Reassignment; Input

COSC 101, 2018-01-29

Announcements
● First lab this week

Outline
● Warm-up
● Reassignment
● Input
● Programming practice

Warm-up
● What is the output of this program?
  year = 2018
  month = "January"
  day = "29"
  print(type(year))
  print(type(month))
  print(type(day))
  print(str(year))
  print(int(day))
  print(month, day, year)

  Output:
  <class 'int'>
  <class 'str'>
  <class 'str'>
  2018
  29
  January 29 2018

Reassignment
● When a variable name is used on the left-hand side of an assignment statement...
  ○ The first time: the variable is created and refers to the value on the right-hand side
  ○ Subsequent times: the variable is updated to refer to the value on the right-hand side
● When you use a variable in an expression or statement (excluding the left-hand side of an assignment statement), the latest value assigned to the variable is used
● Example:
  myVar = 5
  print(myVar)
  myVar = 10
  print(myVar)

  Output:
  5
  10
• Drawing a *reference diagram* can help you understand what your program is doing
  ○ Reference diagram after executing `myVar = 5`

    \[
    \begin{array}{c}
    \text{myVar} \\
    \hline
    5
    \end{array}
    \]

  ○ Reference diagram after executing `myVar = 10`

    \[
    \begin{array}{c}
    \text{myVar} \\
    \hline
    10
    \end{array}
    \]

• For each program: (1) indicate what it will output, and (2) draw a reference diagram depicting the state of each variable after the program has executed.
  
  a. \[
  \text{fruit} = "apple"
  \text{vegetable} = "beet"
  \text{fruit} = "cranberry"
  \text{print(fruit, vegetable)}
  \]

\text{Output: cranberry beet}

b. \[
\text{x} = \text{'}ab\text{'}
\text{y} = 123
\text{x} = \text{x} + \text{'}c\text{'}
\text{print(x, y)}
\]

\text{Output: abc 123}

c. \[
\text{r} = 1
\text{s} = 2
\text{r} = \text{r} + \text{s}
\text{s} = \text{r}
\text{print(r, s)}
\]

\text{Output: 3 3}

d. \[
\text{first} = "Computer"
\text{second} = "Science"
\text{third} = \text{first} + \text{second}
\text{first} = 101
\text{third} = \text{third} + \text{str(first)}
\text{print(first, second, first)}
\text{print(third)}
\]

\text{Output: 101 Science 101
ComputerScience101}

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Input

• *Why do we want to get input from the user?* --- to make programs more: flexible, useful

• Use the \text{input} function to get user input

• *What does a programmer provide to the input function?* --- a prompt string (i.e., a message that is displayed before waiting for user input
  ○ E.g., \text{input("How old are you? ")}
What is the result of this expression?

type(input("How old are you? ")
Output:
<class 'str'>

Where is the value returned by input stored? --- nowhere, unless you call input on the right-hand side of an assignment statement

Example: Write a program that asks a user for their name and age, and outputs: Wow <name>, you don’t look a day over <age - 1>!

  • Program:
    name = input("What is your name ?")
    age = input("How old are you? ")
    age = int(age) - 1
    print("Wow", name, "you don’t look a day over", age, "!")
  • Why do we need to call int on the age? --- input returns a string
  • What happens if a user does not enter a number for their age? --- runtime error

Evaluate the following programs. If input is needed, provide your own. Indicate what output is produced, if any. If an error occurs, specify what type of error.

  a. place = input("Where are you from? ")
     print("I have heard", place, "is a fun place to visit.")
     Output:
     Where are you from? Wisconsin
     I have heard Wisconsin is a fun place to visit.
  b. name = input("What is your name? ")
     count = len(name)
     print("There are " + str(count) + " letters in your name.")
     Output:
     What is your name? Aaron
     There are 5 letters in your name.
  c. year = input("What year is it? ")
     year = year + 1
     print("Next year is", year)
     Runtime error --- cannot add string (value of year) and integer (1)
  d. print("Knock, knock")
     who = input("Who's there? ")
     print(who + " who?")
     input(""")
     print("Ha ha ha!")
     Output:
     Knock, knock
     Who's there? Orange
     Orange who
     Orange you going to let me in?
     Ha ha ha!

Programming practice

  a. Write a program that asks for the length and width of a rectangle and prints the area.
  b. Write a program that asks for the cost of an item and prints the tax amount and total cost with a tax rate of 8%.
c. Write a program that plays a short game of mad libs: ask for three words and fill them in a sentence. (E.g., She verb the adjective noun.)

d. Write a program that asks for a temperature in fahrenheit and outputs the temperature in degrees celsius. (To convert: subtract 32 and multiply by five-ninths)

e. Write a program that asks for four integers and prints the average.