Appendix A

Answers to Selected Exercises

Chapter 2

5. Loops and numbers

a)

```
i = 0
while i < 11:
    i += 1
```

b)

```
for i in range(11):
    pass
```

6. Conditionals

```
n = int(raw_input('enter a number: '))
if n < 0:
    print 'negative'
elif n > 0:
    print 'positive'
else:
    print 'zero'
```

7. Loops and strings

```
s = raw_input('enter a string: ')
for eachChar in s:
    print eachChar    # (does not print index)
```

or

```
for i in range(len(s)):
    print i, s[i]
```

or

```
i = 0
slen = len(s)
while i < slen:
    print i, s[i]
```

or

```
for i, x in enumerate(s):
    print i, x
```

8. Loops and operators

```
subtot = 0
for i in range(5):
    subtot += int(raw_input('enter a number: '))
print subtot
```

or

```
# uses sum() BIF and generator expressions
print sum(int(raw_input('enter a number: ')) for i in range(5))
```

Chapter 3

4. Statements
   Use ;
5. Statements
   Use \ (unless part of a comma-separated sequence in which case \ is optional)
7. Identifiers

`40XL`	number
`$saving$`	symbol
`print`	keyword
`0x40L`	number
`big-daddy`	symbol
`2hot2touch`	number
`thisIsn'tAVar`	symbol
`if`	keyword
`counter-1`	symbol

Chapter 4

1. Python objects

   All Python objects have three attributes: type, ID, and value. All are read-only with a possible exception of the value (which can be changed only if the object is mutable).

5. `str()` vs. `repr()`

   `repr()` is a built-in function while `str()` was a built-in function that changed to a factory function in Python 2.2. They will both return a string representation of an object; however, `str()` returns a *printable* string representation while `repr()` (and the backquote operator ``` `` ```) return an *evaluatable* string representation of an object, meaning that it is a string that represents a (valid) Python object that would be created if passed to `eval()`.

6. Object equality

`type(a) == type(b)`	whether the value of `type(a)` is the same as the value of `type(b)... ==` is a value compare
`type(a) is type(b)`	whether the type objects returned by `type(a)` and `type(b)` are the same object

   Since there exists only one (type) object for each built-in type, there is no need to check their values; hence, only the latter form should be used.

Chapter 5

8. Geometry

```
import math

def sqcube():
    s = float(raw_input('enter length of one side: '))
    print 'the area is:', s ** 2., '(units squared)'
    print 'the volume is:', s ** 3., '(cubic units)'

def cirsph():
    r = float(raw_input('enter length of radius: '))
    print 'the area is:', math.pi * (r ** 2.),
    '(units squared)'
    print 'the volume is:', (4. / 3.) * math.pi * (r **
3.), '(cubic units)'

sqcube()
cirsph()
```

11. Modulus

a)

```
for i in range(0, 22, 2):     # range(0, 21, 2) okay too
    print i
```

or

```
for i in range(22):           # range(21) okay too
    if i % 2 == 0:
        print i
```

b)

```
for i in range(1, 20, 2):     # range(1, 21, 2) okay too
    print i
```

or

```
for i in range(20):           # range(21) okay too
    if i % 2 != 0:
        print i
```

c)

When `i % 2 == 0`, it's even (divisible by 2), otherwise it's odd.

Chapter 6

1. Strings

`find(), rfind(), index(), rindex();` can also use the **`in`** operator.

2. Identifiers

```
import string
alphas = string.letters + '_'
alnums = alphas + string.digits
iden = raw_input('Identifier to check? ')
if len(iden) > 0:
     if iden[0] not in alphas:
         print "Error: first char must be alphabetic"
     else:
          if len(iden) > 1:
               for eachChar in iden[1:]:
                    if eachChar not in alnums:
                         print "Error: others must be alnum"
                         break
               else:
                    import keyword
                    if iden not in keyword.kwlist:
                         print 'ok'
                    else:
                         print 'Error: keyword name'
else:
     print 'Error: no identifier entered'
```

Chapter 7

1. Dictionary methods

```
dict.update()
```

3. Dictionary methods

a)

```
keys = dict.keys()
keys.sort()
```

or

```
sorted(dict.keys())
```

4. Creating dictionaries

```
# assumes  and list2 are the same length
d = {}
for i in range(len(list1)):
    d[list1[i]] = list2[i]
```

or

```
d = {}
for i, x in enumerate(list1):
     d[x] = list2[i]
```

or

```
d = dict(map(None, list1, list2))
```

or

```
d = dict(zip(list1, list2))
```

7. Inverting dictionaries

```
list1 = oldDict.values()
list2 = oldDict.keys()
```

Now apply the solutions to Problem 4.
Note that these solutions are destructive, meaning that for one-to-many dictionaries, keys that share the same values will only have the latest installed value for the value that is now a key. Extra Credit: Come up with a non-destructive solution where keys that share the same values in the old dictionary are now stored inside a list as the value for the corresponding key in the new dictionary.

Chapter 8

3. `range()` built-in function
   a)

```
range(10)
```

4. Prime numbers

```
import math
def isprime(num):
    count = int(math.sqrt(num))
    while count > 1:
        if num % count == 0:
            return False
        count -= 1
    else:
        return True
```

Chapter 9

2. File access

```
f = open(raw_input('enter filename: '))
i = 0
num = int(raw_input('enter number of lines: '))
for eachLine in f:
    if i == num:
        break
    print eachLine,        # suppress NEWLINE
    i += 1
f.close()
```

13. Command-line arguments
   b)

```
import sys
print "# of args", len(sys.argv)    # argc
print "args:", sys.argv             # argv
```

Chapter 10

1. Raising exceptions
   e)

2. Raising exceptions
   d)

4. Keywords
try-except monitors the **try** clause for exceptions and execution jumps to the matching **except** clause. However, the **finally** clause of a **try-finally** will be executed regardless of whether or not an exception occurred. How does the **try-except-finally** statement work?

5. Exceptions (we'll provide the solution, but you have to determine why):
   a) `SyntaxError`
   b) `IndexError`
   c) `NameError`
   d) `ZeroDivisionError`
   e) `ValueError`
   f) `TypeError`

Chapter 11

2. Functions

```
def sumtimes(x, y):
    return (x+y, x*y)
```

6. Variable-length arguments

```
def printf(string, *args):
    print string % args
```

Chapter 12

2. Importing attributes

a)

```
import mymodule ⇒ mymodule.foo()
```

and

```
from mymodule import foo ⇒ foo()
```

b)

If you use the **import** statement, the module name is brought into the local namespace, and `foo()` is only accessible from the module's namespace.
If you use the **from-import** statement, "`foo()`" itself is brought into the local namespace. In this case, you do not need to use the module's namespace to access it.

Chapter 13

2. Functions versus methods
   Methods are basically functions but tied to a specific class object type. They are defined as part of a class and are executed as part of an instance of that class.

15. Delegation
   It makes no difference whether we use `open()` or `capOpen()` to read our file because in `capOpen.py`, we delegated all of the reading functionality to the Python system defaults, meaning that no special action is ever taken on reads. The same code would be executed, i.e., none of `read()`, `readline()`, or `readlines()` are overridden with any special functionality.

Chapter 14

1. Callable objects
   Functions, methods, classes, callable class instances

3. `input()` vs. `raw_input()`
   `raw_input()` returns user input as a string; `input()` returns the evaluation of the user input as a Python expression. In other words:

```
input() ≡ eval(raw_input())
```

Chapter 15

Regular expressions

1. Matching strings
   bat, hat, bit, etc.

```
[bh][aiu]t
```

2. First name last

```
[A-Za-z-]+ [A-Za-z-]+
```

   (Any pair of words separated by a single space, e.g., first and last names, hyphens allowed)

3. Last name first

```
[A-Za-z-]+, [A-Za-z]
```

   (Any word and single letter separated by a comma and single space, e.g., last name, first initial)

```
[A-Za-z-]+, [A-Za-z-]+
```

(Any pair of words separated by a comma and single space, e.g., last, first names, hyphens allowed)

8. Python longs
   `\d+[lL]`

   (Decimal [base 10] integers only)

9. Python floats
   `[0-9]+(\.[0-9]*)?`

   (Describes a simple floating point number, that is, any number of digits followed optionally by a single decimal point and zero or more numeric digits, as in "0.004," "2," "75.," etc.)

Chapter 16

3. Sockets
   TCP

6. Daytime service

```
>>> import socket
>>> socket.getservbyname('daytime', 'udp')
13
```

Chapter 17

20. Identifiers
    pass is a keyword, so it cannot be used as an identifier. The common idiom in all such cases is to append an underscore (_) to the name of the offending variable.

Chapter 18

2. Python threads
   I/O-bound . . . why?

Chapter 19

1. Client/server architecture
   Window(ing) clients are GUI events generated usually by users which must be processed by the window(ing) system that acts as the server; it is responsible for making timely updates to the display as to be apparent to the user.

Chapter 20

15. CGI errors

The Web server returns either no data or error text, which results in an HTTP 500 or Internal Server Error in your browser because that (returned data) is not valid HTTP or HTML data. The `cgitb` module captures the Python traceback and returns it as valid data through CGI, which gets displayed to the user . . . a great debugging tool.

Chapter 21

1. Extending Python
   - Performance improvement
   - Protecting source code
   - New or desired change of functionality
   - And more!

Chapter 22

1. DB-API

The DB-API is a common interface specification for all Python database adapters. It is good in that it forces all adapter writers to code to the same specification so that end-user programmers can write consistent code that can be (more) easily ported to other databases with the minimum amount of effort.

Chapter 23

3. Web services and the `csv` module

Replace the **`for`** loop in `stock.py` with the following:

```
import csv
for tick, price, chg, per in csv.reader(f):
    print tick.ljust(7), ('%.2f' % round(float(price),
2)).rjust(6), chg.rjust(6), per.rjust(6)
```