**1.** **Clustering**  
Let's say I have 2 features called 'rotationPoints' and 'approachTime' for 5 animals. And I have 5 trials for each animal. Let's say the animal names are A, B, C, D, and E. How do I cluster the data in 2D.

Can you please provide a Matlab code for above method with arbitrary data? Please keep the data label same as my previous prompt for my better understanding.  
I want to check if the animals have any clustering. Ideally, I would like to check without a num\_clusters input and by labelling the animals by color so that I can see if they belong to a single cluster.  
  
**2.** **Linear Programming**  
An electronic company ABC is planning on manufacturing and selling new product called Product X on an experimental basis over the next six months. The manufacturing and selling prices of this product X are projected to vary from month to month.

The following table gives the forecast of the costs and prices:

Month Manufacturing Cost Selling Price (during the month)

January $15

February $15 $20

March $25 $15

April $15 $35

May $ 35 $20

June $45

All the units of Product X manufactured during any month are shipped out in one large load at the end of that month. The firm can sell as many as 200 units per month, but its operation is limited by the size of its warehouse which can accommodate only 100 units of Product X

As the operations manager of ABC company, you need to determine the number of Products X to be manufactured and sell each month to maximize the firm's profit.

ABC company has no units of Product X on hand at the beginning of January and wishes to have zero units of Product X on hand at the end of the test period in June.

Please formulate the mathematical model specifying the unknown quantities.

**3. How to fit a S-bend curve and get parameters from it?**