Consider the following code:

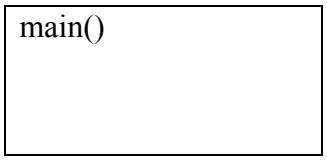
```
1  def main():
2      a = 10
3      b = 55
4      print("in function main........dir() = %s" % ( dir() ))
5      result = absval(a,b)
6      print("The absolute value of %d - %d = %d" % (a,b, result))
7
8  def absval(x,y):
9      print("in function absval......dir() = %s" % ( dir() ))
10     if x > y:
11       z = x - y
12     else:
13       z = y - x
14     #
15     #Draw stack frame here
16     #
17     return z
18
19  main()
```

`dir()` is a Python function that lists all of the variables currently **in scope**.

For tracing through a program using a stack diagram, follow these steps:

1. Draw stack frame for the function that was called
    a. Allocate the function parameters in this frame (e.g., `x, y`)
    b. Store the local variables in this frame (e.g. `a, b, z`)
2. Assign the **parameters** the values of the **arguments** used when calling the function
3. Move to the function definition, and execute the function step-by-step
4. Send the return value back to calling function
5. Remove function from the stack
6. Continue executing whichever function is now remaining at top of stack

Once we call main, here's what happens. Our stack frame:

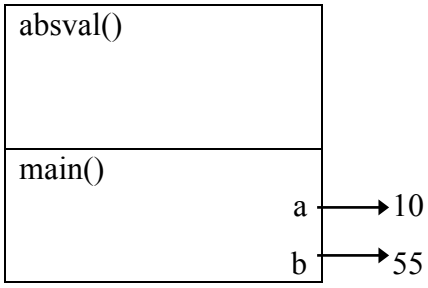


After lines 2 and 3:

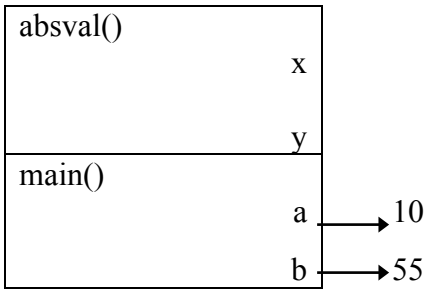
Line 4 prints to the screen

```
in function main........dir() = ['a', 'b']
```

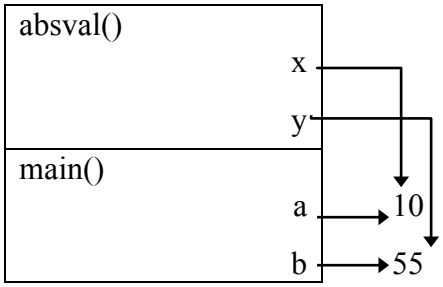
Line 5 calls absval(). We take a look at our procedure and allocate space on the stack first:



Then allocate parameters:



Assign the parameters the value of the arguments from the call in main() – the values `a` and `b` respectively:

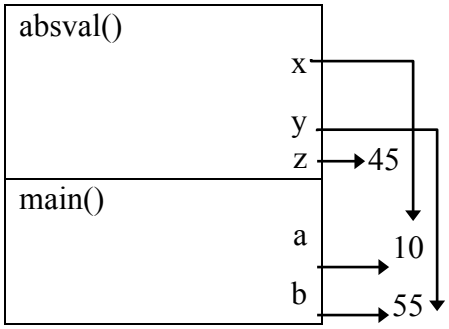


Now we start going through the function line-by-line. At line 9 we print:

```
in function absval.....dir() = ['x', 'y']
```

line 10 is false since `x` (i.e., 10) is less than `y` (55)

we then jump to the else and execute line 13 yielding…..

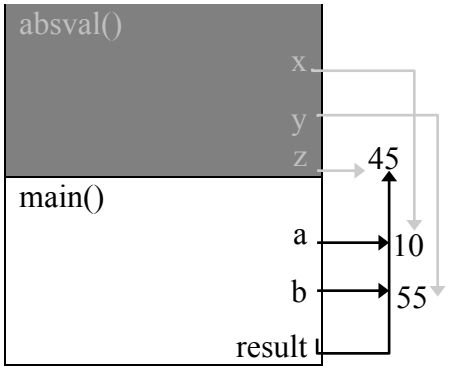


THIS IS THE SOLUTION!

Note, z is a local variable and should be in the stack
Also, we have not yet hit `return` therefore you can have `result` on the stack, but it **should not** have a value yet.

If you are curious, to finish up…

The next line is 17 where we return `z`. We allocate `result` on the stack, assign it the return value, and then remove `absval` from the stack (shown here as grayed out).



This also returns execution to line 5, which is now done. We move on to line 6 which prints to the screen:

```
The absolute value of 10 - 55 is 45
```

main() is now complete, so technically we return from this function, erase main() from the stack and are left with nothing, so python exits.

So, in total, the output was:

```
in function main........dir() = ['a', 'b']
in function absval......dir() = ['x', 'y']
The absolute value of 10 - 55 = 45
```