Python

Variables

A word about

Foo

Bar

etc.

What is a variable?

A variable names a memory location. By using that variable’s name you can store data to or retrieve data from that memory location. Allows the programmer to manipulate the data the variable represents.

Variable Properties:

A variable has 4 properties:

1. a name,
2. a memory location,
3. a data type,
4. a value.

You can assign a value to a variable using an assignment statement.

Rules for naming variables

- Characters allowed
  - A-Z, a-z
  - Numbers 0-9
  - Special: underscore
- Case sensitive
- Cannot be reserve word

Rules for naming variables

- NO embedded spaces
- Must start with an alpha character

- Names must be unique

Rules more:

- Length: any (be reasonable)
- Readability is very important.
- Descriptive names are very useful.

Rules more:

Depending on the FONT, avoid using these characters:

- O 0 (upper o and zero)
- 1 I l (one, upper I, lower L)
- 2 Z (two and upper Z)
- 5 Ss (five, letter s)
- Others: 7, 8 B, p, q, b, d

Reserve words (Keywords)

```
import keyword

print (keyword.kwlist)
```

Keyword (reserve word list)

- False
- None
- True __
- peg_parser__
- and
- as
- assert
- async
- await
- break
- class
- continue
- def
- del
- elif
- else
- except
- finally
- for
- from
- global
- if
- import
- in
- is
- lambda
- nonlocal
- not
- or
- pass
- raise
- return
- try
- while
- with
- yield

Naming test

Name	• Yes
Address	• Yes
City_state_il	• Yes
First-name	• No
Total01	• Yes
Dollar$	• No
23collection	• No
collection23	• yes

Naming test

57_12_link	• No
Print004	• Yes
Else	• No
True_else	• Yes
Answer14	• Yes
Aabbccddeeffgghhiijjkkllmmnnooppqqrrsst	• Yes
loop99	• Yes

Are these the same: First_Name
first_name

NO

Create a variable name for the following fields:

First name	fname	FirstName	
Middle name	mname	MidName	
Last name	Lname	LastName	
Student ID number	studentID	SIDnumber	
Letter grade	grade	lettergrade	grd
Points	points	pts	
Rainfall amount	rainfall	rainfallamount	rainamt

Create a variable name for the following fields:

Total sales	totalsales salestotal
Discount amount	discount disamt disamount
Item id number	Itemnumber itemid idnum
Sales tax	salestax stax
Minutes	minutes min
Todays date	todaysdate currentdate currdt todaydt
Current time	currenttime ctime

Data types - NUMERIC

Integer - whole number

python: int

Float - decimal number

python: float

Data Types - text

Character - single character

String – multiple characters

Python: str or in quotes

Data Types - More

Boolean – True or False

Array – ordered list of values

Data Type - constant

Variables that will not change when program is executing

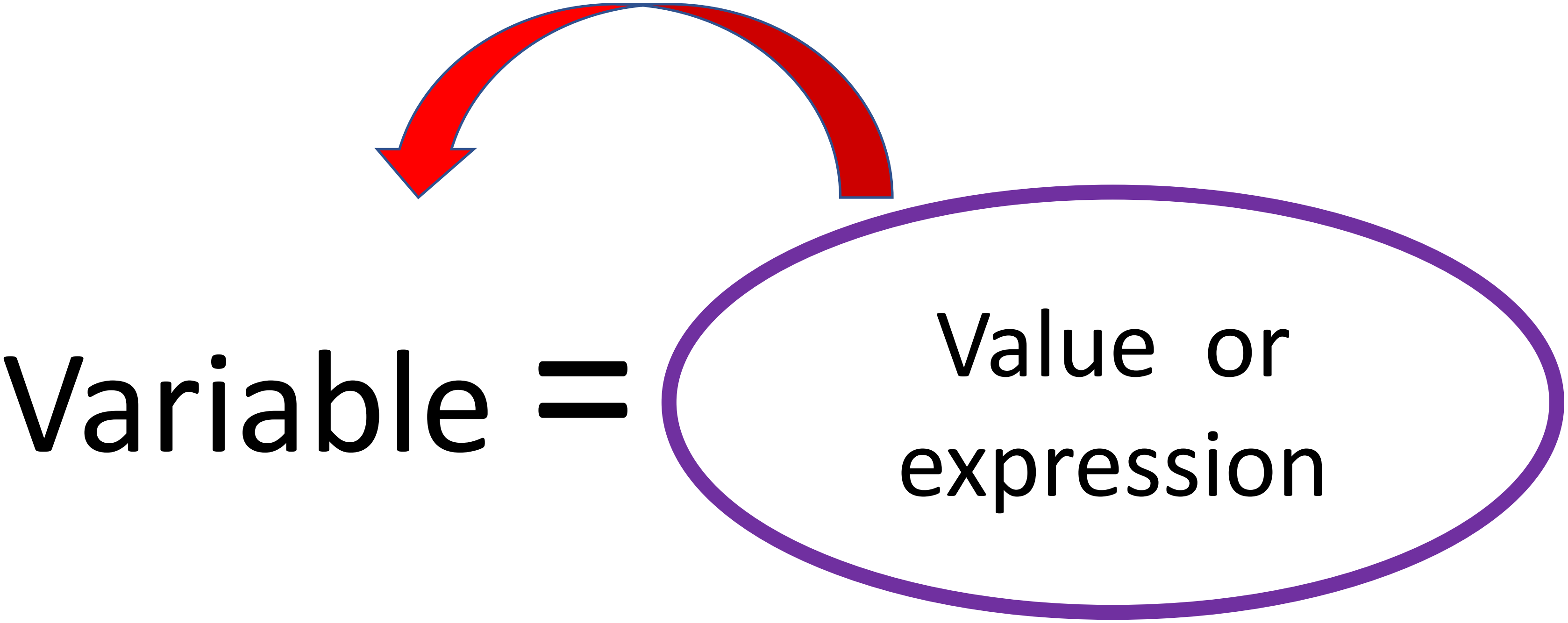
Also, naming constant values helps in maintenance

Putting data into a variable 1

The Assignment character

=

Assigning value to a variable



Variable = Value or expression

Assign value to a variable: numbers

Integer:

```
count = 0
```

Decimal (float):

```
DollarTotal = 67.33
```

Assign value to a variable: string (text)

Character:

code = ‘B’

String (text):

towername = “Sears Tower”

Note: all strings must be in quotes (either single or double)

Show contents of a variable

Basic Output

PRINT

Put data on the screen

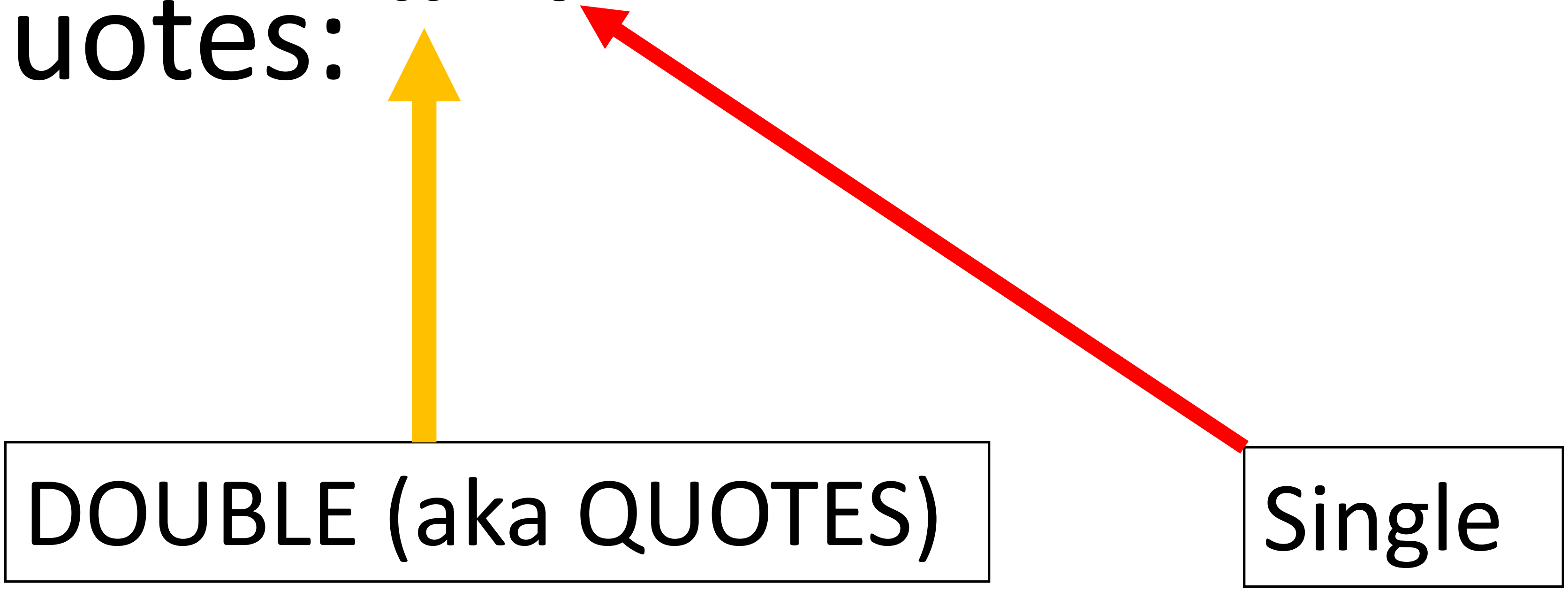
Format:

```
print()
```

Items to be displayed inside the **Parentheses**

Print Constants (WYSIWYG)

Use either type of quotes: “ ‘



DOUBLE (aka QUOTES)

Single

Examples – Hard coded

```
print(‘-----------------------’)
print(‘The Financial Report’)
print(“The Financial Report”)
```

Examples - variables

```
print(address)
print(count)
```

Display the CONTENTS of the variables in Parentheses

Print – multiple items

Print(obj1,obj2)

Obj’s are separated by commas

Obj is either a string or variable

Print – multiple - examples

```
print(“Address is: “,address)
```

```
print(“Total count is: “,count)
```

```
print(numb1,numb2,numb3)
```

Try This

```
total01 = 100
total02 = 22.44
head = ‘This is a report TITLE’
print(head)
print(‘Total #1: ‘,total01)
print(‘Total #2: ‘,total02)
```

var2

About the QUOTES

- Start and end with same quote.

  “ “ or ‘ ‘

- Use double to show single

  “ ‘ “

- Use single to show double.

  ‘ “ ‘

Try This

```
print(“ Homer’s stuff”)
print(‘”YOU KNOW”’)
```

New line or next line command

New line and blank line in print

‘\n’

Backslash is known as the escape character

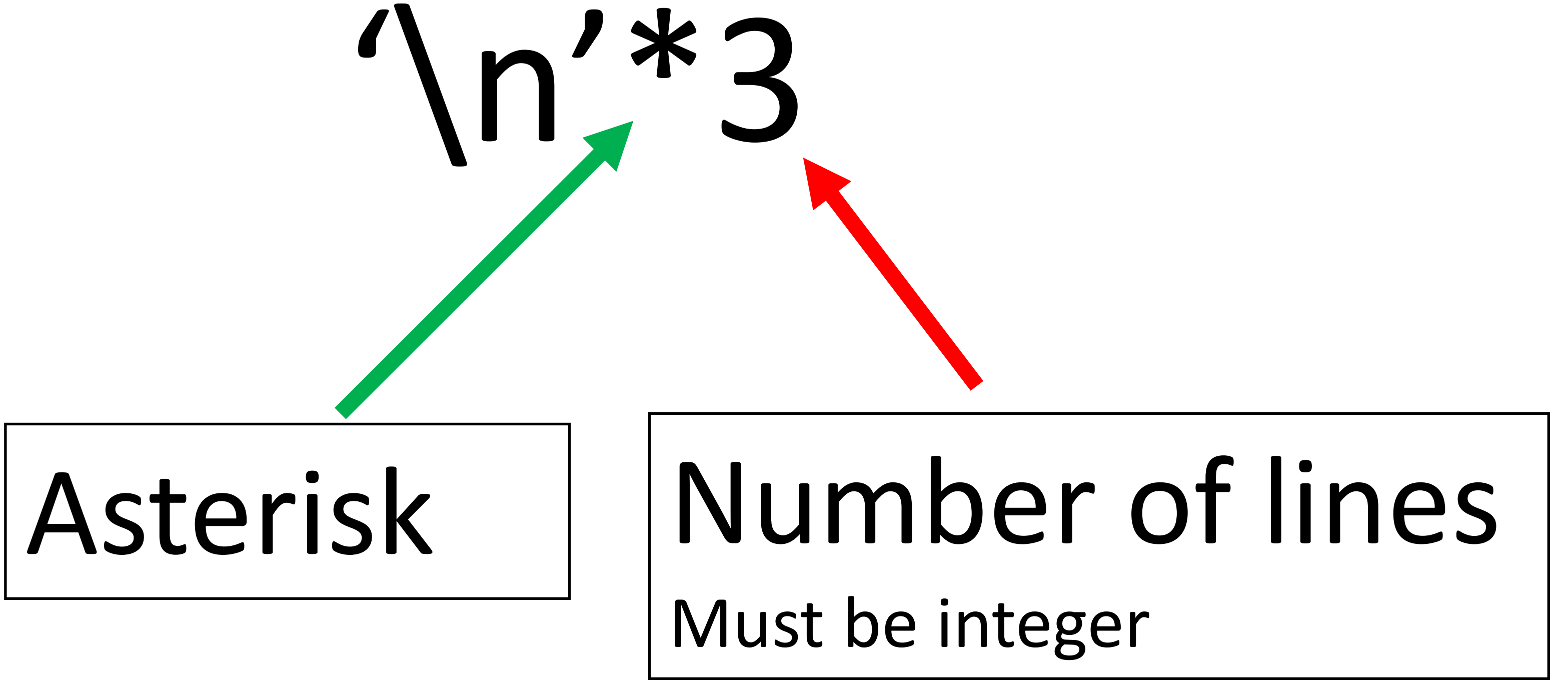
New Line - examples

```
print(‘ The Report\n’)

print(‘\n’)
```

New line character - multiple

Example



‘\n’*3

Asterisk

Number of lines

Must be integer

Try this:

```
print('--------')
print('\n')
print('--------')
print('\n'*3)
print('--------')
```

var3

Print notes

The print statement will convert:

- integers to string for display
- float to string for display

Putting data into a variable 2

Basic input

Input

Get data into a variable so that your program can manipulate the data. Also make the program interactive with the user.

input

GET data from a user

Format:

```
input()
```

Input

Input comes from keyboard (buffer)

All input from keyboard is 'TEXT' (string)

IMPORTANT

Usage:

Assign input to a variable:

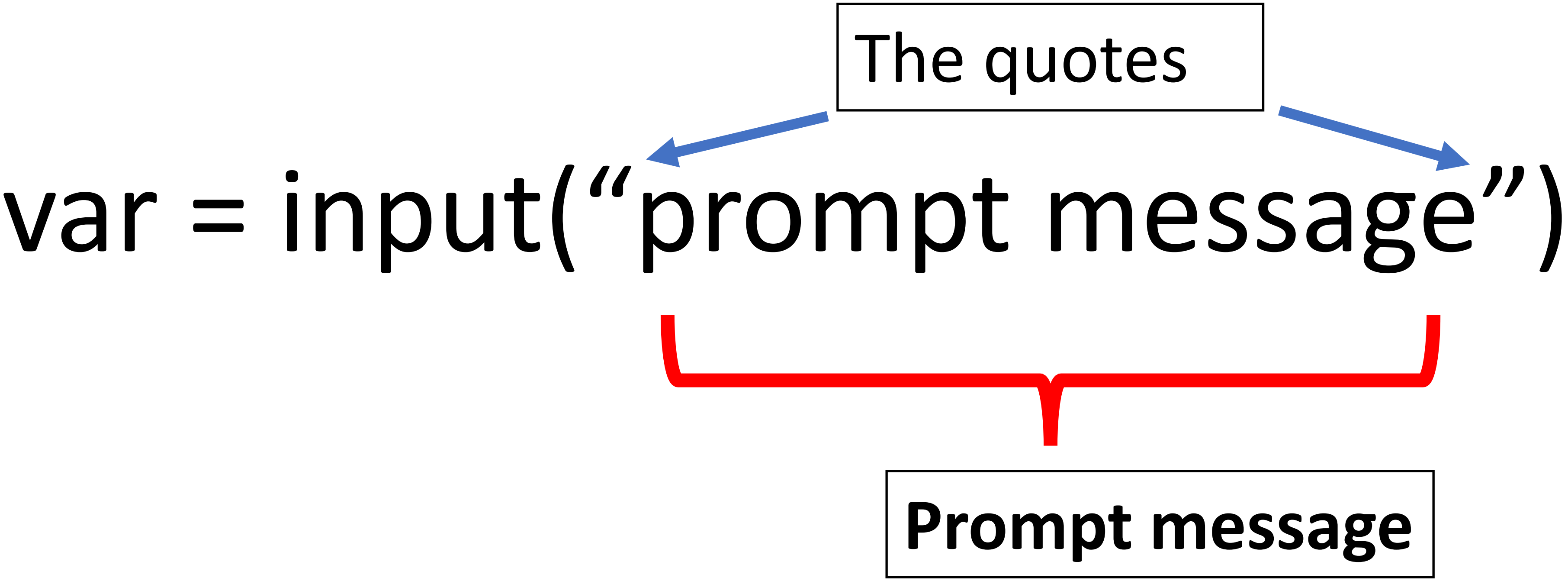
```
invent = input()
```

Try this:

```
print(‘\n’*60)
stuff = input()
print(‘-----------’)
print(stuff)
print (‘---------’)
```

Add a **Prompt** message

Prompt message goes inside the **Parentheses with quotes**



The quotes

```
var = input(“prompt message”)
```

Prompt message

Prompt message

Prompt message gives instructions to the user as to what kind of data to type in.

Prompt message

Example:

Stuff = input(‘ type in your name’)

The Prompt message

Try this

Why a prompt message consider this:

```
print(‘\n’*60)
stuff = input(‘)
print(‘-----------’)
print(stuff)
print (‘---------’
```

Try this

```
print(‘\n’*60)
stuff = input(‘ type something: ‘)
print(‘-----------’)
print(stuff)
print (‘---------’)
```

Why input into variable

```
print('\n'*5)
input('Enter a name: ')
#emplname = input('Enter a name: ')
print('-----------')
print(emplname)
print ('---------')
print('\n'*5)
```

Input example

Get employee name:

```
Emplyname = input(‘enter employee name: ‘)
```

Get payment amount:

```
pymt=float(input(‘Enter payment amount’))
```

Get authorization code:

```
authcode = int(input(‘Enter security code: ‘))
```

Are these two statements the same?

```
Name = input(‘Type in your name’)

Name = input(‘Joann Zebra’)
```

Data Conversion

Convert the contents of varable from one data format to another data format.

Note:

print does conversion of number to stings automatically

Conversion command:

int()	convert to integer
float()	convert to decimal
str()	convert to text

Convert the contents of the variable or hard coded item in the parenthesis
To the indicated format and assignment to a new variable.

Convert to integer

```
fnumb = 5.55
snumb = ‘44’
inumb1 = int(fnumb)
inumb2 =int(snumb)
```

Convert to float

```
inumb = 7
snumb = ‘88’
fnumb1 = float(inumb)
fnumb2 = float(snumb)
```

Convert to String

```
fnumb = 3.89
inumb = 99
snumb1 = str(fnumb)
snumb2 = str(inumb)
```

Input from keyboard

All input from Keyboard is always text (string).

If Input is numeric, then must be converted.

Convert input to Integer example 1

```
inumb = 0
snumb = input(‘Enter number’)
inumb2 = int(snumb)
```

Convert to integer

Convert input to Integer example 2

```
inumb = 0


inumb = int(input(‘Enter number’))
```

Convert to integer

NOTE

Convert input to decimal example

```
fnumb=0.0
snumb=input(‘Enter decimal: ‘)
fnumb=float(snumb)
```

OR

```
fnumb = 0.0
fnumb = float(input(‘Enter decimal: ‘))
```

Input Notes

All input is TEXT (string)

even digits (numbers)

If want input from keyboard to used as a number, the input must be converted to integer or float

Use input to stop program

```
A = 1
B = 2
print('\n'*5)
print('A = ', A, '   B = ", B')
input('hit enter key to continue')
print('-------done')
print('\n'*5)
```

STRINGS

AKA text

Strings (aka text)

Any characters that are between quotes

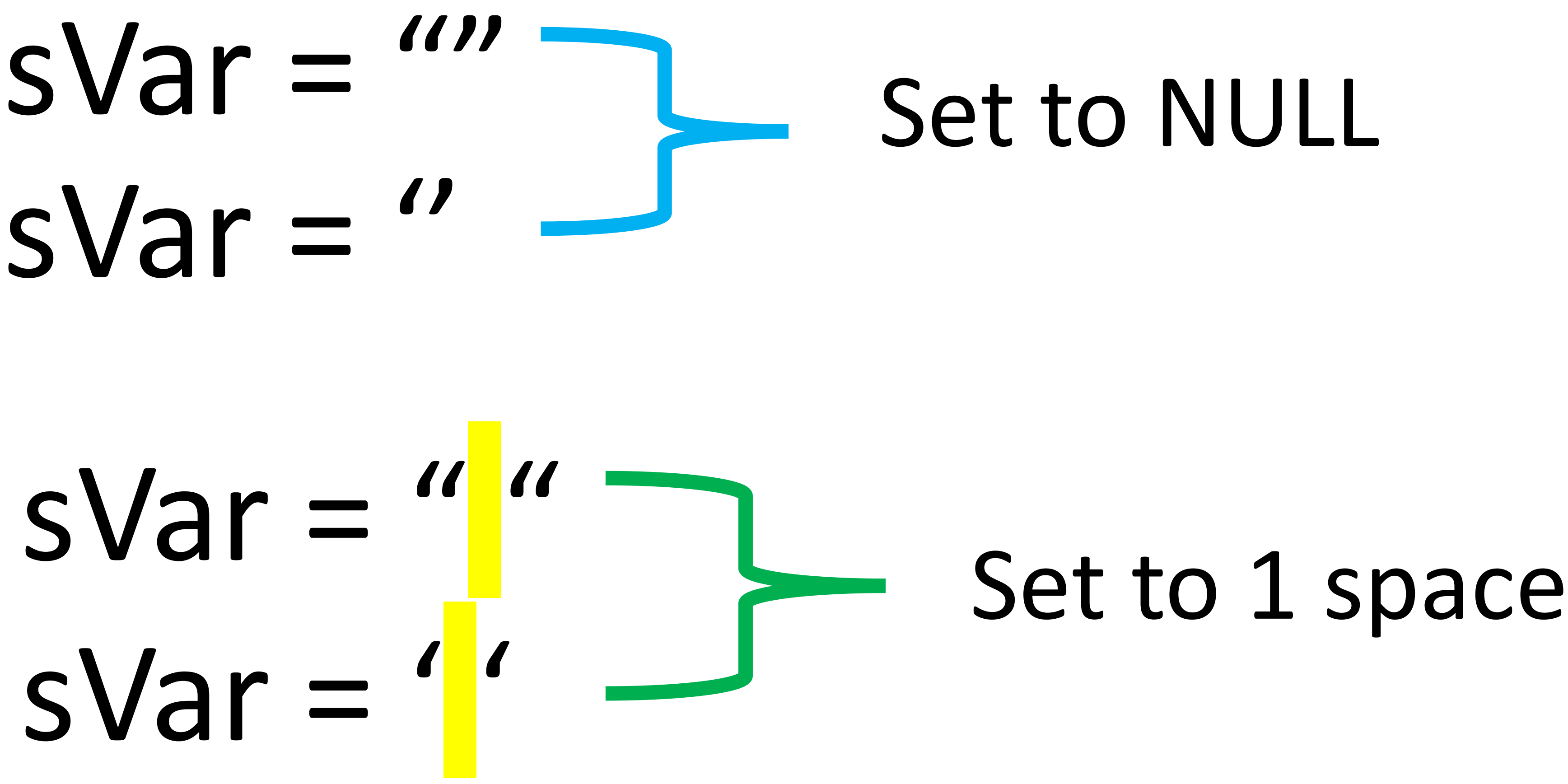
Reminder: all characters on the keyboard are TEXT

Character - NULL

A character the represents nothing

Technically, the character is a hex 00

Set string variable



sVar = “”

sVar = ‘’

Set to NULL

sVar = “ “

sVar = ‘ ‘

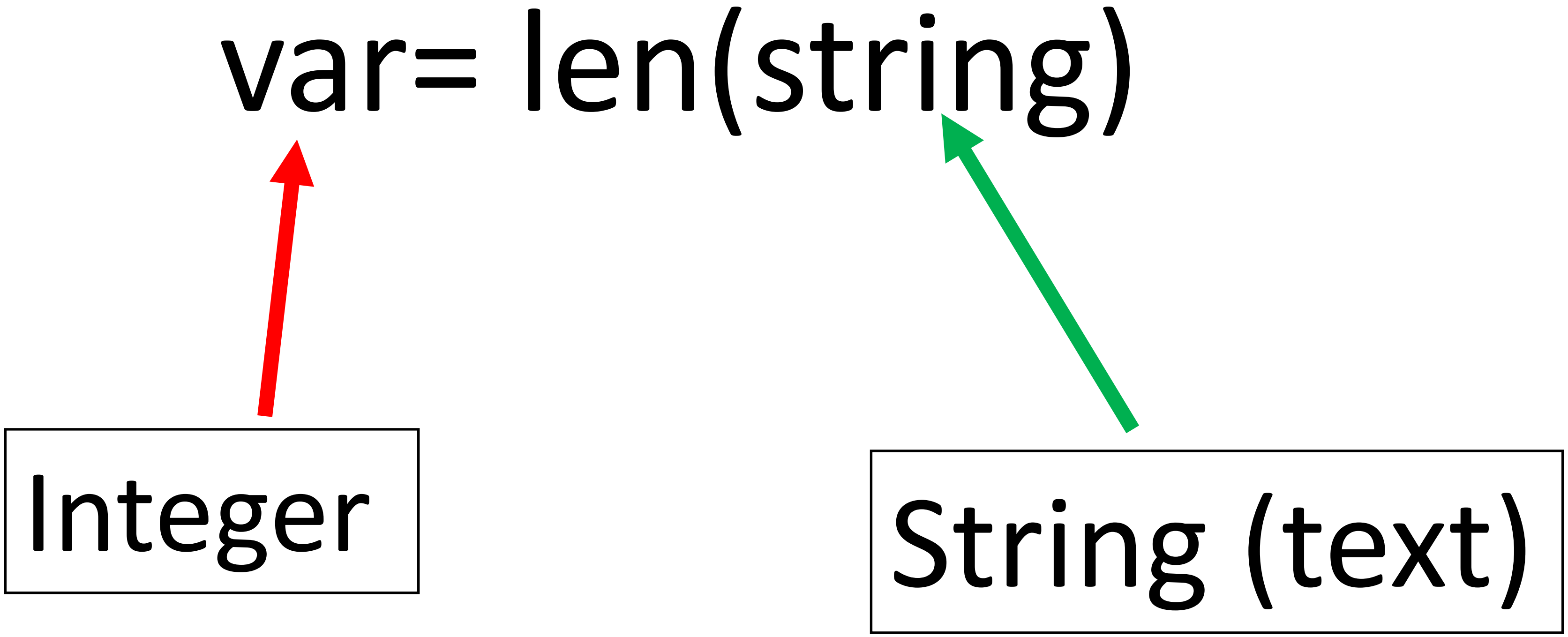
Set to 1 space

Set a value to a string variable

```
title = “Report 1”
```

Length of string - format

len()   get length of string



```
var= len(string)
```

Integer

String (text)

var7

String Length examples

```
slen1 = len("abcd")
print('length of text: ', slen1)
```

```
[4]
```

```
city = 'New York'
clen = len(city)
print('length of city: ', clen)
```

```
[8]
```

Concatenation

Joining 2 or more string together

The concatenation character is: **+**

Note: if any of the variables are number, the system will attempt to add, this will cause an error

Concatenation - Examples

```
Fname = “Johnny”
Lname = ‘Five’
Wname = Fname + “ “ + Lname
print (Wname)
```

Output:

```
Johnny Five
```

var8

Character control

chr()

show the character for a number

ord()

show the number for a character

Try this

```
print('\n'*3)
xx = int(input(' Enter a number
                    between 0 and 65535: '))
print(xx,' is ', chr(xx))
print('----------')
achr = input(' type in one character: ')
print(achr, ' is coded as: ',ord(achr))
print('\n'*3)
```

Program Naming

Characters allowed:

A-Z, a-z Numbers 0-9

Special: underscore

Case sensitive

Length, Readability, Descriptive

Program Naming

Cannot be:

- reserve word
- keyword
- module name
- Have imbedded spaces

Wrapup

Data type: strings

more covered in the future

Data type: list (arrays)

covered in the future

Data type: dictionary

covered in the future

done