

$OUTPUT ::= success \mid alreadyInDirectory \mid notInDirectory \mid numberInUse$

$Success$	
$message! : OUTPUT$	
$message! = success$	

$AlreadyInDirectory$	
$message! : OUTPUT$	
$n? : NAME$	
$s? : SURNAME$	
$n? \mapsto s \in persons$	
$message! = alreadyInDirectory$	

$NameNotInDirectory$	
$message! : OUTPUT$	
$n? : NAME$	
$s? : SURNAME$	
$n? \mapsto s? \notin persons$	
$message! = NamenotInDirectory$	

$NumberInUse$	
$message! : OUTPUT$	
$p? : TELEPHONE$	
$p? \in \text{ran } phoneNumbers$	
$message! = numberInUse$	

$TotalAddPerson \hat{=} (AddPerson \wedge Success) \vee AlreadyInDirectory$

$TotalRemovePerson \hat{=} (RemovePerson \wedge Success) \vee NameNotInDirectory$

$TotalAddNumber \hat{=} (AddNumber \wedge Success) \vee NameNotInDirectory \vee NumberInUse$