## Environments to understand bindings

- Environments are formalism for tracking bindings of variables and values
- Assignments pair name and value in environment
- Asking for value of name just looks up in current environment
- Python shell is default (or global) environment
- Definitions pair function name with details of function

```
x = 5
p = 3

result = 1

for turn in range(p):
    print('iteration: ' + str(turn) + 'current result: ' +
  str(result))
    result = result * x
```

Global environment

| | |
|---|---|
| x | 5 |
| p | 3 |
| result | ~~1~~, ~~5~~, ~~25~~, 125 |

```
x = 5
p = 3

result = 1

for turn in range(p):
    print('iteration: ' + str(turn) + 'current result: ' +
   str(result))
    result = result * x
```

|   |   |
|---|---|
| x | 5 |
| p | 3 |
| result | 125 |

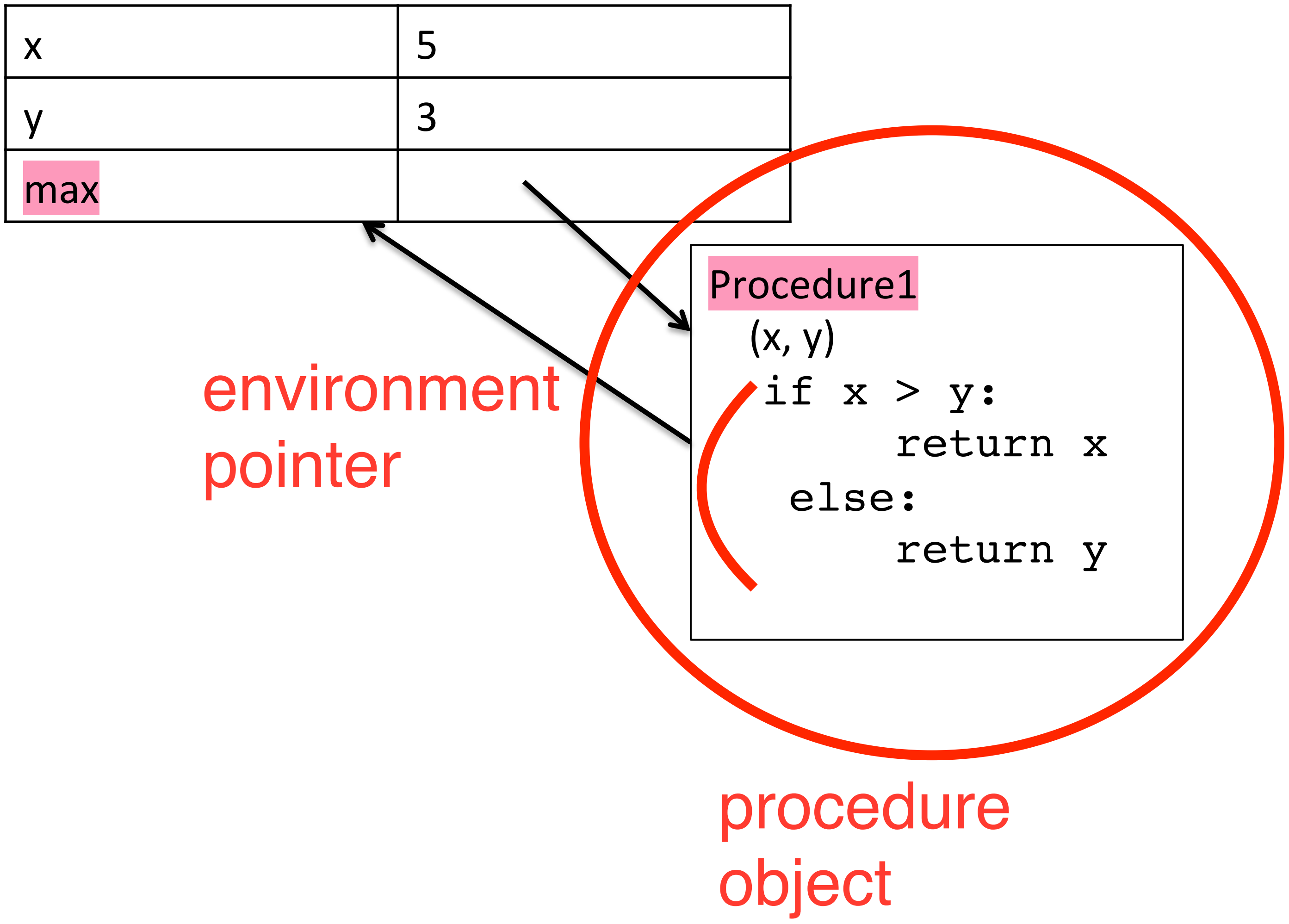
Result

125

# Back to functions

```
x = 5
y = 3

def max(x, y):
    if x > y:
        return x
    else:
        return y
```



## When we call a function

- Want to evaluate `<expr0>(<expr1>, …, <exprn>)`
- First evaluate `<expr0>`, which looks up procedure object in environment
- Then evaluate each of the other `<expri>` to get values of parameters
- Bind parameter names in procedure object to values of arguments in a new frame, which has as a parent the environment in which procedure was defined
- Evaluate body of procedure relative to this new frame

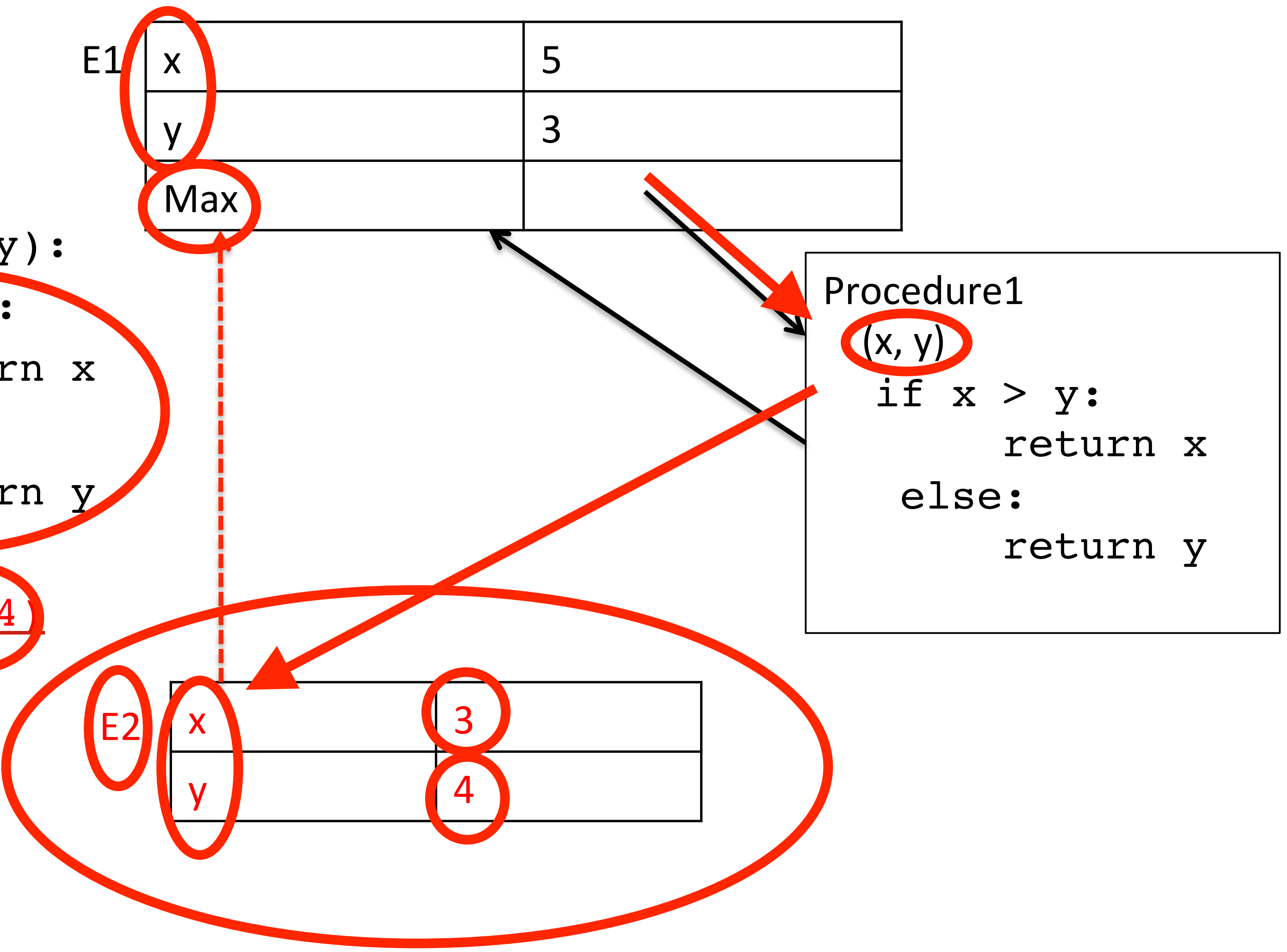
# When we call the function

```
x = 5
y = 3

def max(x, y):
    if x > y:
        return x
    else:
        return y

z = max(3, 4)
```

= 4


E1
x
5
y
3
Max
Procedure1
(x, y)
if x > y:
return x
else:
return y
E2
x
3
y
4