Assign 3 Q 2

Claim: For all k and for any Acc: pow\_tl(n, k, Acc) = Acc \* pow(n, k)

Proof will be by induction on k.

Base Case:

pow\_tl(n, 0, Acc) = Acc \* pow(n, k)

|-> Acc = Acc \* 1 -by function def of pow and pow\_tl  
|-> Acc = Acc

Induction Hypothesis:

pow\_tl(n, k, Acc) = Acc \* pow(n, k)

Induction Step:

Show pow\_tl(n, k+1, Acc) = Acc \* pow(n, k+1)

pow\_tl(n, k+1, Acc) = Acc \* pow(n, k+1)

|-> pow\_tl(n, k, Acc \* n) = Acc \* (n \* pow(n, k) ) -by def of pow and pow\_tl

|-> (Acc \* n) pow (n,k) = Acc \* n \* pow(n,k) -by IH

|-> Acc \* n \* pow(n,k) = Acc \* n \* pow(n,k)

This completes the proof