# Counting

1) A Student wants some books from the library. He has to choose from 4 different comic books, 5 different fiction books, and 4 different medical books: **(5*2 = 10 points)**
   a) In how many ways can a student choose one of each kind of book? Explain your answer.
   b) In how many ways can a student just choose one of the books? Explain your answer.
2) There are 7 red and 9 black marbles. There should be 10 of the marbles placed in a box. How many different combinations can there be in one box if: **(5*4 = 20 points)**
   a) There must be equal number of both color of marbles.
   b) There must be at least 6 red marbles in a box.
   c) All the red marbles should be used.
   d) All the black marbles should be used.
3) There are 5 buses between Sac State and 65th Street, and 4 train lines between *65th Street and Folsom*. Find the number of ways that a man can travel by bus: (*a*) from *Sac State* to Folsom by way of *65th Street*; (*b*) roundtrip from *Sac State* to Folsom by the way of *65th Street*; (*c*) roundtrip from Sac State to Folsom by way of *65th Street* but without using a transportation mode more than once. **(5*3 = 15 points)**
4) a. How many distinguishable ways can the letters of the word MISSISSIPPI be arranged in order?
   b. How many distinguishable orderings of the letters of MISSISSIPPI begin with M and end with I? **(5*2 = 10 points)**
5) A team is selected with 12 players including the captain **(5*3 = 15 points)**
   a) How many different combinations of 3 can be chosen?
   b) How many of these combinations include captain?
   c) How many do not include captain?
6) A computer programing team of 5 should be formed from 9 employees. Two of the employees are managers. However, to avoid dispute problems, the 2 managers cannot both be chosen. Find the number of teams that can be formed? **(6 points)**
7) A photo has to be captured with 8 different celebrities. There are also some chairs available. So, they have the option to either sit on the chair or stand while taking picture. How many different photos are possible? **(6 points)**
8) I have to create one computer password. A password is of length 5 characters, first two of which are distinct numbers, next character can be any upper-case letter, and the remaining 2 characters can be any digit or letter (upper- or lower-case)? How many combinations are allowed? Note: Repetition of characters are not allowed. **(6 points)**
9) I have 3 red pens and 7 blue pens. I cannot buy new pens anymore. How many weeks can I try different combinations? **(6 points)**
10) There are 4 entry and exit points (A single point can be used either for entry or exit). In how many ways can a person enter and leave a space if the he or she has to use different points? What if the person can use same points? **(6 points)**