COT6410
Assignment # 6

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Question 01:

Consider the 3SAT instance:
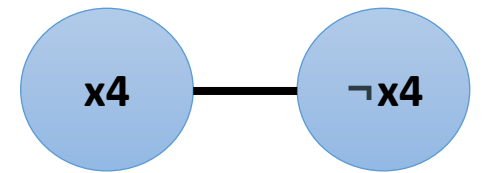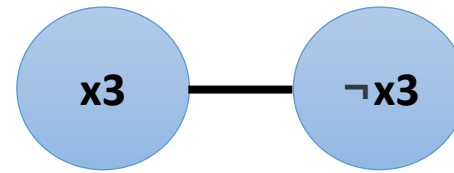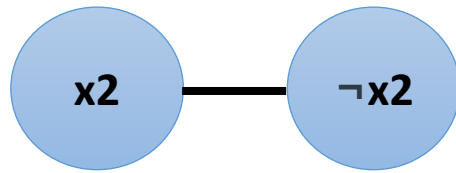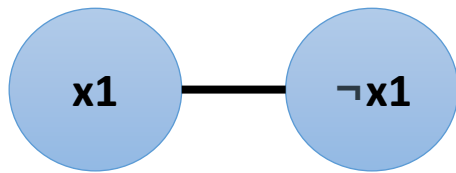**E = (x1 ∨ x1 ∨ x2) & (¬x1 ∨ ¬x2 ∨ ¬x4) & (¬x2 ∨ ¬x3 ∨ x4) & (x2 ∨ ¬x4 ∨ ¬x4)**

a. Recast **E** as an instance of k-Vertex Covering and present a solution to the latter
b. Recast **E** as an instance of 3-Coloring and present a solution to the latter

Question 01(a):

E = (x1 ∨ x1 ∨ x2) & (¬x1 ∨ ¬x2 ∨ ¬x4) & (¬x2 ∨ ¬x3 ∨ x4) & (x2 ∨ ¬x4 ∨ ¬x4)

Variable Gadgets:

Clause Gadgets:
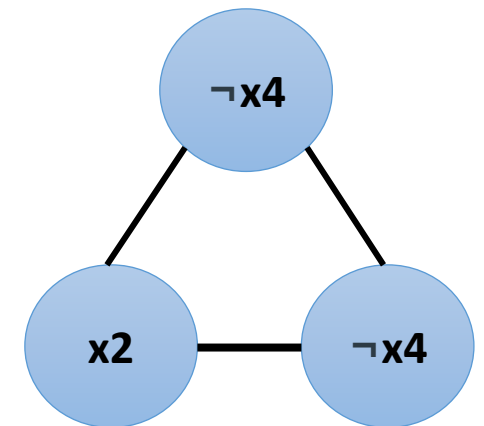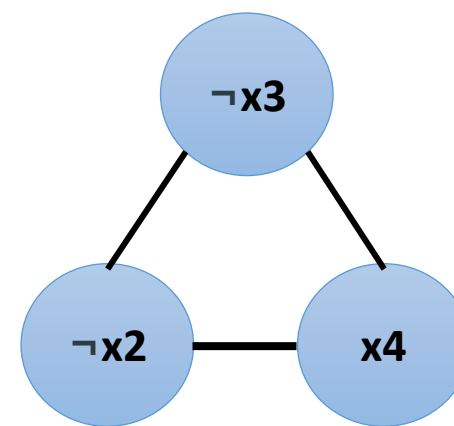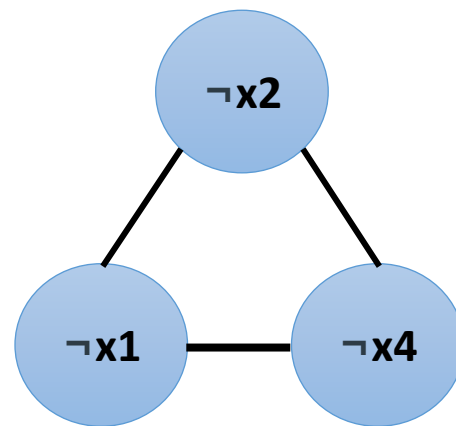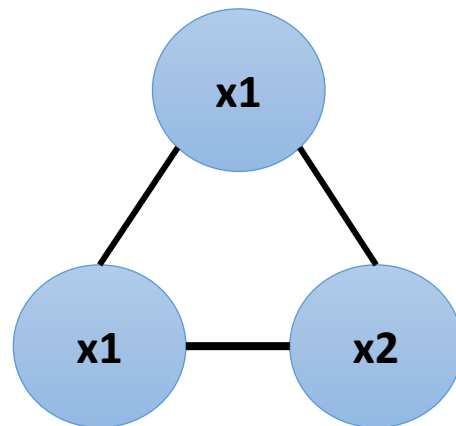
E = (x1 ∨ x1 ∨ x2) & (¬x1 ∨ ¬x2 ∨ ¬x4) & (¬x2 ∨ ¬x3 ∨ x4) & (x2 ∨ ¬x4 ∨ ¬x4)

Combined Gadgets:
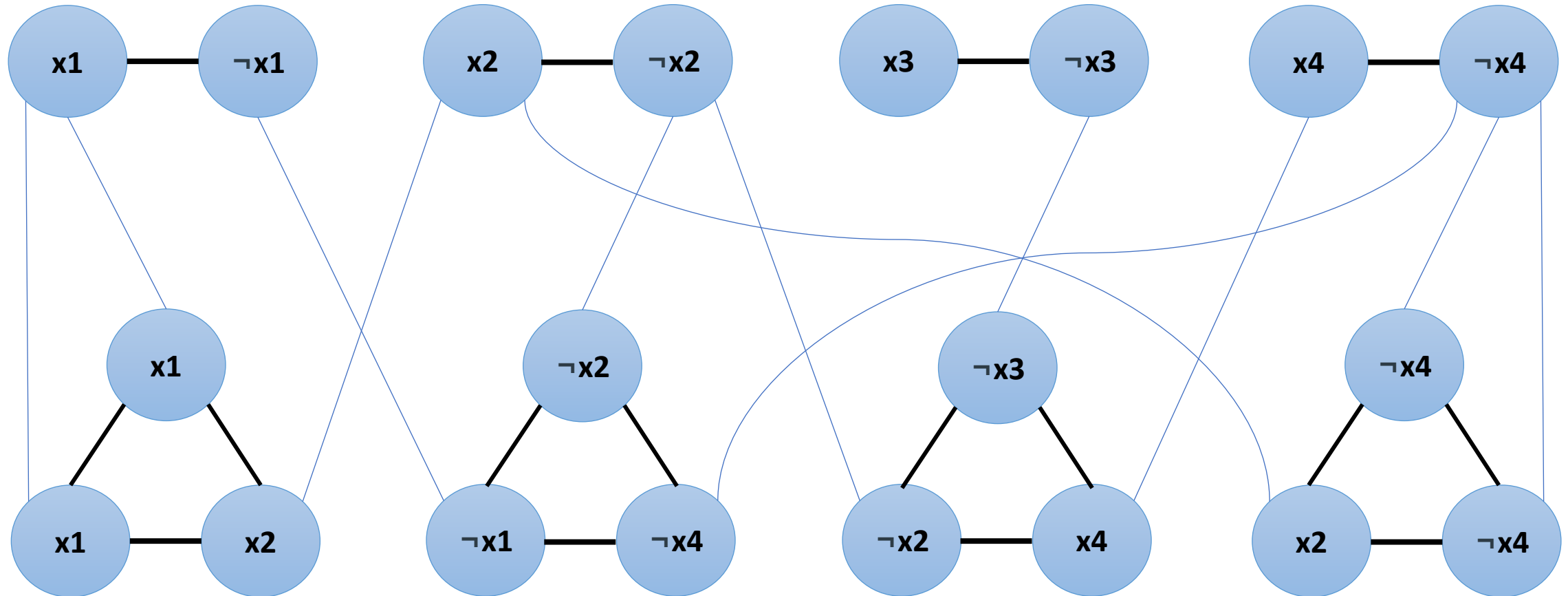
E = (x1 ∨ x1 ∨ x2) & (¬x1 ∨ ¬x2 ∨ ¬x4) & (¬x2 ∨ ¬x3 ∨ x4) & (x2 ∨ ¬x4 ∨ ¬x4)

Selecting Vertex Cover:
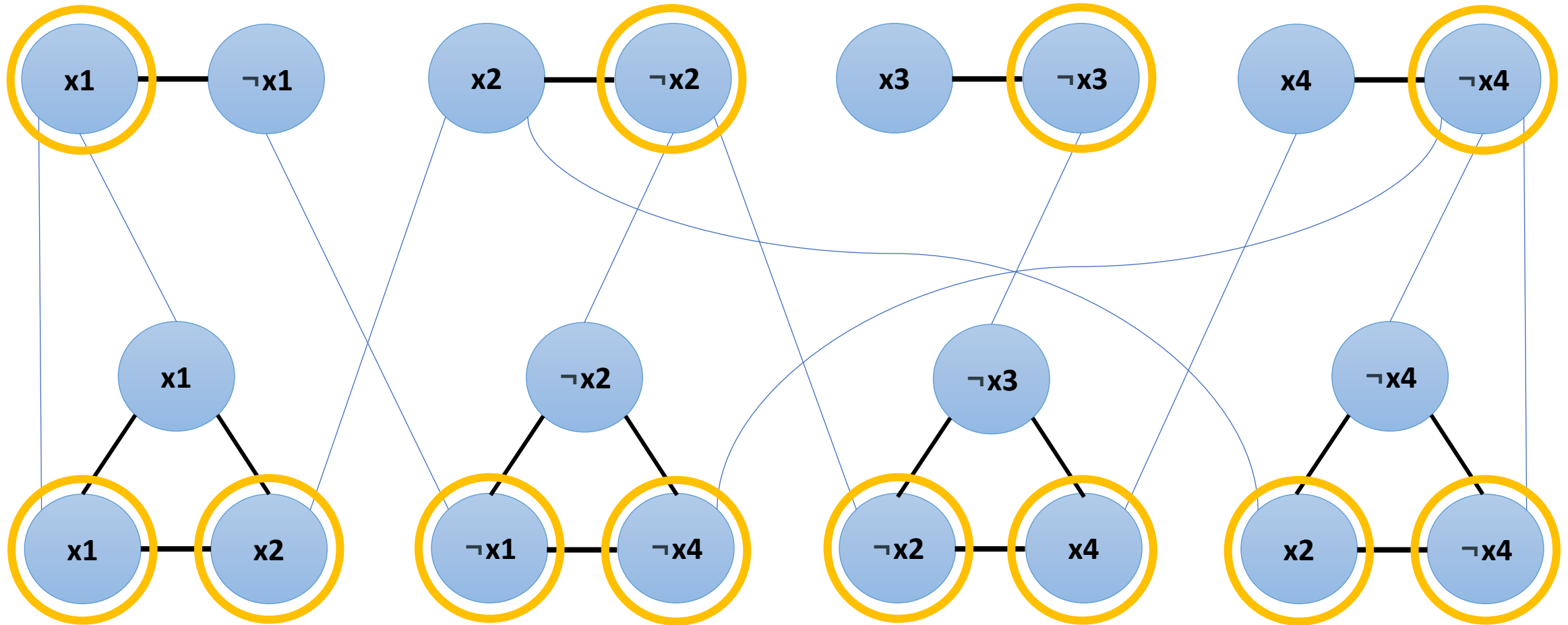
Question 01(b):

Note: It is irrelevant if **x3** is true or false

True
False
Base
¬ Not
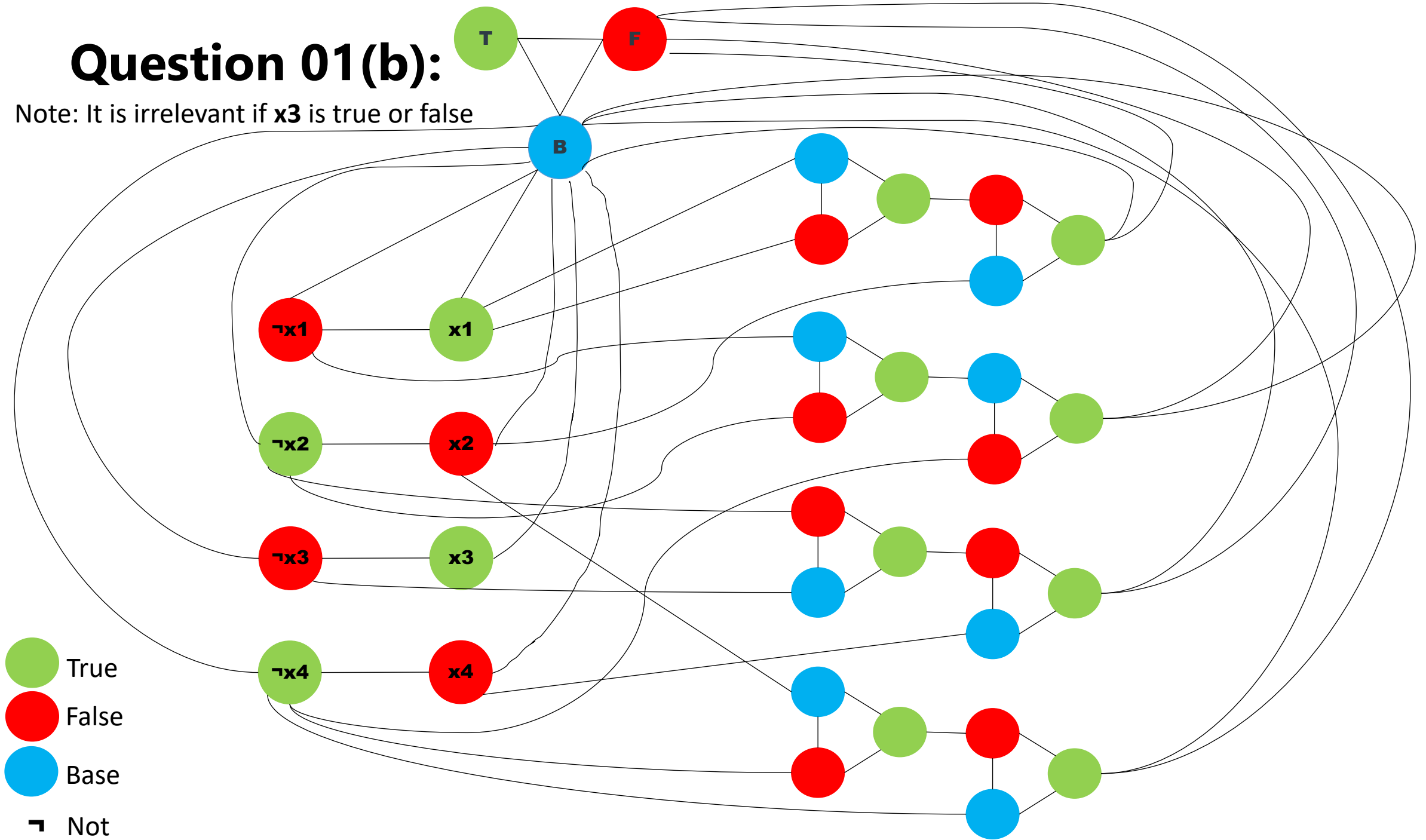
Question 02:

Consider the task list:

(T1,3), (T2,8), (T3,1), (T4,6), (T5,3), (T6,2), (T7,7)

a. Fill in the schedules for these tasks under the associated strategies below.

b. Greedy using a reordering of the list so that longest-running tasks appear earliest in the list (I did the sorting for you):

(T2,8), (T7,7), (T4,6), (T1,3), (T5,3), (T6,2), (T3,1)

Question 02(a):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
T1	T1	T1	T3	T4	T4	T4	T4	T4	T4	T6	T6						
T2	T2	T2	T2	T2	T2	T2	T2	T5	T5	T5	T7	T7	T7	T7	T7	T7	T7

Question 02(b):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
T2	T2	T2	T2	T2	T2	T2	T2	T1	T1	T1	T5	T5	T5	T3
T7	T7	T7	T7	T7	T7	T7	T4	T4	T4	T4	T4	T4	T6	T6

Question 03:

What if in the above case **(T1,3), (T2,8), (T3,1), (T4,6), (T5,3), (T6,2), (T7,7)**, we had that there is a partial order

T1<T3; T3<T4; T3<T7; T7<T5; T6<T2?

a. Draw the graph that depicts these relationships.

b. Show the 2-processor schedule that results when the task number is the priority; a smaller task number means higher priority.

Question 03(a):

(T1,3), (T2,8), (T3,1), (T4,6), (T5,3), (T6,2), (T7,7)
T1<T3; T3<T4; T3<T7; T7<T5; T6<T2?

Question 03(b):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
T1	T1	T1	T3	T4	T4	T4	T4	T4	T4	T7	T7	T7	T7	T7	T7	T7	T5	T5	T5
T6	T6	T2	T2	T2	T2	T2	T2	T2	T2										