Science & Technology Facilities Council | UK Research and Innovation | NERC SCIENCE OF THE ENVIRONMENT

Python

Slicing

Centre for Environmental Data Analysis
SCIENCE AND TECHNOLOGY FACILITIES COUNCIL
NATURAL ENVIRONMENT RESEARCH COUNCIL

software carpentry

National Centre for Atmospheric Science
NATURAL ENVIRONMENT RESEARCH COUNCIL

National Centre for Earth Observation
NATURAL ENVIRONMENT RESEARCH COUNCIL

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Can also be *sliced* using a range of indices

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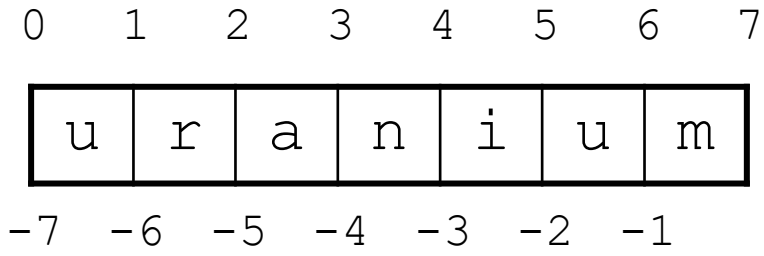
```
>>> element = 'uranium'
>>>
```



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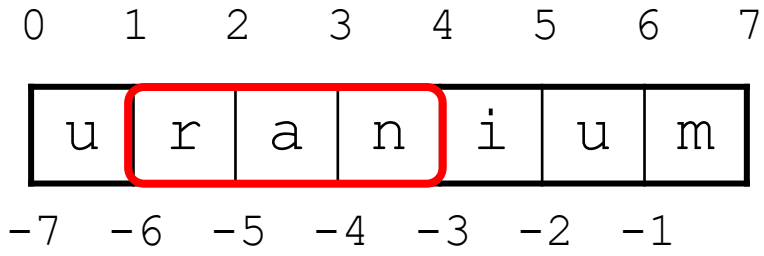
Can be indexed by integers in the range `0…len(X)-1`

Can also be *sliced* using a range of indices

```
>>> element = 'uranium'
>>> print(element[1:4])
ran
>>>
```



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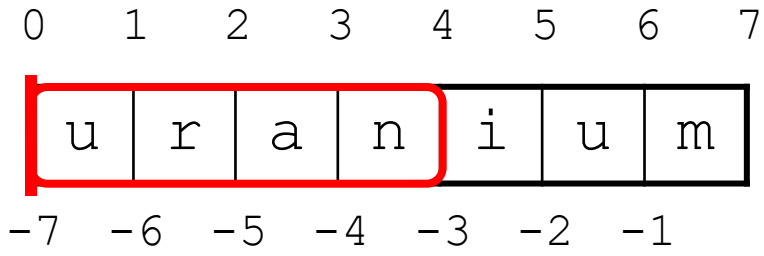
Can also be *sliced* using a range of indices

```
>>> element = 'uranium'
>>> print(element[1:4])
ran
>>> print(element[:4])
uran
>>>
```



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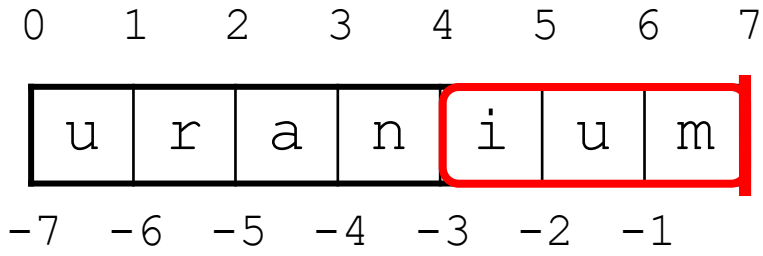
Can also be *sliced* using a range of indices

```
>>> element = 'uranium'
>>> print(element[1:4])
ran
>>> print(element[:4])
uran
>>> print(element[4:])
ium
>>>
```



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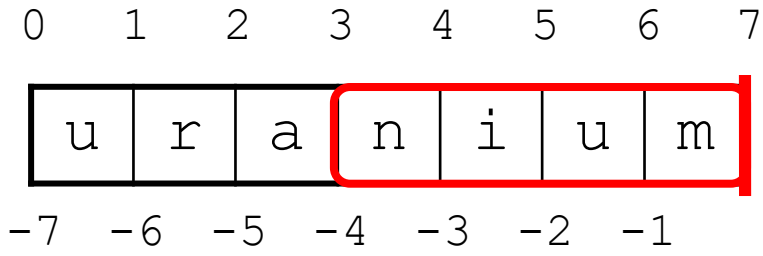
Can be indexed by integers in the range `0…len(X)-1`

Can also be *sliced* using a range of indices

```
>>> element = 'uranium'
>>> print(element[1:4])
ran
>>> print(element[:4])
uran
>>> print(element[4:])
ium
>>> print(element[-4:])
nium
>>>
```



Python checks bounds when indexing

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But truncates when slicing

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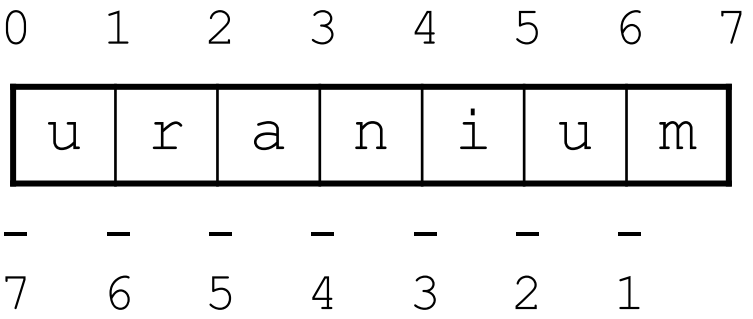
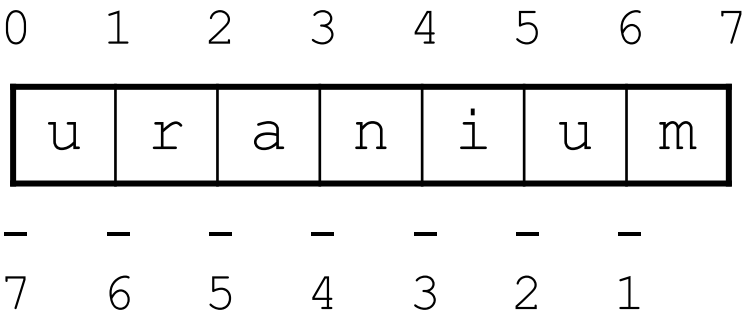
```
>>> element = 'uranium'
>>>
```



Python checks bounds when indexing

But truncates when slicing

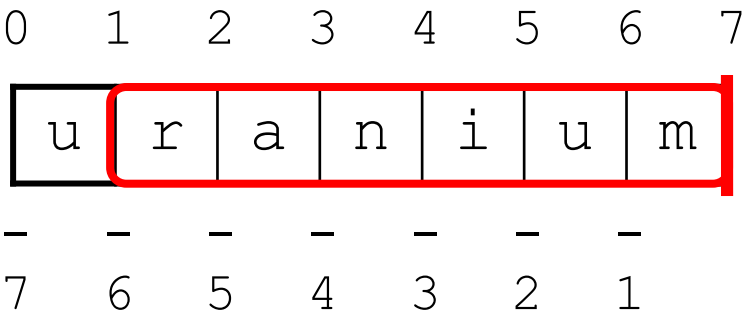
```
>>> element = 'uranium'
>>> print(element[400])
IndexError: string index out of range
>>>
```



Python checks bounds when indexing

But truncates when slicing

```
>>> element = 'uranium'
>>> print(element[400])
IndexError: string index out of range
>>> print(element[1:400])
ranium
>>>
```



So `text[1:3]` is 0, 1, or 2 characters long

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```
''          ''
'a'         ''
'ab'        'b'
'abc'       'bc'
'abcdef'    'bc'
```

Slicing always creates a new collection

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Beware of aliasing

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```
>>> points = [[10, 10], [20, 20], [30, 30], [40, 40]]
>>>
```

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```
>>> points = [[10, 10], [20, 20], [30, 30], [40, 40]]
>>> middle = points[1:-1]
>>>
```

Slicing always creates a new collection

Beware of aliasing

```
>>> points = [[10, 10], [20, 20], [30, 30], [40, 40]]
>>> middle = points[1:-1]
>>> middle[0][0] = 'whoops'
>>>
```

Slicing always creates a new collection

Beware of aliasing

```
>>> points = [[10, 10], [20, 20], [30, 30], [40, 40]]
>>> middle = points[1:-1]
>>> middle[0][0] = 'whoops'
>>> middle[1][0] = 'aliasing'
>>>
```

Slicing always creates a new collection

Beware of aliasing

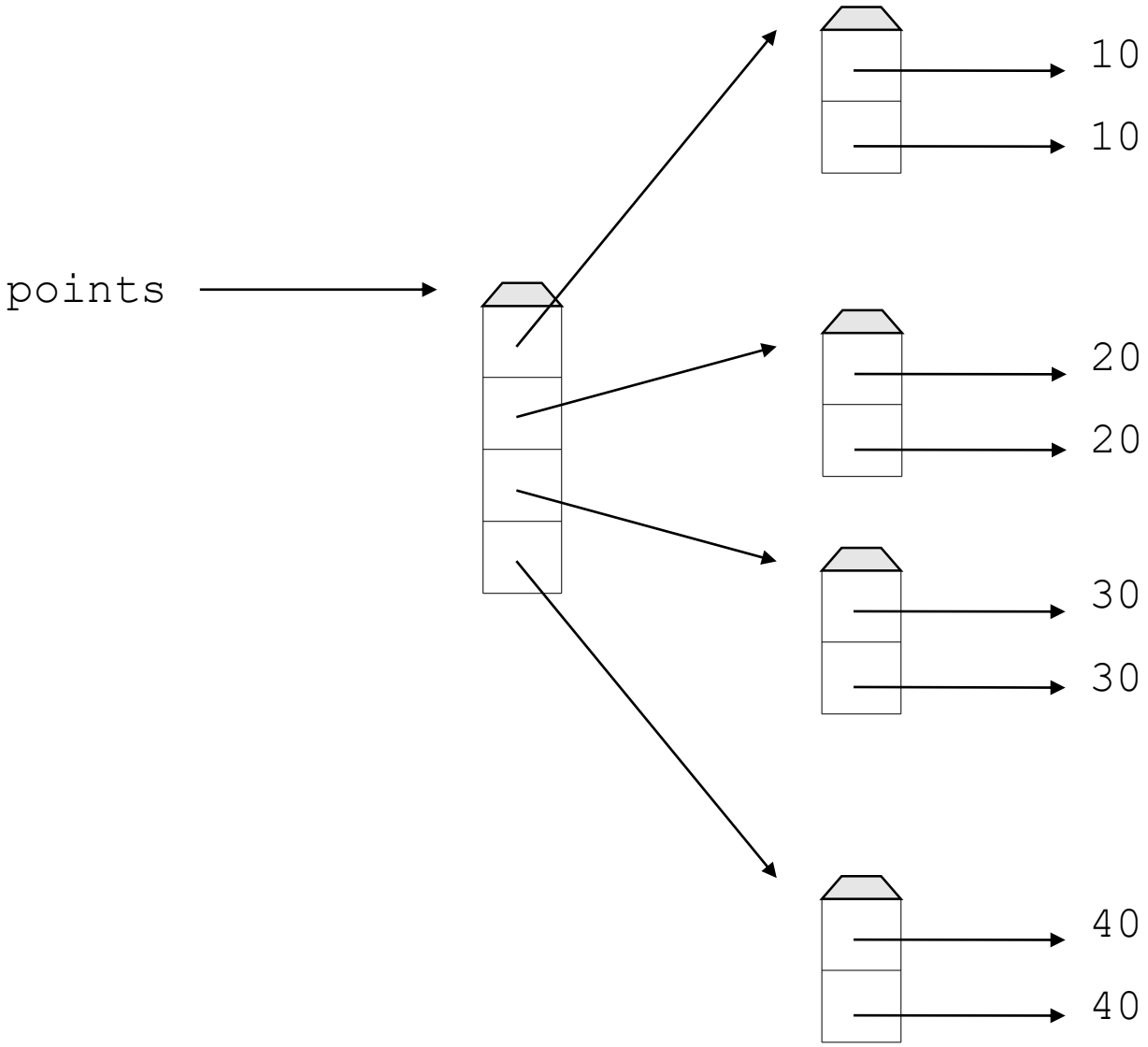
```
>>> points = [[10, 10], [20, 20], [30, 30], [40, 40]]
>>> middle = points[1:-1]
>>> middle[0][0] = 'whoops'
>>> middle[1][0] = 'aliasing'
>>> print(middle)
[['whoops', 20], ['aliasing', 30]]
>>>
```

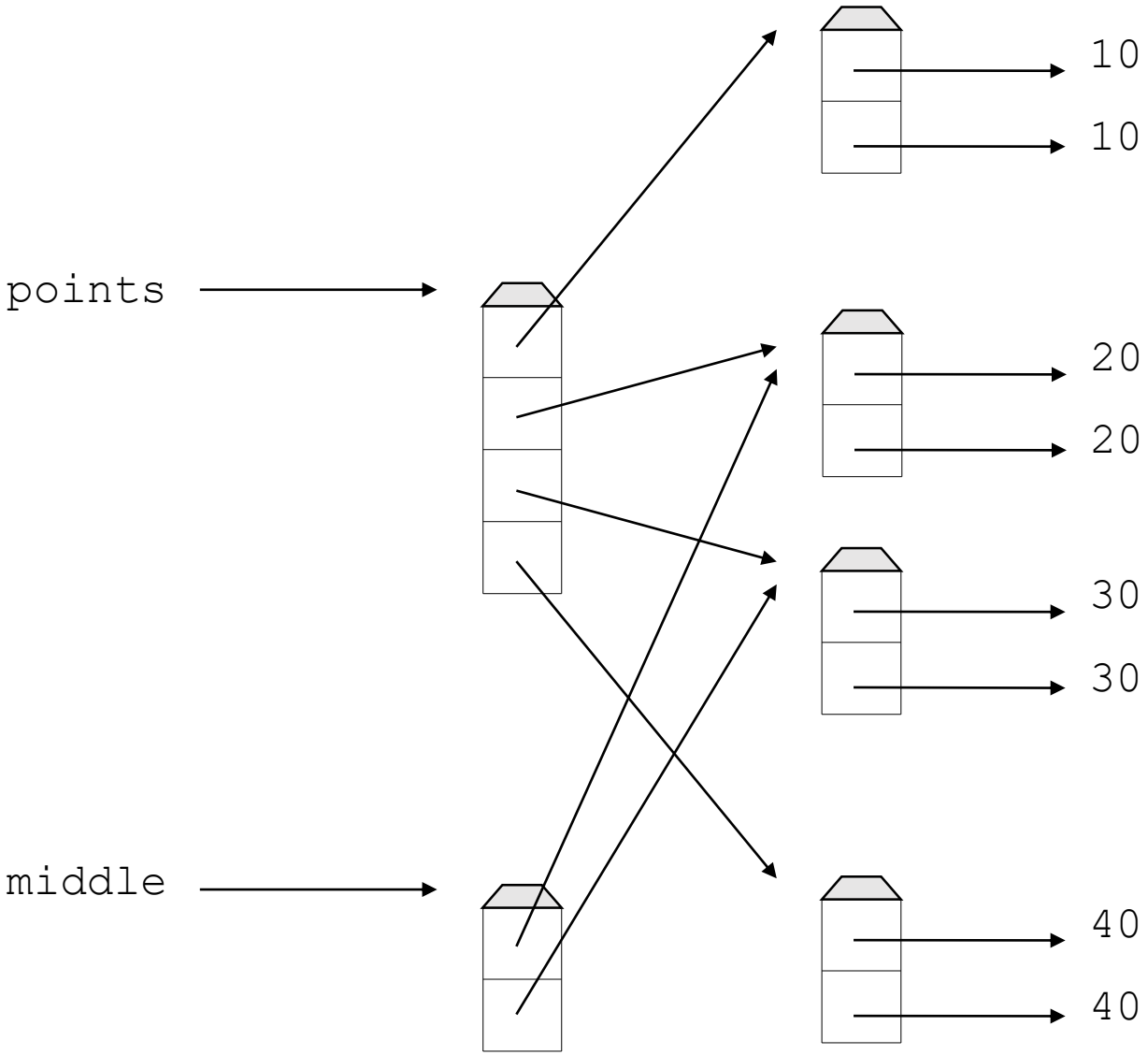
Slicing always creates a new collection

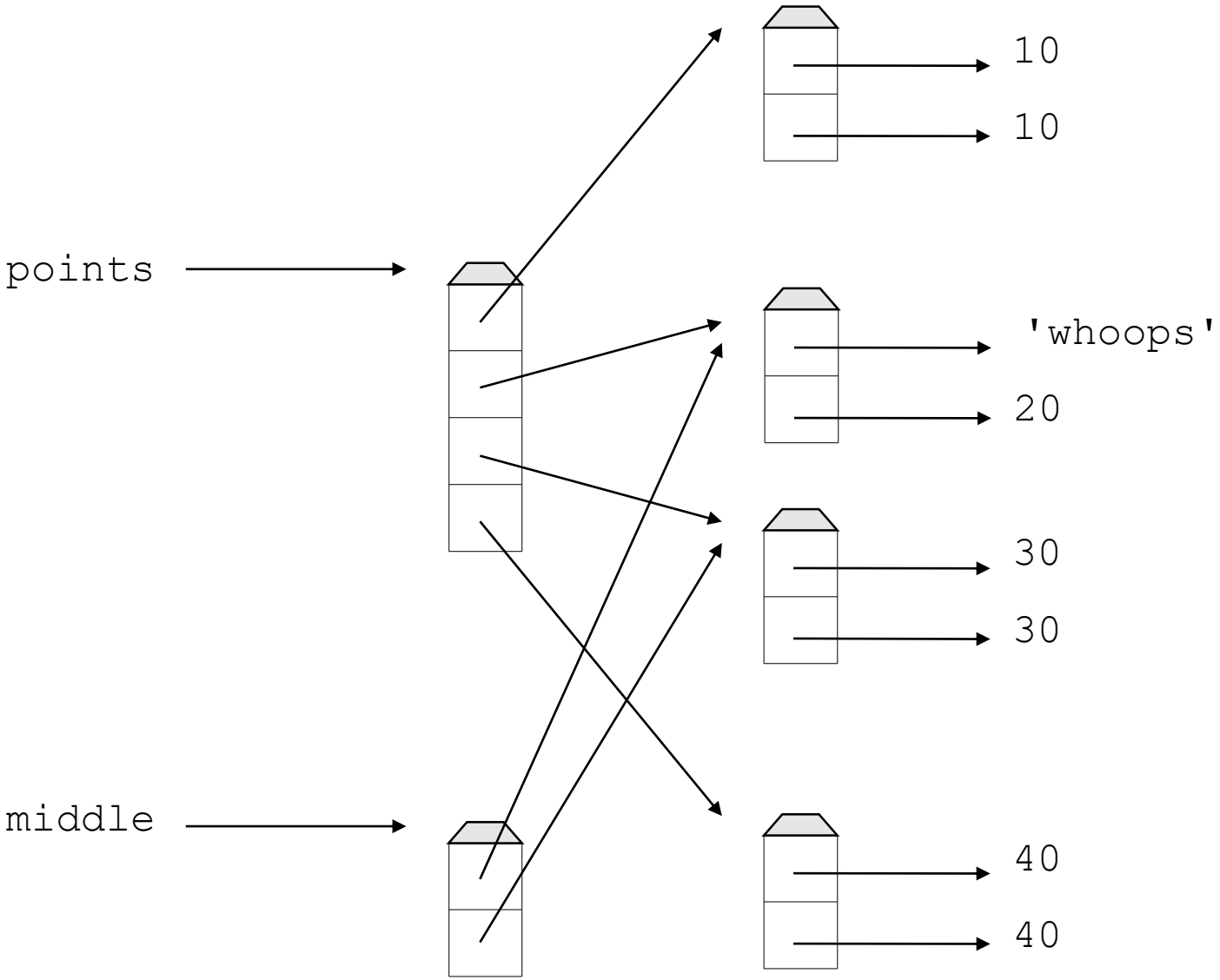
Beware of aliasing

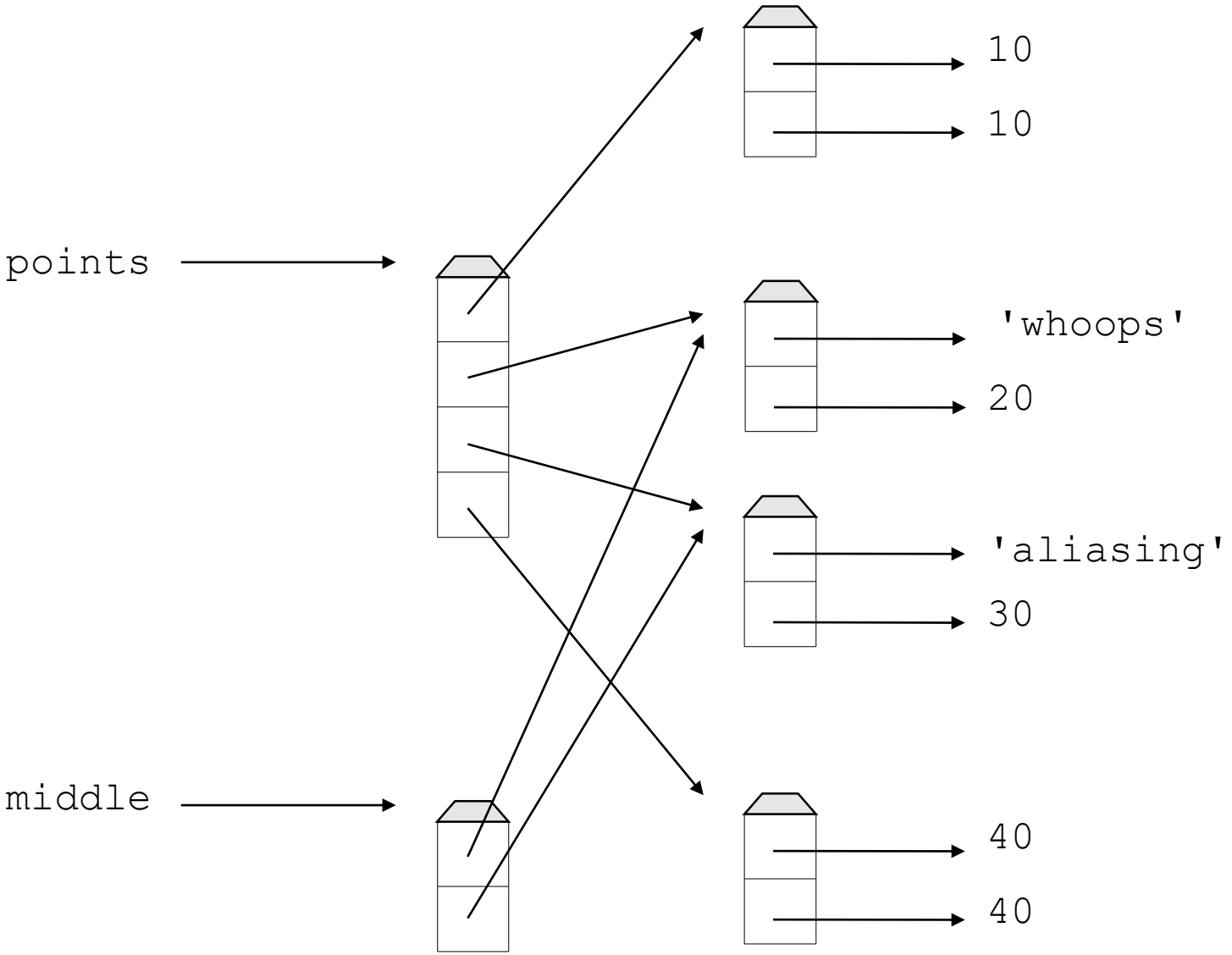
```
>>> points = [[10, 10], [20, 20], [30, 30], [40, 40]]
>>> middle = points[1:-1]
>>> middle[0][0] = 'whoops'
>>> middle[1][0] = 'aliasing'
>>> print(middle)
[['whoops', 20], ['aliasing', 30]]
>>> print(points)
[[10, 10], ['whoops', 20], ['aliasing', 30], [40, 40]]
>>>
```

STOP HERE


points
10
10
20
20
30
30
40
40


points
middle
10
10
20
20
30
30
40
40


points
middle
10
10
'whoops'
20
30
30
40
40


points
middle
10
10
'whoops'
20
'aliasing'
30
40
40

created by

Greg Wilson

October 2010