Comprehending Comprehensions

by Rodrigo Girão Serrão

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Textualize

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What's a (list) comprehension?

It's a way to build lists.

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Better understood
when compared to a loop.

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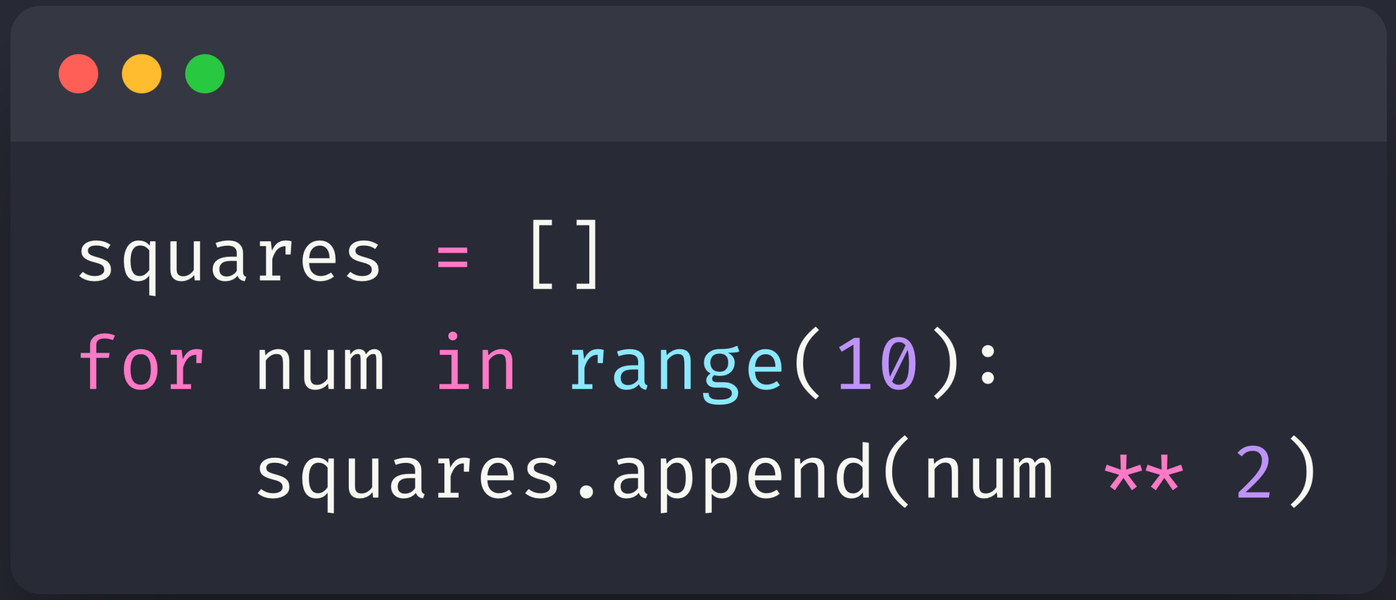

```
squares = []
for num in range(10):
    squares.append(num ** 2)
```

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```python
squares = []
for num in range(10):
    squares.append(num ** 2)
```

```python
squares = [num ** 2 for num in range(10)]
```

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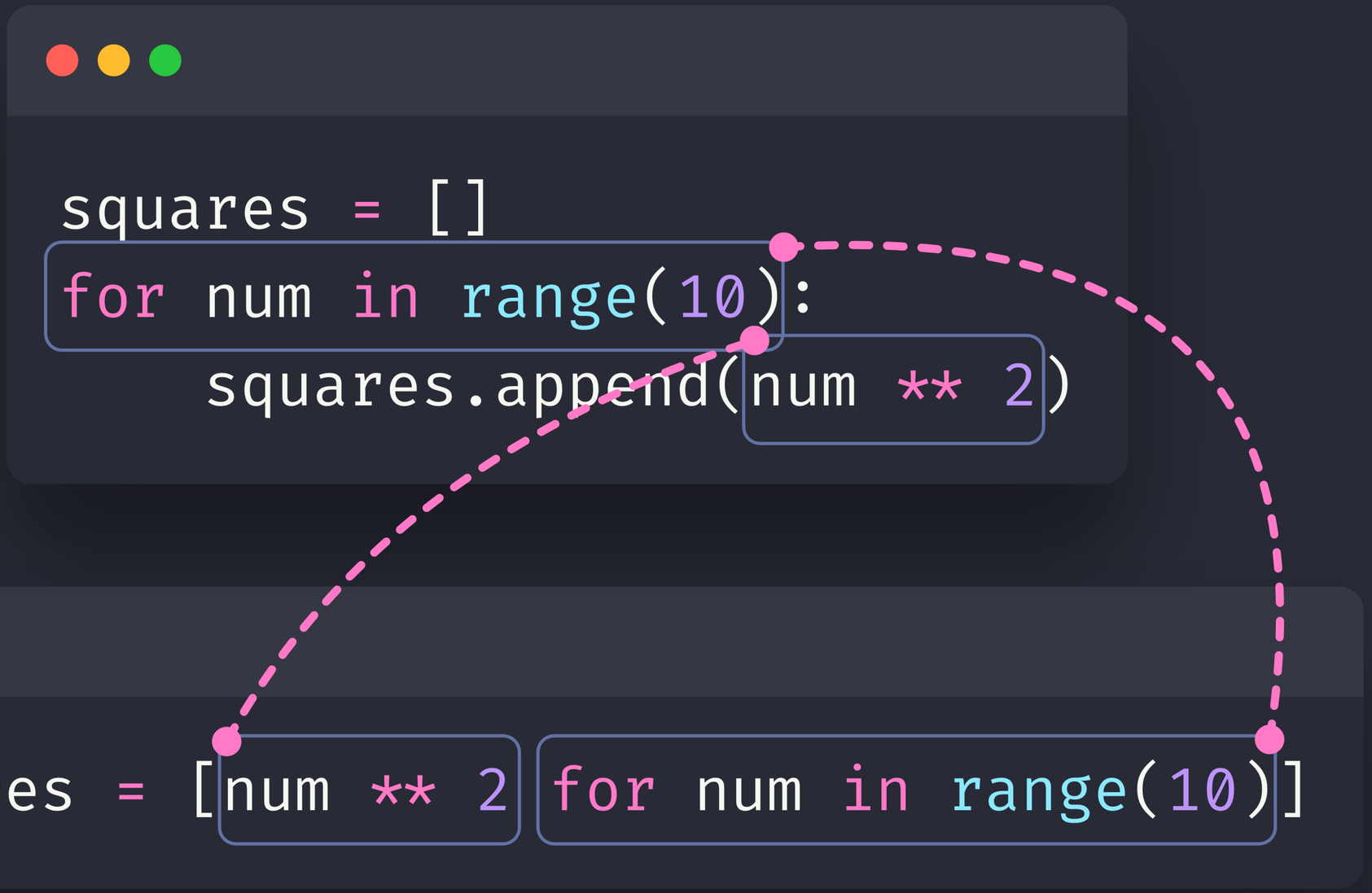
Extract important parts.



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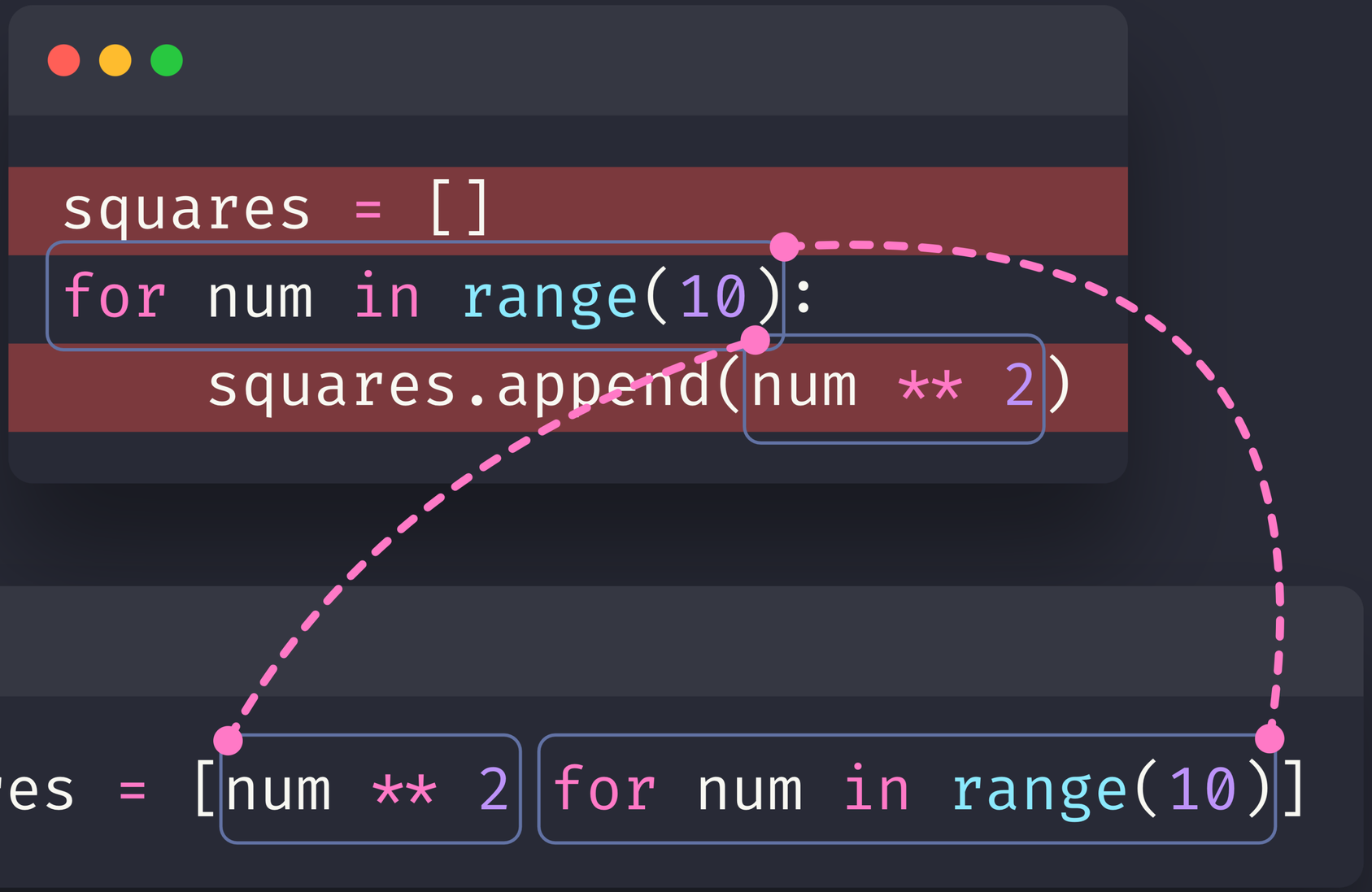
Drop fluff.



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How to write ***ANY*** (list) comprehension:

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How to write ***ANY*** (list) comprehension:

```
new_list = []
for element in iterable:
    new_list.append(func(element))
```

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```
for element in iterable:
    new_list.append(func(element))
new_list = [                      ]
```

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```
for element in iterable:
    new_list.append(                )
new_list = [func(element)                ]
```

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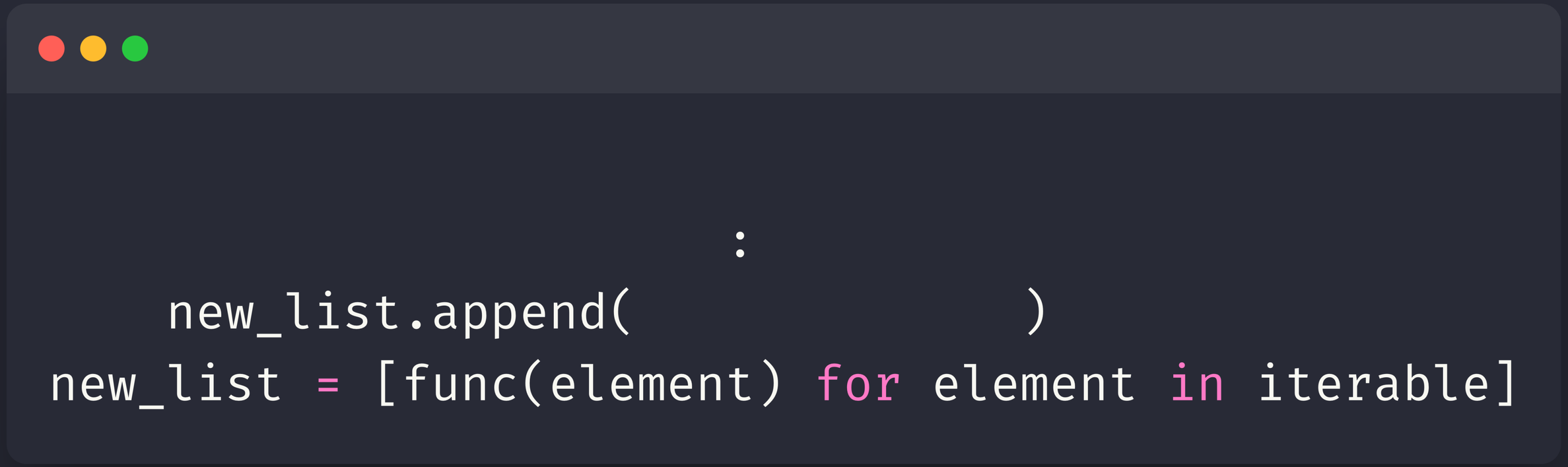

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```
                                :
    new_list.append(                    )
new_list = [func(element) for element in iterable]
```

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Filtering data

```python
odd_squares = []

for num in range(10):
    if num % 2:
        odd_squares.append(num ** 2)
```

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```python
odd_squares = [
    num ** 2
    for num in range(10)
    if num % 2
]
```

```python
odd_squares = []

for num in range(10):
    if num % 2:
        odd_squares.append(num ** 2)
```

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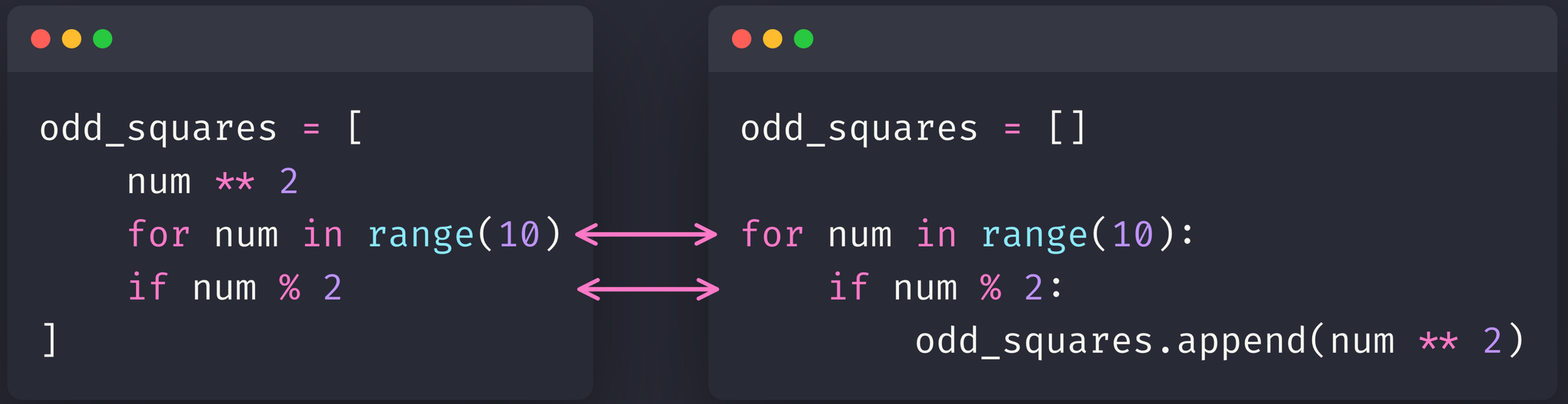

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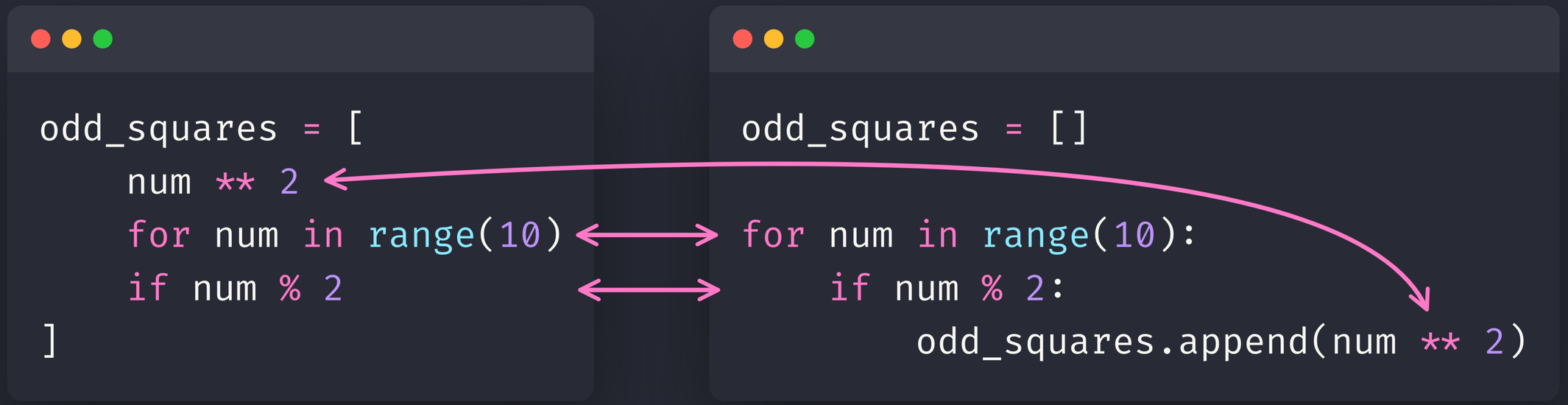

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How to write ***ANY*** (list) comprehension (take 2):

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How to write ***ANY*** (list) comprehension (take 2):

```
new_list = []
for element in iterable:
    if predicate(element):
        new_list.append(func(element))
```

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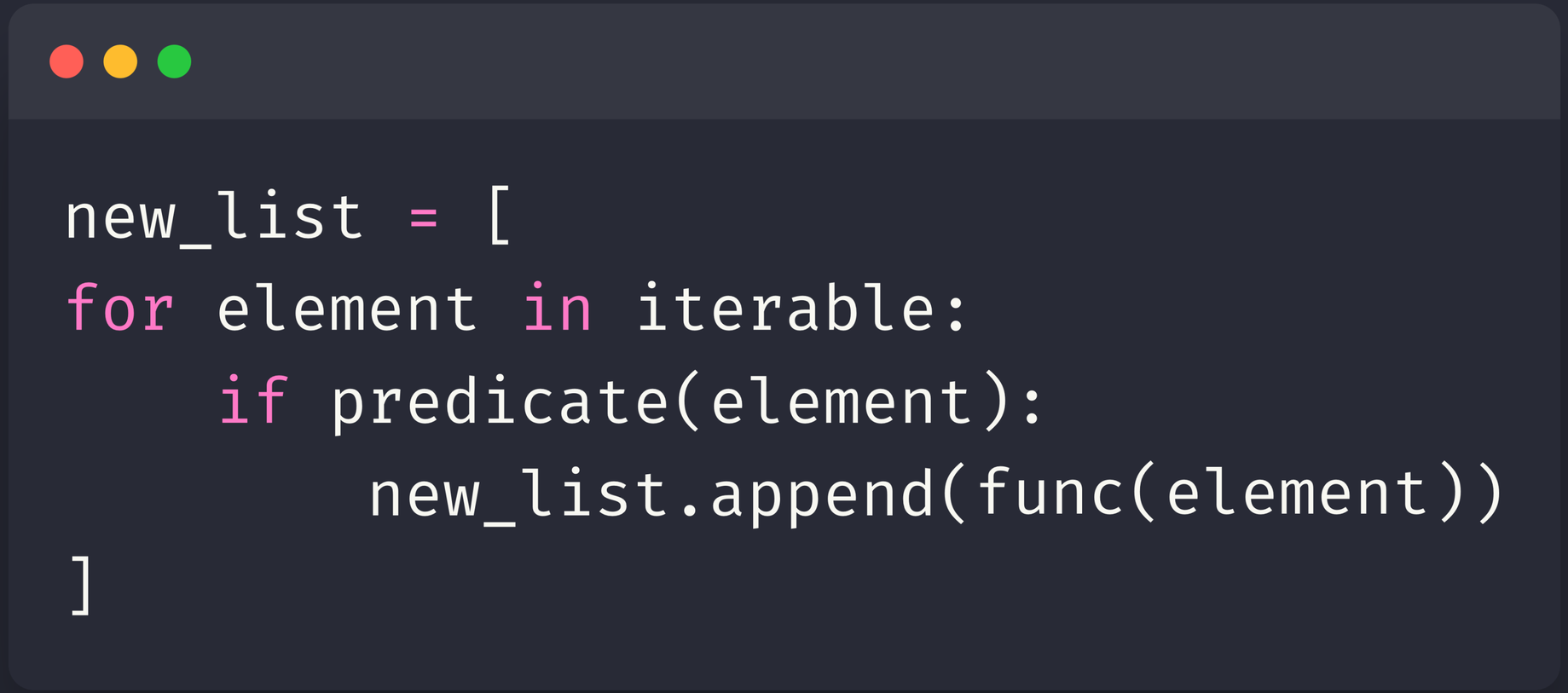

```
new_list = [
for element in iterable:
    if predicate(element):
        new_list.append(func(element))
]
```

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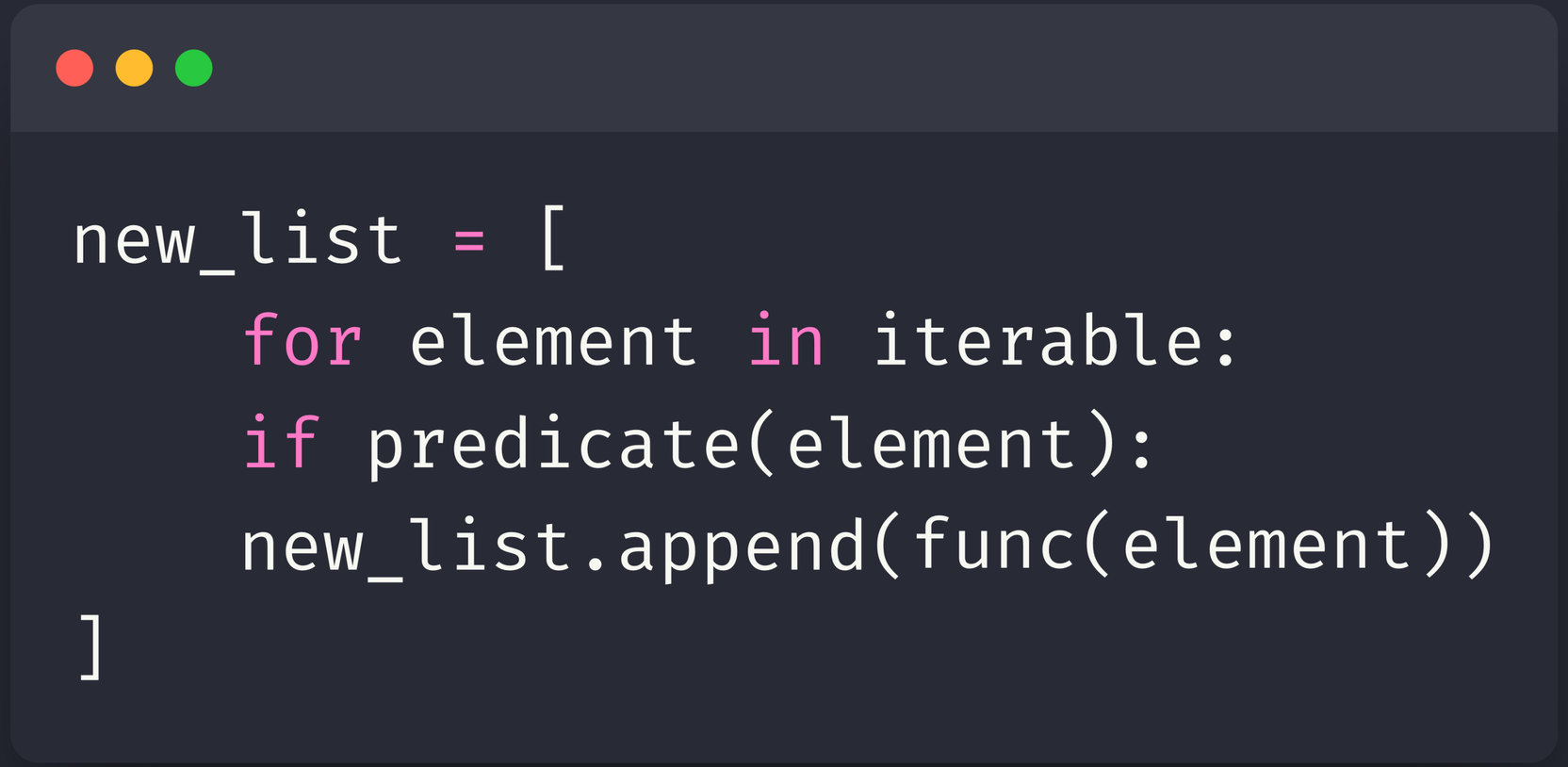

```
new_list = [
    for element in iterable:
    if predicate(element):
    new_list.append(func(element))
]
```

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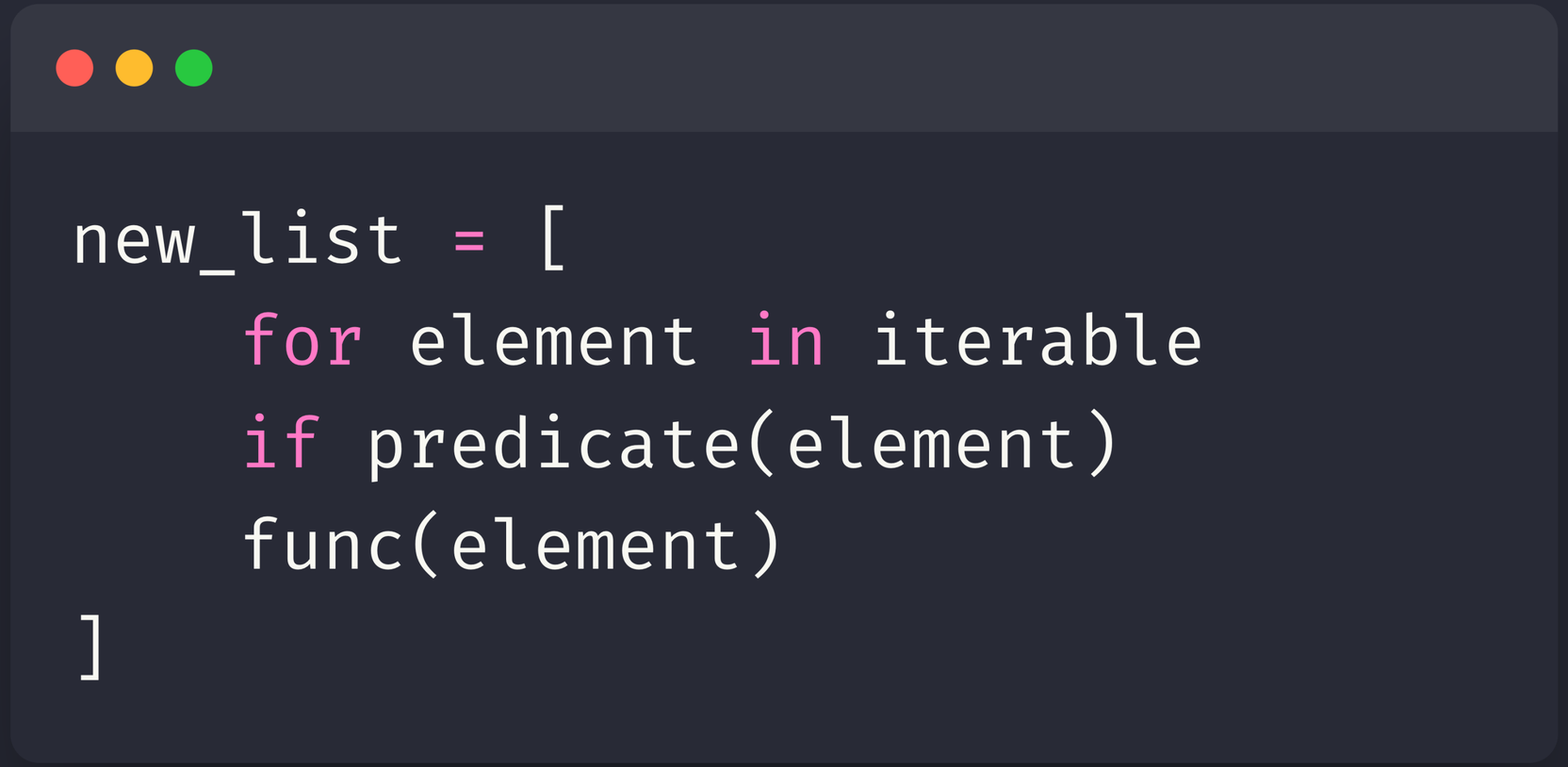

```
new_list = [
    for element in iterable
    if predicate(element)
    func(element)
]
```

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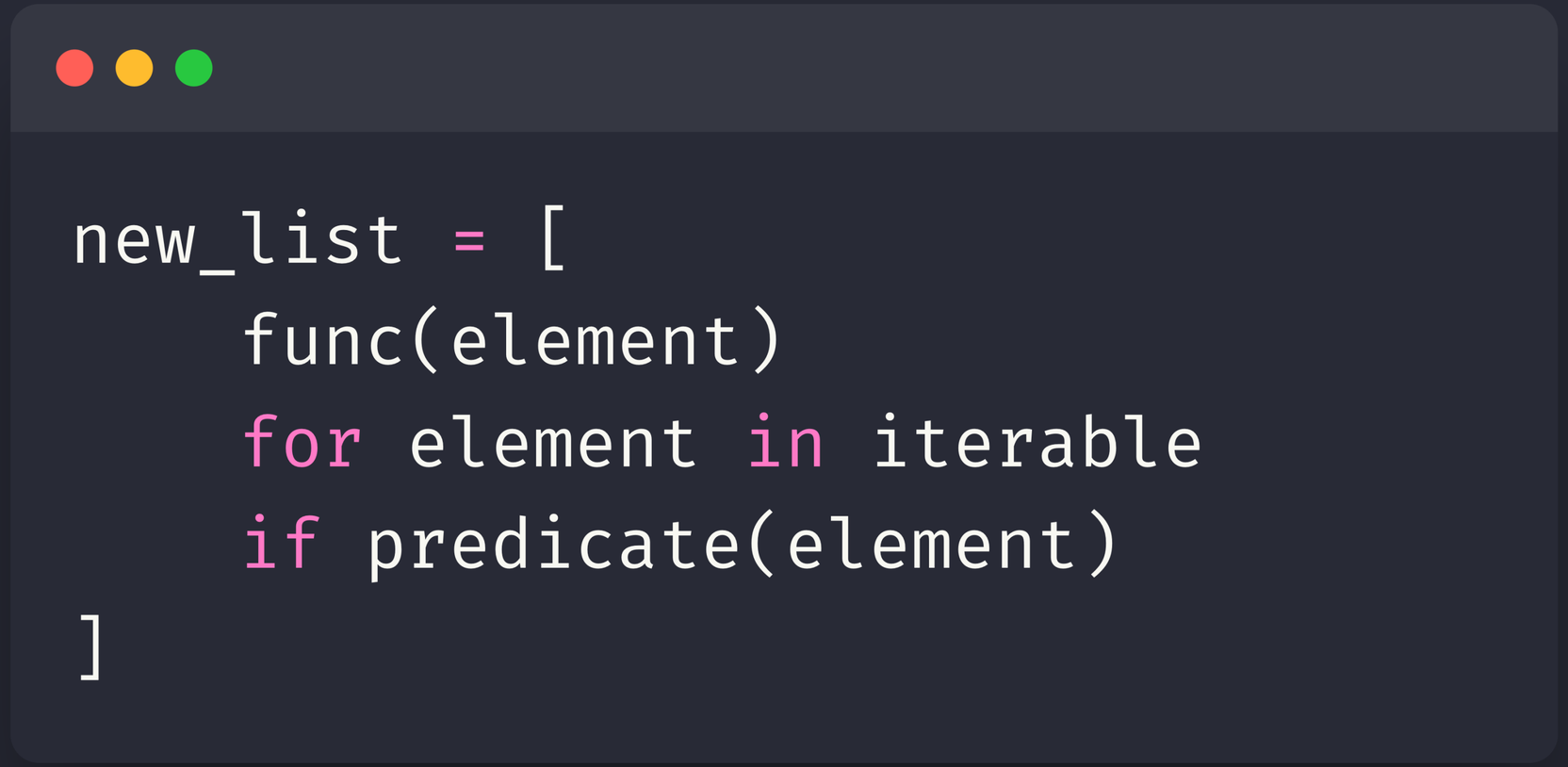

```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

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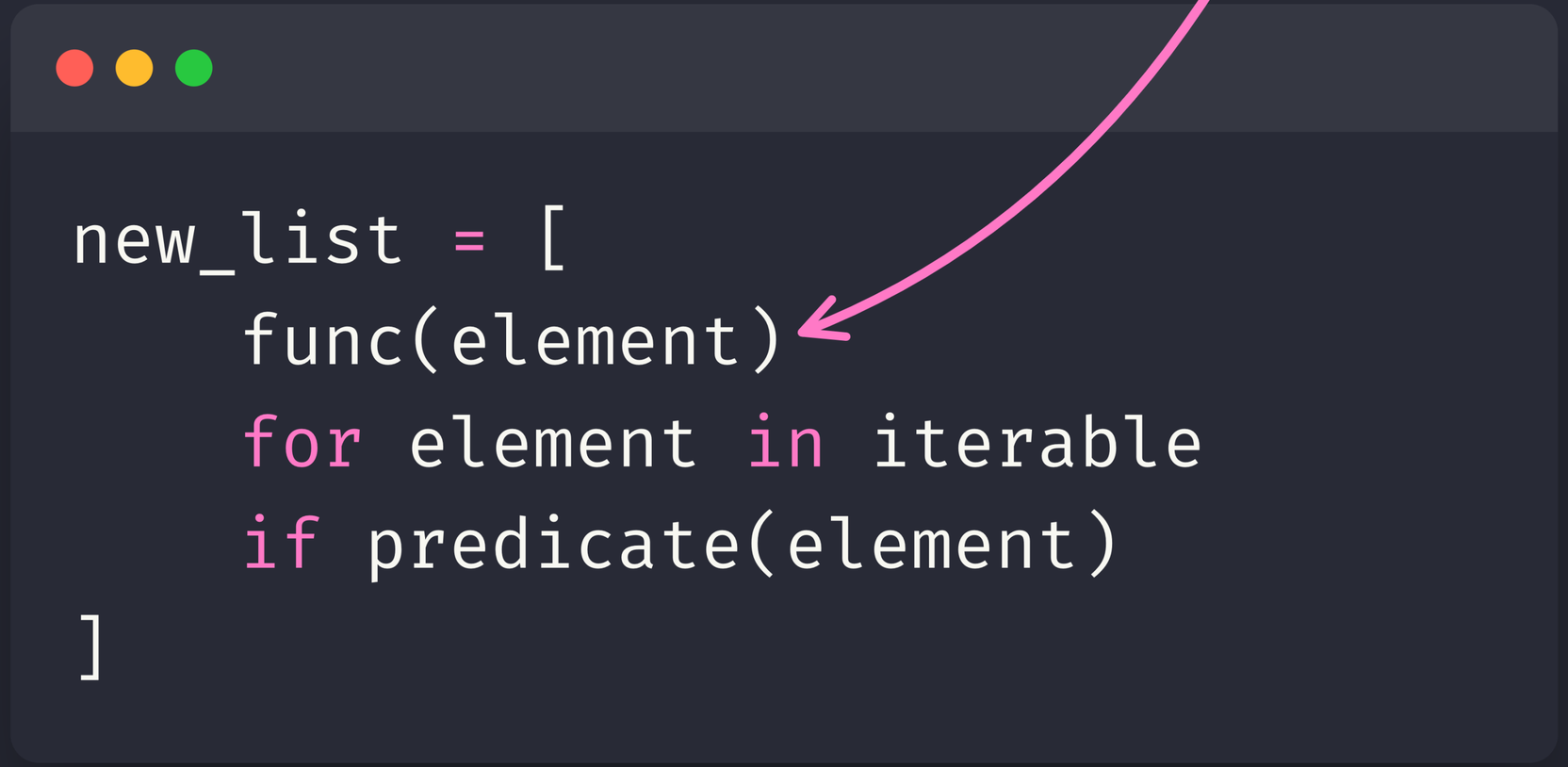
1. Data transformation.



```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

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```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

2. Data source.

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```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

3. Data filter (optional).

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That's all there is to it.

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Really.

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Why bother?

Fast(er) ⚡

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Short(er) 👈

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Pur(er) ✨

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Short(er) 🤏

Pur(er) ✨

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*English is hard!

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Readability was subjective..?

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```
my_list = []
for it2 in it1:
 for _ in it3:
  if p1(it2):
   for it4 in it2:
    for v1 in it4:
     if p2(v1):
      if p3(it4):
       for it6 in it5:
        for v2, it7 in it6:
         for v3, it8, it9 in it7:
          if p2(v1):
           for v4, v5 in zip(it8, it9):
            my_list.append(func(v1, v2, v3, v4, v5))
```

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```
my_list = [
 func(v1, v2, v3, v4, v5)
 for it2 in it1
 for _ in it3
 if p1(it2)
 for it4 in it2
 for v1 in it4
 if p2(v1)
 if p3(it4)
 for it6 in it5
 for v2, it7 in it6
 for v3, it8, it9 in it7
 if p2(v1)
 for v4, v5 in zip(it8, it9)
]
```

```
my_list = []
for it2 in it1:
 for _ in it3:
  if p1(it2):
   for it4 in it2:
    for v1 in it4:
     if p2(v1):
      if p3(it4):
       for it6 in it5:
        for v2, it7 in it6:
         for v3, it8, it9 in it7:
          if p2(v1):
           for v4, v5 in zip(it8, it9):
            my_list.append(func(v1, v2, v3, v4, v5))
```

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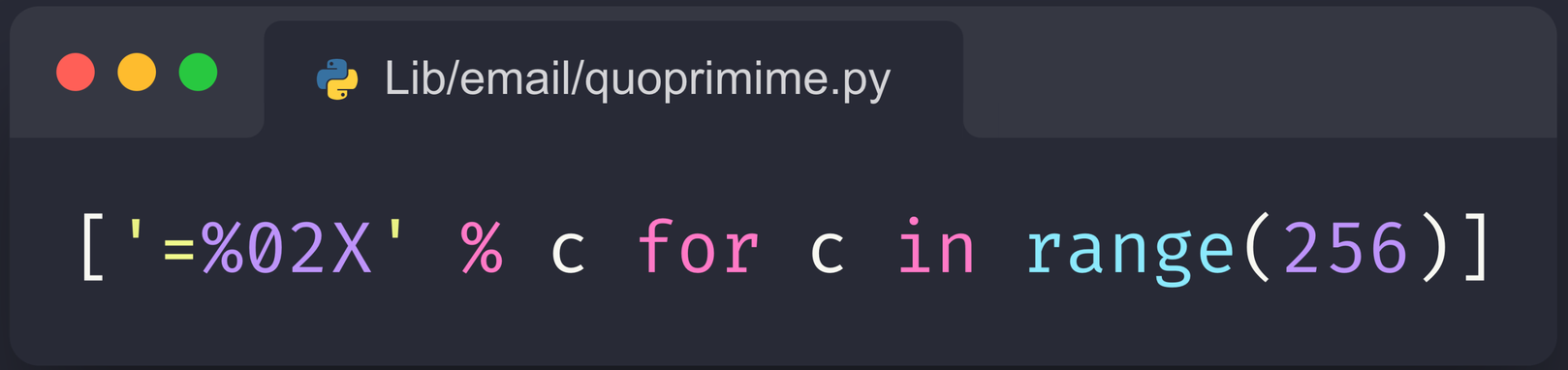
Examples ✨



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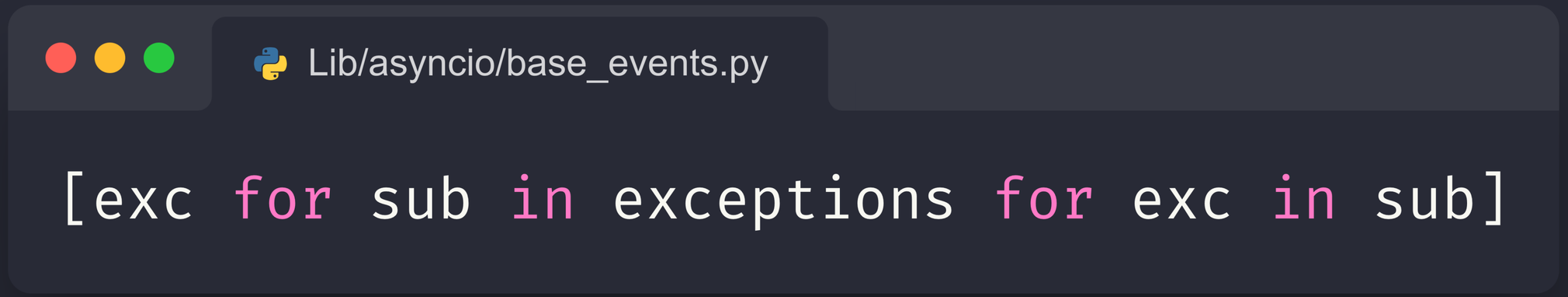

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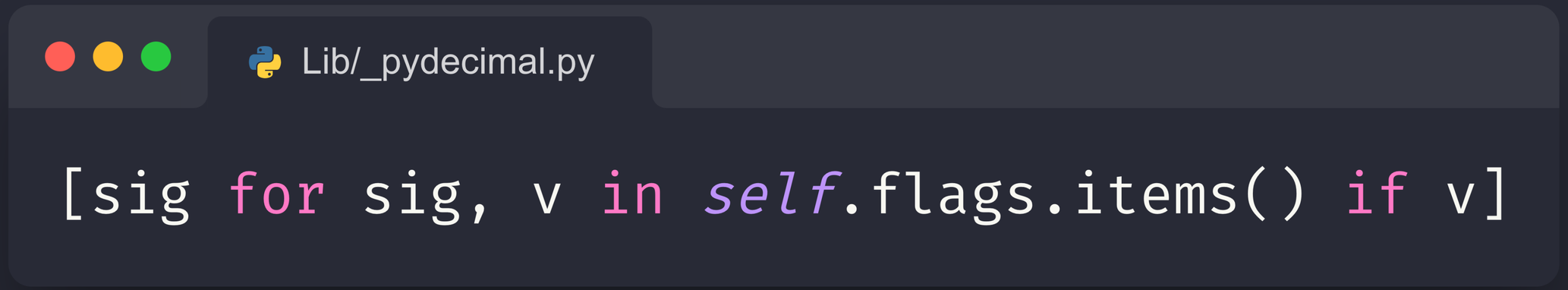

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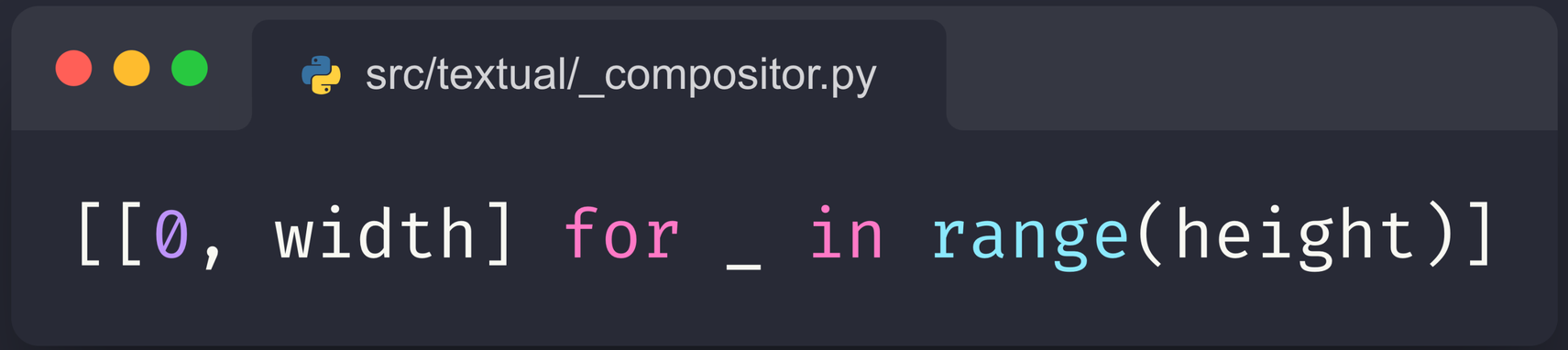

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src/textual/css/stylesheet.py

```
[
    rule
    for rule in reversed(self.rules)
    if rule in limit_rules
]
```

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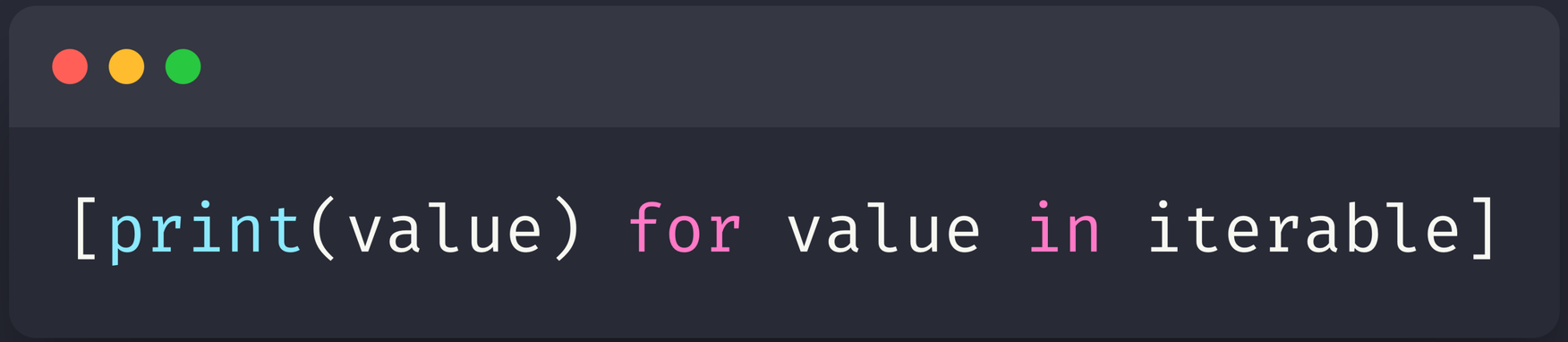
Examples 🤢



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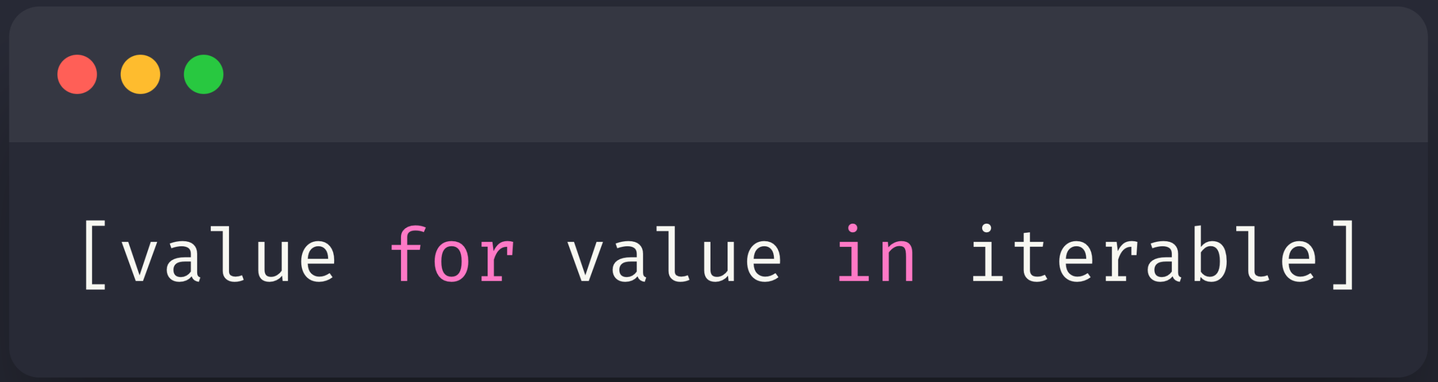

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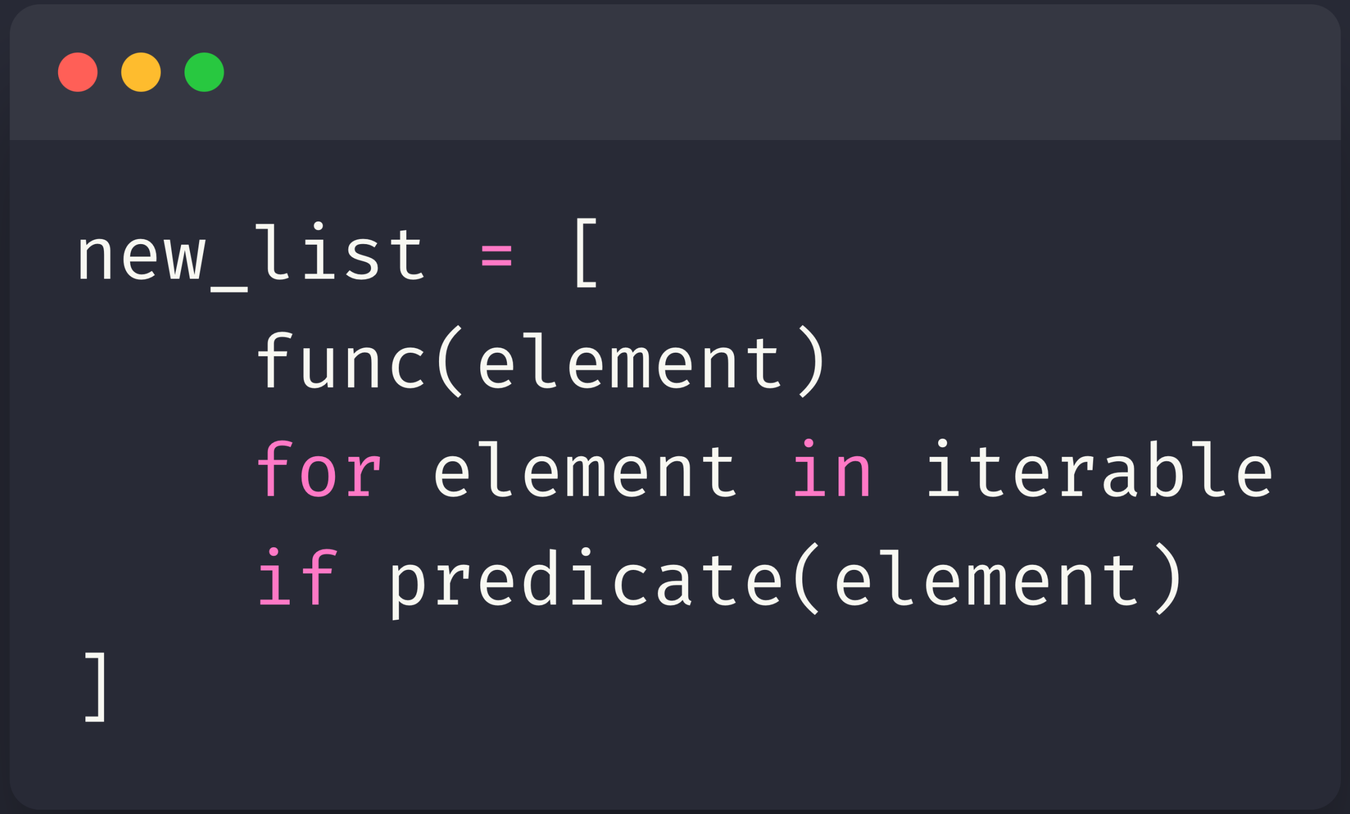
Set comprehensions



```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

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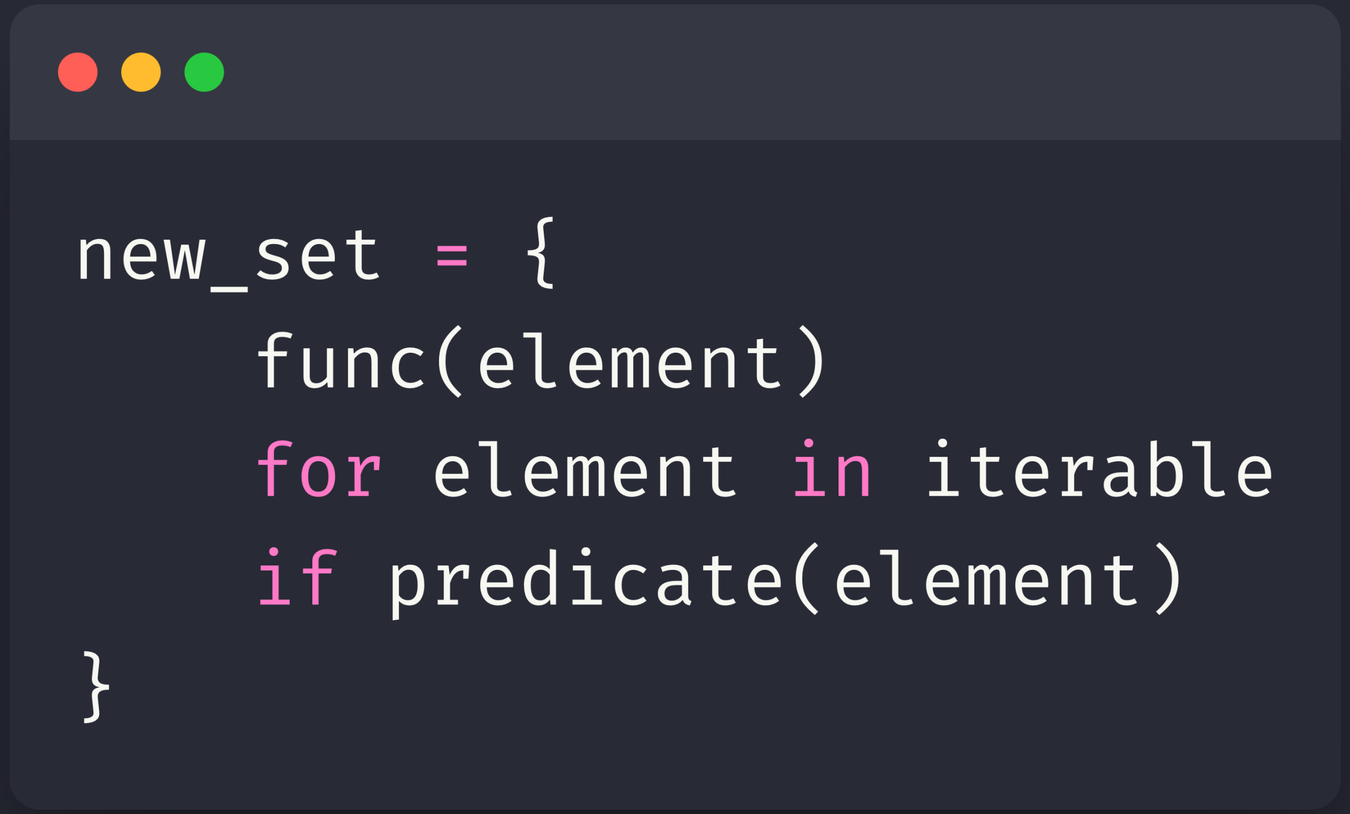

```
new_set = {
    func(element)
    for element in iterable
    if predicate(element)
}
```

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That's all there is to it.

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Really.

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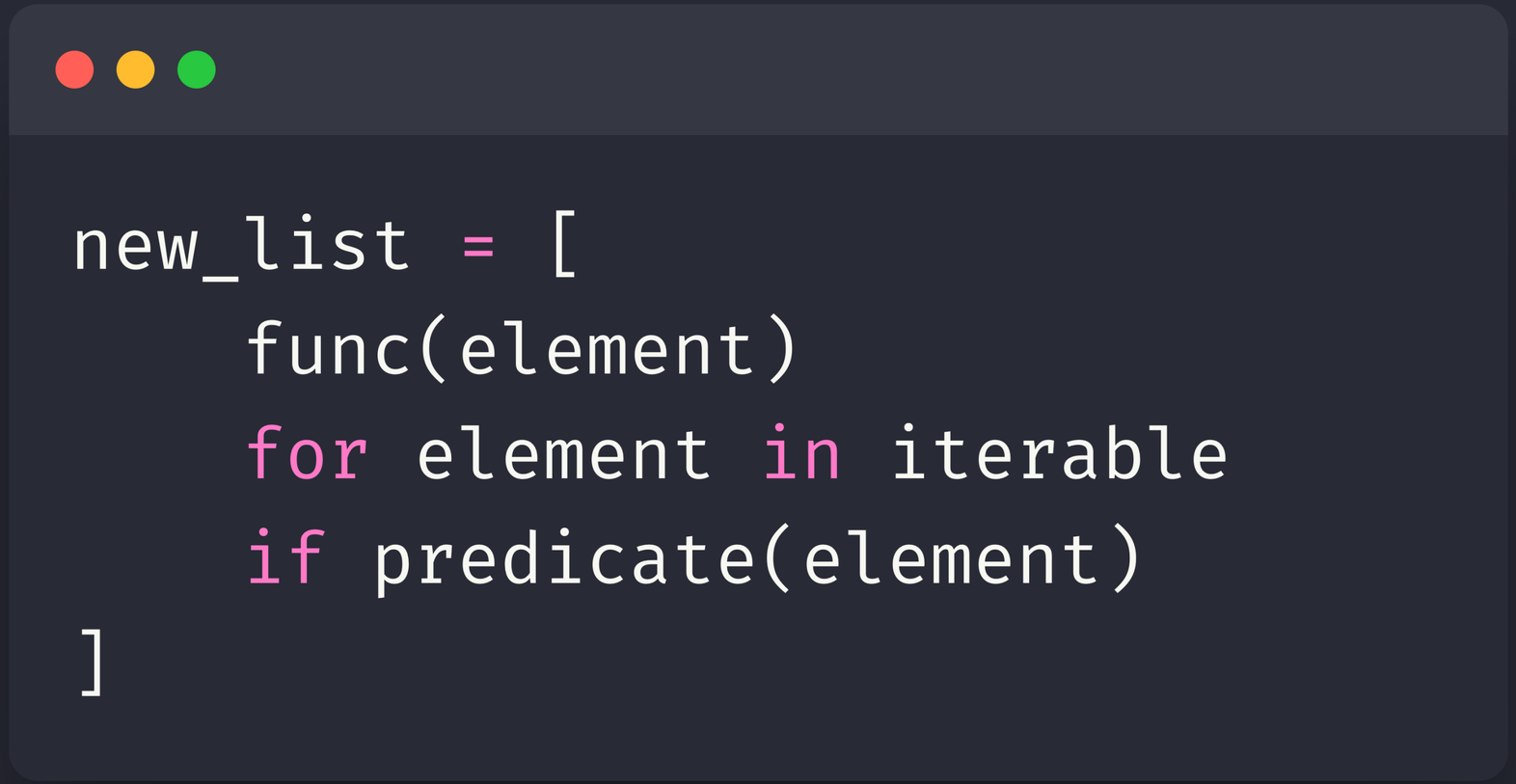
Dictionary comprehensions



```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

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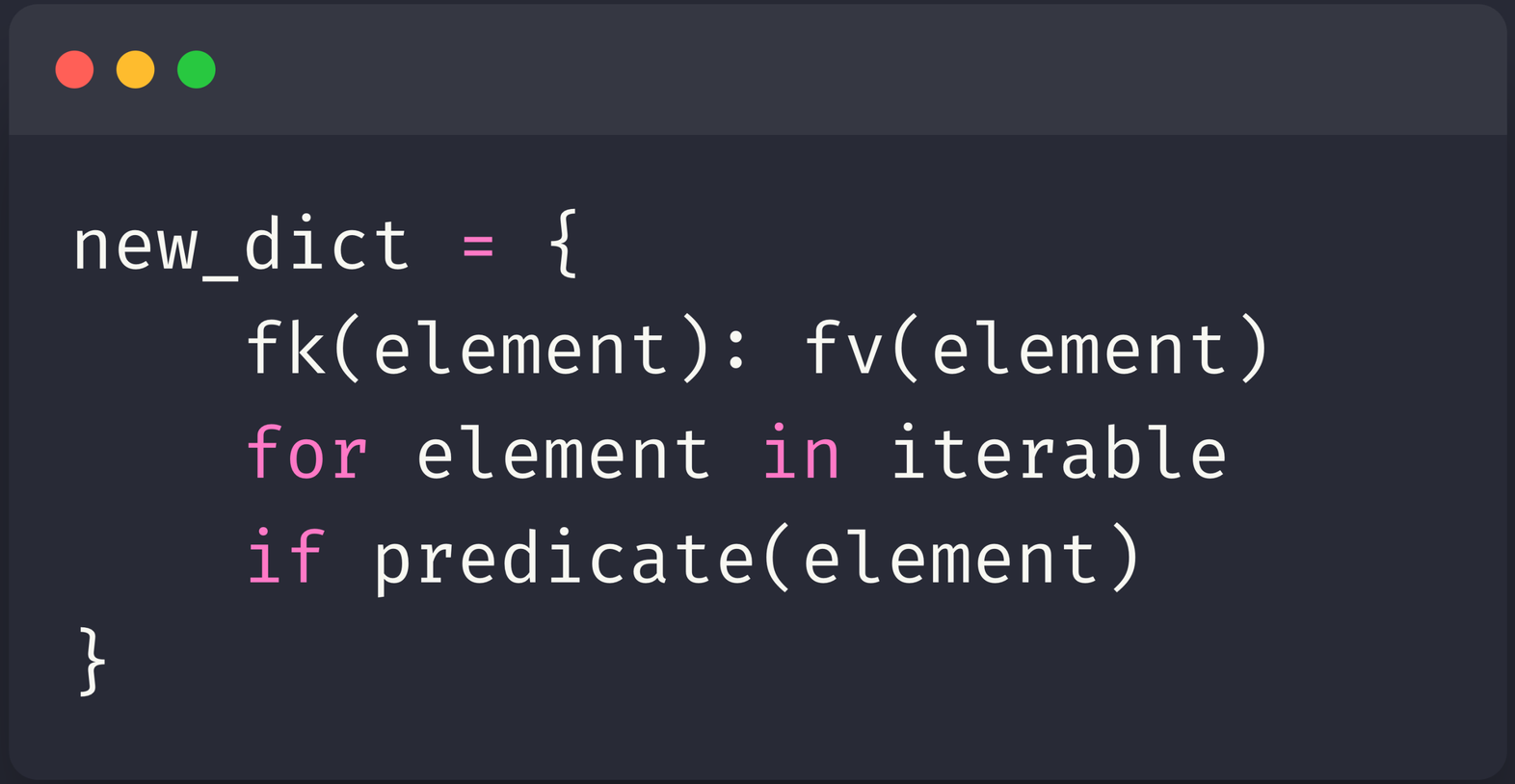

```
new_dict = {
    fk(element): fv(element)
    for element in iterable
    if predicate(element)
}
```

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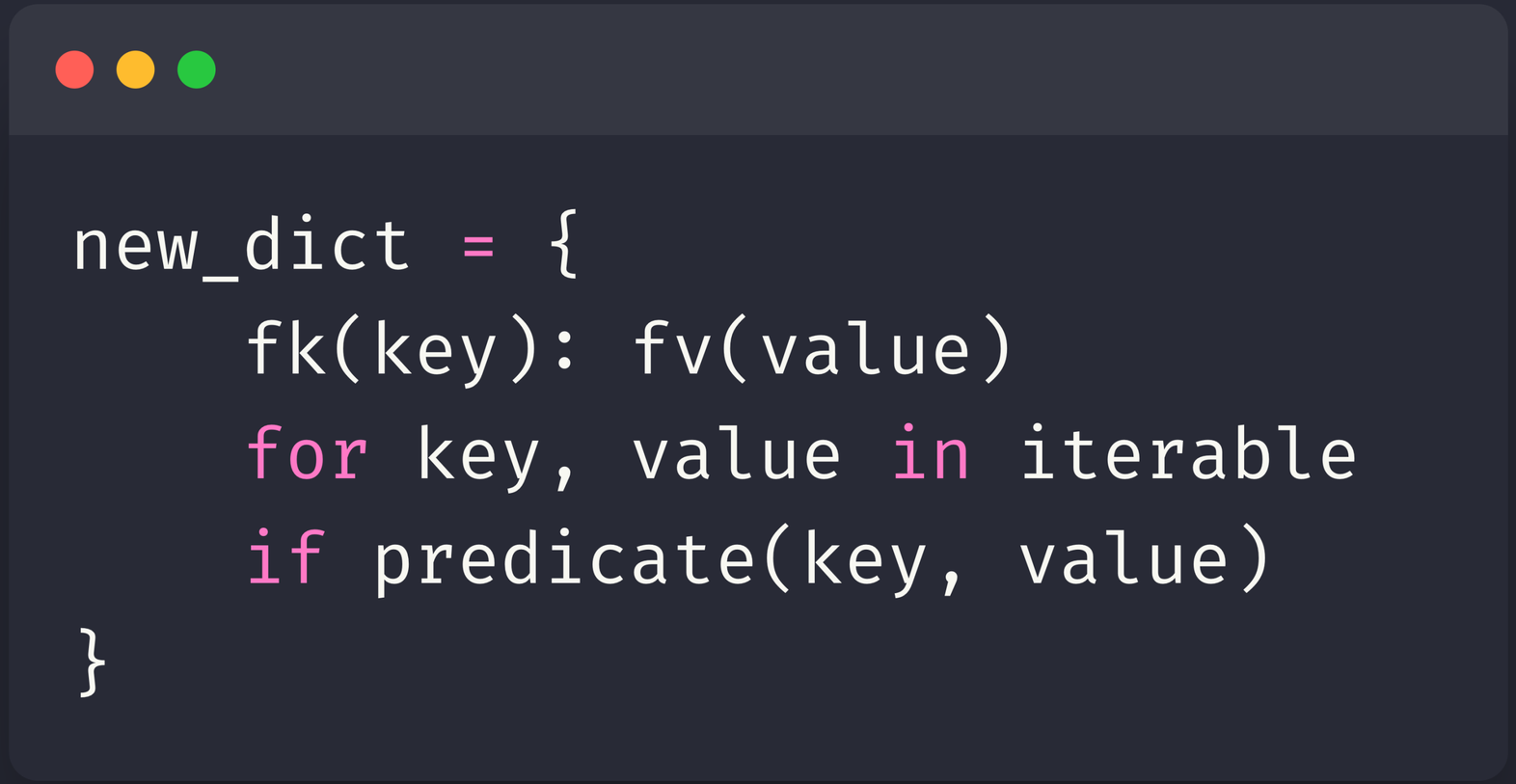

```
new_dict = {
    fk(key): fv(value)
    for key, value in iterable
    if predicate(key, value)
}
```

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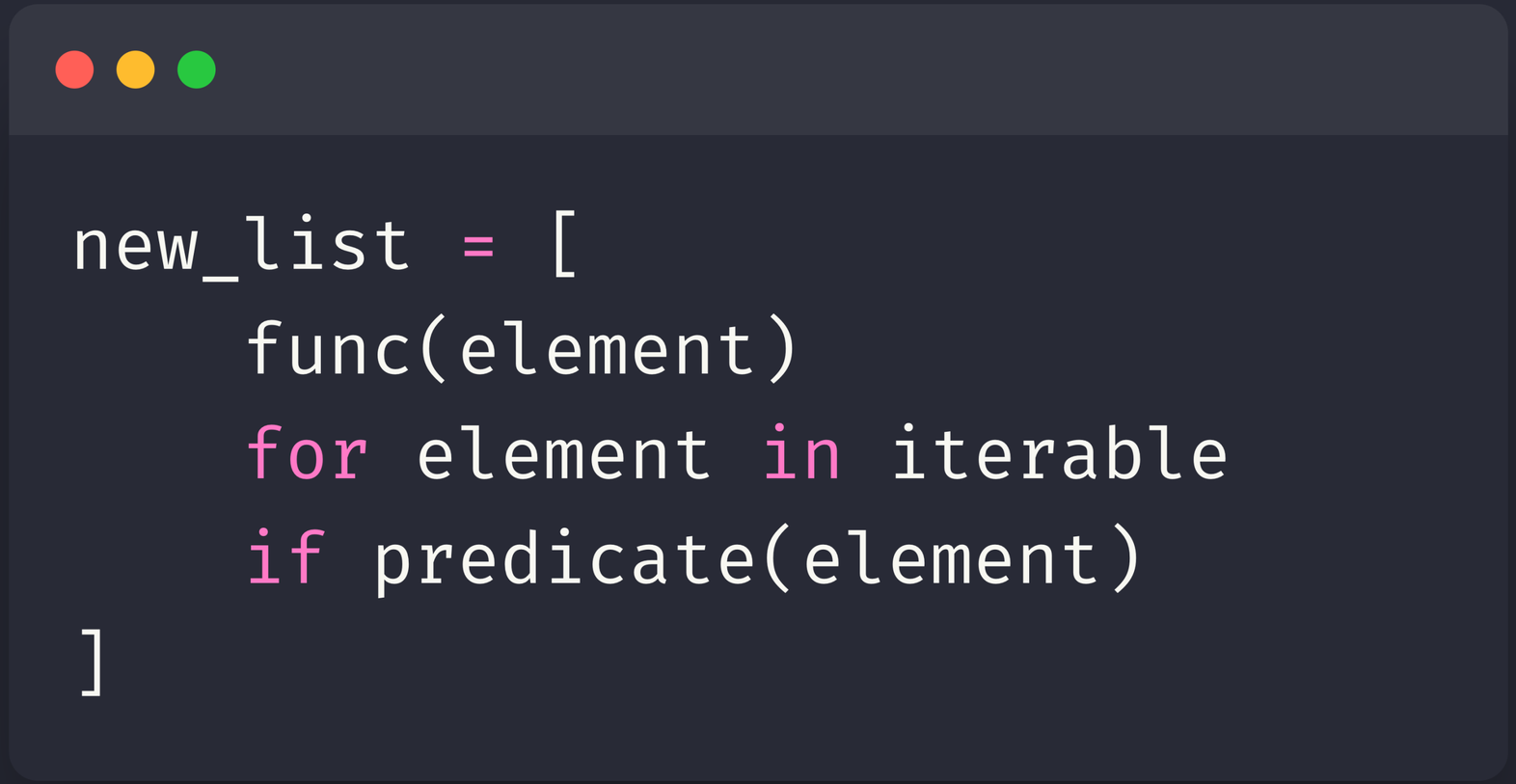
Generator expressions



```
new_list = [
    func(element)
    for element in iterable
    if predicate(element)
]
```

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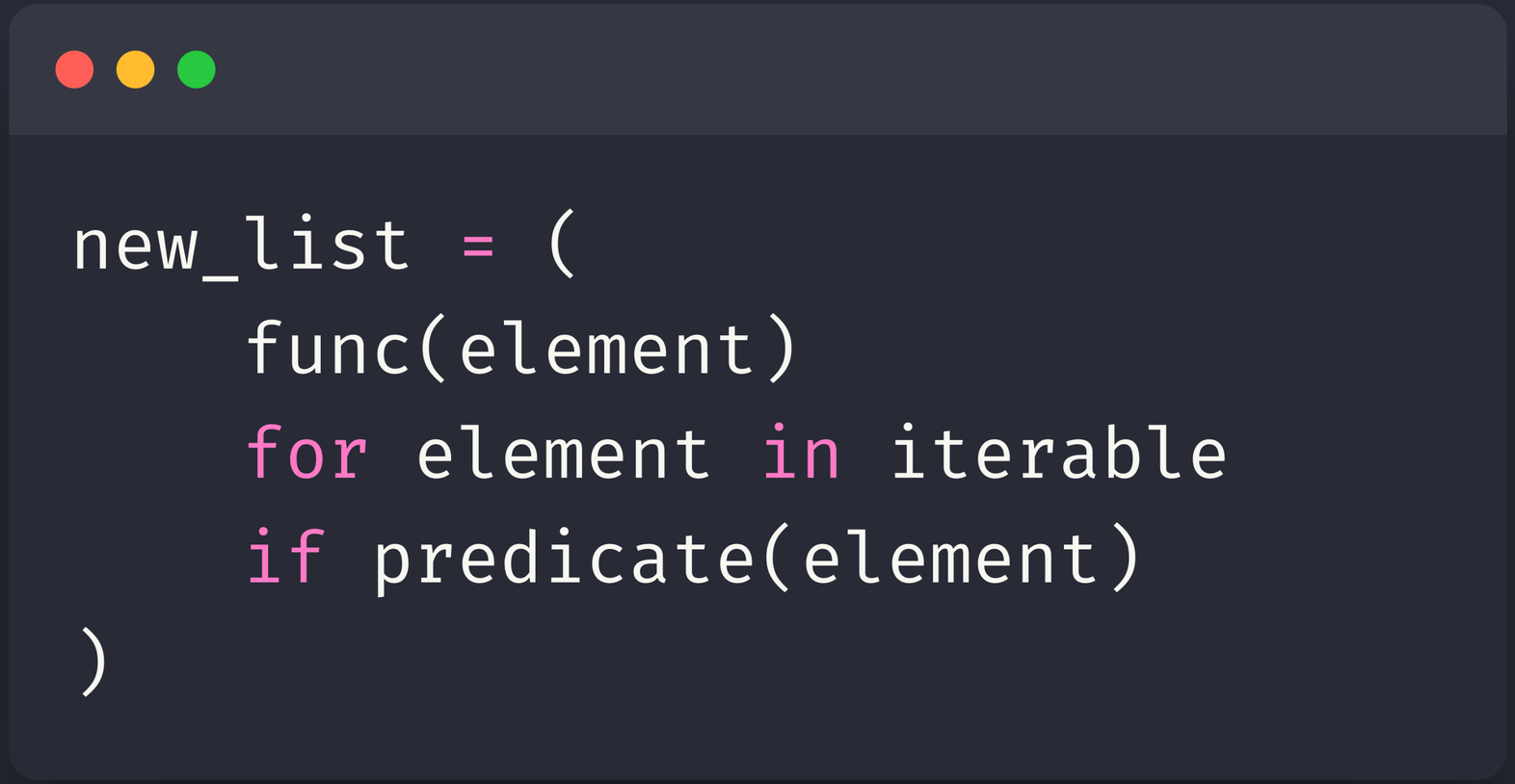

```
new_list = (
    func(element)
    for element in iterable
    if predicate(element)
)
```

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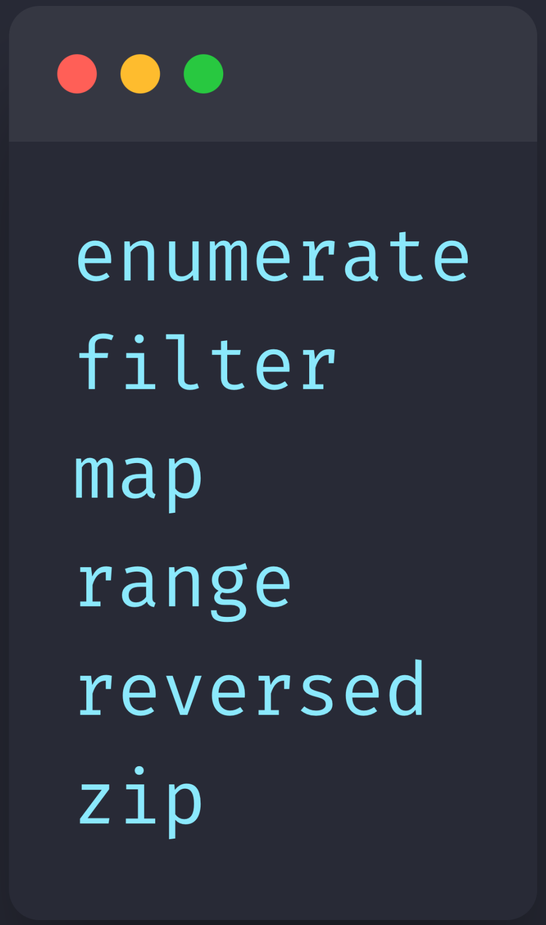

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Workshop tomorrow.

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Just practice

Workshop tomorrow!

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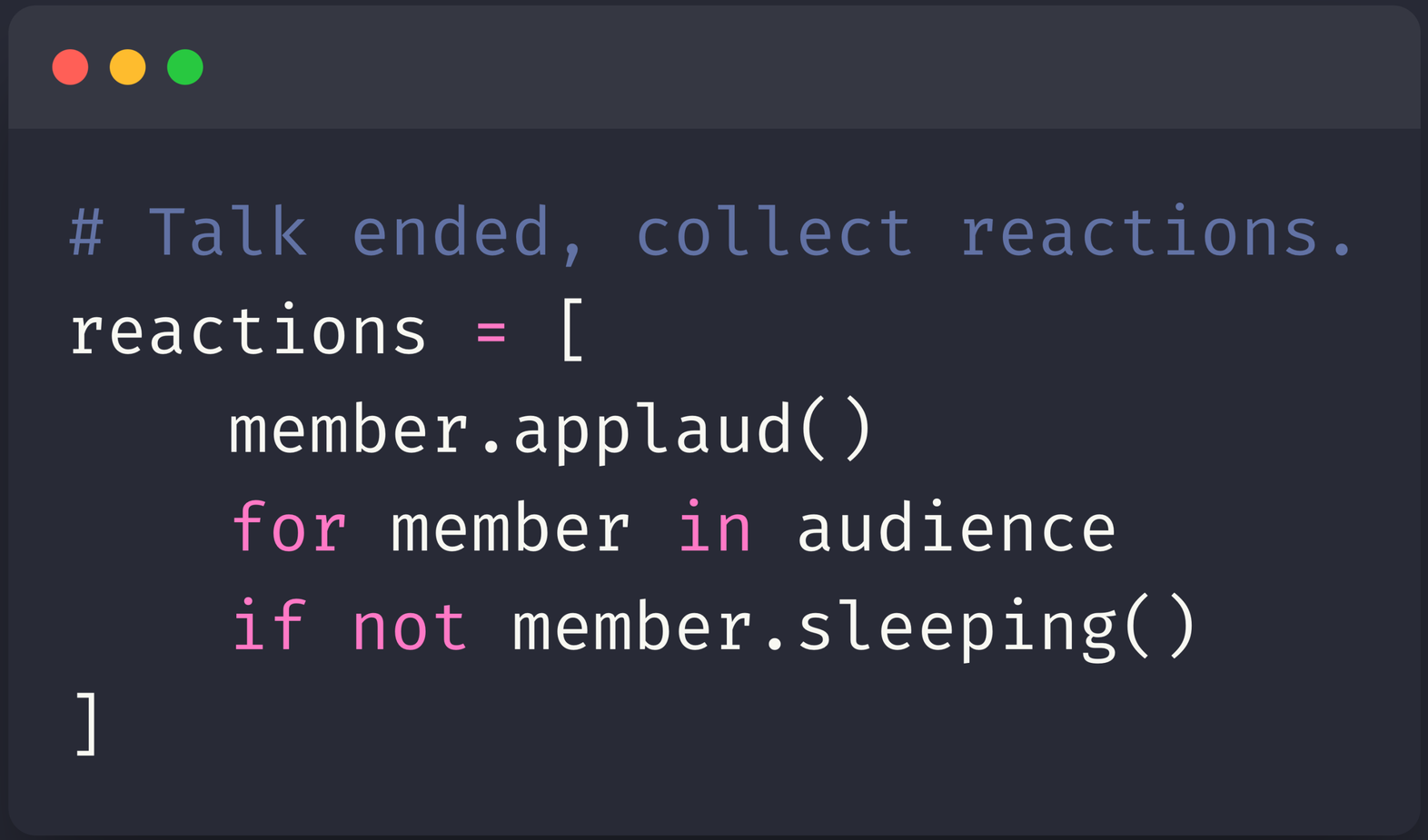
Workshop tomorrow!



```
# Talk ended, collect reactions.
reactions = [
    member.applaud()
    for member in audience
    if not member.sleeping()
]
```

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presented with  snappify*

*no affiliation, they're just awesome

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