

Problem Set 3: Estimators

Incremental Mean

#In class you wrote a function mean that computed the mean of a set of numbers
#Consider a case where you have already computed the mean of a set of data and
#get a single additional number. Given the number of observations in the
#existing data, the old mean and the new value, complete the function to return
#the correct mean

```
from __future__ import division

def mean(oldmean,n,x):
    #Insert your code here
    return (oldmean*n+x)/(n+1)

currentmean=10
currentcount=5
new=4

print mean(currentmean,currentcount,new) #Should print 9
```

Likelihood Challenge

#Compute the likelihood of observing a sequence of die rolls
#Likelihood is the probability of getting the specific set of rolls
#in the given order
#Given a multi-sided die whose labels and probabilities are
#given by a Python dictionary called dist and a sequence (list, tuple, string)
#of rolls called data, complete the function likelihood
#Note that an element of a dictionary can be retrieved by dist[key] where
#key is one of the dictionary's keys (e.g. 'A', 'Good').

```
def likelihood(dist,data):
    #Insert your answer here
    likelihood = 1
    for x in data:
        likelihood *= dist[x]
    return likelihood

tests= [(({ 'A':0.2, 'B':0.2, 'C':0.2, 'D':0.2, 'E':0.2}, 'ABCEDEECAB'), 1.024e-07),((

for t,l in tests:
    if abs(likelihood(*t)/l-1)<0.01: print 'Correct'
    else: print 'Incorrect'
```

```
tests= [(({ 'A':0.2, 'B':0.2, 'C':0.2, 'D':0.2, 'E':0.2}, 'ABCDEDECAB'), 1.024e-07), ({ 'Good':0.6, 'Bad':0.2, 'Indifferent':0.2}, ['Good', 'Bad', 'Indifferent', 'Good', 'Good', 'Bad']), 0.001728), ({ 'Z':0.6, 'X':0.333, 'Y':0.067}, 'ZXYYZXYXZY'), 1.07686302456e-08), ({ 'Z':0.6, 'X':0.233, 'Y':0.067, 'W':0.1}, 'WXYZYZZZW'), 8.133206112e-07)]
```

Note:

Likelihood in statistics quantifies how well a specific set of parameter values explains observed data. **It's calculated by multiplying the probabilities of each data point given the chosen parameters.** The higher the likelihood, the better the model fits the data. In essence, it helps determine the most probable parameter values for a given dataset.