COMP 141

For Loops

Announcements

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

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
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

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)
```

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

<table>
<thead>
<tr>
<th>num</th>
<th>num</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

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]
```
For Loop Example 1

```python
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 5 is 25
The square of 6 is 36
The square of 7 is 49
The square of 8 is 64
The square of 9 is 81

For Loop Example 2

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

Output
30

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

For Loop Example 3

```python
def f_to_c(degree_f):
    c = (degree_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()
```

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