Assignment 2

1.1 Use induction to prove $F_i = \frac{\phi^i - \hat{\phi}^i}{\sqrt{5}}$; where $F_i = F_{i-2} + F_{i-1}$, and ϕ is the golden ratio $\frac{1+\sqrt{5}}{2}$.

Proof by induction is used to show that an expression f_n (typically a recursive function) is true; in practice, it is a two step process involving a calculation followed by a set of algebraic steps applied to the expression being proved.

To prove by induction, write out the expressions f_n and f_{n+1} (note: f_{n+1} is the same as f_n, but with $(n+1)$ substituted everywhere in place of n). Trying to get the LHS of the expression f_{n+1} to equal the RHS of the expression in terms of f_n is called the "inductive step". After the inductive step is complete, if the expression being proved f_c also holds for some constant c, the expression is said to be "proved by induction".