SNA

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Q.3 (a) Using Trajan's Algorithm, there are no bridges & no articulation point.

(b) neighbourhood overlap =
$$\frac{\text{number of nodes of both A \& B}}{\text{number of node of A or B}}$$
Assuming e = 5 & f = 6
⇒
number of nodes common in e & f = 0

Hence, neighbourhood overlap = 0

(c) Strongly Connected component = {1, 2, 3, 4, 6}
Disconnected = {5}

(d)

node	degree
1	4
2	3
3	3
4	2
5	0
6	2

(e) Local clustering coefficient ⇒
$$C_i \Rightarrow \frac{L}{\binom{n}{2}}$$

$$C_1 = \frac{3}{\binom{4}{2}}, \quad C_2 = \frac{2}{\binom{3}{2}}, \quad C_3 = \frac{2}{\binom{3}{2}}$$

$$C_4 = \frac{1}{\binom{2}{2}}, \quad C_5 = \frac{0}{\binom{2}{2}}, \quad C_6 = \frac{1}{\binom{2}{2}}$$

$C_1 = 0.5$, $C_2 = 2/3$, $C_3 = 2/3$, $C_4 = C_6 = 1$, $C_5 = 0$

Global clustering coeff $\Rightarrow 23/36 \Rightarrow 0.633888$

(d) $\text{avg. path} = \frac{1}{n(n-1)} \times \sum_{i \neq j} d(v_i, v_j)$

$n = 6$

$d(1,2) = d(1,3) = d(1,4) = d(1,6) = 1$
$d(1,5) = 0$

$d(2,1) = d(2,3) = d(2,4) = 1$
$d(2,5) = 0$
$d(2,6) = 2$

$d(3,1) = d(3,2) = d(3,6) = 1$
$d(3,4) = 2$
$d(3,5) = 0$

$d(4,1) = d(4,2) = 1$
$d(4,3) = d(4,6) = 2$
$d(4,5) = 0$

$d(5,1) = d(5,2) = d(5,3) = d(5,4) = d(5,6) = 0$

$d(6,1) = d(6,3) = 1$
$d(6,2) = d(6,4) = 2$, $d(6,5) = 0$

avg path $\Rightarrow \frac{14\times1 + 6\times2 + 10\times0}{6\times5}$

$\Rightarrow 0.8667$

diameter $\Rightarrow 6$

6 → 1 → 2 → 3

diameter $\Rightarrow$ 2, (maximum of minimum distance)

2-6, 3-4, 4-3, 4-6, 6-2, 6-4 $\Rightarrow 2$

but Since it is disconnected graph diameter will be infinity.

eccentricity = Infinity