

CSE 307 - Principles of Programming Languages
Homework Assignment 01
Python Basics and Parsing with Python

Assigned: 09/05/2019
Due: 09/12/2019
Total Points: 20

Solve the following problems in Python. Each problem is worth five (5) points each.

Problem 1:

Write a program that reads a line from the input stream and determines if it is a legal identifier. The program should print only one output: True or False and then exit. A Python identifier starts with a letter (A - Z, or a - z) or an underscore (_) followed by zero or more letters, underscores, or digits (0 - 9). Legal Python identifiers cannot be Python keywords. Python keywords are reserved and so cannot be used as constants, variables, function names, class names, or as any other identifier in Python.

Note: Starting an identifier with a single leading underscore indicates that the identifier is private. Starting an identifier with two leading underscores indicates a strongly private identifier. If the identifier also ends with two trailing underscores, the identifier is a language-defined special name.

You can easily view a list of all Python keywords by using the built-in "help" function.

```
Python 3.5.2 (default, Nov 12 2018, 13:43:14)
[GCC 5.4.0 20160609] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> help()
```

Welcome to Python 3.5's help utility!

If this is your first time using Python, you should definitely check out the tutorial on the Internet at <http://docs.python.org/3.5/tutorial/>.

Enter the name of any module, keyword, or topic to get help on writing Python programs and using Python modules. To quit this help utility and return to the interpreter, just type "quit".

To get a list of available modules, keywords, symbols, or topics, type "modules", "keywords", "symbols", or "topics". Each module also comes with a one-line summary of what it does; to list the modules whose name or summary contain a given string such as "spam", type "modules spam".

help> keywords

Here is a list of the Python keywords. Enter any keyword to get more help.

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

help>

Problem 2:

Write a program that reads a line and determines if it is a legal number. The

program should print only one output: int, float, or None and then exit.

In Python 3, there is effectively no limit to how long an integer value can be. Of course, it is constrained by the amount of memory your system has, as are all things, but beyond that an integer can be as long as you need it to be. The following strings can be prepended to an integer value to indicate a base other than 10:

```
>>> 0b (zero + lowercase letter 'b') Base 2 (binary)
>>> 0B (zero + uppercase letter 'B') Base 2 (binary)
>>>
>>> 0o (zero + lowercase letter 'o') Base 8 (octal)
>>> 0O (zero + uppercase letter 'O') Base 8 (octal)
>>>
>>> 0x (zero + lowercase letter 'x') Base 16 (hexadecimal)
>>> 0X (zero + uppercase letter 'X') Base 16 (hexadecimal)
>>>
```

Values with these prefixes are legal numbers (integers) in Python.

The float type in Python designates a floating-point number. Float values are specified with a decimal point.

<https://docs.python.org/3/tutorial/floatingpoint.html>

Optionally, the character 'e' or 'E' followed by a positive or negative integer may be appended to specify scientific notation.

```
>>> Example: 4.2e-4 = 0.00042
>>>
```

Float values are 64-bit "double-precision" values, according to IEEE 754 standard (https://en.wikipedia.org/wiki/IEEE_754). In that case, the maximum value a floating-point number can have is approximately 1.8×10^{308} . Python will indicate a number greater than that by the string "inf".

The closest a nonzero number can be to zero is approximately 5.0×10^{-324} . Anything closer to zero than that is effectively zero.

Floating point numbers are represented internally as binary (base-2) fractions. Most decimal fractions cannot be represented exactly as binary fractions, so in most cases the internal representation of a floating-point number is an approximation of the actual value. In practice, the difference between the actual value and the represented value is very small and should not usually cause significant problems.

Problem 3:

3. Write a program that reads two lines and determines if it is a legal string enclosed within single or double quotes. The program should print only one output: True or False and then exit.

The following is a table of escape sequences which cause Python to suppress the usual special interpretation of a character in a string:

```
>>> \' ..... Literal single quote (') character
>>>
>>> \" ..... Literal double quote (") character
>>>
>>> \newline ..... newline is ignored
>>>
>>> \\ ..... Literal backslash (\) character
>>>
```

To break up a string over more than one line, include a backslash before each newline, and the newlines will be ignored:

```
>>>>> 'a\
... b\
... c'
```

Problem 4:

Write a program that reads a date in the format: MM/DD/YYYY, from the command

line and print it out as: Day, Month DD, Year.

For example we read "02/07/2019" and output "Thursday, February 7, 2019".

Submission Instructions:

1. Please write each program in a separate file.

2. The file name should correspond the problem for which your program is written.

..... Example: Your program for problem 1 should be called "p1.py".

3. Please collect and submit your program files as a compressed zip file.

4. The title of the compressed file should be:

..... cse307_hw01-LastNameFirstName

.....

5. This is an individual assignment. Any collaboration on writing your programs

..... will be treated as a violation of academic integrity.