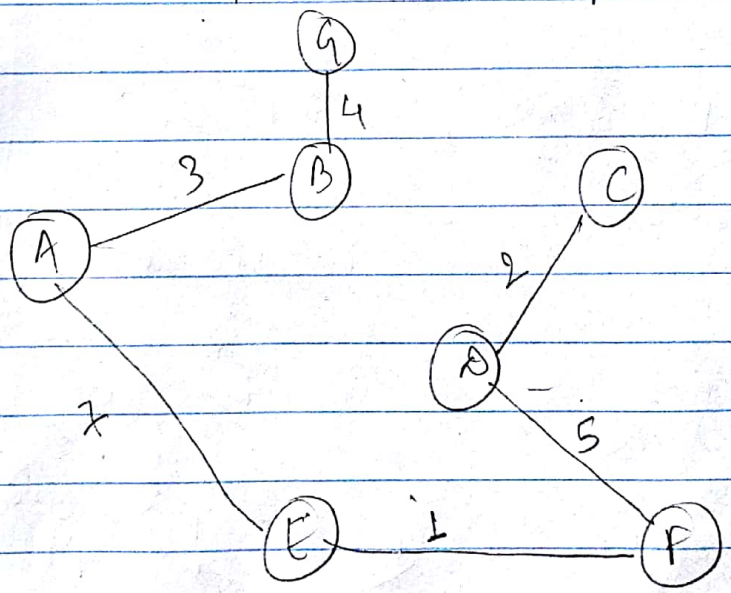
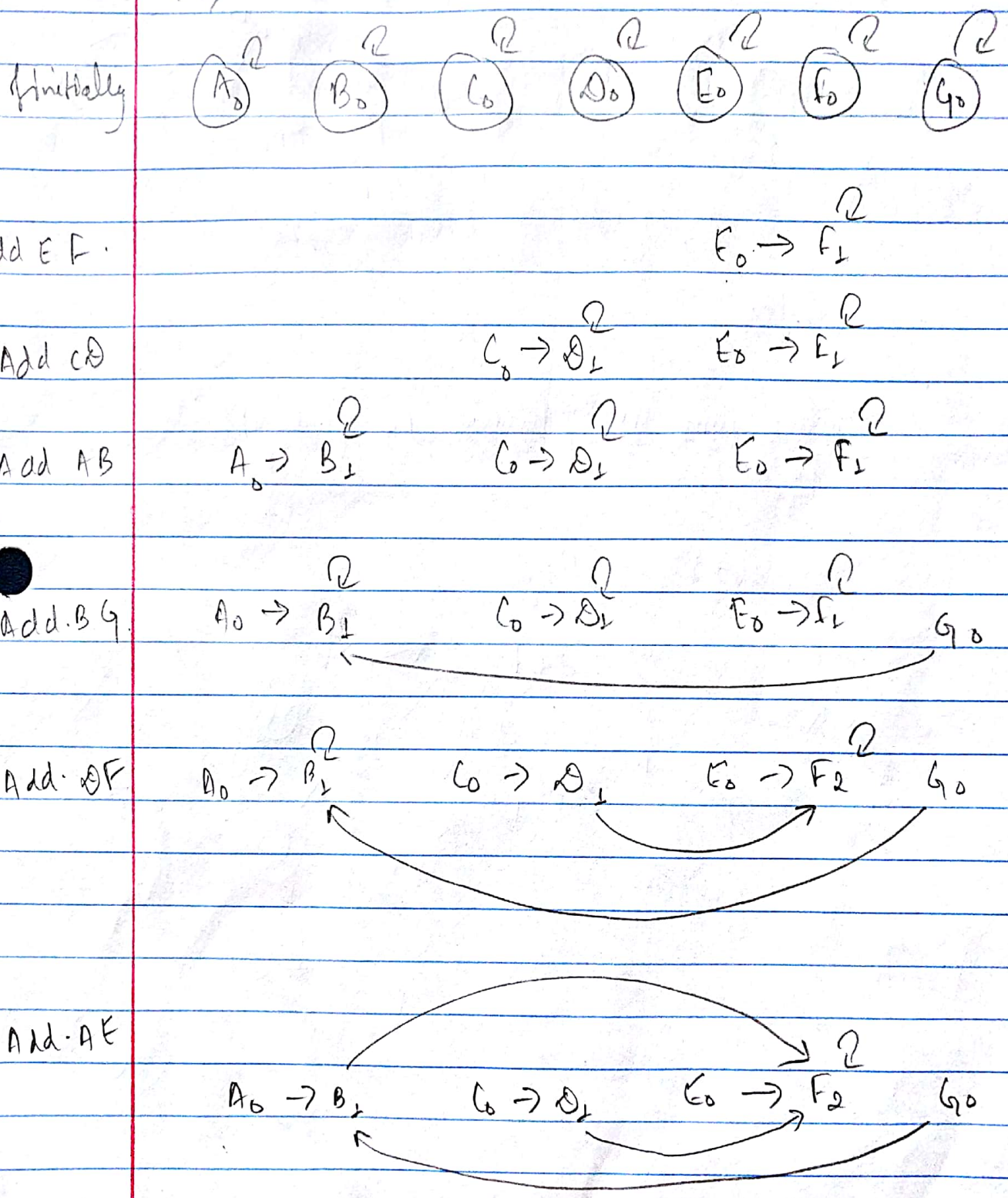
Ganesh Budhathoki

Problem 1 a Solution:

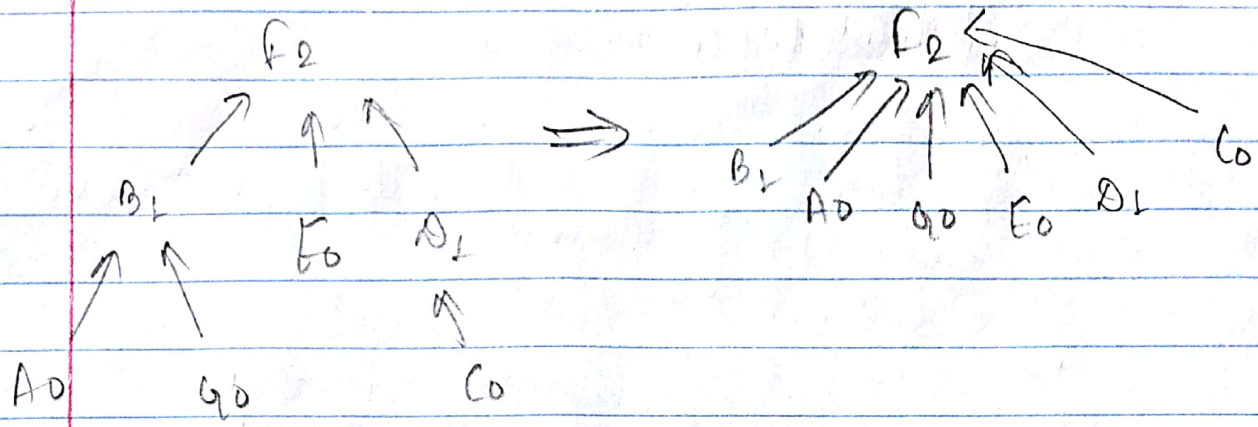
	deq	deq	deq	deq	deq	deq	deq
Initially	A	B	G	E	F	D	C
A	∞, nil						
B	∞, nil	3, A					
C	∞, nil		9, B		6, F	2, D	
D	∞, nil			8, E	5, F		
E	∞, nil	7, A					
F	∞, nil			1, E			
G	∞, nil		4, B				



1 b) Without Path Compression



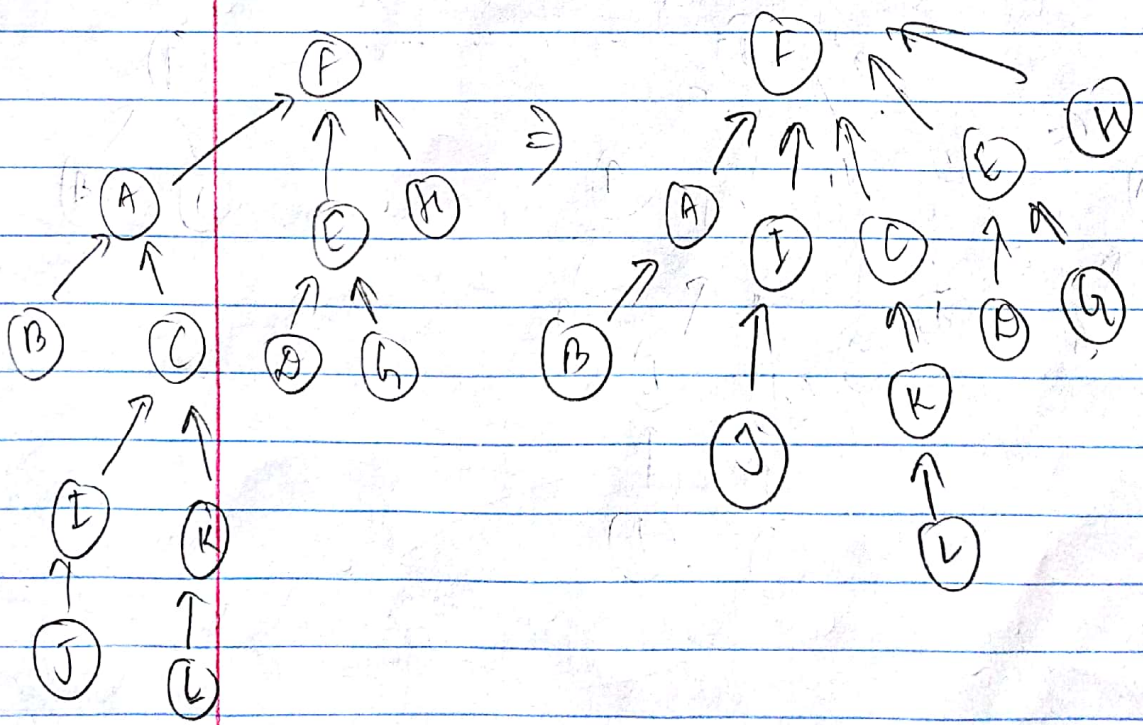
N°4th Path compression



2. Which node is returned by find(I)?

Ans: Node F

Draw find(I):



#3 b) Horn formula. Trace

1 $a \wedge b \rightarrow d$
2 $d \wedge e \rightarrow g$
3 $\rightarrow e$
4 $e \rightarrow a$
5 $\rightarrow b$
6 $d' \vee g'$

F V (F)

Algorithm trace

	a	b	d	e	g
Initially	F	F	F	F	F
		(5) → T		T(3) → T	
	T(4) → T				
		T(5) → T			
				T(1) → T	
					T(2) → T

No it is not satisfiable

The formula is unsatisfiable due to clause 6.

b)

1 $a \wedge b \rightarrow d$

2 $d \wedge e \rightarrow g$

3 $\rightarrow e$

4 $a \rightarrow e$

5 $\rightarrow b$

6 $\neg d \vee \neg g$

Algorithm trace.

	a	b	d	e	g
Initially	F	F	F	F	F
				T(3) → T	
		T(5) → T			

No it is not satisfiable

The formula is unsatisfiable due to clause 1, 2, 4 & 6

A4.a) $S_5 = \{a_4, a_5, a_6, a_7, b_4, b_5, b_6, b_7\}$

$nt = \{a_1, a_2, a_3, b_1, b_2, b_3\} = 6$

$S_4 = \{a_2, a_3, b_2, b_3\}$

$nt = \{a_1, b_2\} = 2$

$S_3 = \{a_1, b_2\}$

b). Optimal set cover is $= S_1 \& S_2 = 2$ sets