(1) Write down a proof that the following recursive factorial function is correct using *proof by induction*. Put your inductive proof into a pdf file (`text_answers.pdf`). *Hint:* review the lecture slides for the two components of a proof by induction, i.e. (a) the base case and (b) the inductive step.

```
/* 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;
}
```

First we take a look at the base case

$$fact(1) = 1$$

Now we assume that

$$fact(k) = k \cdot fact(k-1)$$

$$fact(k) = (k-1) \cdot fact(k-2)$$

…

$$fact(1) = 1$$

Given that the definition of the fact function is that it takes an integer k and multiplies it $k \cdot (k-1)$ until we hit the base case $fact(1) = 1$ we can say that it fulfils its purpose.
And thus, we have proved the fact function by induction.