COMP 141

For Loops

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Announcements

- Reminders
  - Program 4 due Sunday, October 1st by 11:55pm
  - Midterm 1 is on Wednesday, Oct. 4th

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Practice

1. Write a while loop that prints all divisors of 30.
   - Your code should print out the following:
   1, 2, 3, 5, 6, 10, 15, 30

2. Modify this loop to print out all common divisors of 30 AND 50

3. Now let the user select any 2 integers and print out the common divisors of these 2 integers

4. Challenge: Print out only the largest of the common divisors of these 2 numbers

The `for` Loop

Count-Controlled loop: iterates a specific number of times

- Use a `for` statement to write count-controlled loop
  - Designed to work with sequence of data items
    - Iterates once for each item in the sequence
  - General format:

```
for variable in [val1, val2, etc]:
    statements
```

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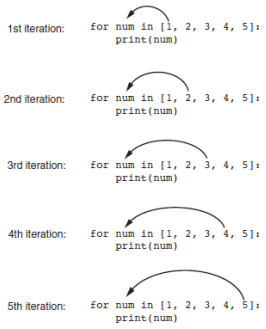
Figure 5-5 The `for` loop



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Using the `range` function

- **The `range` function simplifies the process of writing a `for` loop**
  - `range` returns an iterable object
    - **Iterable**: contains a sequence of values that can be iterated over
- **`range` characteristics:**
  - One argument: used as ending limit
  - Two arguments: starting value and ending limit
  - Three arguments: third argument is step value

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Using `range` Function

Using the **`range`** function, how do we write the same code as the previous example?

```
for num in range(1, 6):
    print(num)
```

1
2
3
4
5

```
for num in range(5):
    print(num)
```

0
1
2
3
4

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From Highest to Lowest

- **The `range` function can be used to generate a sequence with numbers in descending order**
  - Make sure starting number is larger than end limit, and step value is **negative**
  - Example: `range (10, 0, -1)`

[10, 9, 8, 7, 6, 5, 4, 3, 2, 1]

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For Loop Example 1

```
for num in range(1, 10, 1):
    square = num * num
    if square % 5 != 0:
        print("The square of", num, "is", square)
```

Output

```
The square of 1 is 1
The square of 2 is 4
The square of 3 is 9
The square of 4 is 16
The square of 6 is 36
The square of 7 is 49
The square of 8 is 64
The square of 9 is 81
```

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For Loop Example 2

```
total = 0
for num in range(2, 11, 2):
    total += num
print(total)
```

Output

```
30
```

Note: total = 2 + 4 + 6 + 8 + 10

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For Loop Example 3

```
def f_to_c(degrees_f):
    c = (degrees_f - 32) * 5/9
    return c

def main():
    fmin = int(input("Min temp: "))
    fmax = int(input("Max temp: " ))

    for fah_temp in range(fmin, fmax+1, 10):
        cel_temp = f_to_c(fah_temp)
        print(fah_temp, cel_temp)

main()
```

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Class Activity

Compute the sum of the first n odd positive integers using a `for` loop

Example:

- if n is 5, you should compute 1 + 3 + 5 + 7 + 9.

In-Class Lab