Source code:

```
from __future__ import division

ziplist = []
poplist = []
prob = []
totalpop = 0
popcount = 0
h1=h2=h3=h4=h5 = 0
count = 0

with open('zipcode.txt') as openfile:
  for line in openfile:
    temp = line.split()
    ziplist.append(temp[0])
    poplist.append(temp[1])

ziplist.remove('%')
poplist.remove('Zip_Code')

for number in poplist:
  totalpop +=int(number)

for number in poplist:
  temp = int(number) / totalpop
  prob.append(temp)

for number in prob:
  temp = float(number)
  if temp > h1:
    h5 = h4
    h4 = h3
    h3 = h2
    h2 = h1
    h1 = temp
  elif temp > h2:
    h5 = h4
    h4 = h3
    h3 = h2
    h2 = temp
  elif temp > h3:
    h5 = h4
    h4 = h3
    h3 = temp
  elif temp > h4:
    h5 = h4
    h4 = temp
  elif temp > h5:
    h5 = temp
#print out the five most populated zip codes
#print ziplist[prob.index(h1)], poplist[prob.index(h1)]
#print ziplist[prob.index(h2)], poplist[prob.index(h2)]
#print ziplist[prob.index(h3)], poplist[prob.index(h3)]
#print ziplist[prob.index(h4)], poplist[prob.index(h4)]
#print ziplist[prob.index(h5)], poplist[prob.index(h5)]
```

```
#print ziplist[prob.index(h5)], poplist[prob.index(h5)]

right = raw_input('Current zipcode: ').split()
wrong = raw_input('Digits not in zipcode: ').split()

n = ['0','1','2','3','4','5','6','7','8','9']
s = [0,1,2,3,4]
totalproblist = []

for j in n:
  totalprob = 0
  subtotalpop = 0
  correctpop = 0
  if wrong.count(j) == 0:         # set prob of wrong guess to 0
    if right.count(j) == 0:       # set prob of correct guess to 1
      for i in ziplist:           # loop a new zip code
        wrongflag = 0
        rightflag = 0
        for k in wrong:           # check all wrong guess
          if k in i:              # only contain prob without wrong guess
            wrongflag = 1
        for x in s:               # loop through all right guess
          if right[x] != '-1':
            if right[x] != i[x]:
              rightflag = 1
          else:
            for m in s:           # loop through all right guess again
              if right[m] != '-1':
                if right[m] == i[x]:
                  rightflag = 1
        if wrongflag == 0:
          if rightflag == 0:
            subtotalpop += int(poplist[ziplist.index(i)])
            if j in i:
              correctpop +=  int(poplist[ziplist.index(i)])

      totalprob = correctpop / subtotalpop
      totalproblist.append(totalprob)
    else:
      totalproblist.append(1)
  else:
    totalproblist.append(0)

maxprob = 0
for j in n:
  print j,totalproblist[int(j)]
  if totalproblist[int(j)] != 1:
    if totalproblist[int(j)] > maxprob:
      maxprob = totalproblist[int(j)]
      maxi = j

print
print 'Next guess is:', maxi
```

2.2 (a) The five most populated zip codes:

```
>>> ================================ RESTART ================================
>>>
60629 113916
79936 111086
11368 109931
90650 105549
90011 103892
```

2.2 (b)

(i) First guess: -1 -1 -1 -1 -1

```
>>>
Current zipcode: -1 -1 -1 -1 -1
Digits not in zipcode:
0 0.57076571349
1 0.467606948451
2 0.439617734448
3 0.434160325701
4 0.398775246212
5 0.372883567821
6 0.346808929617
7 0.376356157183
8 0.337229472271
9 0.347022909065

Next guess is: 0
>>>
```

(ii) None correctly gussed: -1 -1 -1 -1 -1

Incorrectly guessed: 0, 4

```
>>>
Current zipcode: -1 -1 -1 -1 -1
Digits not in zipcode: 0 4
0 0
1 0.563088311802
2 0.570909118687
3 0.570653573575
4 0
5 0.4663287694
6 0.393224282116
7 0.470141478664
8 0.389922247916
9 0.440192078699

Next guess is: 2
>>>
```

(iii) Correctly guessed: 8 -1 -1 7 -1

Incorrectly guessed: none

```
>>>
Current zipcode: 8 -1 -1 7 -1
Digits not in zipcode:
0 0.527162679998
1 0.0325832588383
2 0.170477773919
3 0.470249449117
4 0.57779270841
5 0.458810433475
6 0.0529958377698
7 1
8 1
9 0.25398999015

Next guess is: 4
>>>
```

(iv) Correctly guessed: 9 2 -1 -1 9
Incorrectly guessed: 5, 6

```
>>>
Current zipcode: 9 2 -1 -1 9
Digits not in zipcode: 5 6
0 0.550722241301
1 0.621407342398
2 1
3 0.156569703599
4 0.0
5 0
6 0
7 0.19818708318
8 0.198848484078
9 1

Next guess is: 1
>>>
```

(v) Correctly guessed: -1 -1 7 0 3
Incorrectly guessed: 4, 5, 8, 9

```
>>>
Current zipcode: -1 -1 7 0 3
Digits not in zipcode: 4 5 8 9
0 1
1 0.618941735132
2 0.793786588277
3 1
4 0
5 0
6 0.381058264868
7 1
8 0
9 0

Next guess is: 2
>>>
```