Week 11 Assignment

Programming for computer engineering

(E22.285191U013.A)

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1) Write down a proof that the following recursive function is correct using *proof by induction.*

```
/* Factorial function definition */
int fact(int n)
{
    /* pre-condition */
    assert (n >= 1);
    /* post-condition */
    if(n > 1)
        return n * fact(n - 1);
    else
        return 1;
}
```

The base case fact(1) = 1 which is consistent with the definition of factorial to a given whole positive number n.

For the inductive step we assume that the base case is true, and that fact(n-1) correctly calculates the factorial of n-1. If this is the case then we know that fact(n) = n * fact(n-1) is true. And since the definition of n! is n * (n-1)! Our proof is now complete.