Symbiosis University of Applied Sciences

Front Page of Answer Book

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Name of Program: B. TECH **Year/Semester: 2ND YEAR/3RD SEMESTER**

Name of Paper: Statistics-I **Paper Code: BTCS03CCB5**

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Total No. of Pages.: 08

Instructions for Examinees

1. Fill up all entries required in this page.
2. Merge this doc page with your scanned answer sheets as a first page in a single PDF file.
3. Write your answers on A4 Ruled Sheets/Register Pages.
4. Write End after the last attempted question.
5. Write the page number on every page and mentioned Total No. of Pages on front Page.
6. **If the content in the Answer Book of two students or more has found similar, in that case all copied answer will stand cancelled.**

PRACTICAL ACTIVITY

1. **TITLE:**

Finding Arithmetic Mean for all 3 types of series using Matlab

2. **AIM/OBJECTIVE:** The objective is to find the Arithmetic Mean for 3 different types of series i.e.

   (a) Individual Series using MATLAB
   (b) Discrete Series —"— —"—
   (c) Continuous Series —"— —"—

3. **METHODOLOGY USED:**

a. For finding Arithmetic Mean of Individual Series:

1 way: Step 1: By using the mean() of MATLAB we can directly provide the Matrix 'X' as argument to mean().

2 way: By traditional way of mathematics, using A.M formula i.e.

$$AM = \frac{\sum x_i}{n} = \frac{x_1 + x_2 + x_3 + \dots + x_n}{n}$$

$\sum x_i$ → Sum of all the observations; n → Total No. of observations

b. For finding Arithmetic Mean of Discrete Series:

1 way: By traditional approach of maths, we will use mathematical expression i.e.

$$AM = \frac{\sum f_i x_i}{\sum f_i} = \frac{f_1 x_1 + f_2 x_2 + \dots + f_n x_n}{f_1 + f_2 + f_3 + \dots + f_n}$$

$\sum f_i$ → Sum of the frequencies of respective 'X'

$\sum f_i x_i$ → Sum of the prodt of frequency of particular observations

Step 1. Store the 'X' & freq 'f' in the variable.

Step 2. Then store the product of freq (f) and 'X' in one variable

Step 3. Find out the sum of freq (f) and prodt variable.

Step 4. Finally, use the mathematical formula & put respective formulas in order to get the MEAN!

② For finding Arithmetic Mean of Continuous Series

Step①: As in continuous series, we have class interval given so, first we take the MIDVALUE of them & then apply the same discrete series ~~form~~ method!

i.e $AM = \frac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$ ✓

4. BRIEF DESCRIPTION

① Arithmetic Mean is the best measure of central tendency, most stable average, simplest average to understand & easiest to compute.

② Arithmetic Mean is based on all the observations.

③ It is Rigidly defined.

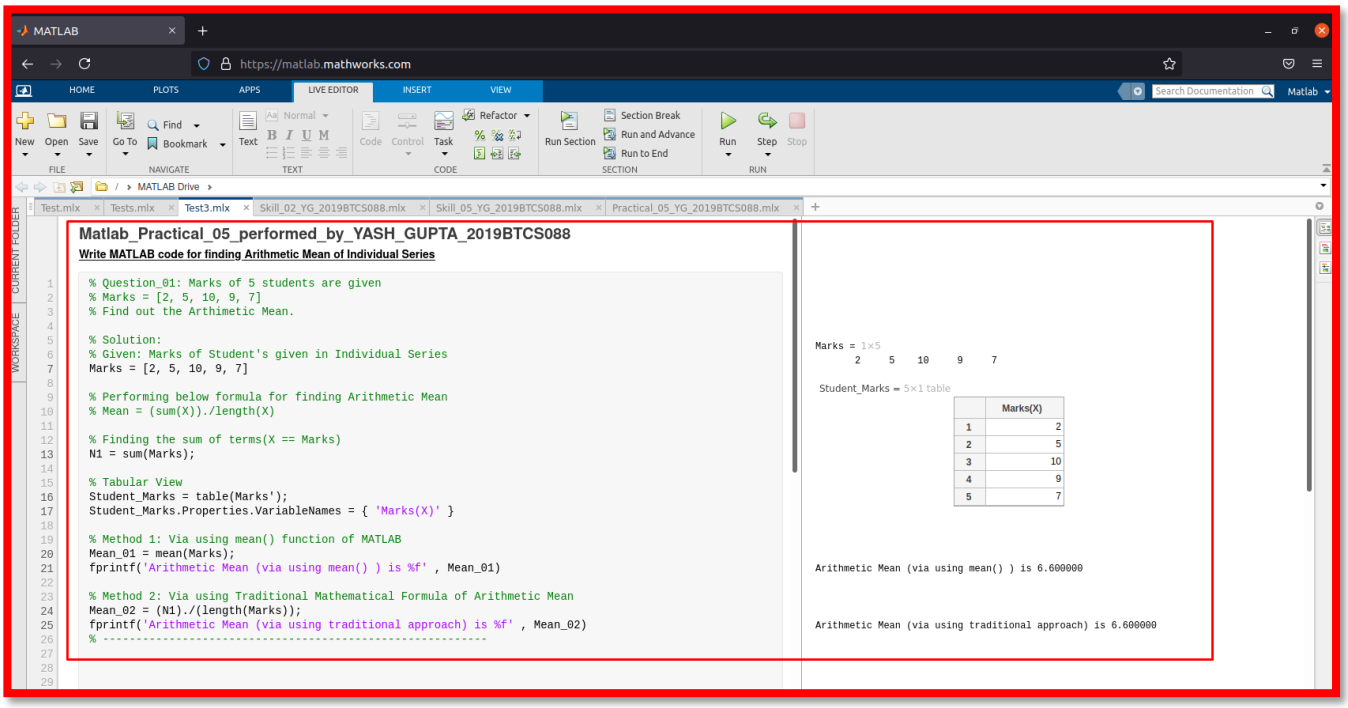
④ A.M follows mathematical properties/ algebraic properties/ mathematical treatment / algebraic treatment.

⑤ It is affected by ~~algebraic~~ extreme fluctuations.

⑥ AM can't be calculated for open End classification.

MATLAB CODE:

A. Example 1: Arithmetic Mean for Individual Series.



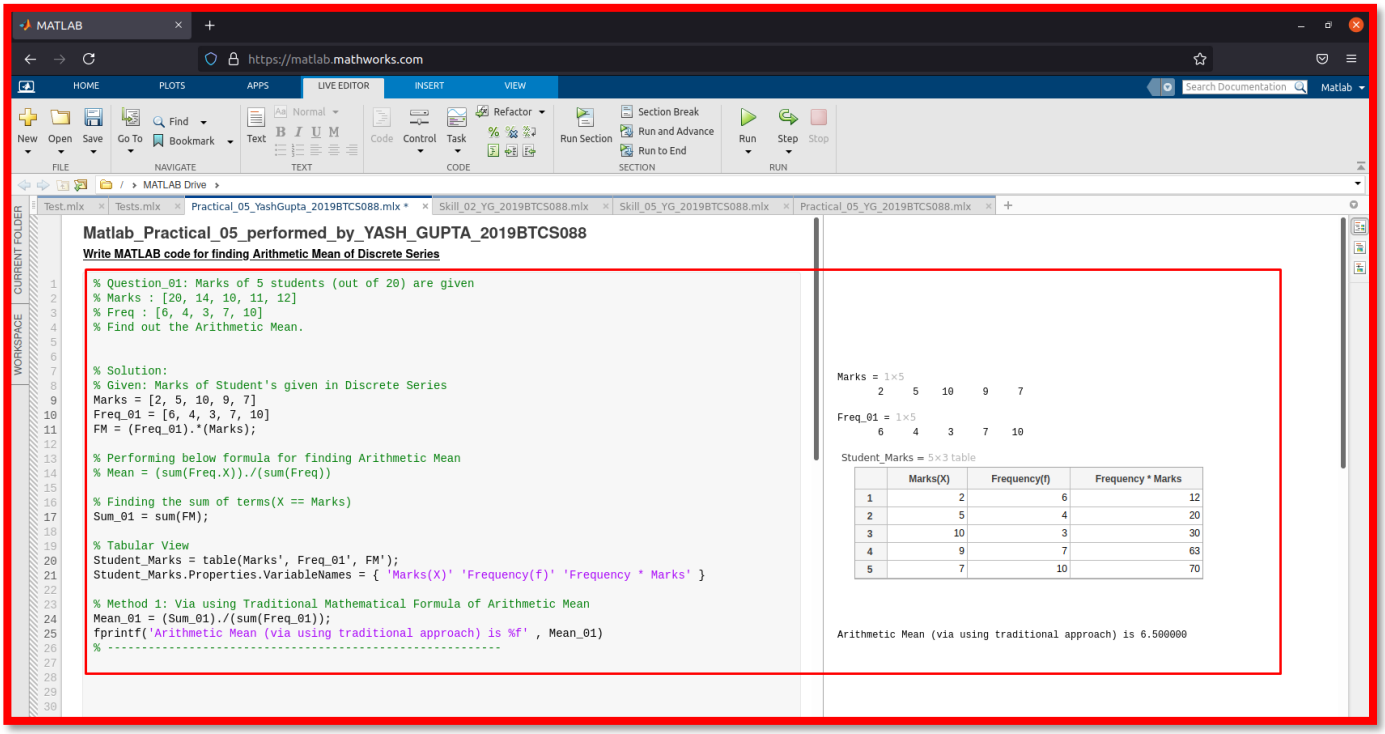
Matlab_Practical_05_performed_by_YASH_GUPTA_2019BTCS088

Write MATLAB code for finding Arithmetic Mean of Individual Series

```
% Question_01: Marks of 5 students are given
% Marks = [2, 5, 10, 9, 7]
% Find out the Arthimetic Mean.

% Solution:
% Given: Marks of Student's given in Individual Series
Marks = [2, 5, 10, 9, 7]

% Performing below formula for finding Arithmetic Mean
% Mean = (sum(X))./length(X)

% Finding the sum of terms(X == Marks)
N1 = sum(Marks);

% Tabular View
Student_Marks = table(Marks');
Student_Marks.Properties.VariableNames = { 'Marks(X)' }

% Method 1: Via using mean() function of MATLAB
Mean_01 = mean(Marks);
fprintf('Arithmetic Mean (via using mean() ) is %f' , Mean_01)

% Method 2: Via using Traditional Mathematical Formula of Arithmetic Mean
Mean_02 = (N1)./(length(Marks));
fprintf('Arithmetic Mean (via using traditional approach) is %f' , Mean_02)
% ------------------------------------------------------------
```

```
Marks = 1×5
     2     5    10     9     7

Student_Marks = 5×1 table

    Marks(X)
1           2
2           5
3          10
4           9
5           7

Arithmetic Mean (via using mean() ) is 6.600000

Arithmetic Mean (via using traditional approach) is 6.600000
```

B. Example 1: Arithmetic Mean for Discrete Series.



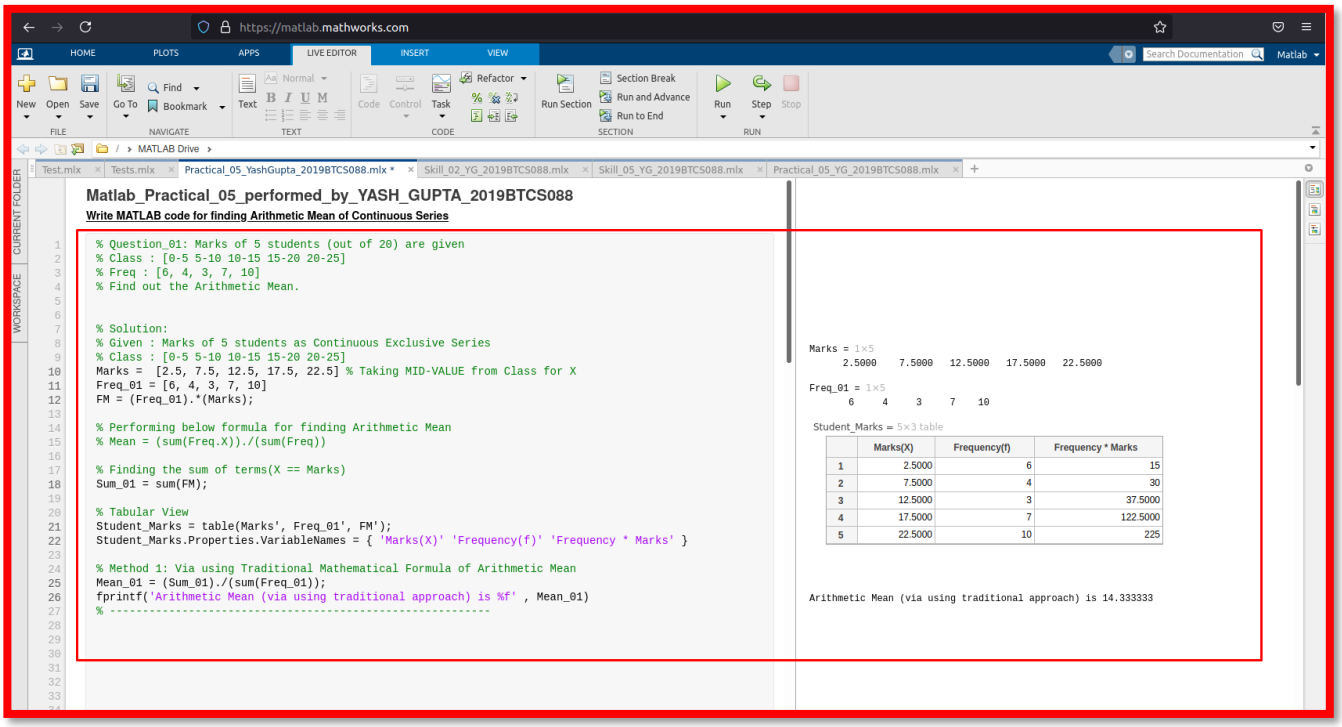
Matlab_Practical_05_performed_by_YASH_GUPTA_2019BTCS088

Write MATLAB code for finding Arithmetic Mean of Discrete Series

```
% Question_01: Marks of 5 students (out of 20) are given
% Marks : [20, 14, 10, 11, 12]
% Freq : [6, 4, 3, 7, 10]
% Find out the Arithmetic Mean.


% Solution:
% Given: Marks of Student's given in Discrete Series
Marks = [2, 5, 10, 9, 7]
Freq_01 = [6, 4, 3, 7, 10]
FM = (Freq_01).*(Marks);

% Performing below formula for finding Arithmetic Mean
% Mean = (sum(Freq.X))./(sum(Freq))

% Finding the sum of terms(X == Marks)
Sum_01 = sum(FM);

% Tabular View
Student_Marks = table(Marks', Freq_01', FM');
Student_Marks.Properties.VariableNames = { 'Marks(X)' 'Frequency(f)' 'Frequency * Marks' }

% Method 1: Via using Traditional Mathematical Formula of Arithmetic Mean
Mean_01 = (Sum_01)./(sum(Freq_01));
fprintf('Arithmetic Mean (via using traditional approach) is %f' , Mean_01)
% ------------------------------------------------------------
```

```
Marks = 1×5
     2     5    10     9     7

Freq_01 = 1×5
     6     4     3     7    10

Student_Marks = 5×3 table

    Marks(X)    Frequency(f)    Frequency * Marks
1           2               6                   12
2           5               4                   20
3          10               3                   30
4           9               7                   63
5           7              10                   70

Arithmetic Mean (via using traditional approach) is 6.500000
```

C. Example 1: Arithmetic Mean for Continuous Series.



Matlab_Practical_05_performed_by_YASH_GUPTA_2019BTCS088

Write MATLAB code for finding Arithmetic Mean of Continuous Series

```
% Question_01: Marks of 5 students (out of 20) are given
% Class : [0-5 5-10 10-15 15-20 20-25]
% Freq : [6, 4, 3, 7, 10]
% Find out the Arithmetic Mean.


% Solution:
% Given : Marks of 5 students as Continuous Exclusive Series
% Class : [0-5 5-10 10-15 15-20 20-25]
Marks =  [2.5, 7.5, 12.5, 17.5, 22.5] % Taking MID-VALUE from Class for X
Freq_01 = [6, 4, 3, 7, 10]
FM = (Freq_01).*(Marks);

% Performing below formula for finding Arithmetic Mean
% Mean = (sum(Freq.X))./(sum(Freq))

% Finding the sum of terms(X == Marks)
Sum_01 = sum(FM);

% Tabular View
Student_Marks = table(Marks', Freq_01', FM');
Student_Marks.Properties.VariableNames = { 'Marks(X)' 'Frequency(f)' 'Frequency * Marks' }

% Method 1: Via using Traditional Mathematical Formula of Arithmetic Mean
Mean_01 = (Sum_01)./(sum(Freq_01));
fprintf('Arithmetic Mean (via using traditional approach) is %f' , Mean_01)
% ------------------------------------------------------------
```

```
Marks = 1×5
    2.5000    7.5000   12.5000   17.5000   22.5000

Freq_01 = 1×5
     6     4     3     7    10
```

Student_Marks = 5×3 table

	Marks(X)	Frequency(f)	Frequency * Marks
1	2.5000	6	15
2	7.5000	4	30
3	12.5000	3	37.5000
4	17.5000	7	122.5000
5	22.5000	10	225

```
Arithmetic Mean (via using traditional approach) is 14.333333
```

SKILL ACTIVITY

TITLE: Concept of Arithmetic Mean with MATLAB

1. What is the purpose of this Activity? (Explain in 3-4 lines)

Purpose of this Activity is to find out:-

- (a) What is A.M? Why & where to use A.M?
- (b) Application of A.M in Real world problems
- (c) ~~Use of~~ Implication of A.M in Matlab

2. Steps performed in this Activity? (Explain in 5-6 lines)

If dataset is provided as Individual Series

- Step①: Store the dataset in one variable.
- Step②: By using the mean() of MATLAB we can directly find out the A.M. & in mean() provide "x" as argument.

If dataset is provided as Discrete Series

- Step①: store the "x" & "f" in any variable
- Step②: Find out the sum of frequency 'f' in var 'N'.
- Step③: Here, use the mathematical formula to find out A.M

ie. $\bar{X} = \frac{\sum_{i=1}^{n} f_i x_i}{\sum f_i} = \frac{f_1x_1 + f_2x_2 + \cdots + f_nx_n}{f_1 + f_2 + f_3 + \cdots + f_n}$

3. What Resources/Materials/Equipments/Tools did you use for this activity?

a. Matlab 30 Days Trial Software (2020)

b. mean() from MATLAB Help Documentation.

4. What skills did you acquire?

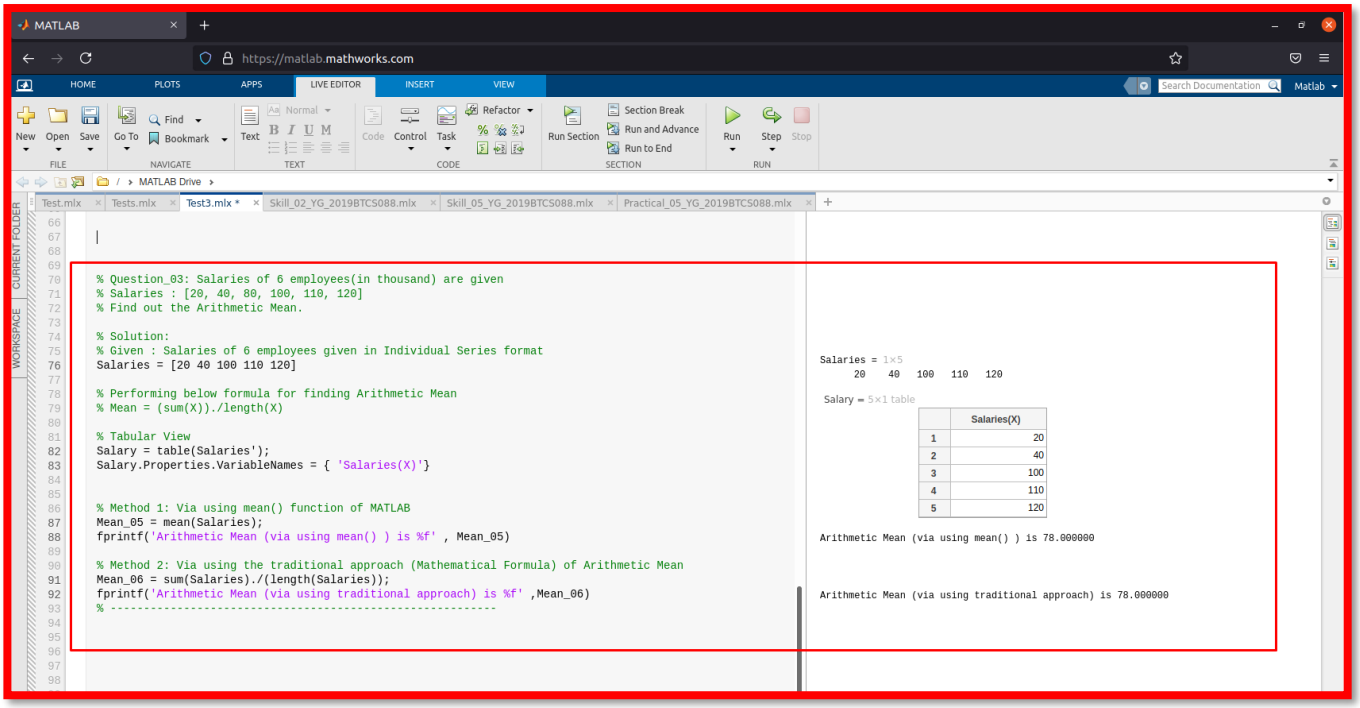
- What to AIM ? Where & Why to use it ?
- mean() usage in Real world problems
- Usage of Traditional Mathematical formula in MATLAB
- How to solve different types of series ?

5. Time taken to complete this activity? 03:00 (HOURS)

Yogapriya

Signature of student

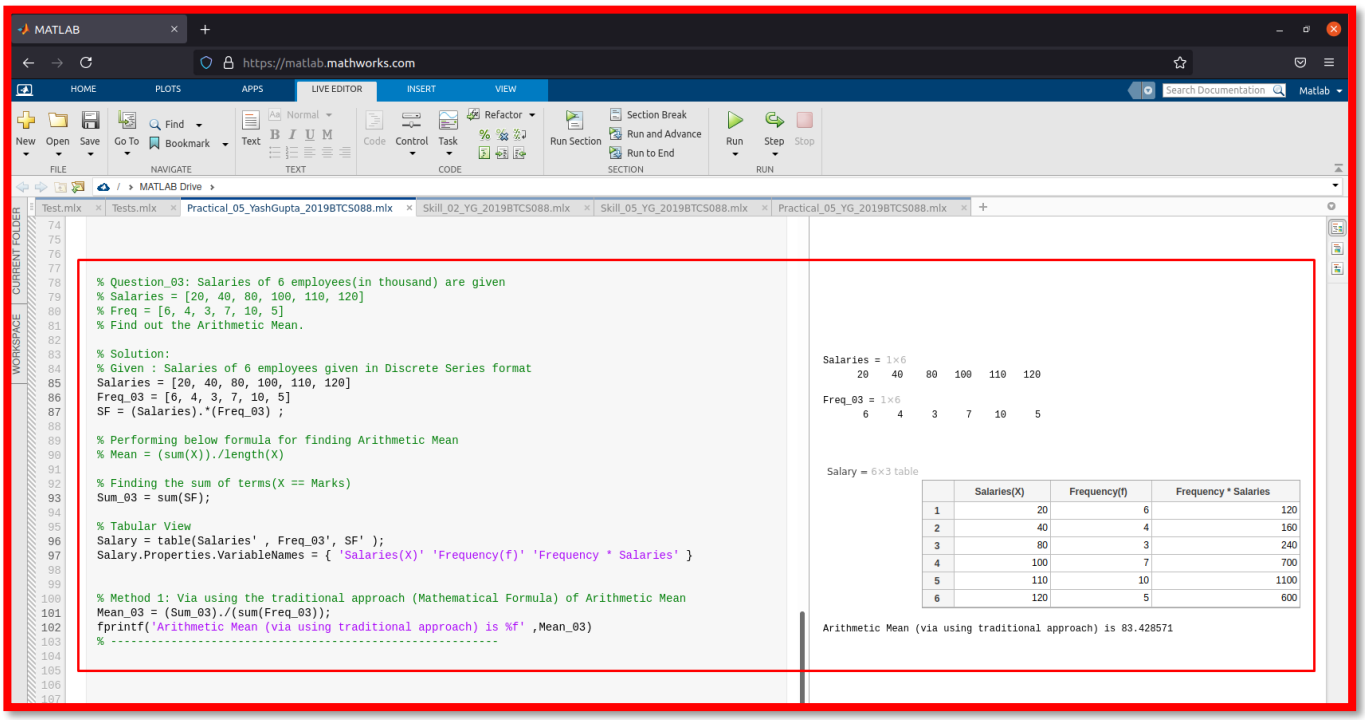
A. Example 1: Arithmetic Mean for Individual Series Problem.



```
% Question_03: Salaries of 6 employees(in thousand) are given
% Salaries : [20, 40, 80, 100, 110, 120]
% Find out the Arithmetic Mean.

% Solution:
% Given : Salaries of 6 employees given in Individual Series format
Salaries = [20 40 100 110 120]

% Performing below formula for finding Arithmetic Mean
% Mean = (sum(X))./length(X)

% Tabular View
Salary = table(Salaries');
Salary.Properties.VariableNames = { 'Salaries(X)'}


% Method 1: Via using mean() function of MATLAB
Mean_05 = mean(Salaries);
fprintf('Arithmetic Mean (via using mean() ) is %f' , Mean_05)

% Method 2: Via using the traditional approach (Mathematical Formula) of Arithmetic Mean
Mean_06 = sum(Salaries)./(length(Salaries));
fprintf('Arithmetic Mean (via using traditional approach) is %f' ,Mean_06)
% -------------------------------------------------------------
```

```
Salaries = 1×5
    20    40   100   110   120

Salary = 5×1 table

    Salaries(X)
1           20
2           40
3          100
4          110
5          120

Arithmetic Mean (via using mean() ) is 78.000000

Arithmetic Mean (via using traditional approach) is 78.000000
```

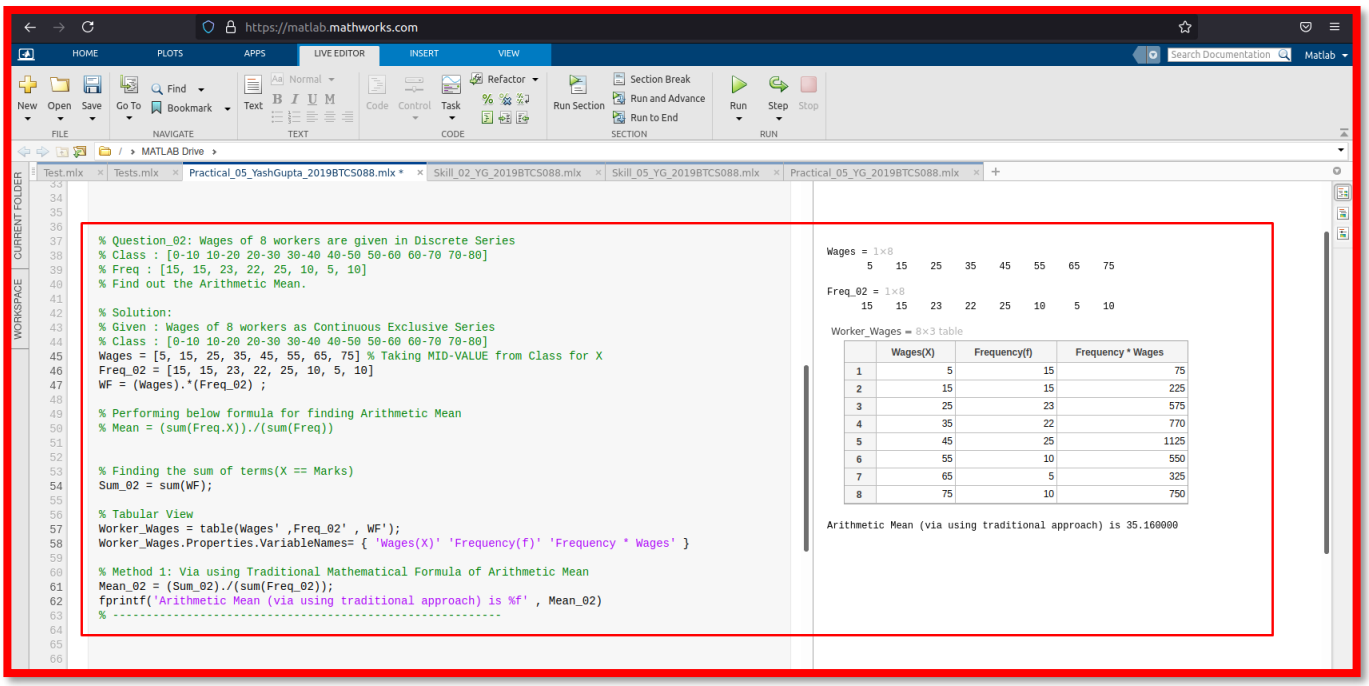
B. Example 1: Arithmetic Mean for Discrete Series Problem.



```
% Question_03: Salaries of 6 employees(in thousand) are given
% Salaries = [20, 40, 80, 100, 110, 120]
% Freq = [6, 4, 3, 7, 10, 5]
% Find out the Arithmetic Mean.

% Solution:
% Given : Salaries of 6 employees given in Discrete Series format
Salaries = [20, 40, 80, 100, 110, 120]
Freq_03 = [6, 4, 3, 7, 10, 5]
SF = (Salaries).*(Freq_03) ;

% Performing below formula for finding Arithmetic Mean
% Mean = (sum(X))./length(X)

% Finding the sum of terms(X == Marks)
Sum_03 = sum(SF);

% Tabular View
Salary = table(Salaries' , Freq_03', SF' );
Salary.Properties.VariableNames = { 'Salaries(X)' 'Frequency(f)' 'Frequency * Salaries' }


% Method 1: Via using the traditional approach (Mathematical Formula) of Arithmetic Mean
Mean_03 = (Sum_03)./(sum(Freq_03));
fprintf('Arithmetic Mean (via using traditional approach) is %f' ,Mean_03)
% -------------------------------------------------------------
```

```
Salaries = 1×6
    20    40    80   100   110   120

Freq_03 = 1×6
     6     4     3     7    10     5

Salary = 6×3 table

    Salaries(X)    Frequency(f)    Frequency * Salaries
1            20               6                     120
2            40               4                     160
3            80               3                     240
4           100               7                     700
5           110              10                    1100
6           120               5                     600

Arithmetic Mean (via using traditional approach) is 83.428571
```

C. Example 1: Arithmetic Mean for Continuous Series.



```
% Question_02: Wages of 8 workers are given in Discrete Series
% Class : [0-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80]
% Freq : [15, 15, 23, 22, 25, 10, 5, 10]
% Find out the Arithmetic Mean.

% Solution:
% Given : Wages of 8 workers as Continuous Exclusive Series
% Class : [0-10 10-20 20-30 30-40 40-50 50-60 60-70 70-80]
Wages = [5, 15, 25, 35, 45, 55, 65, 75] % Taking MID-VALUE from Class for X
Freq_02 = [15, 15, 23, 22, 25, 10, 5, 10]
WF = (Wages).*(Freq_02) ;

% Performing below formula for finding Arithmetic Mean
% Mean = (sum(Freq.X))./(sum(Freq))


% Finding the sum of terms(X == Marks)
Sum_02 = sum(WF);

% Tabular View
Worker_Wages = table(Wages' ,Freq_02' , WF');
Worker_Wages.Properties.VariableNames= { 'Wages(X)' 'Frequency(f)' 'Frequency * Wages' }

% Method 1: Via using Traditional Mathematical Formula of Arithmetic Mean
Mean_02 = (Sum_02)./(sum(Freq_02));
fprintf('Arithmetic Mean (via using traditional approach) is %f' , Mean_02)
% ------------------------------------------------------------
```

```
Wages = 1×8
     5    15    25    35    45    55    65    75

Freq_02 = 1×8
    15    15    23    22    25    10     5    10
```

Worker_Wages = 8×3 table

	Wages(X)	Frequency(f)	Frequency * Wages
1	5	15	75
2	15	15	225
3	25	23	575
4	35	22	770
5	45	25	1125
6	55	10	550
7	65	5	325
8	75	10	750

```
Arithmetic Mean (via using traditional approach) is 35.160000
```