

Chapter 3: Control Flow and Loops

Lesson 5: Comprehensions

◇ 1. List Comprehension

Syntax:

```
[expression for item in iterable if condition]
```

Example:

```
squares = [x**2 for x in range(5)] # [0, 1, 4, 9, 16]
evens = [x for x in range(10) if x % 2 == 0] # [0, 2, 4, 6, 8]
```

◇ 2. Dictionary Comprehension

Syntax:

```
{key_expr: value_expr for item in iterable if condition}
```

Example:

```
squares_dict = {x: x**2 for x in range(5)} # {0: 0, 1: 1, 2: 4, 3: 9, 4: 16}
```

◇ 3. Set Comprehension

Syntax:

```
{expression for item in iterable if condition}
```

Example:

```
unique_squares = {x**2 for x in [1, 2, 2, 3]} # {1, 4, 9}
```

Practice Exercises

1. Squares of even numbers from 0 to 20

```
# Output: [0, 4, 16, 36, ..., 400]
```

2. Words longer than 3 characters

```
words = ['hi', 'hello', 'sun', 'cat', 'fantastic']  
# Output: ['hello', 'fantastic']
```

3. Create a dictionary with numbers and their cubes

```
# Output: {1: 1, 2: 8, 3: 27, 4: 64}
```

4. Unique lengths of words

```
words = ['apple', 'bat', 'cat', 'apple', 'dog']  
# Output: {3, 5}
```