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]:

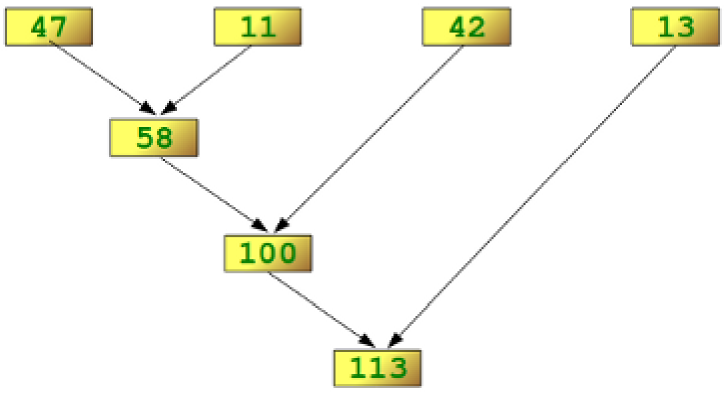
```
113
```

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')
```

Out[2]:



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!