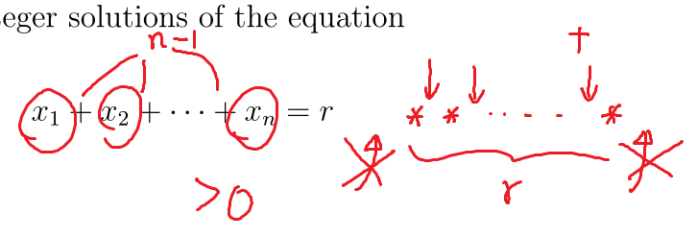
CS1231 Review 18

1. The number of r-permutations of a set of n distinct elements (**no repetition allowed**) is $P(n,r) = \frac{n!}{(n-r)!}$. $n \quad (n-1) \ldots n-(r-1) = n-r+1$ (r terms)
2. The number of r-permutations of a set of n distinct elements **with repetition allowed** is n^r. $n \quad n \ldots n$ (r terms)
3. The number of r-combinations of a set of n distinct elements (**no repetition allowed**) is $\binom{n}{r} = \frac{n!}{r!(n-r)!}$.
4. The number of r-combinations of a set of n distinct elements **with repetition allowed** is $\binom{n+r-1}{r}$.
5. The number of **nonnegative** integer solutions of the equation

$$x_1 + x_2 + \cdots + x_n = r$$

is $\binom{n+r-1}{r}$.

6. The number of **positive** integer solutions of the equation $x_1 + x_2 + \cdots + x_n = r$ is $\binom{r-1}{n-1}$.



7. A **graph** $G = (V, E)$ consists of V, a nonempty finite set of vertices and E, a set of edges.

8. Each edge is associated with either one or two vertices called its end point(s).

9. An edge with one endpoint is called a loop.

10. If more than one edge are associated with a pair of vertices, such edges are called multiple edges

11. A graph with no loops or multiple edges is simple graph.

12. A graph with no loops but admits multiple edges is called a multigraph.

13. A **Digraph** $G = (V, E)$ consists of V, a nonempty finite set of vertices and E, a set of directed edges.

14. The directed edge associated with the ordered pair (u, v) is said to start from u and end at v and is denoted as $\overrightarrow{u,v}$.

directed graph