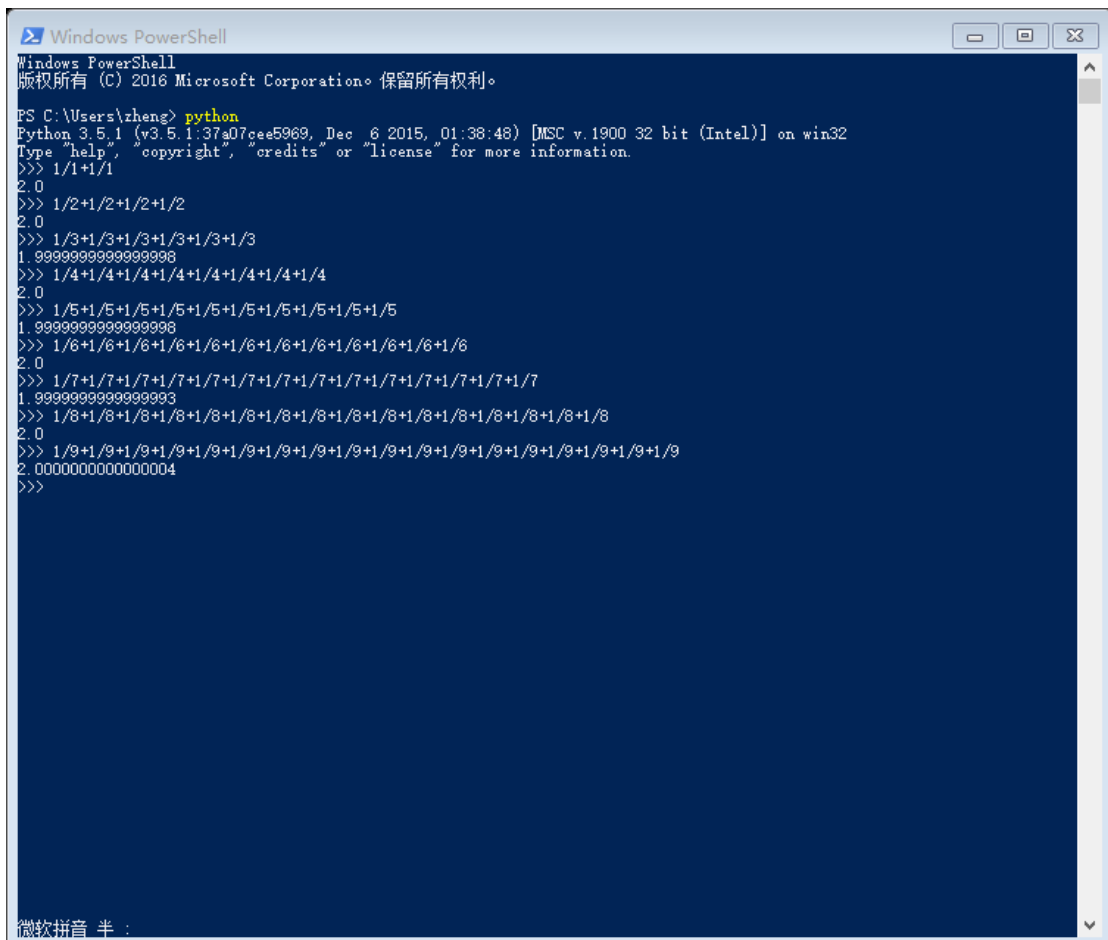


COMP1001 – Problem solving in IT  
Due Date: 5:00pm, Friday, 23 September  
2016 Assignment 1 (30 marks)  
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13104036D

3. (Imprecision of floating-point number representation) We have seen in the class that real numbers with decimal point may not be represented exactly in a computer. Now we consider adding  $1/n$ , where  $n = 1, 2, \dots, 9, 2n$  times. That is, the correct result should be 2.0. Determine which of these 9 cases cannot be represented exactly using Python

Solution:



```
Windows PowerShell
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PS C:\Users\zheng> python
Python 3.5.1 (v3.5.1:37a07cee5969, Dec 6 2015, 01:38:48) [MSC v.1900 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>> 1/1+1/1
2.0
>>> 1/2+1/2+1/2+1/2
2.0
>>> 1/3+1/3+1/3+1/3+1/3+1/3
1.9999999999999998
>>> 1/4+1/4+1/4+1/4+1/4+1/4+1/4+1/4
2.0
>>> 1/5+1/5+1/5+1/5+1/5+1/5+1/5+1/5+1/5+1/5
1.9999999999999998
>>> 1/6+1/6+1/6+1/6+1/6+1/6+1/6+1/6+1/6+1/6+1/6+1/6
2.0
>>> 1/7+1/7+1/7+1/7+1/7+1/7+1/7+1/7+1/7+1/7+1/7+1/7+1/7
1.9999999999999993
>>> 1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8+1/8
2.0
>>> 1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9+1/9
2.0000000000000004
>>>
```

As shown by the experiment above, when  $n = 3, 5, 7, 9$ , the result cannot be represented exactly in Python.