

# Python Programming Basics

CSCI 1030U - Intro to Computer Science  
@IntroCS

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# Outline

- Input and Output
- Values and types
- Variables

# Input and Output



# Input

- You can prompt the user for a string input using the `input` function:

```
name = input('What is your name? ')
```

- *Note: Just because you know how to input, doesn't mean that you should!*



# Output

- You can output to the console using the `print` function:

```
print(8)
print('CSCI 1030U')
print("This is Randy's program")
```

```
name = 'Amhad'
greeting = f'Hello, {name}!'
print(greeting)
```

```
print(f'Hello, {name}!')
```

# Values and Types



# Python Types

- Numbers
- Sequences
- User-defined types



# Python Types

- Numbers
  - Integers, e.g. 28
  - Long, e.g. 4128705297804
  - Floating points, e.g. 7.125
  - Complex, e.g.  $4.2 + 3i \Rightarrow \text{complex}(4.2, 3)$
- Sequences
- User-defined types





# Python Types

- Numbers
- Sequences
  - Lists, e.g. `[2, 4, 8, 16, 32, 64]`
  - Strings, e.g. `"the quick brown fox jumped over the lazy dog"`
  - Tuples, e.g. `(1, 'RTX2070', '32GB RAM', 'i7 11800H')`
  - Dictionaries, e.g. `{"first_name": "Abdullah", "last_name": "Azam", "balance": 100.00}`
- User-defined types



# Python Types

- Numbers
- Sequences
- User-defined types
  - A more advanced topic, which will be discussed in a later lecture

# Variables



# Variables

- A variable is a space in memory reserved to hold a value
  - Variables have names, so that we can refer to them in our program
  - Variables have a type
    - In Python, the type of a variable is inferred from the value assigned to it
    - In other languages (e.g. C++), the type of a variable is explicitly declared before the variable can be used
      - e.g. `int num_students = 8;`
  - Variables can be used in expressions
  - Variables can change their value over time



# Variables

- Assigning a value to a variable:

```
owner = "George Smith"  
interest_rate = 0.045
```

- Printing the value of a variable:

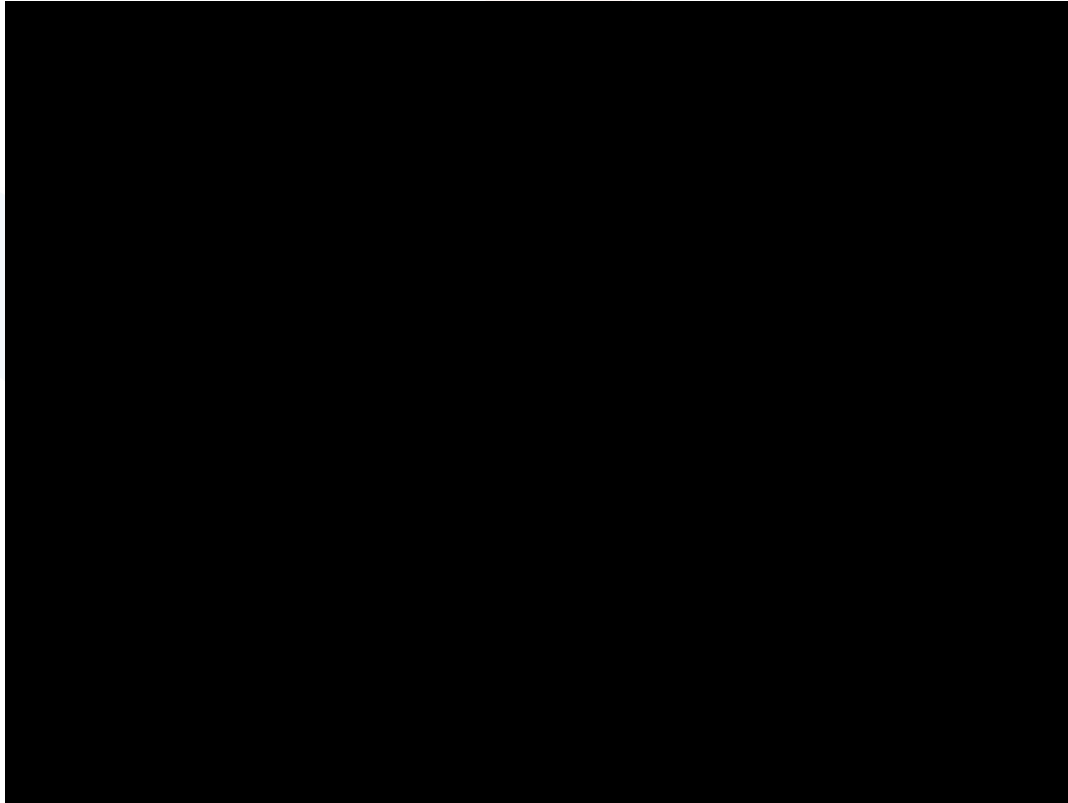
```
print('Owner:', owner)  
print(f'Owner: {owner}')
```

- Using a variable in an expression:

```
interest = 10000 * interest_rate
```



# The Variable Table





# Variables - Type Hints

- You can specify type hints for your variables:

```
owner: str = "George Smith"  
interest_rate: float = 0.045
```

# Programming Exercise 01b.1

- Write a program that uses the `print` and `input` functions to ask the user their name, and then prints a greeting to them



# Programming Exercise 01b.2

- Write a program that uses the `turtle` library to draw a spiral

# Programming Challenge 01b.1

- Write a program that uses the `turtle` library to draw your initials

# Hackers' Corner

- Using VS Code's keyboard shortcuts:
  - CTRL-C, CTRL-X, CTRL-V (copy, cut, and paste)
  - CTRL-/ (toggle comments)
  - CTRL-S (manual save)

# Extra Resources

- <https://think.cs.vt.edu/blockpy/blockpy/load> (transfer to/from block code)
- <https://www.twilio.com/quest> (a game to learn the basics of Python)
- <https://codingbat.com/python> (some programming exercises, for practice)
- Python tutorials:
  - <https://developers.google.com/edu/python/>
  - <https://www.freecodecamp.org/>
  - <https://hackr.io/tutorials/learn-python>
  - <https://www.codecademy.com/catalog/language/python>

# Wrap-up

- Input and Output
- Values and types
- Variables

# Coming Up

- Expressions
- Errors
- Debugging