Make your solutions concise and formal. Your goal is to convince me that you know the solutions. You are highly encouraged to typeset your solutions in Latex. Please put your name on every page. Put each problem’s solution on separate pages. You must indicate who you worked with on the homework. Failure to follow these policies will result in your homework being returned ungraded. See the course website to further homework policies. Note that you must write your solutions by yourself, in your own words, but may work in groups of size up to three.

1. How many strings of four decimal digits
   (a) do not contain the same digit twice?
   (b) end with an even digit?
   (c) have exactly three digits that are 9s?

2. How many license plates can be made using either three digits followed by three uppercase English letters or three uppercase English letters followed by three digits

3. A computer network consists of six computers. Each computer is directly connected to at least one of the other computers. Show that there are at least two computers in the network that are directly connected to the same number of other computers.

4. Show that if there are 100,000,000 wage earners in the United States who earn less than 1,000,000 dollars (but at least a penny), then there are two who earned exactly the same amount of money, to the penny.

5. How many bit strings of length 12 contain
   (a) exactly three 1s?
   (b) at most three 1s?
   (c) at least three 1s?
   (d) an equal number of 0s and 1s?