Sindhuja Yerramalla
U00839259

HW-10

Discrete. Structures.

Problem1 :-

Probability of success i.e (number showing up) $= 1/6$

$\rightarrow n = 10, \; p = 1/6$

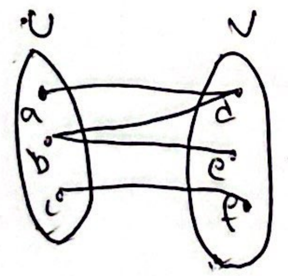
$P(X_i) = {}^{n}C_i \, p^i \, q^{n-i}$; $E(X_1 + X_2 + X_3 + X_4 + X_5 + X_6) = np$

$= 10 \times \frac{1}{6} = 5/3$ //

Problem2 :-

A biparatite graph may or may not be connected.
A graph without any edge's is also biparatite.

example :-



There should be a path between any pair of vertices for a graph to be connected. but in the given example there is no graph between. c & e, so the. given. is not connected. but it is a biparatite graph. Because for a graph to be biparatite. there should be two sets of vertices U, V such that there is no edge among ~~two sets~~ the vertices of same set. Since no path from ae, bf ---, we ~~can sets~~

we can say biparatite graph are not connected.

Problem 3:- Given Urn A contains 3 red, 4 blue, 5 green

Urn B contains 7 red, 8 blue, 9 green.

experiment 1:- Probability of red from A $= \frac{3}{12} = 1/4$

Probability of blue from B $= 4/12 = 1/3$

Probability of green from A $= 5/12$.

Probability of red after red from A $= 8/25$

Probability of red after blue from A $= 7/25$

Probability of red after green from A $= 7/25$

Probability of red $P(red) = \frac{8}{25} \times \frac{1}{4} + \frac{7}{25} \times \frac{1}{3} + \frac{7}{25} \times \frac{5}{12}$

$$= \frac{24}{25 \times 12} + \frac{28}{25 \times 12} + \frac{35}{25 \times 12} = \frac{87}{300} = 0.29.$$

Experiment 2:-

Probability of red from B $= 7/24$

Probability of blue from B $= 8/24$

Probability of green from B $= 9/24$.

Probability of red after red from B $= 4/13$

Probability of red after blue from B $= 3/13$

Probability of red after green from B $= 3/13$

Probability of red

Probability of red $P(red) = \frac{4}{13} \times \frac{7}{24} + \frac{3}{13} \times \frac{8}{24} + \frac{3}{13} \times \frac{9}{24}$

$= 79/312 = 0.253$

Experiment 1 is most probable for final ball to be red

Problem 4

Given a graph $H = (V, E)$ such that H has 15 edges.

$\bar{H}$ has 13 edges

WKT for n vertices the total possible edges are $n(n-1)/2$.

So total number of edges possible for H are

edges(H) + edges$(\bar{H})$ = $15 + 13 = 28$.

$$\frac{n(n-1)}{2} = 28$$

$$n(n-1) = 56$$

$$n(n-1) = 8 \times 7 = 8 \times (8-1)$$

$$\Rightarrow \boxed{n = 8} \quad \therefore \text{There are 8 vertices in H.}$$

Problem 5

Given graph G has ~~v~~ v vertices & e edges.

& M is the maximum degree of vertices of G

& m is the minimum degree of vertices of G

$\Rightarrow \quad m \leq \deg(u) \leq M$ where u is any vertex in G.

$$\Rightarrow \quad m\cancel{M}\,\ldots \leq \sum_{u=\text{vertices of } G} \deg(u) \leq MV$$

we know that $\sum_{u=\text{vertices of } G} \deg(u) = 2e.$

$$\Rightarrow \quad mV \leq 2e \leq MV \quad \Rightarrow \quad m \leq \frac{2e}{V} \leq M \,//.$$