Solutions to Practice Problems

1. It will print

   ```
   0
   0
   1
   0
   1
   2
   ```

   with the numbers in some order. The numbers won't be printed in the same order each time.

2. It will print

   ```
   5
   4
   3
   2
   1
   ```

3. It will print

   ```
   Python
   I
   like
   Python
   ```

4. Function main( ) can't see variable L in function BuildList( ), so main( ) doesn't know what L is.

5. The while loop ends when we have x equal to 0 at the top of the loop. If x ever becomes 0 inside the loop we set variable done to True (which does nothing since we never use this value of x), and then set x to 13, so x is never 0 at the top of the loop.

6. Function countDownBy2(n) counts down from value n. If n is even it eventually gets to 0 and halts. If n is odd it skips 0 and goes from 1 to -1, to -3, and so forth, so in this case it won't halt. To fix it change the if-statement from if n != 0 to if n > 1, so we don't recurse on either of the base cases n == 0 and n==1.

7. The value associated with a name is supposed to be a list of the friends of that person. However, the code says that if a is not in D.keys( ) then D[a] = b. In this case the value associated with the name a is the name of one person, not a list of people. This causes the dictionary to crash the second time you enter a friend of "john"; since D["john"] is a string rather than a list, D["john"].append("sally") makes no sense.

8. The program will run; class B inherits the constructor from class A. It prints 47, which is 23+24.

9. The problem is that the changeFavoriteColor( ) method changes a local variable favoriteColor to fave rather than the instance variable self.favoriteColor. If this line is changed to

```
        self.favoriteColor=fave
```

the program would work correctly.

10. Here's the code:

```
import random

def getNumber():
        return random.randint(1, 101)

def game(num):
        done = False
        while not done:
                guess = eval(input( "Guess? " ))
                if guess == num:
                        print( "Got it!" )
                        done = True
                elif guess > num:
                        print( "Too high." )
                else:
                        print( "Too low." )

def main():
        print( "I'm thinking of a number between 1 and 100." )
        number = getNumber()
        game(number)

main()
```

11. Here’s the program:

```
def sumDigits(x):
        sum = 0
        while x > 0:
                sum = sum + x%10
                 x = x//10
        return sum

def main():
         count = 0
        n = 0
        while count < 100:
                if sumDigits(n) == 10:
                         print(n)
                        count = count + 1
                n = n+1

main()
```

12. Here’s the function:

```
def readFile():
        F = open( "data.txt", "r")
        X=[]
        Y = []
        Z = []
        for line in F:
                line = line.strip()
                 if line[0] == "#":
                        continue
                else:
                        nums = line.split()
                        X.append(int(nums[0]))
                        Y.append(int(nums[1]))
                        Z.append(int(nums[2]))
        return X, Y, Z
```

13. Here’s the function:

```
def Find(x, L, low, high):
    if high<low:
        return False
    else:
        mid = (low+high)//2
        if x == L[mid]:
            return True
        elif x < L[mid]:
            return Find(x, L, low, mid-1)
        else:
            return Find(x, L, mid+1, high)
```

14. Here’s the program:

```
def main():
    fname = input( "file name? " )
    F = open(fname, "r" )
    L = ["bob was here.\n" ]
    for line in F:
        L.append(line)
    F = open(fname, "w")
    for line in L:
        F.write(line)

main()
```

15. Here’s the program:

```
class Animal:
        def __init__(self, name):
                 self.name = name

        def __str__(self):
                return self.name

class Cat(Animal):
        def __str__(self):
                return "meow"

class Dog(Animal):
        def __str__(self):
                return "woof"

class Duck(Animal):
        def __str__(self):
                return "quack"

def main():
        x = Dog( "Lassie")
        y = Cat( "Sylvester" )
        z = Cat( "Cat in the Hat" )
        w = Duck( "Donald" )
        print(x, y, z, w)

main()
```

16. Here’s the program:

```
def main():
    F = open("words25K.txt", "r")
    D ={}
    for line in F:
        word = line.strip()
        n = len(word)
        if n in D.keys():
            D[n].append(word)
        else:
            D[n] = [word]
    lengths = list(D.keys())
    lengths.sort()
    for n in lengths:
        print( "words of length %d:"%n)
        for word in D[n]:
             print( "   %s"%word )
        print()

main()
```