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Tutorial - 3

Q1

1) Adam $\rightarrow A$, Betty $\rightarrow B$, Cindy $\rightarrow C$,
David $\rightarrow D$, Elizabeth $\rightarrow E$, Fred $\rightarrow F$,
George $\rightarrow G$.

$$d(A, A) = 0, d(A, B) = 1, d(A, C) = 2$$

	A	B	C	D	E	F	G
A	0	1	2	1	3	1	3
B	1	0	1	1	2	1	2
C	2	1	0	1	1	2	1
D	1	1	1	0	2	2	2
E	3	2	1	2	0	3	2
F	1	1	2	2	3	0	3
G	3	2	1	2	2	3	0

2) Eccentricity \Rightarrow

$$A \Rightarrow 3$$

$$B \Rightarrow 2$$

$$C \Rightarrow 2$$

$$D \Rightarrow 2$$

$$E \Rightarrow 3$$

$$F \Rightarrow 3$$

$$G \Rightarrow 3$$

3) Avg. path length $\Rightarrow \frac{\sum_{i \neq j} d(i, j)}{n(n-1)}$

$\Rightarrow 74$

7×6

$\Rightarrow 1.7619$

4) ~~Diameter~~ Diameter = max(Eccentricity) = 3

5)

node	degree
A	3
B	4
C	4
D	3
E	1
F	2
G	1

degree	probab
1	$\frac{2}{7}$
2	$\frac{1}{7}$
3	$\frac{2}{7}$
4	$\frac{2}{7}$

avg degree $\Rightarrow \frac{1 \times \frac{2}{7}}{7} + \frac{2 \times \frac{1}{7}}{7} + \frac{3 \times \frac{2}{7}}{7} + \frac{4 \times \frac{2}{7}}{7}$

$\Rightarrow \frac{2 + 2 + 6 + 8}{7}$

$\Rightarrow 18/7$

$\Rightarrow 2.57$

Q2 In degree \Rightarrow

<u>node</u>	<u>degree</u>
A	3
B	4
C	0
D	2
E	0

<u>degree</u>	<u>prob</u>
0	$\frac{2}{5}$
2	$\frac{1}{5}$
3	$\frac{1}{5}$
4	$\frac{1}{5}$

out degree \Rightarrow

<u>node</u>	<u>degree</u>
A	1
B	1
C	3
D	1
E	3

<u>degree</u>	<u>prob</u>
1	$\frac{3}{5}$
3	$\frac{2}{5}$

2) Degree \rightarrow

node	degree
A	4
B	5
C	3
D	3
E	3

degree	prob
3	$\frac{3}{5}$
4	$\frac{1}{5}$
5	$\frac{1}{5}$

$$\text{avg degree} \Rightarrow \frac{3 \times 3}{5} + \frac{4 \times 1}{5} + \frac{5 \times 1}{5}$$

$$\Rightarrow \frac{9 + 4 + 5}{5}$$

$$\Rightarrow 3.6$$