

15-110 Recitation Week 2

Reminders

- HW 1 due Monday 9/13 at Noon EDT!
- Check 1 grades are out! The resubmission deadline is 9/21
- For recitation today:
 - There is a starter code file on the website for the Functions Practice Question – use that to get some practice running code!
 - Recitation feedback form: <https://forms.gle/m1VtwJvTE6kfAXRg6>

Overview

- Functions, arguments, returned value, side effects
- Binary practice, ASCII, RGB
- Graphics practice, tkinter

Problems

FUNCTION PRACTICE

Parts of a Function Call:

Libraries Practice + Function Cheat Sheet

A painter is doing some planning for this year, and is hoping to predict how much paint he'll need and how much money he'll make. He's hoping you'll help him with your vast knowledge of Python built-in functions, and the math/random libraries.

1. The painter specializes in painting circular designs. A single can of paint can cover a design with an area of 2500 square inches. How many cans of paint would he need for three circular designs, each with a radius of 75 inches? (Hint: we can only buy round numbers of cans)
2. The painter knows that in general, it rains between 10-15% of days in his area. He asks us to pick a random percentage in this range and calculate the number of days, out of 365, that it rains on. We should round this number of days up to the nearest integer. The painter works every single day that it doesn't rain, and makes \$100 dollars every day. He loses \$50 on every day that it rains, since his paint from the previous day is half washed away and he has to redo it. What is the painter's expected revenue this year?

Built-in Functions:

- **abs(a)**: takes the absolute value of a
- **pow(a, b)** : raises a to the power of b
- **round(a, b)**: rounds a to b number of significant digits

Random Library

- **random.randint(a, b)**: randomly chooses an integer on the **closed** interval [a, b] (a and b are included!)
- **random.random()**: picks a random float between [0, 1) (1 is excluded!)

Math Library

- **math.ceil(a)**: takes a number and returns the next highest integer
- **math.log(a, b)**: takes the log of a with base b
- **math.radians(a)**: converts degrees to radians
- **math.pi**: This is **not** a function but a constant that is an approximation of the value of pi

Built-in Functions, Return Values, and Side Effect Practice

For each of the following function calls, what is the return value and side effect, if any?

Function Call	Returned Value	Side Effect?
abs(-1)	1	No side effect
int(math.pi)		
print("hello")		
float(4)		
print(float(4))		
print("None")		
type("110 rocks!")		
bool(1)		
math.log(16,2)		

BINARY PRACTICE

Fast Facts:

What is the smallest and largest integer that can be represented with 4 bits?

How many bits are in a byte?

How can we store 18 in 4 digit binary?

Conversion Practice:

Convert 38 to binary using 8 bits

Convert 101 to binary using 8 bits.

What is 01110111 in decimal?

What is 11010010 in decimal?

What is the next binary number after 0011?

ASCII/RGB Conversion Practice:

What ASCII character corresponds to the decimal value 64?

Convert 1010101 to ASCII.

For a certain color, the RGB value represented as a binary string is: 00101101 01110101 11100111.

Convert this to a decimal value for the R, G, and B values of the color.

GRAPHICS PRACTICE

Tkinter review

Follow along with your TA to draw a robot!

Practice

We'd like you to take the remainder of recitation to practice using tkinter. You can draw anything you'd like but here are a few ideas in case you need some inspiration:

- house, self portrait, your favorite food

Please ask your TA's if you have any questions or are having any issues with this on your computer.