

Ranges

Ranges

A range is a group of numbers. (They must be ints, whole numbers.)

A range is an iterator like a string or list.

A range is different from a list of numbers, in that it does not store all the numbers it instead uses calculations to determine what the numbers should be.

We use them because they are really simple to write out, create, and don't force us to type out a list of numbers.

They also take up considerably less ram than a list containing the same information.



Ranges

If you give 1 number (`range(x)`) it will count from 0 to $x-1$

If you give 2 numbers (`range(x,y)`) it will count from x to $y-1$

If you give 3 numbers `range(x,y,z)` it will count starting at x by steps of z while the count is less than y .

```
x = range(25)
x = range(13, 25)
x = range(13, 25, 3)
```



Ranges in Loops

Ranges are commonly paired with for loops.

They allow us to use a sequence of numbers rather than iterating over something.

This is useful for example if we need the index of the list as well as the entry. Like if we were writing out a list to string where it was index:entry, index:entry etc.

```
for x in range(15, 0, -5):  
    print(x)
```



Exercise - What is the Output?

1.

```
for i in range(16,2,-3):  
    print(i, end=" ")
```

2.

```
for i in range(4):  
    print(i, i+1, sep=", ")
```

3.

```
for i in range(3,2):  
    print(i)
```



Exercise

1. Write a range that is every five years from 1960 to 2000.
2. Write a range that counts down from 30 to 0



Exercise

Rewrite the for loop we made last class that goes through a list and prints each item in the list, along with its index. (Hint: you can use a range, and you won't need a separate counter variable.)

Example:

```
planets = ["mercury", "venus", "earth", "mars"]  
0: mercury, 1: venus, 2: earth, 3: mars
```



Exercise

You have a list of employees, and a list of job titles. Assume the lists are the same length and in the same order.

Use **one for loop** to go through both lists and print the job title of each employee.

For example, if these are your lists:

```
employees = ['Bob', 'Cynthia', 'Abdul']  
job_titles = ['accountant', 'engineer', 'recruiter']
```

This should be your output:

```
Bob's job title is accountant.  
Cynthia's job title is engineer.  
Abdul's job title is recruiter.
```



Exercise

Write some code that creates a range based on what the user enters.

Challenge: you can make a range with 1, 2, or 3 numbers. How would you allow the user to pick any of these options?



Resources

Basics about ranges: https://www.w3schools.com/python/ref_func_range.asp

More info about ranges: <https://realpython.com/python-range/>

