Names and values

Scalar int, float, bool, no char

↓

✓ a and b   a or b   LOGICAL

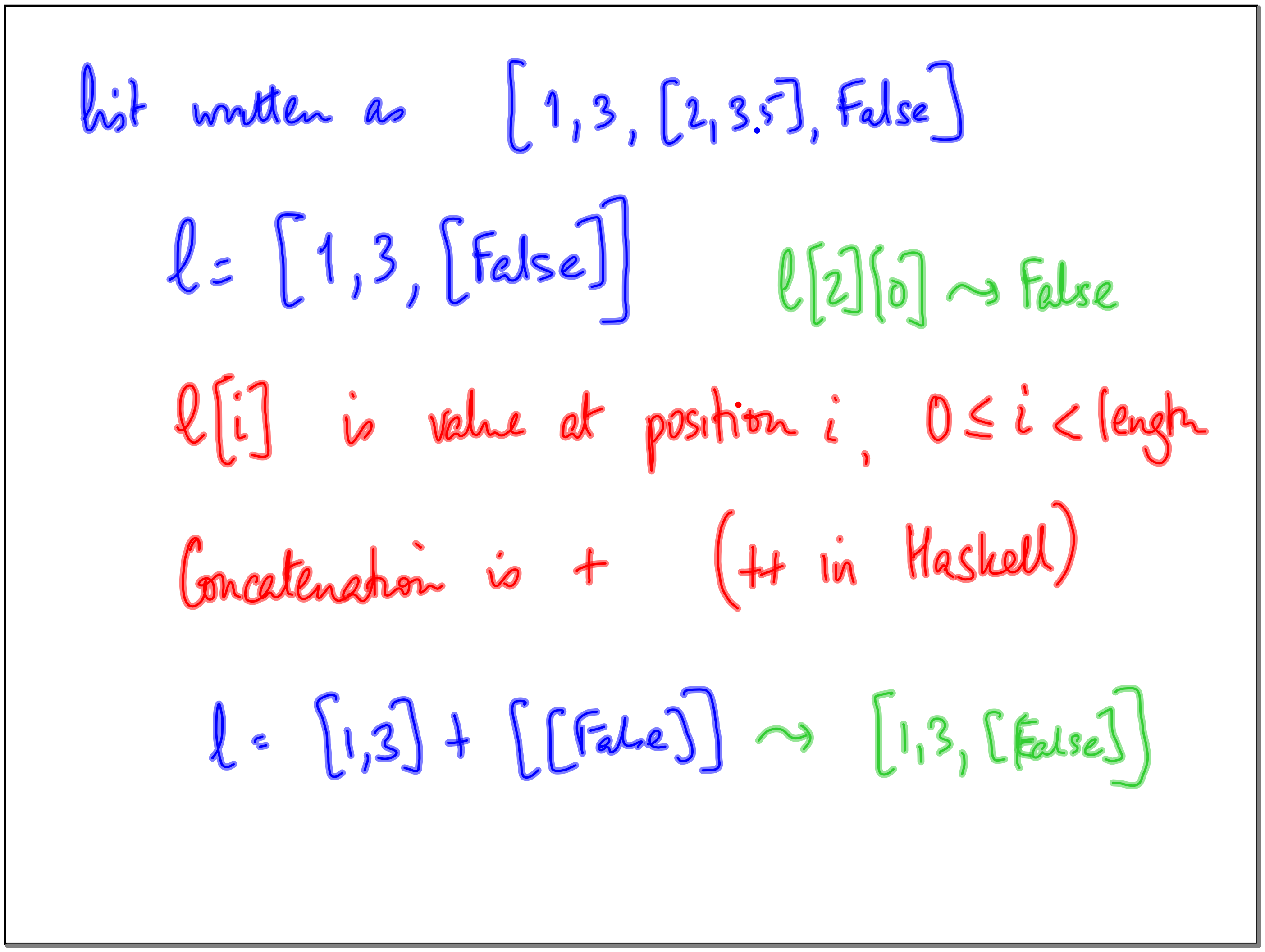
✗ a & b   a | b   BITWISE

Lists – example of "sequence"

Lists

Strings

Tuples



list written as [1, 3, [2, 3.5], False]

l = [1, 3, [False]]   l[2][0] $\rightsquigarrow$ False

l[i] is value at position i, $0 \leq i <$ length

Concatenation is + (++ in Haskell)

l = [1,3] + [[False]] $\rightsquigarrow$ [1,3, [False]]

$l[i:j]$ "slice" $[l[i], l[i+1], \ldots, l[j-1]]$

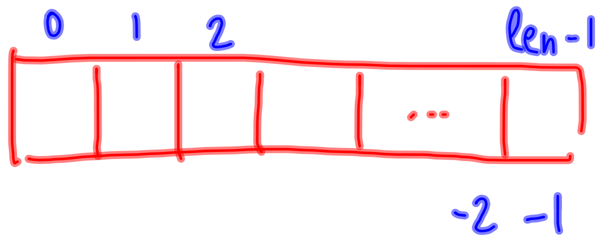
Prefix $l[0:j]$, also $l[:j]$

$\underline{len}(l)$ is length of l

Suffix $l[i:len(l)]$, also $l[i:]$

"Full" slice : $l[:]$

Negative indices are interpreted from right end



String: h = "hello"

x = ' "world" '

} Single or double quote

y = ''' "John's ball" ''' Triple quote!

Like lists: h = "hello" x = '"world"'

h[2] $\rightsquigarrow$ "l"

h+x $\rightsquigarrow$ 'hello"world"'

h[2:4] $\rightsquigarrow$ "ll"

Tuples

```
pair = (3,4)
info = ("AB", 62, 3.5, False)
```

What about updates?

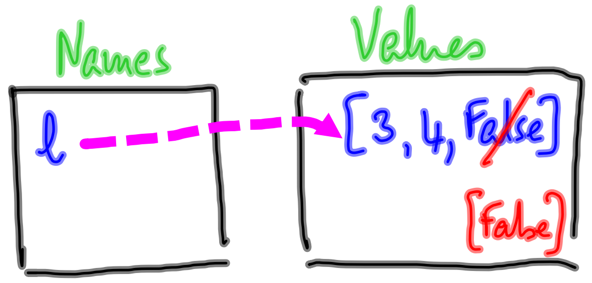
l= [3, 4, False]

Want to change False to [False]

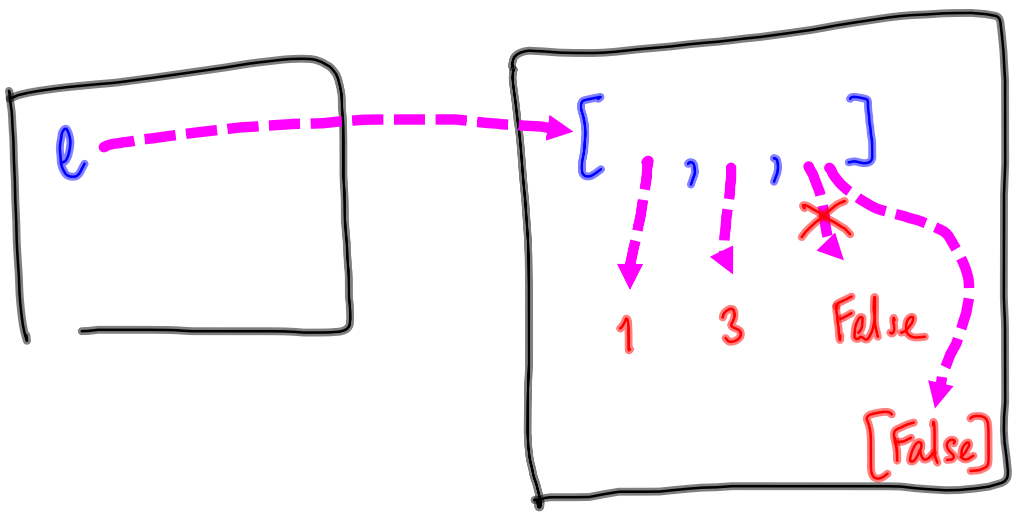
Update in place

l[2] = [False]

What does this mean?



More correct picture



h = "hello" Want "help!"

h[3] = "p" , h[4] = "!" X

Lists are <u>mutable</u>

Strings & tuples (and scalars) are <u>immutable</u>

Instead: h = h[0:2] + "p!"

In a list, can directly update a slice

l = [1, 3, 6.2, [True], 8]

l[1:4] = [5, "hello", 62]

$$[1, \underline{5, \text{"hello"}}, 62, 8]$$

l[1:3] = [16, 18, 19] $\quad [1, \underline{16, 18, 19}, 62, 8]$

Can contract a slice

```
l[i:j] = []
```

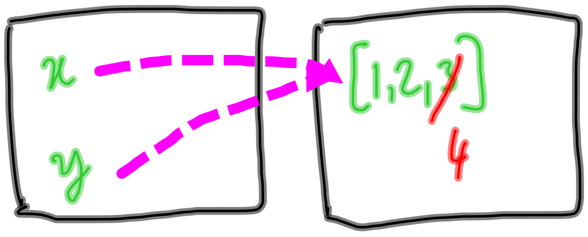
deletes the slice

```
x = [1,2,3]

y = x
```

DOES NOT COPY THE LIST

```
y[2] = 4
```



```
y = x[:]
```

slice always makes a new object

Use full slice to make a copy of a list

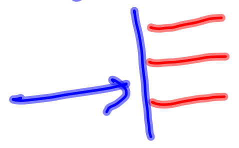
Function definitions in Python:

```
def examplefn(x):
    y = 2*x
    return(y)
```

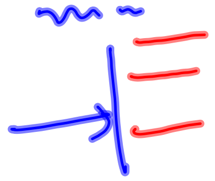
indent uniformly

Modifying control flow

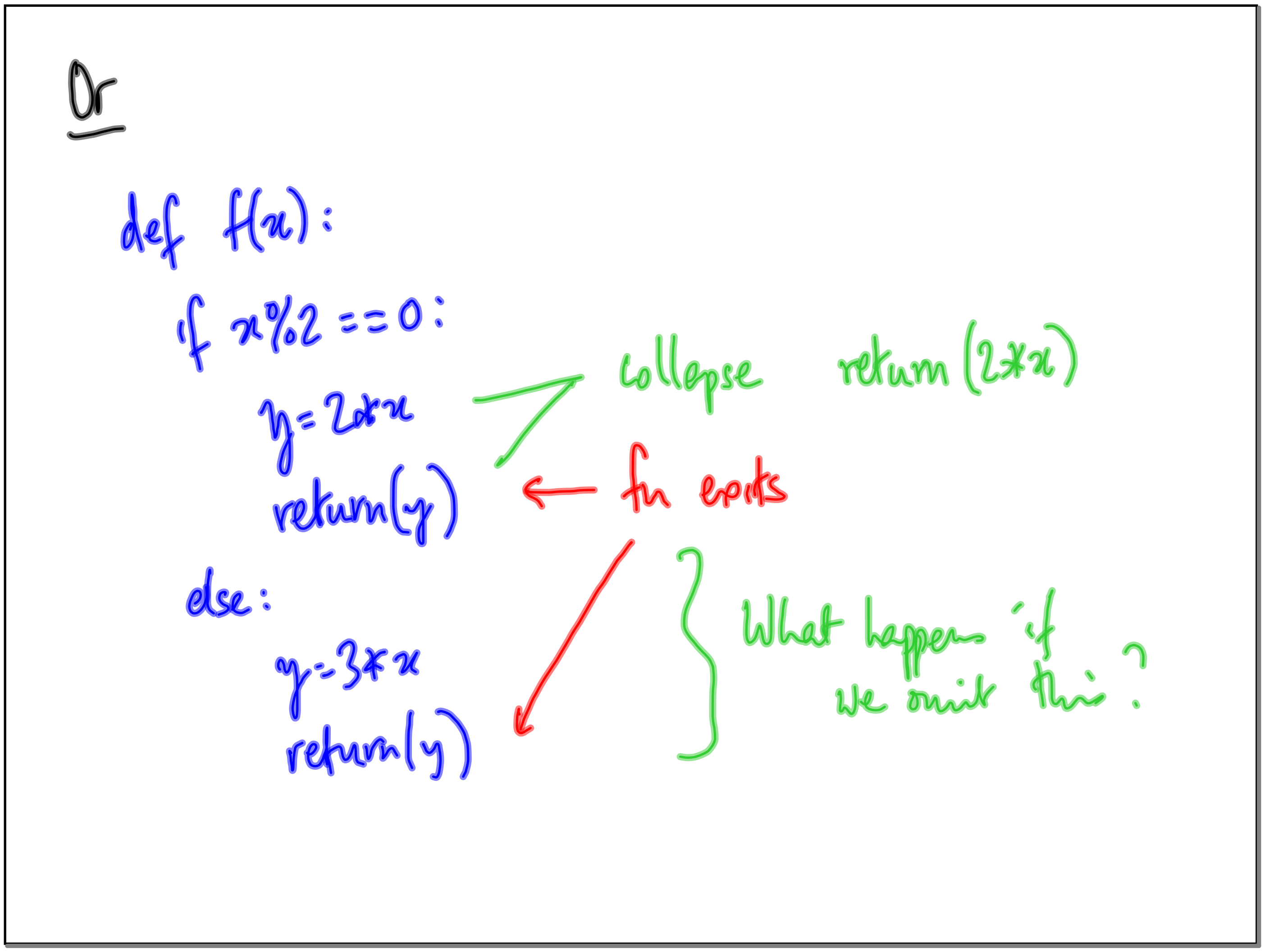
if conditional-expression:



else: OPTIONAL



```
def f(x):
    if x%2 == 0:
        y = 2*x
    else:
        y = 3*x
    return(y)
```



Or

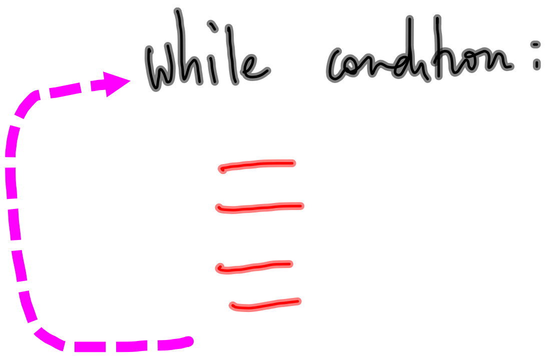
```
def f(x):
  if x%2 == 0:
    y = 2*x
    return(y)
  else:
    y = 3*x
    return(y)
```

collapse return(2*x)

fn exits

What happens if we omit this?

Do something repeatedly



```
def mylog(x,n):
    ans = 0
    while x >= n :
        x = x//n
        ans = ans + 1

    return(ans)
```