

CONTROL & ENVIRONMENTS

CS 61A GROUP MENTORING

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1 Environment Diagrams

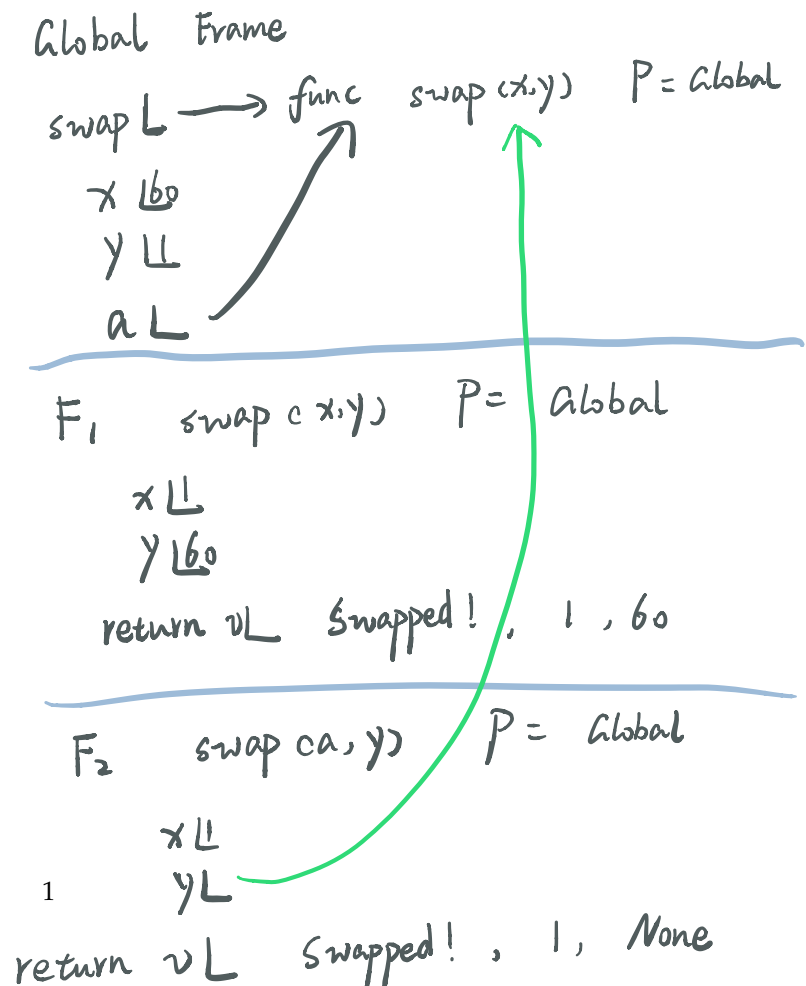
1. When do we make a new frame in an environment diagram?

When we call a function

2. Draw the environment diagram that results from running the following code.

```
def swap(x, y):  
    x, y = y, x  
    return print("Swapped!", x, y)
```

```
x, y = 60, 1  
a = swap(x, y)  
swap(a, y)
```

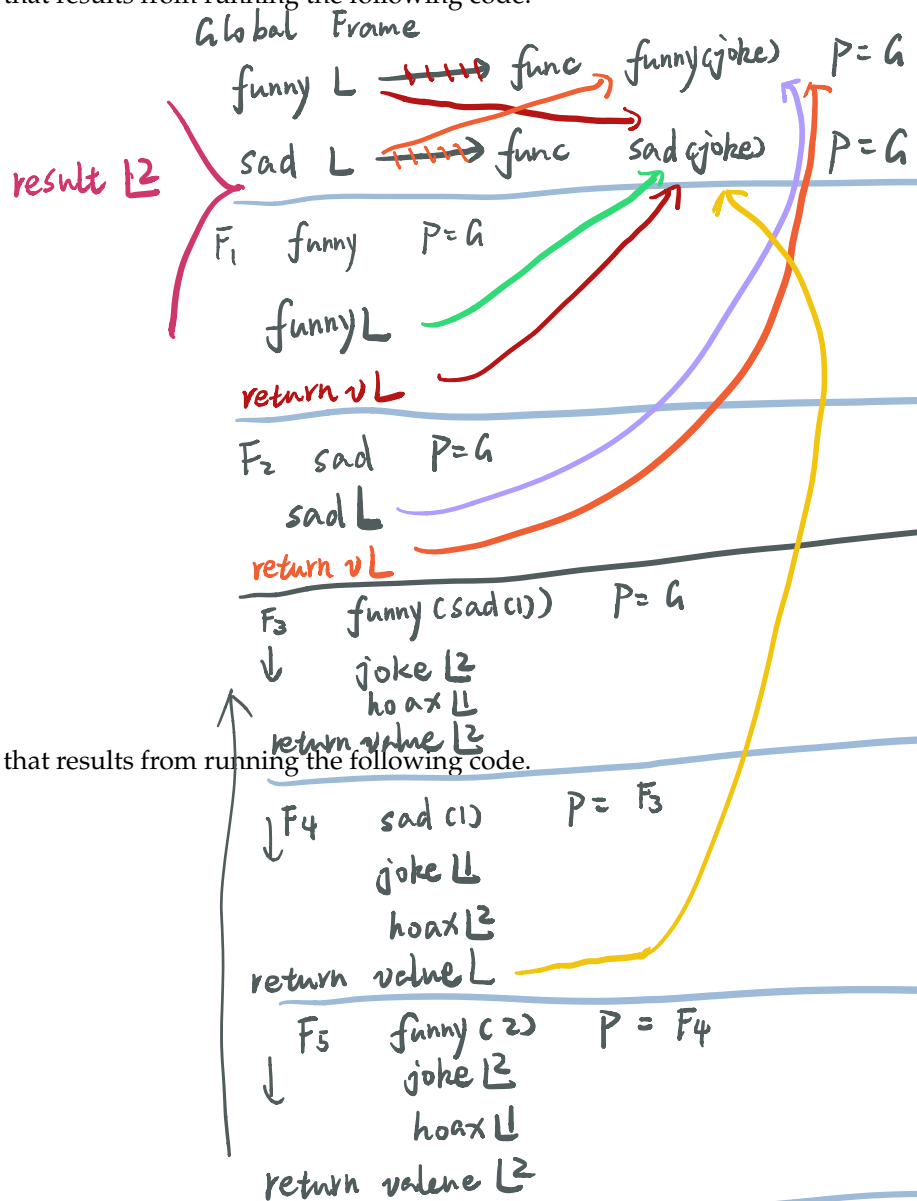


3. Draw the environment diagram that results from running the following code.

```
def funny(joke):
    hoax = joke + 1
    return funny(hoax)
```

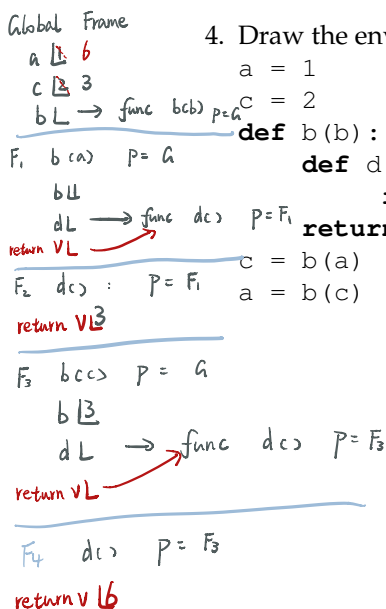
```
def sad(joke):
    hoax = joke - 1
    return hoax + hoax
```

```
funny, sad = sad, funny
result = funny(sad(1))
```



4. Draw the environment diagram that results from running the following code.

```
a = 1
c = 2
def b(b):
    def d():
        return b + c
    return d()
c = b(a)
a = b(c)
```



2 Control

1. Write a function that returns true if a number is divisible by 4 and false otherwise.

```
def div-by-4(x):  
    if x % 4 == 0:  
        return True  
  
    else:  
        return False
```

2. Write a function, `is_leap_year`, that returns true if a number is a leap year and false otherwise. Recall that a *leap year* is divisible by 4 unless the year is not divisible by 400.

```
def is_leap_year(x):  
    if x % 4 == 0 and x % 100 != 0:  
        return True  
  
    elif x % 400 == 0:  
        return True  
  
    else:  
        return False
```

3. Implement `fizzbuzz(n)`, which prints numbers from 1 to `n` (inclusive). However, for numbers divisible by 3, print "fizz". For numbers divisible by 5, print "buzz". For numbers divisible by both 3 and 5, print "fizzbuzz".

```
def fizzbuzz(n):
    """
    >>> result = fizzbuzz(16)
    1
    2
    fizz
    4
    buzz
    fizz
    7
    8
    fizz
    buzz
    11
    fizz
    13
    14
    fizzbuzz
    16
    >>> result is None
    True
    """
```

```
k = 1
while k <= n:
    if k % 3 == 0 and k % 5 == 0:
        print("fizzbuzz")
    elif k % 3 == 0:
        print("fizz")
    elif k % 5 == 0:
        print("buzz")
    else:
        print(k)
    k += 1
```