
Department of Electrical and Computer Engineering
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Programming for All 1 (Comp 1010)

2. Python Variables and Data types

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Python Variables

- A variable is a name given to a memory location that can hold a value.
- Variable Naming Rules in Python
 1. Variable name should **start with letter**(a-zA-Z) or underscore (_). Variable name can have **numbers**[0-9] but **not** at the beginning.
 2. In variable name, no **special characters** such as[@, \$, #, %, **space**,...] allowed other than underscore (_).
 3. Variables names are **case sensitive**
 4. Variable name should not be a Python **keyword**. Keywords are also called as reserved words. (e.g. print, if, and, def, else,)

Example

- Valid Variable names

age, _age, Age, AGE, age1, student_name,
username, area, amount, accountNumber,
account_number, gate123, _255

- Invalid variable names

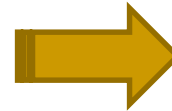
1student, 45A,100, u@u, user-name,
account number, print , if, class,

Python basic syntax

■ Lines Indentation

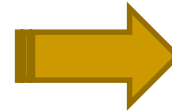
- ❑ Blocks of code are denoted by line indentation, which is rigidly enforced
- ❑ Example:

```
a= 6
|   b=7
|   ~~~~~
|   print(a+b)
|   ~~~~~
```



```
a= 6
b=7
print(a+b)
```

```
valid=True
if valid:
|   print("Pass")
else:
|   print("reject")
|   ~~~~~
```



```
valid=True
if valid:
|   print("Pass")
else:
|   print("reject")
```

Syntax ...

■ Quotation in Python

- ❑ Python accepts single ('), double (") and triple (''' or """) quotes to denote string literals
- ❑ The triple quotes are used to span the string across multiple lines

```
word = 'word'  
sentence = "This is a sentence."  
paragraph = """This is a paragraph. It is  
made up of multiple lines and sentences."""
```

Python comments

■ Comments in Python

- ❑ Comments in Python are the lines in the code that are **ignored by the compiler** during the execution of the program.
- ❑ A hash sign (#) that is not inside a string literal begins a comment

```
# This code prints the sum of two number a and b
a = 6
b = 7
print(a+b)
```

- ❑ Triple-quoted string are used as a multiline comments

```
'''
*****
Documentations adds clarity your code.
it is a good practice to write
comments!
*****
'''
```

Syntax ...

- Multiple statements on a single Line
 - The semicolon (;) allows multiple statements on the single line

```
a = 6; b = 7; c = 10  
print(a + b + c )
```

Assigning Values to Variables

- Ensure variable names valid
- The **equal sign (=)** is known as simple assignment operator

variable_name = expression

```
score = 85
```

- Python allows to assign a single value to several variables

```
value1 =value2=value3 = 55
```


Values and Python Basic Data types

- Python is a **dynamically typed** programming language
- The **interpreter** assigns variables **a type** at runtime based on the **variable's value**
 - No need to declare a variable type explicitly

```
number = 100 # integer type value is assigned to a variable number
miles = 1000.0 # float type value has been assigned to variable miles
u_Name = "UAC" # string type value is assigned to variable name
valid = True # boolean type value is assigned to variable valid
```

```
print(type(number))
print(type(miles))
print(type(u_Name))
print(type(valid))
```

output

```
<class 'int'>
<class 'float'>
<class 'str'>
<class 'bool'>
```

Python Basic Data types

- Data types specify the type of data like numbers and characters to be stored and manipulated within a program
- Basic data types of Python are:
 - ❑ **Numbers** : int , float, complex
 - ❑ **Boolean** : True or False
 - ❑ **Strings** : sequence of one or more characters
 - ❑ **None** : special data type in Python;
 - ❑ defines a null value or the absence of a value
 - ❑ Example : money=None

Example 1

- Write a python program the computes the total and average of five numbers (num1,num2,num3,num4 and num5)

```
num1 =50
num2 =60
num3 =40
num4 =90
num5 =70

total = num1 + num2 + num3 + num4 + num5
average = total/5

print("Total = ", total)
print("Average = ", average)
```

output

```
Total = 310
Average = 62.0
```

Standard input and output

- The **input()** function is used to get data from **keyboard**
variable_name = input([prompt])
- The **print()** function allows a program to display text onto the console(Screen)

```
name = input('what is your name: ')\nprint ( "I am ", name)
```

output

```
what is your name: Habtamu\nI am  Habtamu
```

Type conversion - Casting

- We can explicitly cast, or convert, a variable from one type to another
 - ❑ float_to_int = **int(3.5)**
 - ❑ int_to_float = **float(4)**
 - ❑ string_to_int = **int("1")** #number treated as string
 - ❑ int_to_string = **str(8)**
 - ❑ float_to_string = **str(3.5)**

```
name = input('what is your name: ')
print ( "I am ", name)

num1 = input('Enter first number: ')
num2 = input('Enter second number: ')
num3 = input('Enter third number: ')

sum = num1 + num2 + num3
total = int(num1) + int(num2) + int(num3)

print("sum = ", sum)
print("total = ", total)
```

Observe the
output of sum
is different?

```
Enter first number: 25
Enter second number: 50
Enter third number: 69
sum = 255069
total = 144
```

thank you