

## 1. Python 3.x vs. 2.x Changes:

- The `print` statement has been replaced with a `print()` function, with keyword arguments to replace most of the special syntax of the old `print` statement. New function syntax:

```
print(value, ..., sep=' ', end='\n', file=sys.stdout)
```

a) Predict the expected output of each of the following.

Version 2.x	Version 3.x	Expected Output
<code>print 'cat', 5, 'dog'</code>	<code>print('cat', 5, 'dog')</code>	
<code>print</code>	<code>print()</code>	
<code>print 'cat', 5,</code> <code>print 'horse'</code> <code>print 'cow'</code>	<code>print('cat', 5, end='')</code> <code>print(' horse')</code> <code>print('cow')</code>	

Version 3.x	Expected Output
<code>print ('cat', 5, 'dog', sep='23', end='#')</code>	
<code>print ('cat', 5, 'dog', end='#', sep='23')</code>	
<code>print ('cat', 5, 'dog', sep='23', 'horse')</code>	
<code>print ('cat', 5, 'dog', sep='&gt;*3')</code>	

- The `range()` now behaves like `xrange()` of version 2.x. The `xrange()` function no longer exists in version 3.
- `raw_input()` was renamed to `input()`. That is, the new `input()` function reads a line from `sys.stdin` and returns it as a string with the trailing newline stripped. It raises `EOFError` if the input is terminated prematurely. To get the old behavior of `input()`, use `eval(input())`.

Example, use a `for` loop to generate a sequence of values one at a time for each iteration of the loop:

```
n = eval(input("Enter # of iterations? "))
for count in range(n):
    print(count, end=" ")
print("\nDone")
```

```
Enter # of iterations? 6
0 1 2 3 4 5
Done
```

- Removed `<>` as an alternate “not equal” operator, so use `!=` instead.
  - There is only one built-in integral type, named `int`. It behaves like the old `long` type.
  - An expression like `1/2` returns a float. Use `1//2` to get the truncating “integer division” behavior of version 2.
  - Dictionary methods `dict.keys()`, `dict.items()` and `dict.values()` return iterable “views” instead of lists. For example, this no longer works: `keyList = d.keys(); keyList.sort()`. Use `keyList = sorted(d)` instead.
- (Also, the `dict.iterkeys()`, `dict.iteritems()` and `dict.itervalues()` methods are no longer supported.)

2. Review of assignment statements. Predict the output of the following programs

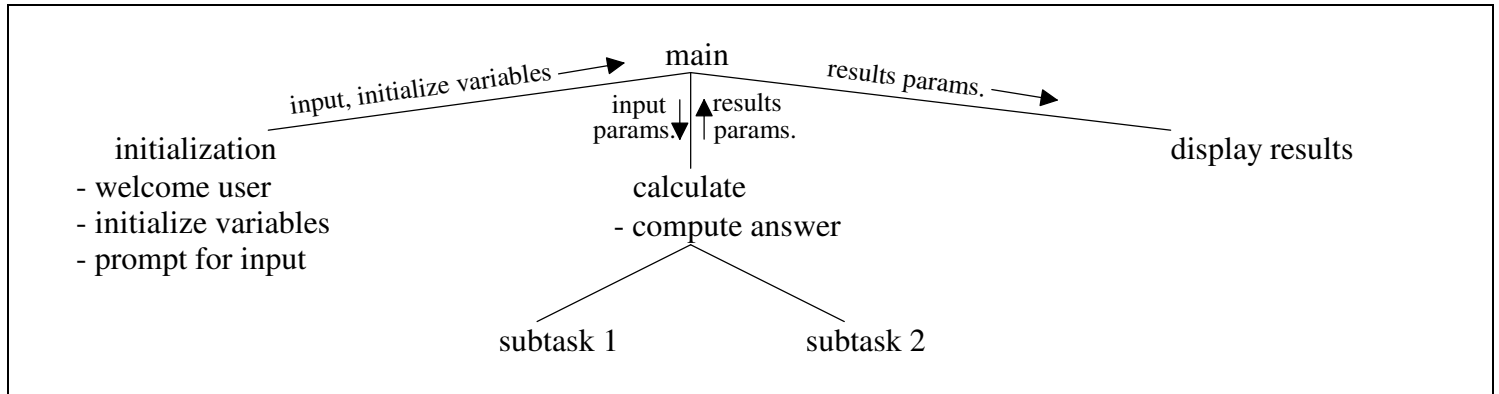
```
a = 123
b = a
a += 1
print ('a is', a)
print ('b is', b)
print ()

c = ['cat', 'dog']
d = c
c.append('cow')
print('c is', c)
print('d is', d)
```

```
c = 'cat'
d = c
c += 'fish'
print('c is', c)
print('d is', d)
```

3. Design a program to roll two 6-sided dice 1,000 times to determine the percentage of each outcome (i.e., sum of both dice). Report the outcome(s) with the highest percentage.

Most simple programs have a similar functional-decomposition design pattern:



a) Customize the diagram for the dice problem by briefly describing what each function does and what parameters are passed.

b) An alternative design methodology is to use object-oriented design. For the above dice problem, what objects would be useful and what methods (operations on the objects) should each perform?