

CS 106

Introduction to Computer Science I

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Today's Topics

- Questions / Comments?
- type
- Programmer defined functions

Programs to write together

- 1. Show use of type
- 2. Let's write code to get every pair of characters in a string or elements of a list

Creating programmer-defined functions

- Just as Python allows us to call functions already written (e.g. `print`, `min`, `max`, `input`, etc.), Python allows us to write our own functions that can then be called.
- Syntax example:

```
def funname(parm1, parm2):  
    # body of function  
    return returnval
```

Creating programmer-defined functions

- `def funname(parm1, parm2):`
 # body of function
 return ____

`funname` is a name you make up (allowable characters same rules as variable names)

`parm1, parm2` etc. are a comma separated list of parameters (variable names you make up) can have 0 or more parameters

Some functions return a value to the caller. This is done by the return statement which is `return` followed by the value to be returned.

Creating programmer-defined functions

- The parameters are the way input is provided to the function when it is called.
- The return value(s) is the way output is provided by the function to the caller.

Creating programmer-defined functions

- Let's write a function that returns a random string among “Hello”, “Goodbye” or “#\$%@\$#!”
 - Note: this will have 0 parameters (it doesn't need any input) and will return a string

Creating programmer-defined functions

- Let's write a function that takes in 4 numbers and returns the largest of the 4 numbers
 - This function will have 4 parameters and a return statement

Programmer-defined functions

- `def funname(parm1, parm2):`
 # body of function
 return ____

Note: `parm1` and `parm2` (the parameters) are variables that are local to `funname`. That is, you can't use them outside of that function body.

The way to set the values of the parameter variables is to call the function.

e.g. `funname(42, 'Skidmore')`

#would be a way to set `parm1` to 42 & `parm2` to 'Skidmore'

Programmer-defined functions

- `def funname(parm1, parm2):`
 # body of function
 return ____

Other variables (not just hardcoded values) are allowed to be passed in when the functions is called

e.g.

```
num = -6
```

```
sentence = 'Skidmore College is great'
```

```
funname(num, sentence)
```

```
# would be a way to set parm1 to -6 & parm2 to
```

```
# 'Skidmore College is great'
```

Programmer-defined functions

```
import math # to be able to use the sqrt function
```

```
def fun1(a, b):  
    return math.sqrt(a**2 + b**2)
```

- What do you think this function does?
- What might be a better name for it than fun1?
- How could we call it?

Programmer-defined functions

```
import math # to be able to use the sqrt function
```

```
def fun1(a, b):  
    return math.sqrt(a**2 + b**2)
```

- hypotenuse
- How could we call it?

```
hyp = fun1(3,4) # hyp becomes 5.0 (=sqrt of 25)
```

```
hyp2 = fun1(6,8) # hyp2 becomes 10.0
```

```
hyp3 = fun1(28,45) # hyp3 becomes 53.0
```

Programmer-defined functions

- Let's write a function that computes a salary after a raise. Parameters should be salary and raise percentage and it should return a new salary.

- Example call:

```
new_sal = salary_after_raise(100000, 0.03)
```

```
# new_sal should be 103000 (which is original
```

```
# salary + 3000 which is 3 % of 100000)
```

Programmer-defined functions

Let's write a function that counts how many words there are in a string (parameter) and returns that number. Let's say the number of words is just $1 + \text{number of spaces}$.

- Example call:

```
num_words = count_words('Skidmore College is the place to be!')
```

```
# the count_words function should return 7 because there  
# are 6 spaces
```

Programmer-defined functions

Let's write a function that takes in a list of ints and determines how many positive numbers there are in it.

Let's write a function that determines how many odd numbers there are in a list.

Let's write a function that simulates the flipping of a coin.

Let's write a function that simulates rolling a 6 sided die.

Programmer-defined functions

Let's write a function that randomly recommends a Monty Python's Flying Circus episode to watch. According to wikipedia, there are 4 series (aka seasons) of the show, the first 3 of which have 13 episodes and the last has 6 episodes.

Expect a return string like this: We recommend you watch Monty Python's Flying Circus Series 2, Episode 11.

Programmer-defined functions

Let's write a function that takes in a list (assumed to be numbers) and creates and returns a new list that is 1 shorter in length and each element is the sum of the corresponding one in the original list and the next one in the original list.

e.g. if this list: `[5, 8, 10, -3]` is passed in, it should return `[13, 18, 7]`

Because $13 = 5 + 8$, $18 = 8 + 10$, $7 = 10 - 3$