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# Python #3

## Function Fun

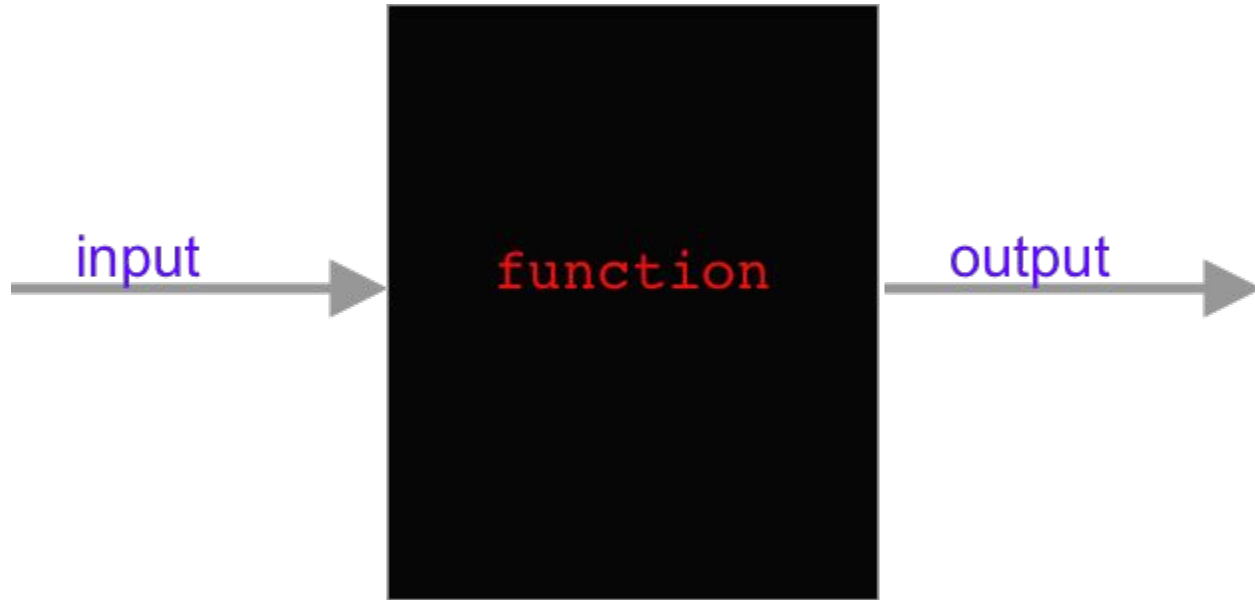
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# Function as a black box



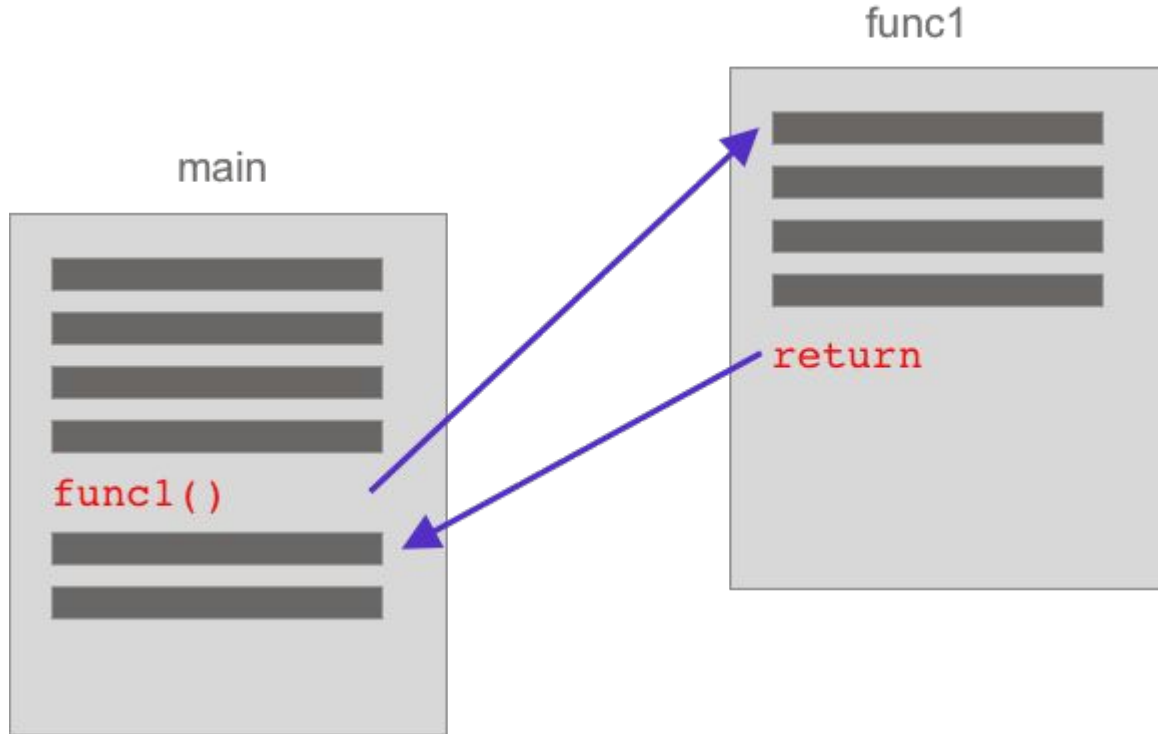
# What is a function?

- Black box which does something
- Can take inputs, produce outputs
- Interrupts normal program flow
  - Program executes until function is **called**
  - Function executes until **return**
  - Program continues following the call

# Why functions?

- Reusability
- Abstraction
- Readability
- Testability
- Maintainability
- Extensibility

# Function control flow



# Fun Function Facts

- Function is a type (like int, float, str...)
- Functions may contain parameters (arguments), passed in
- Functions may return a value, or multiple values
- Arguments and return values can be any type, including function
- A function can call other functions, (including itself)
- A function may contain definitions of new functions
- Scope of variables inside a function are local to that function, and invisible from outside the function
- Functions may expect a specific number of arguments, or allow a variable number of arguments
- The value of some function arguments may have defaults
- Object references are passed by value.

# Some function patterns

- No args, no return values
- Args, single return value
- Return multiple values
- Call another function

## Advanced

- Return a function
- Function as an argument
- Define and call a function
- Recursive

# Function domains

- Included in “Python”
  - Built-ins
  - Standard library (module)
- Produced by others
  - User-defined in current file
  - User-defined in another file
  - User-defined, installed (module)



# Some functions we could write....

1. For given string, make upper, lower, title case
2. Add html tag around word
3. Return count of substring in string, ignoring case
4. Delete nth char from string
5. Write string "replace" using string "find"
6. Insert substring (like newline) in middle of string

# YouTube channel

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