

Task 1 Problem 1

Spyder (Python 3.6)

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Editor - C:\Users\amitp.VIDEO54\Desktop\Training\July14-Batch\Assignment\Assignment-Stats1&2\task 1 problem 1.py

test1.py test.py task 1 problem 1.py task 1 problem 2.py task 1 problem 3.py

```
6 """
7
8 import math
9
10 ...
11
12 Task 1
13 Problem 1
14 ...
15
16 def my_mean(my_list):
17     mean = 0
18     res = 0
19     num = len(my_list)
20     for i in my_list:
21         res = res + i
22
23     mean = float((res) / (num))
24     return mean
25
26 def my_std (my_list, is_pop=False):
27     num = len(my_list)
28     mean = my_mean(my_list)
29     var = 0.0
30     std = 0.0
31     for i in my_list:
32         var = var + (i - mean)**2
33
34     if is_pop == False:
35         var = float(var) / (num)
36     else:
37         var = float(var) / (num-1)
38
39     std = math.sqrt(var)
40
41     return std
42
43 my_list = [1550, 1700, 900, 850, 1000, 950]
44 mean = my_mean(my_list)
45 print("      Mean is ${{}}".format(my_mean(my_list)))
46 print("Population Std Dev is ${{}}".format(my_std(my_list)))
47 print("      Sample Std Dev is ${{}}".format(my_std(my_list, True)))
48
```

Variable explorer

Name	Type	Size	Value
mean	float	1	1158.3333333333333
my_list	list	6	[1550, 1700, 900, 850, 1000, 950]

Variable explorer File explorer

IPython console

Console 1/A

```
Mean is 1158.333333
Population Std Dev is 335.927406
Sample Std Dev is 367.990036

In [66]:
```

IPython console History log

Permissions: RW End-of-lines: CRLF Encoding: UTF-8 Line: 47 Column: 32 Memory: 74 %

Desktop 10:41 PM 9/23/2018

Task 1 Problem 2

The screenshot displays the Spyder Python IDE interface. The main editor window shows a Python script for calculating the mean and variance of a list. The script includes comments for 'Task 1' and 'Problem 2'. The code defines two functions: `my_mean` and `my_var`, and then uses them to calculate the mean and variance for a specific list.

```
4
5 @author: amitp
6 """
7
8 import math
9
10 '''
11 Task 1
12 Problem 2
13 '''
14
15 def my_mean(my_list):
16     mean = 0
17     res = 0
18     num = len(my_list)
19     for i in my_list:
20         res = res + i
21
22     mean = float((res) / (num))
23     return mean
24
25 def my_var (my_list, is_pop=False):
26     num = len(my_list)
27     mean = my_mean(my_list)
28     var = 0.0
29
30     for i in my_list:
31         var = var + (i - mean)**2
32
33     if is_pop == False:
34         var = float(var) / (num)
35     else:
36         var = float(var) / (num-1)
37
38     return var
39
40 my_list = [3, 21, 98, 203, 17, 9]
41 mean = my_mean(my_list)
42 print("      Mean is  %f"%my_mean(my_list))
43 print("Population Variance is %f"%my_var(my_list))
44 print("  Sample Variance is %f"%my_var(my_list, True))
45
```

The Variable explorer on the right shows the following variables:

Name	Type	Size	Value
mean	float	1	58.5
my_list	list	6	[3, 21, 98, 203, 17, 9]

The IPython console shows the output of the script:

```
Mean is  58.500000
Population Variance is 5183.250000
Sample Variance is 6219.900000

In [68]:
```

The status bar at the bottom indicates: Permissions: RW, End-of-lines: CRLF, Encoding: UTF-8, Line: 12, Column: 14, Memory: 73 %.

Task 1 Problem 3

The probability of failing in 0 subjects, $P(X=0) = 0.8$

The probability of failing in 1 subjects, $P(X=1) = 0.1$

The probability of failing in 2 subjects, $P(X=2) = 0.07$

The probability of failing in 3 subjects, $P(X=3) = 0.03$

The probability distribution can be shown as:

X	0	1	2	3
P(x)	0.8	0.1	0.07	0.03

Task 2 Problem -1

Probability of success = Probability of wrongly answering one question: $\frac{3}{4}$

Probability of failure = Probability of correctly answering one question: $\frac{1}{4}$

Using Binomial distribution, probability of 5 wrong question can be determined

Where $n = 20$, $x = 5$

$$P(5) = {}^{20}C_5 \left(\frac{3}{4}\right)^5 \left(\frac{1}{4}\right)^{20-5}$$

$$= 15504 * 0.237 * 0.00000000093$$

$$= 0.0000034$$

Task 2 Problem 2

Probability of success = Probability of getting 'D': $1/5$

Probability of failure = Probability of not getting 'D': $4/5$

Using Binomial distribution, probability of getting 'D' exactly 5 times

Where $n = 50$, $x = 5$

$$\begin{aligned} P(5) &= 50C_5 (1/5)^5 (4/5)^{50-5} \\ &= 2118760 * 0.00032 * 3.5e-32 \\ &= 2.3855e-29 \end{aligned}$$

Task 2 Problem 3

#	Ball 1	Ball 2	Probability
1	Red	Red	$4/10 * 3/9 = 2/15$
2	Red	Black	$4/10 * 6/9 = 4/15$
3	Black	Red	$6/10 * 4/9 = 4/15$
4	Black	Black	$6/10 * 5/9 = 1/3$

#	Possibilities	Probability
1	Probability of 2 Red ball	$2/15$
2	Probability of 1 Red ball	$4/15 + 4/15 = 8/15$
3	Probability of 0 Red ball	$1/3$