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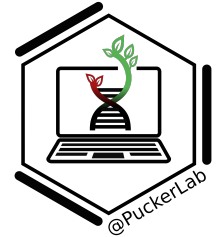

Prof. Dr. Boas Pucker

Python - Functions

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Availability of slides

- All materials are freely available (CC BY) - after the lectures:
  - GitHub: https://github.com/bpucker/PyBo

- Questions: Feel free to ask at any time

- Feedback, comments, or questions: pucker[a]uni-...

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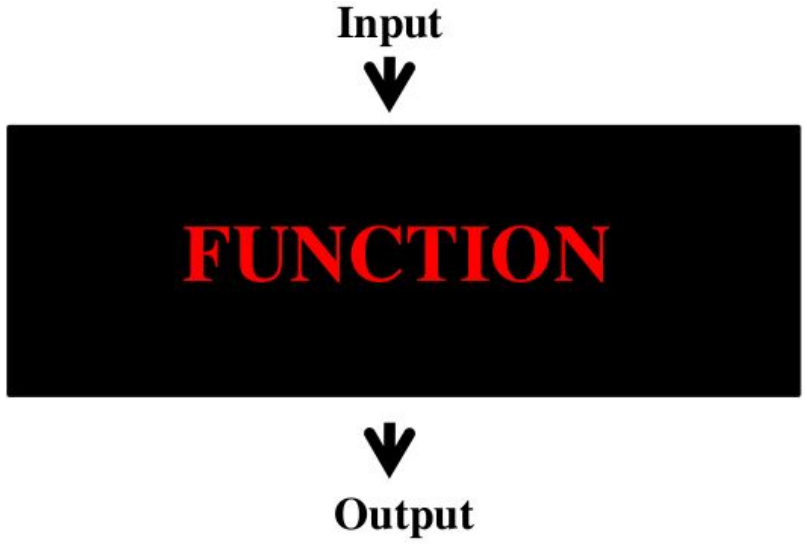
What is a function?



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Elements of a function

```
1   #def: Function indicator
2   #sqrt_root_calculator: function name (no spaces in name!)
3   #number: argument/parameter
4
5   def sqrt_root_calculator( number ):
6       """ calculates sqrt root of given number """
7
8       sqrt_root = number**0.5 #calculation
9
10      #Body of function (everything happens here)
11
12      return sqrt_root    #return of result (optional)
13      #Function ends at return (following lines would be ignored)
14
15  #Function is only defined (nothing happens to this point)
16
17  result = sqrt_root_calculator( 125 )    #function call
18  #Calling function with an argument (definition above is required)
```

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Advantages of functions

- Generate modules: write it onces and apply it often (for different purposes)
- Structure: increase readability of your code
- Nested calculations are enabled by functions

```
1  def get_gc_content( seq ):
2      """ calculates GC content of given sequence """
3      return float( seq.count('G')+ seq.count('C') ) / len(seq)
4
5  gc_content = get_gc_content("ATGCGACTCAATGCA")
6  print(gc_content)
```

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Important functions

- str(<VARIABLE>) #converts variable to string
- int(<VARIABLE>) #converts variable to integer
- float(<VARIABLE>) #converts variable to float
- <STRING1>.count('<STRING2>') #counts occurrences of string2 in string1
- <LISTE>.count(<LISTELEMENT>) #counts occurrences of element in list
- len(<STRING/LIST>) #calculate length of string/list

- Warning: Functions return error if invalid arguments (e.g. wrong variable type) are given!

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Exercises - Part2

- Primer: ‘ATGCCATGCATTCGACTACG’

- 2.1) Calculate length of primer and print it!
- 2.2) Get number of Gs and print it!
- 2.3) Write a function to analyze the nucleotide composition of a primer and print it!
- 2.4) Write a function that calculates the annealing temperature?
  - 2+4 rule: A/T = 2 degrees; G/C = 4 degrees
- 2.5) Is it a suitable primer? Why (not)?

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Time for questions!