Computer Systems Modeling and Verification (USEEN1)

List comprehension*

Tristan Crolard

Department of Computer Science
CEDRIC lab / SYS team

tristan.crolard@cnam.fr

cedric.cnam.fr/sys/crolard

*. These slides are adapted from *Python for Computational Science* (2024)

List comprehension

- List comprehension follows the mathematical "set builder notation"
- Convenient way to convert a list into another list (without a for-loop)

Examples

```
>>> [2*i for i in range(5)]
```

```
[0, 2, 4, 6, 8]
```

```
>>> [x**2 for x in range(10)]
```

```
[0, 1, 4, 9, 16, 25, 36, 49, 64, 81]
```

List comprehension – syntax

Syntax of list comprehension:

[expression(v) for v in sequence]

where v is some variable.

Examples

```
>>> import math
>>> [math.sqrt(x) for x in [1, 4, 9, 16]]
[1.0, 2.0, 3.0, 4.0]
>>> [s.capitalize() for s in ["dog", "cat", "mouse"]]
['Dog', 'Cat', 'Mouse']
```

List comprehension with filter

[expression(v) for v in sequence if condition(v)]

- includes expression(v) only if condition(v) is True.

Examples

```
>>> [i for i in range(10) if i > 5]
```

```
[6, 7, 8, 9]
```

```
>>> [i for i in range(10) if i**2 > 5]
```

```
[3, 4, 5, 6, 7, 8, 9]
```

```
>>> [i ** 2 for i in range(10) if i > 5]
```

```
[36, 49, 64, 81]
```