

COL703 Quiz 1

Sreemanti Dey

TOTAL POINTS

2 / 3

QUESTION 1

1 1 / 1

+ **0.5 pts** Partially correct

✓ + **1 pts** Correct

+ **0 pts** Incorrect

+ **0 pts** Not attempted

QUESTION 2

2 1 / 1

+ **0.5 pts** Partially Correct

✓ + **1 pts** Correct

+ **0 pts** Incorrect / Not attempted

QUESTION 3

3 0 / 1

+ **1 pts** Correct

+ **0.5 pts** Partially Correct

✓ + **0 pts** Incorrect/Not attempted

2

1+1+0

Quiz 1 (Aug 18, Marks: 3, Duration: 20 mins)

COL703, Aug-Nov 2022

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Entry No.: 2020CS10393

- [1 marks] Is it true that we can transform any proof of $\phi_1, \phi_2, \dots, \phi_n \vdash \psi$ into a proof of the theorem $\vdash \phi_1 \rightarrow (\phi_2 \rightarrow (\phi_3 \rightarrow (\dots \rightarrow (\phi_n \rightarrow \psi) \dots)))$? If not, explain why. If yes, sketch the transformation.
- [1 marks] Give a natural deduction proof of validity of the sequent $(p \vee q) \vee r \vdash p \vee (q \vee r)$.
- [1 marks] Give a natural deduction proof of the law of excluded middle using basic proof rules.

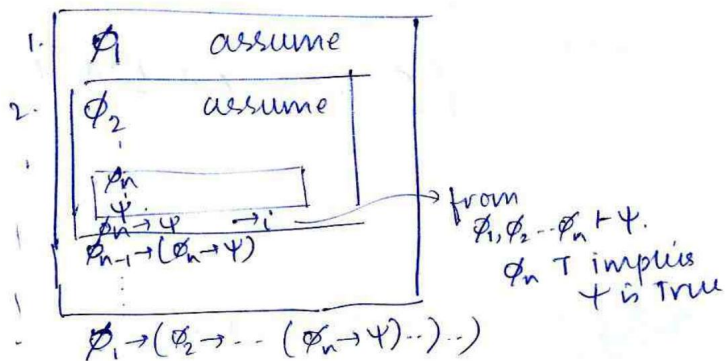
②. $(p \vee q) \vee r \vdash p \vee (q \vee r)$

- $(p \vee q) \vee r$ premise
- | | | | | | |
|---|-------------|--------|---------------------|-------------|--|
| $p \vee q$ | assume | | | | |
| <table border="1"> <tr> <td>p</td> <td>assume</td> </tr> <tr> <td>$p \vee (q \vee r)$</td> <td>$\vee_i, 3$</td> </tr> </table> | p | assume | $p \vee (q \vee r)$ | $\vee_i, 3$ | |
| p | assume | | | | |
| $p \vee (q \vee r)$ | $\vee_i, 3$ | | | | |
-
-
- | | |
|---------------------|-------------|
| q | assume |
| $q \vee r$ | $\vee_i, 5$ |
| $p \vee (q \vee r)$ | $\vee_i, 6$ |
| $p \vee (q \vee r)$ | \vee_e |
-
-
-
-
-
- | | |
|---------------------|--------------|
| r | assume |
| $q \vee r$ | $\vee_i, 9$ |
| $p \vee (q \vee r)$ | $\vee_i, 10$ |
-
- $p \vee (q \vee r)$ \vee_e proved.

①. Yes, we can.

The transformation is

consider ϕ_i 's as assumptions in the proof of $\vdash \phi_1 \rightarrow (\phi_2 \rightarrow (\dots (\phi_n \rightarrow \psi) \dots))$ instead of premises as in proof of $\phi_1, \phi_2, \dots, \phi_n \vdash \psi$



3. $\vdash p \vee \neg p$

