NPTEL MOOC

PROGRAMMING, DATA STRUCTURES AND ALGORITHMS IN PYTHON

Week 3, Lecture 1

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More about `range()`

- `range(i,j)` produces the sequence `i,i+1,…,j-1`
- `range(j)` automatically starts from `0`; `0,1,…,j-1`
- `range(i,j,k)` increments by `k`; `i,i+k,…,i+nk`
  - Stops with `n` such that `i+nk < j <= i+(n+1)k`
- Count down? Make `k` negative!
  - `range(i,j,-1)`, `i > j`, produces `i,i-1,…,j+1`

More about `range()`

- General rule for `range(i,j,k)`
  - Sequence starts from `i` and gets as close to `j` as possible without crossing `j`
- If `k` is positive and `i >= j`, empty sequence
  - Similarly if `k` is negative and `i <= j`
- If `k` is negative, stop “before” `j`
  - `range(12,1,-3)` produces `12,9,6,3`

More about `range()`

- Why does `range(i,j)` stop at `j-1`?
  - Mainly to make it easier to process lists
  - List of length `n` has positions `0,1,..,n-1`
  - `range(0,len(l))` produces correct range of valid indices
    - Easier than writing `range(0,len(l)-1)`

`range()` and lists

- Compare the following
  - `for i in [0,1,2,3,4,5,6,7,8,9]:`
  - `for i in range(0,10):`
- Is `range(0,10) == [0,1,2,3,4,5,6,7,8,9]`?
  - In Python2, yes
  - In Python3, no!

range() and lists

- Can convert range() to a list using list()
  - list(range(0,5)) == [0,1,2,3,4]
- Other type conversion functions using type names
  - str(78) = "78"
  - int("321") = 321
    - But int("32x") yields error

Summary

- `range(n)` has is implicitly from `0` to `n-1`
- `range(i,j,k)` produces sequence in steps of `k`
  - Negative `k` counts down
- Sequence produced by `range()` is not a list
  - Use `list(range(..))` to get a list