Week 2

Arithmetic Operators

- **+, -, *, /, **, %, //**
- **Priority:**
  - PEMDAS
    1) Parentheses
    2) Exponents
    3) Multiplication and Division
    4) Addition and Subtraction

Variables

- **var_name = var_value**
  - A=3
- **Variable name rules:**
  - Allowed characters: alphanumeric and _
  - No space
  - Case sensitive
  - Can not start with a number
  - Do not used reserved keywords
  - Use camelCase convention
    - thisParamName

Keywords in Python programming language

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

Variable Types

- **int(integer)**
  - A=2
- **Float**
  - A=2.0
- **String**
  - A=”2”
  - A=’2’
- **Boolean**
  - A=True
  - A=False
  - A == 2

- **Python automatically determines the variable types**
- **Use type(varName) to determine the type of a vairbale**
- **Divide by Zero Exception**

Quiz 1

- **You are an ESA eingineer in charge of developing a new rocket which has to fly back from the exoplanet Kepler-452b (aka. Earth 2.0). What is the escape speed for this planet? What is its ratio compared to earth?**

Escape speed	M = Mass of body (e.g. planet) to escape from r = radius of body	$v = \sqrt{\frac{2GM}{r}}$

Comparison & Logical Operators

- **Comparison operators result in boolean values**
- **Logical operators operate on boolean values**

Comparison Operators

Symbol Use Case	Bool	Operation
5 < 3	False	Less Than
5 > 3	True	Greater Than
3 <= 3	True	Less Than or Equal To
3 >= 5	False	Greater Than or Equal To
3 == 5	False	Equal To
3 != 5	True	Not Equal To

Logical Use	Bool	Operation
5 < 3 `and` 5 == 5	False	`and` - Evaluates if all provided statements are True
5 < 3 `or` 5 == 5	True	`or` - Evaluates if at least one of many statements is True
`not` 5 < 3	True	`not` - Flips the Bool Value

Strings

- **A list of characters surrounded by**
  - Single quotes
    - ‘This is a string’
  - Double quotes
    - “This is a string”
- **Escape character**
  - Add “\” before reserved characters to print them
  - Print(‘\’’) → ‘
  - \, ‘, “, \n, \t, …
- **Add two string**
  - “Hello” + ‘ ‘ + “World” → “Hello World”
- **F-String:**
  - print(f“Hello {name}”)
- **len() returns the length of an object**
  - len(“hello”) → 5

Quiz 2

- **store this address as a string in a variable: C:\user\docs\Letter.txt**
  - Print “The file is saved under <address>”

Type conversion & Reading from Input

- **convert to Y: Y(variable)**
  - int(1.2) → 1
  - str(1.2) → “1.2”
  - float(“1.2”) → 1.2
- **read user input from console using**
  - input(“message: ”)
  - returns a string
  - you may need to convert the format

String Methods

- **Methods are specific functions that operate on a specific type of object e.g. strings**
- **Check out the built-in types documentation here:**
  - https://docs.python.org/3/library/stdtypes.html
- **Some example methods:**
  - name=”ali”
  - name.upper() → “ALI”
  - "The sum of 1 + 2 is {}".format(1+2) → “The sum of 1 + 2 is 3”
  - '1,2,3'.split(',')→ ['1', '2', '3']

Quiz

- **write a program that**
  - asks the name of the player and prints a greeting message with the name in capital case
  - asks the user to enter the number of letters in his/her name
  - compares the entered value with the number of letter in his/her name and prints “True” if it matches and “False” if it does not match (without conditional statement)
  - Example run:
    - What is your name?
    - Ali
    - Hello ALI
    - How many letters are in your name?
    - 4
    - False