

reduce()

Many times students have difficulty understanding `reduce()` so pay careful attention to this lecture. The function `reduce(function, sequence)` continually applies the function to the sequence. It then returns a single value.

If `seq = [s1, s2, s3, ... , sn]`, calling `reduce(function, sequence)` works like this:

- At first the first two elements of `seq` will be applied to function, i.e. `func(s1,s2)`
- The list on which `reduce()` works looks now like this: `[function(s1, s2), s3, ... , sn]`
- In the next step the function will be applied on the previous result and the third element of the list, i.e. `function(function(s1, s2),s3)`
- The list looks like this now: `[function(function(s1, s2),s3), ... , sn]`
- It continues like this until just one element is left and return this element as the result of `reduce()`

Let's see an example:

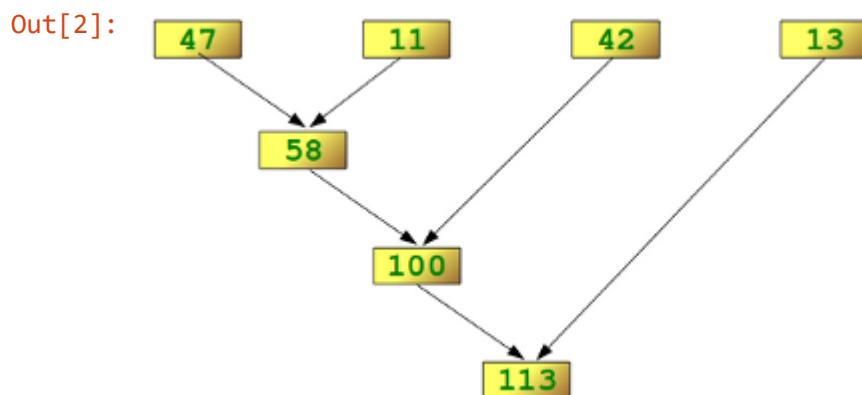
```
In [1]: from functools import reduce

lst =[47,11,42,13]
reduce(lambda x,y: x+y,lst)
```

Out[1]: 113

Lets look at a diagram to get a better understanding of what is going on here:

```
In [2]: from IPython.display import Image
Image('http://www.python-course.eu/images/reduce_diagram.png')
```



Note how we keep reducing the sequence until a single final value is obtained. Lets see another example:

```
In [3]: #Find the maximum of a sequence (This already exists as max())
max_find = lambda a,b: a if (a > b) else b
```

```
In [4]: #Find max  
reduce(max_find, lst)
```

Out[4]: 47

Hopefully you can see how useful reduce can be in various situations. Keep it in mind as you think about your code projects!