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<u>2D Scatter Plot</u>

1. Put all the values in a master matrix from the question

```
>> master

master =

    12    13    10    10    18     6
    12    13    11    11    17     6
    10    13     6     9    17     6
    11    12     8     9    17     7
    11    12     5     8    16     4
     8    11     7    10    14     5
    10    11     4    10    15     7
    10    10    10    17    13     5
     4     9     8     9    12     6
     7     9     8     9    14     6
```

2. Extracted three classes from the master matrix whose 1st column represents Band1 and 2nd coumn represents Band2

```
>> class1          >> class2          >> class3

class1 =           class2 =           class3 =

    12    13           10    10           18     6
    12    13           11    11           17     6
    10    13            6     9           17     6
    11    12            8     9           17     7
    11    12            5     8           16     4
     8    11            7    10           14     5
    10    11            4    10           15     7
    10    10           10    17           13     5
     4     9            8     9           12     6
     7     9            8     9           14     6
```
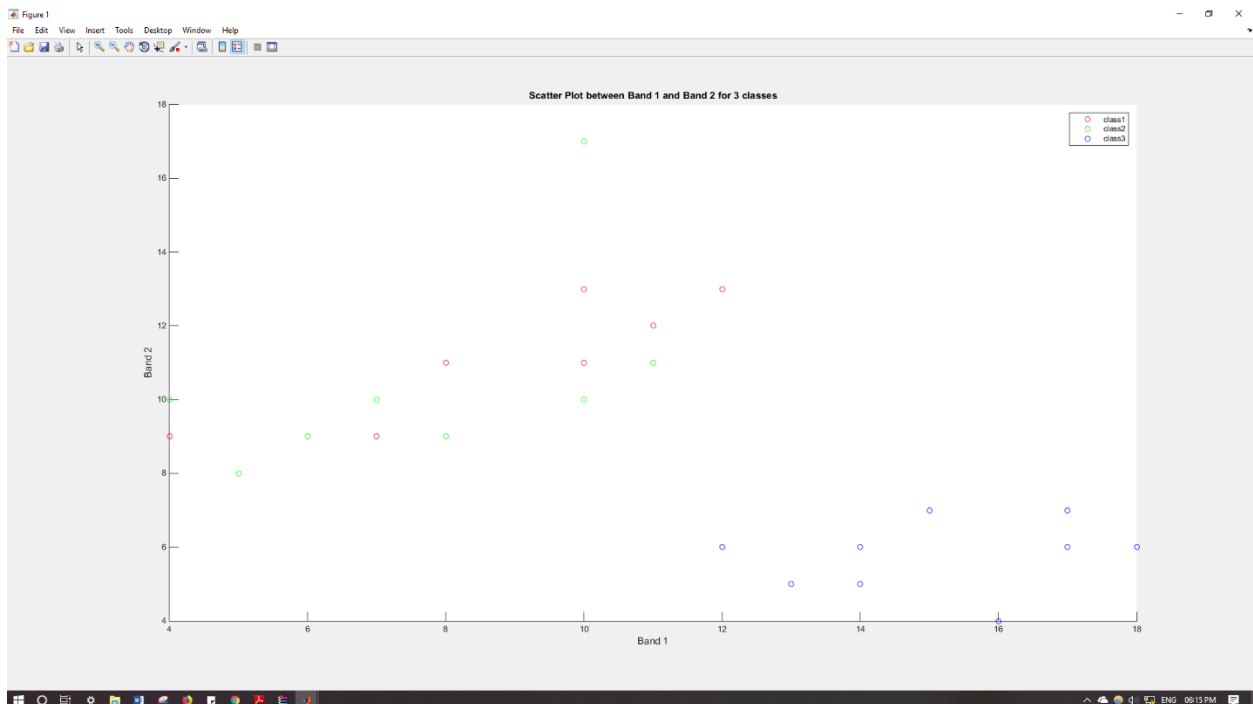
Code for Scatter Plot:-

```
fig=figure % Defining Figure handler fig
scatter(class1(:,1),class1(:,2),'r'); % Scatter Plot for Class 1
hold on
scatter(class2(:,1),class2(:,2),'g'); % Scatter Plot for Class 2
hold on
2
scatter(class3(:,1),class3(:,2),'b'); % Scatter Plot for Class 3
title('Scatter Plot between Band 1 and Band 2 for 3 classes') % Figure
Title
xlabel('Band 1'); % Label for X-axis
ylabel('Band 2'); % Label for Y-axis
legend('class1','class2','class3') % Defining Legend
print(fig,'-djpeg','-r300','Scatter'); % Saving figure in JPEG format at 300 dpi
```
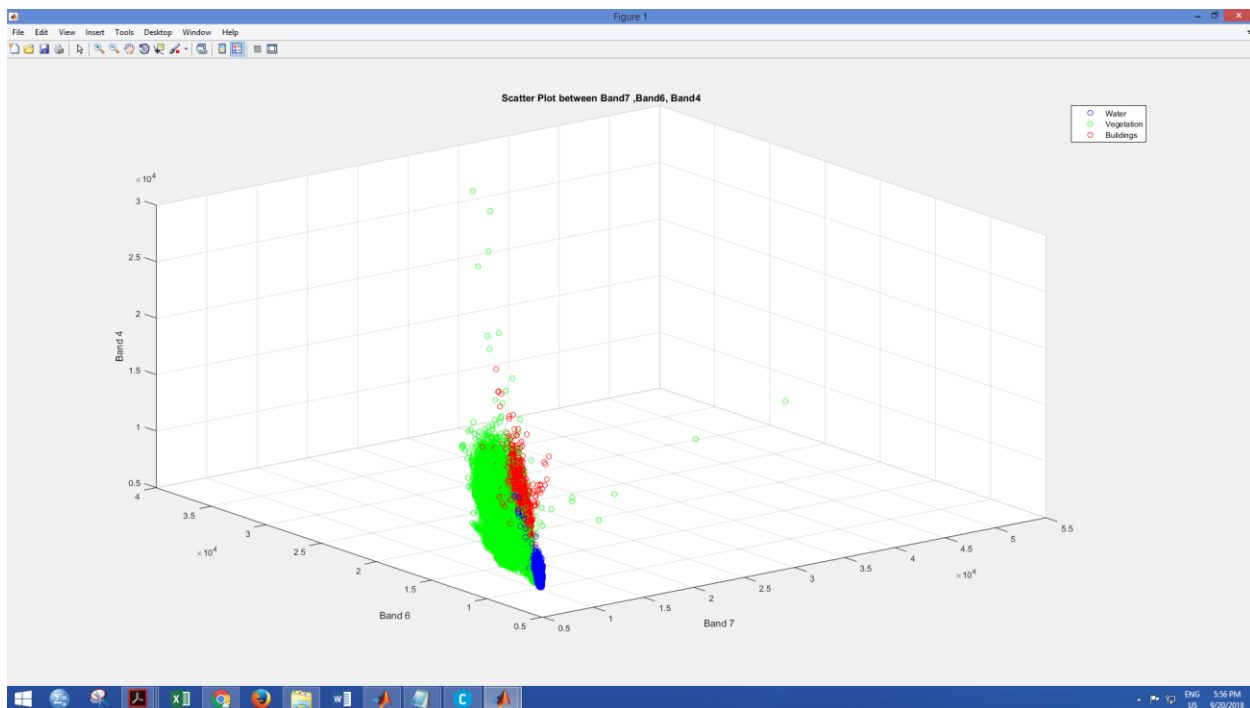
2-D Scatter Plot (Band1 and Band2)

3D Scatter Plot

1. Band7,Band6, Band4

Code used :-

```
figure
scatter3(b7water(:),b6water(:),b4water(:),'b');
hold on
scatter3(B7_veg(:),B6_veg(:),B4_veg(:),'g');
hold on
scatter3(b7buildings(:),b6buildings(:),b4buildings(:),'r');
title('Scatter Plot between Band7, Band6, Band4') % Figure Title
xlabel('Band 7'); % Label for X-axis
ylabel('Band 6'); % Label for Y-axis
zlabel('Band 4'); % Label for Y-axis
legend('Water','Vegetation','Buildings') % Defining Legend
```

2. Band4,Band3 and Band2

Code used :-

```
figure
scatter3(b4water(:),b3water(:),b2water(:),'b');
hold on
scatter3(B4_veg(:),B3_veg(:),B2_veg(:),'g');
hold on
scatter3(b4buildings(:),b3buildings(:),b2buildings(:),'r');
title('Scatter Plot between Band4, Band3, Band2') % Figure Title
xlabel('Band 4'); % Label for X-axis
ylabel('Band 3'); % Label for Y-axis
zlabel('Band 2'); % Label for Y-axis
legend('Water','Vegetation','Buildings') % Defining Legend
```
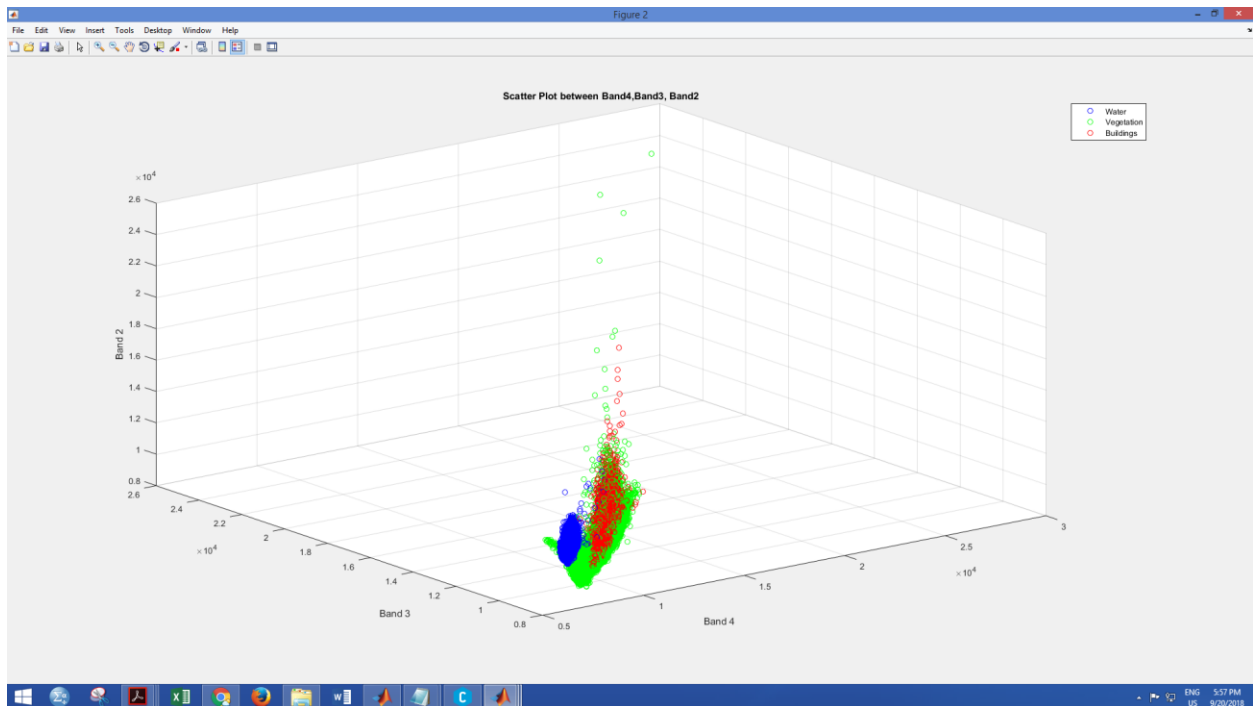
3. Band5,Band4 and Band3

Code used :-

```
figure
scatter3(b5water(:),b4water(:),b3water(:),'b');
hold on
scatter3(B5_veg(:),B4_veg(:),B3_veg(:),'g');
hold on
scatter3(b5buildings(:),b4buildings(:),b3buildings(:),'r');
title('Scatter Plot between Band5, Band4, Band3') % Figure Title
xlabel('Band 5'); % Label for X-axis
ylabel('Band 4'); % Label for Y-axis
zlabel('Band 3'); % Label for Y-axis
legend('Water','Vegetation','Buildings') % Defining Legend
```
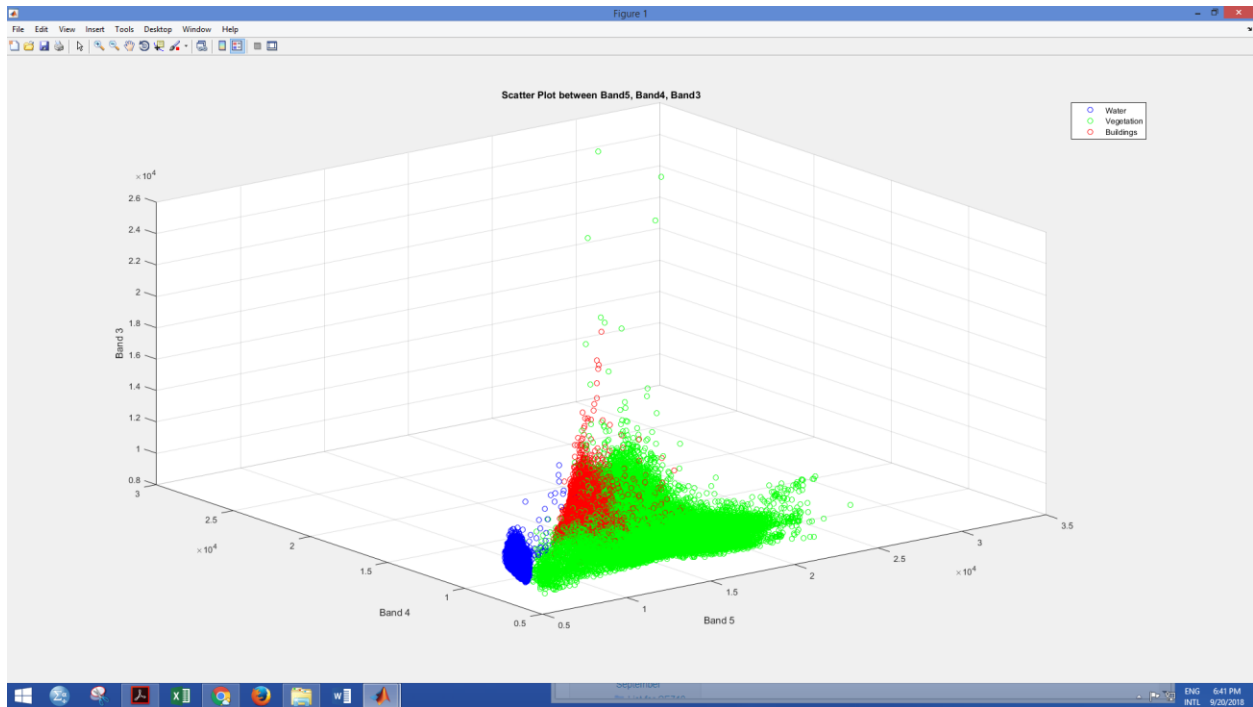
CONCLUSION

Scatter Plots (also called scatter diagrams) are used to investigate the possible relationship between any varisables(2D if no. of variables is two, 3D if 3 variables). A straight line of best fit (using the least squares method) is often included. If the points cluster in a band from upper left to lower right, there is a negative correlation (if x increases, y decreases) and vice- versa. If it is hard to see where you would draw a line, and if the points show no significant clustering, there is probably no correlation

In the first question, we plotted a 2-D scatter plot between band 1 and band2 for three classes. In class 1 and 2 the points cluster in a band lower left to upper right, so there is a positive correlation i.e if Band1 increases then Band2 increases as well) whereas for the class 3 the points are scattered more horizontally, hence we can say that Band2 doesn't changes much which change in Band1 values.

3D scatter plots are used to plot data points on three axes in the attempt to show the relationship between three variables. Each row in the data table is represented by a marker whose position depends on its values in the columns set on the X, Y, and Z axes

In the first scatter plot bands of all the classes(water, vegetation, buildings) shoiw positive relation. Correlation among the buildings being most prominent.

Bands combination 7,6,4 is determine the builtup area(urban area).

In the 2nd plot, the points for water are more cluster at a particular region inspace showing that the bands are more closely related. Whereas the rest two show positive relation between the bands.

In 3rd plot, the points for vegetation is more randomly placed in space, showing weak correlation between the bands. The plots for buildings is also little spread.