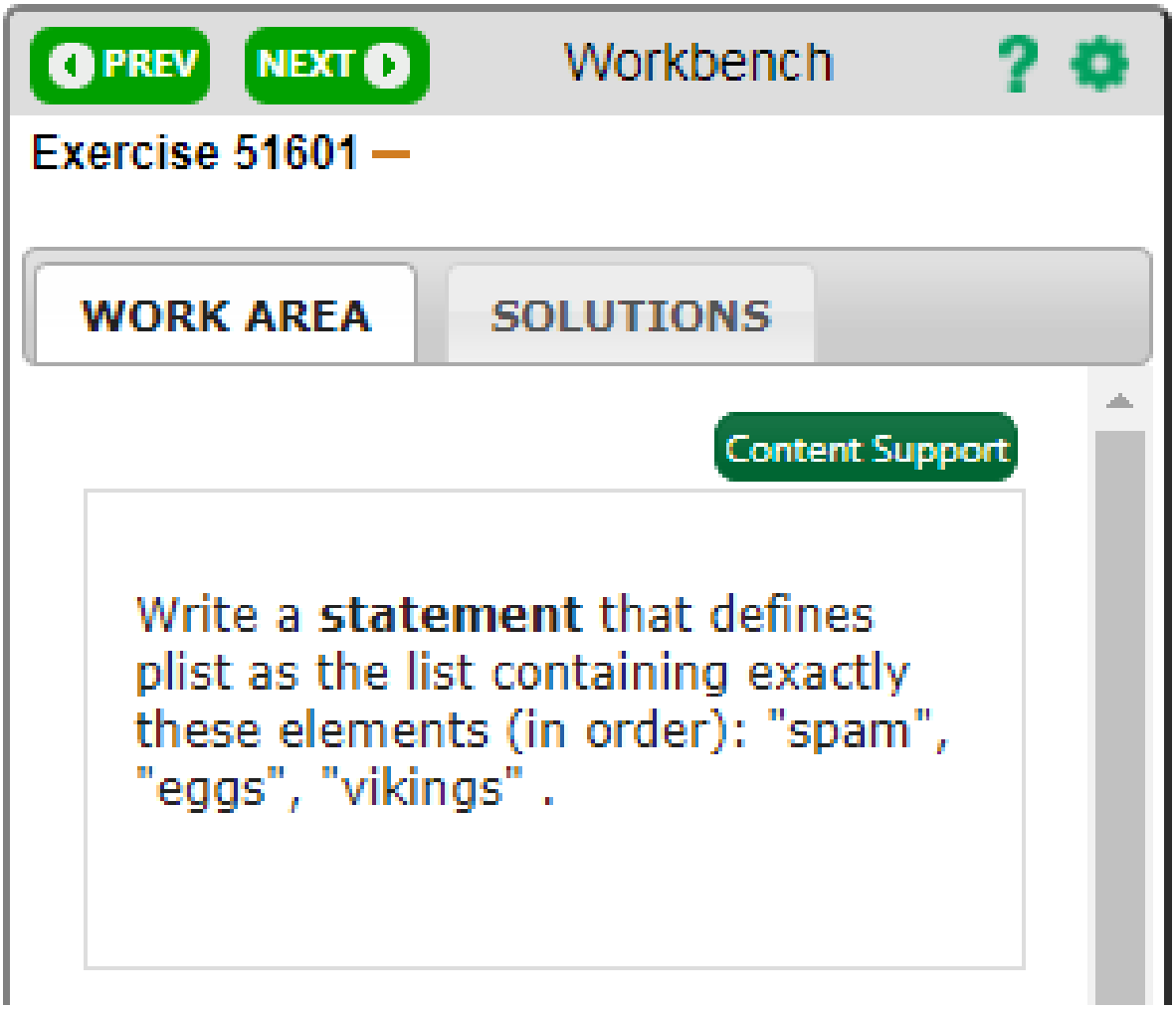
Programming Exercise



Programming Exercise Worksheet

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