Computer Science CSC 238H
St. George Campus

Wednesday May 27 1998
University of Toronto

Quiz #2

First Name: ______________________________

Last Name: ______________________________

Student Number: ______________________

1. [1 mark] Fill in the blanks in the following proof that $\sim(A \vee S) \vee (\sim\sim K \wedge \sim S)$ is equivalent to $\sim[\sim(A \rightarrow K) \vee S]$.

$$
\begin{array}{lll}
 & \sim(A \vee S) \vee (\sim\sim K \wedge \sim S) & \\
\Leftrightarrow & \sim(S \vee A) \vee (\sim\sim K \wedge \sim S) & (\vee \text{ commutes}) \\
\Leftrightarrow & (\sim S \wedge \sim A) \vee (\sim\sim K \wedge \sim S) & (\text{DeMorgan}) \\
\Leftrightarrow & (\sim S \wedge \sim A) \vee (K \wedge \sim S) & (\text{Double negation}) \\
\Leftrightarrow & (\sim S \wedge \sim A) \vee (\sim S \wedge K) & (\wedge \text{ commutes}) \\
\Leftrightarrow & \sim S \wedge (\sim A \vee K) & (\text{Distributive property}) \\
\Leftrightarrow & \sim S \wedge (A \rightarrow K) & (\text{Rewriting Implication}) \\
\Leftrightarrow & \sim S \wedge \sim\sim (A \rightarrow K) & (\text{Double negation}) \\
\Leftrightarrow & \sim[S \vee \sim(A \rightarrow K)] & (\text{DeMorgan}) \\
\Leftrightarrow & \sim[\sim(A \rightarrow K) \vee S] & (\vee \text{ commutes})
\end{array}
$$