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In [ ]: *****
#
#           Statistics 1 : Assignment
#           Problem Statement 1 : To find Standard Deviation for rents
#
#*****
# Average rent given in your area , Find Standard Deviation

# importing the packages and setting an alias
import numpy as np
import math

# Average rent in your area

AvgRnt = [1550,1700,900,850,1000,950]

#*****
# Finding the Standard Deviation , by writing self functions of mean, variance and std deviation
def mean(x):
    return sum(x) / len(x)

# finding the Variance
def variance(x):
    n = len(x)
    x_bar = round(mean(x),2)
    sumx = 0
    for x_i in x:
        sumx += (x_i-x_bar)**2
    return (sumx/n-1)

def standard_deviation(x):
    return(math.sqrt(variance(x)))

print("Approach 1 : Writing own functions \n")
print('-'*80,"\n The Standard Deviation for the rent is : \n",'-'*80)

# print(round(mean(AvgRnt),2))
# print(round(variance(AvgRnt),2))

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print(round(standard_deviation(AvgRnt),2))
#*****
# Finding the Standard Deviation by using Library numpy

print("\nApproach 2 : Using numpy functions  \n")
print('-'*80,"\n The Standard Deviation for the rent is : \n",'-'*80)

# print(round(np.mean(AvgRnt),2))
# print(round(np.var(AvgRnt),2))
print(round(np.std(AvgRnt),2))
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In [ ]: #*****
#               Problem Statement 2 : To find Variance for Tree heights in California
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#*****
# Tree heights given in California , Find Variance

# importing the packages and setting an alias
import numpy as np
import math

# Tree Heights

treeHt = [3,21,98,203,17,9]

#*****
# Finding the Standard Deviation , by writing self functions of mean, variance and std deviation
def mean(x):
    return sum(x) / len(x)

# finding the Variance
def variance(x):
    n = len(x)
    x_bar = round(mean(x),2)
    sumx = 0
    for x_i in x:
        sumx += (x_i-x_bar)**2
    return (sumx/n-1)

def standard_deviation(x):
    return(math.sqrt(variance(x)))

mean1 = round(mean(treeHt),2)
var1 = round(variance(treeHt),2)

print("Approach 1 : Writing own functions \n")
print(" The Variance for the tree heights is : %.2f " %var1)

#*****

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# Finding the Variance by using library numpy
print("\nApproach 2 : Using numpy functions \n")

var1 = round(np.var(treeHt),2)

print(" The  Variance for Tree Heights  is by numpy : %.2f \n"% var1)
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In [ ]: #*****
#               Problem Statement 3 : To find Probability Distribution of variable of
#               : for number of subjects student had failed in
#
#*****

# Number of Students in class is 100 , 80 have passed in all subjects and 20 have failed in one or more subjects

# importing the packages and setting the alias
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import scipy.stats

# Variable denoting number of subjects failed
X = np.arange(1,4)
print(X)

''' Probability of failing in subjects X=1,X=2,X=3

P(X=1) = 10/100 = 1/10 = 0.1
P(X=2) = 7/100 = 0.07
P(X=3) = 3/100 = 0.03
'''

P1 = 0.1
P2 = 0.07
P3 = 0.03
print("The Probability Distribution Function for failed subjects is :\n",'-'*80)
print(P1,P2,P3)

print('-'*80)

# Expected Value or the mean  $E[X] = 0.1 * 1 + 0.07 * 2 + 0.03 * 3$ 
ExpectedVal = P1*X[0] + P2*X[1] + P3*X[2]
print("The Expected Value i.e mean is :\n",'-'*80)
print(ExpectedVal)
#Expected Value  $E(X) = 0.1 * 1 + 0.07 * 2 + 0.03 * 3 = 0.1 + 0.14 + 0.09 = 0.33 = 33\%$ 
plt.bar(X,[0.1,0.07,0.03])
plt.show()

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