

13.14.

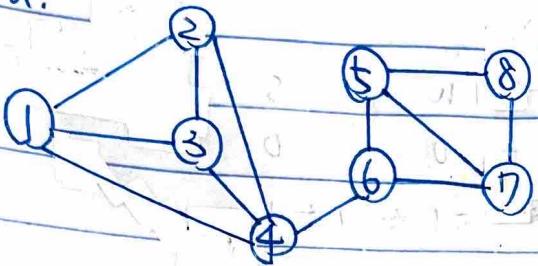
X = "skull and bones", Y = "lullabybabies".

skull and bones													
0	0	0	0	0	0	0	0	0	0	0	0	0	0
l	0	<	0	<	0	<	1	<	1	<	1	<	1
u	0	<	0	<	0	<	1	<	1	<	1	<	1
l	0	<	0	<	1	<	2	<	2	<	2	<	2
l	0	<	0	<	1	<	2	<	3	<	3	<	3
a	0	<	0	<	1	<	2	<	3	<	4	<	4
b	0	<	0	<	1	<	2	<	3	<	4	<	5
y	0	<	0	<	1	<	2	<	3	<	4	<	5
b	0	<	0	<	1	<	2	<	3	<	4	<	5
a	0	<	0	<	1	<	2	<	3	<	4	<	5
b	0	<	0	<	1	<	2	<	3	<	4	<	5
r	0	<	0	<	1	<	2	<	3	<	4	<	5
e	0	<	0	<	1	<	2	<	3	<	4	<	5
s	0	<	1	<	1	<	2	<	3	<	4	<	5

Longest common subsequence: ullabes

14.16.

a.



b. DFS(1)

DFS(4)

DFS(6)

DFS(7)

DFS(8)

DFS(5)

DFS(3)

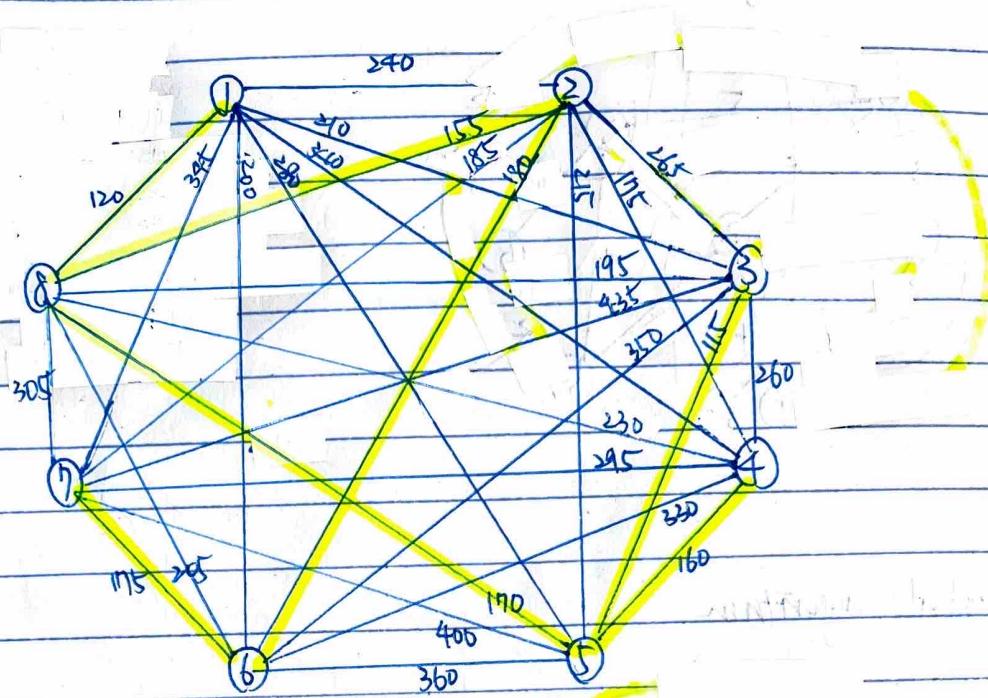
DFS(2)

14678532.

Visited

Queue

14.27.

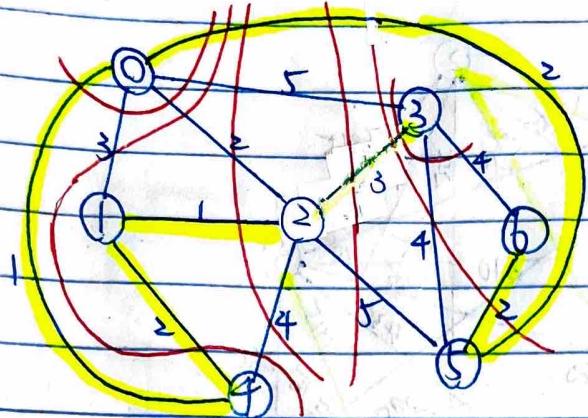


Build the bridges between 1 and 8 of weight 120.

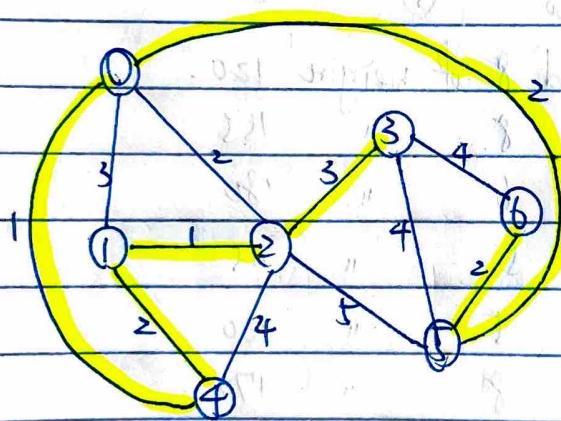
2	"	8	"	155
2	"	6	"	180
3	"	5	"	115
4	"	5	"	160
5	"	8	"	170
6	"	7	"	175

(using Kruskal's MST Algorithm).

#### 4. Prim-Jarník Algorith.



#### 5. Kruskal's algorithm



- 1) choose  $0 \rightarrow 4$ . (weight 1)
  - 2) choose  $1 \rightarrow 2$ . (weight 1)
  - 3) choose  $1 \rightarrow 4$ . (weight 2).
  - 4) choose  $5 \rightarrow 6$  (weight 2)
  - 5) choose  $0 \rightarrow 5$  (weight 2)
  - 6) don't choose  $0 \rightarrow 2$  (weight 2)  $\rightarrow$  creates a cycle.
  - 7) choose  $2 \rightarrow 3$  (weight 3).
- (other weight 3 edges creates a cycle)

## b. Dijkstra's algorithm.

	min.	parent.
✓ 0	0	-
✓ 1	5	0
✓ 2	2	0
✓ 3	3	0
✓ 4	9	1
✓ 5	3	2
✓ 6	6	5
✓ 7	12	6.

$0 \rightarrow 1. 0 > 5$        $2 \rightarrow 5. 0 > 2 + 1 = 3.$

$0 \rightarrow 2. 0 > 2$        $3 \rightarrow 5. 3 < 3 + 6 = 9.$

$0 \rightarrow 3. 0 > 3$        $1 \rightarrow 2. 2 < 5 + 3 = 8$

$1 \rightarrow 4. 00 > 5 + 4 = 9.$

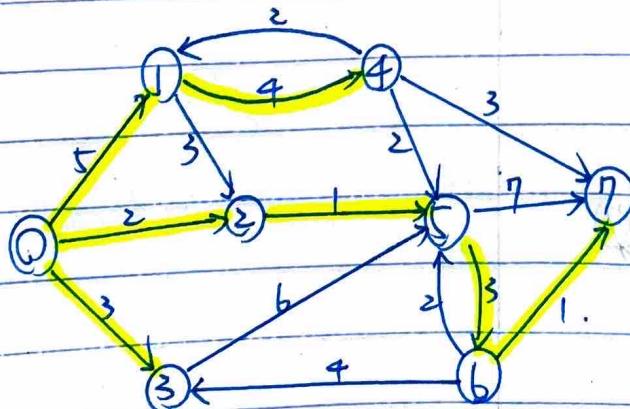
$5 \rightarrow 6. 00 > 3 + 3 = 6$        $6 \rightarrow 5. 3 < 6 + 2 = 8$

$5 \rightarrow 7. 00 > 3 + 7 = 10$        $6 \rightarrow 7. 10 > 6 + 1 = 7.$

$4 \rightarrow 5. 3 < 9 + 2 = 11$        $6 \rightarrow 3. 3 < 6 + 4 = 10.$

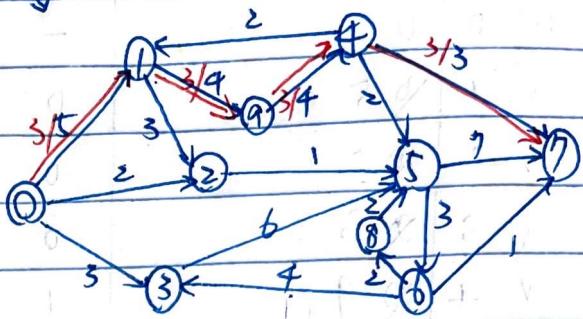
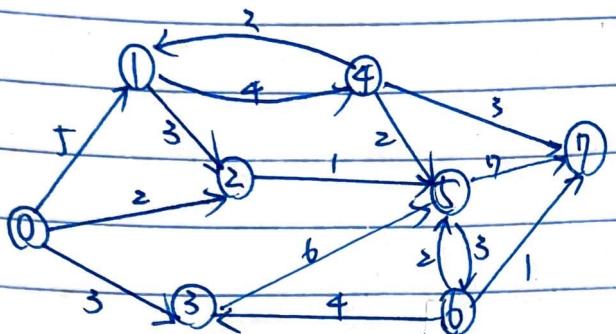
$4 \rightarrow 7. 10 < 9 + 3 = 12.$

$4 \rightarrow 1. 5 < 9 + 2 = 11$

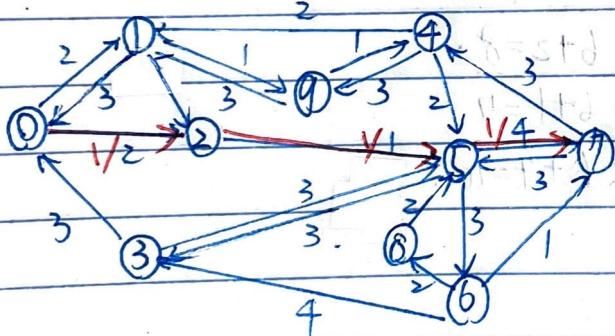
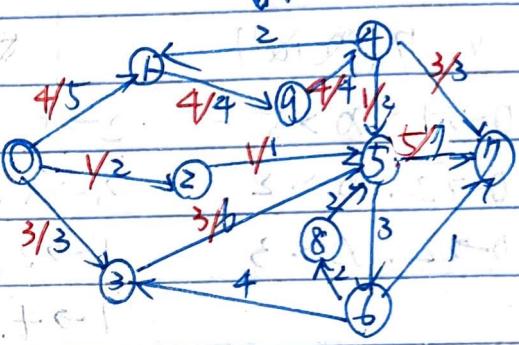
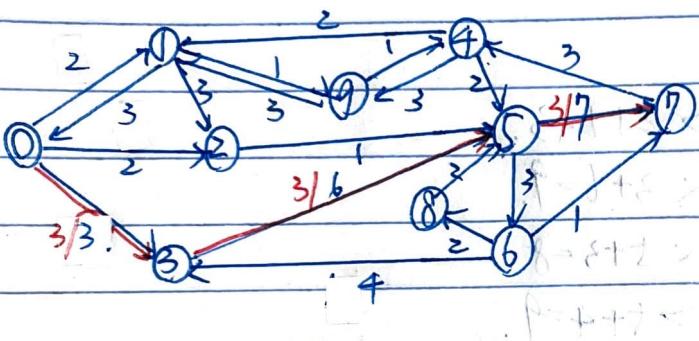


## 7. Flow network.

no parallel edges



Residual graph.



$$4+3+1 = 5+3 = 8$$

Maximum flow = 8.

