# LECTURE 26 **OBJECT-ORIENTED PROGRAMMING 2 OPERATOR OVERLOADING** MCS 260 Fall 2021

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### REMINDERS

- Homework 9 available, due Tuesday at 10am
- Project 3 will be posted this evening
- Project 3 due 6pm central on Fri Nov 5

#### REVIEW

Key concepts from Lecture 25

## **GOALS FOR TODAY**

Improve our Rectangle and Circle classes.

Introduce operator overloading.

### **CIRCLES AND RECTANGLES**





## **DESIRED METHODS**

For both object types:

- Uniform scale about center
- Translation by a vector



## \_\_STR\_\_

When Python needs to convert an object to a string, it calls the \_\_str\_(self) method, if it exists.

Define this and return a string that is a humanreadable representation of what the object is.

## EQUALITY

How is A==B evaluated when A and B are objects?

By default, it checks whether the names refer to the same object in memory. This is often not what you want.

### OVERLOADING

Python allows us to specify our own behavior for operators like ==. This is called **operator overloading**.

If method A. \_\_\_\_\_eq\_\_\_ exists, then A==B evaluates to the return value of A. \_\_\_\_eq\_\_\_(B).

## ISINSTANCE

- The built-in function isinstance (obj, cls) returns a bool indicating whether obj is an instance of the class cls, e.g. isinstance (7, int)
- Using it sparingly. Remember, Python recommends EAFP rather that LBYL in most cases.
- EAFP = Easier to Ask Forgiveness than Permission
- LBYL = Look Before You Leap

Many operators can be overloaded, including:

Expression	Special method
A+B	Aadd(B)
A-B	Asub(B)
A*B	Amul(B)
A/B	Atruediv(B)
A**B	A. pow (B)

List of many more in the Python documentation.

## OVERLOADING BUILT-IN FUNCTIONS ETC.

Expression Actually calls

len(A)	Alen()
bool(A)	Abool()
A[k]	Agetitem(k)
A[k] = v	Asetitem(k,v)

#### REFERENCES

- In *Downey*:
  - Chapter 17 discusses classes, objects, and methods
- Object-oriented programming is discussed in general terms in Section 6.5 of Brookshear & Brylow.

#### **REVISION HISTORY**

• 2021-10-21 Initial publication