

10. Are these system specifications consistent? "Whenever the system software is being upgraded, users cannot access the file system. If users can access the file system, then they can save new files. If users cannot save new files, then the system software is not being upgraded."

Answer:

Let  $u$ ,  $f$  and  $n$  represent the propositions "system software is being upgraded", "users can access the file system" and "users can save new files", respectively. The 3 specification statements are thus:  $u \rightarrow \neg f$ ,  $f \rightarrow n$  and  $\neg f \rightarrow \neg u$  respectively.

Let say that system is being updated, that is,  $u$  is true so  $\neg f$  cannot be false in because then  $u \rightarrow \neg f$  would be false. Again in  $\neg f \rightarrow \neg u$ , since  $\neg f$  is already true from earlier,  $\neg u$  must be true. So  $u$  is false but this contradicts with our first assumption that  $u$  is true. So the system specifications are not consistent!