

$NumberDoesntExist$ $message! : OUTPUT$ $p? : TELEPHONE$
$p? \notin \text{ran } phoneNumbers$ $message! = numberDoesntExist$

$TotalAddPerson \hat{=} (AddPerson \wedge Success) \vee AlreadyInDirectory$   
 $TotalRemovePerson \hat{=} (RemovePerson \wedge Success)$   
 $\vee NameNotInDirectory$   
 $TotalAddNumber \hat{=} (AddNumber \wedge Success)$   
 $\vee NameNotInDirectory \vee NumberInUse$   
 $TotalRemoveNumber \hat{=} (RemoveNumber \wedge Success)$   
 $\vee NumberDoesntExist \vee NameNotInDirectory$

$TotalPhone \hat{=} TotalAddPerson \vee TotalRemovePerson$   
 $\vee TotalAddNumber \vee TotalRemoveNumber$

$TotalPhoneAndTotalAddPerson \hat{=} TotalPhone \vee TotalAddPerson$