CS21: INTRODUCTION TO COMPUTER SCIENCE

Prof. Mathieson

Fall 2018

Swarthmore College

Informal quiz: discuss with a new partner

Code draft from Student X: mystery_error.py

```
def mystery(lst):
    s = 0
    for i in range(10):
        s = s + lst(i)
    print(s)

def main():
    my_lst = [8, 3, 7, 2, 4, 9, 1, 19, 2, 17]

    mystery(my_lst)
    print("result1 is:", s)
    print("result2 is:", s/len(my_lst))

main()
```

1) What is Student X trying to do?

2) What errors do you notice in this program?

3) What style modifications would you make?

Outline Sept 26:

- Hand back Quiz 1
- Continue Functions (go over **factorial.py**)
- Scope and program execution
- Stack diagrams
- Multi-function example: **first_last.py**

Notes

- **Lab 3** due **Saturday** night
- Ninja session tonight! 7-10pm
- **Office hours Friday 3-5pm**

Continue Functions

factorial.py example solution

```
"""
Practice with functions. Write a function that takes one argument, a
non-negative integer n, and returns n! = n*(n-1)*(n-2)....3*2*1. Note: 0! = 1

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Date: 9/24/18
"""

def factorial(n):
    """
    Given a non-negative integer n, return n! = n*(n-1)*(n-2)....3*2*1.
    """
    fact = 1 # set up an accumulator variable
    for i in range(n):
        fact = fact * (i+1) # accumulator pattern
    return fact

def main():
    """
    In the main function, test the factorial function.
    """
    # test on 100 different numbers
    for n_test in range(100):

        # call/invoke the factorial function
        result = factorial(n_test)

        # print the result
        print("%i! = %i" % (n_test, result))

main()
```
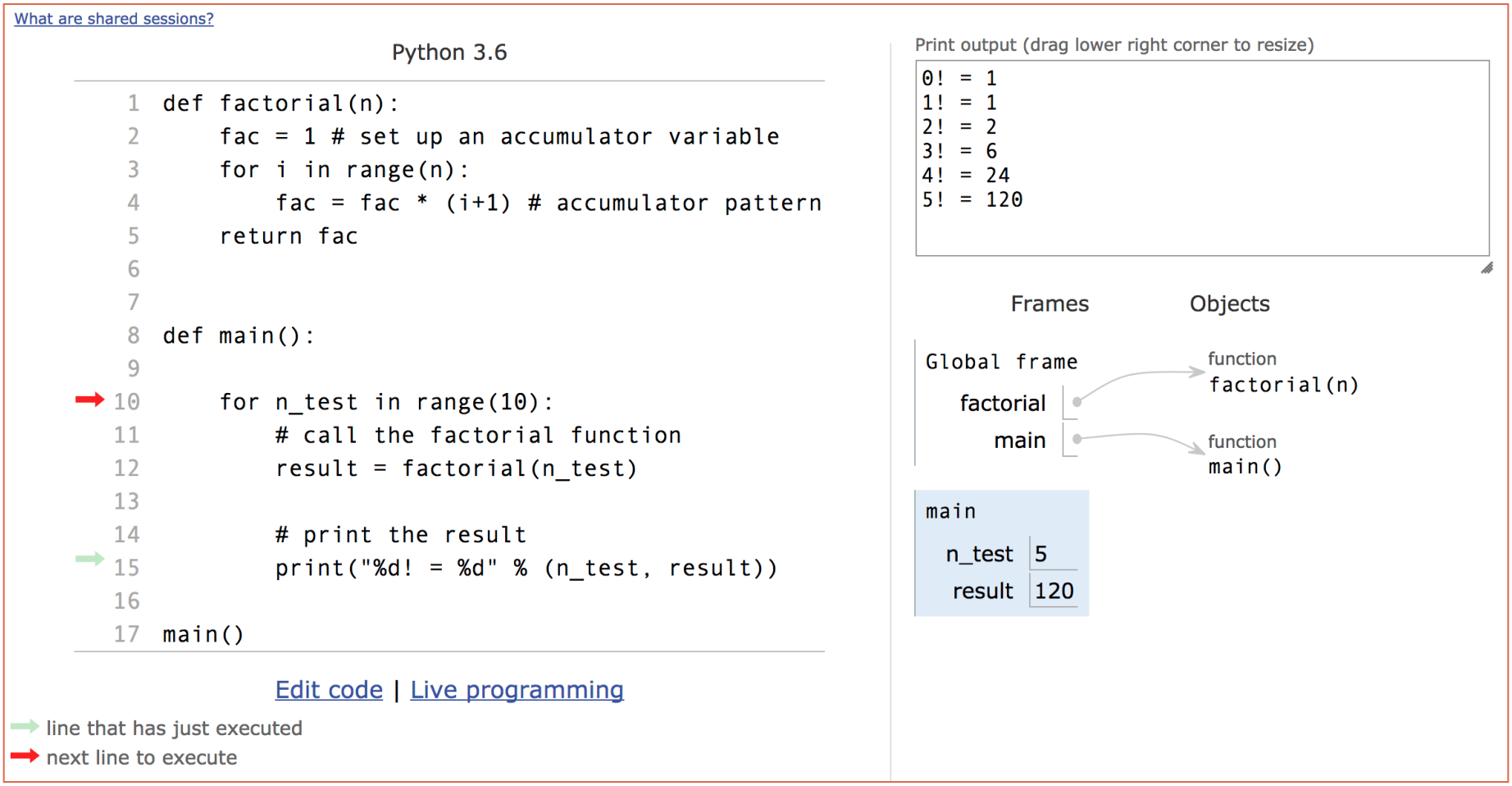

Scope and program execution



pythontutor.com, stack diagrams

first symbols: ! * + = . ?

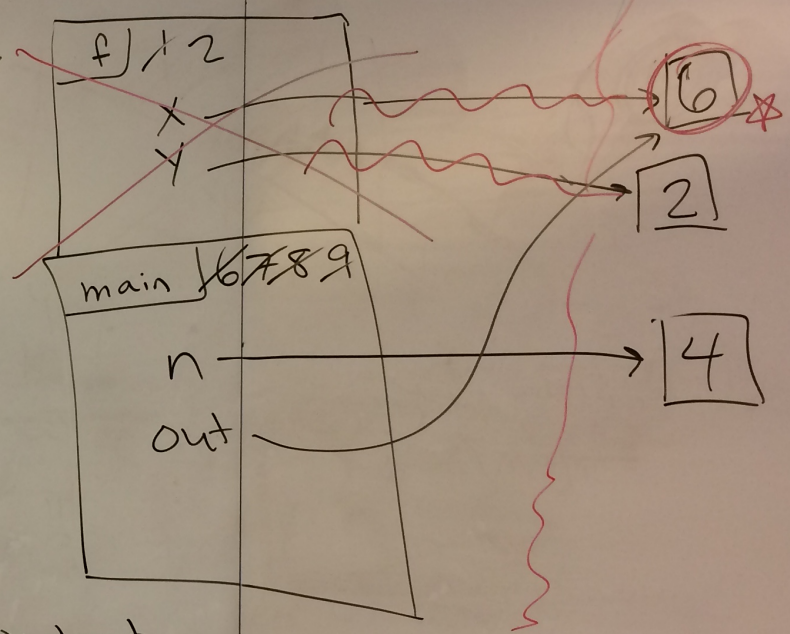
second uppercase: A B ... Z

third lowercase: a b ... z

```
1  def f(x,y):
2      x = x + y
       # draw stack/heap here
3      print(x)
4      return x
5
6  def main():
7      n = 4
8      out = f(n, 2)
9      print(out)
10
11 main()
```

function stack

heap (values)



output

6

6

Program for today

- **cs21/inclass/week04/first_last.py**
- Work with a partner
- Write the functions in order, testing each one
- No need to change main! Only to uncomment test cases