Section 5.4, Problem 18: Prove that Algorithm 1 for computing $n!$ when $n$ is a nonnegative integer is correct.

Algorithm 1:

```plaintext
procedure factorial(n : nonnegative integer)
if $n = 0$ then return 1
else return $n \times \text{factorial}(n - 1)$
```

Section 5.4, Problem 24: Devise a recursive algorithm to find $a^{2^n}$ where $a$ is a real number and $n$ is a positive integer. [Hint: use the equality $a^{2^{n+1}} = \left(a^{2^n}\right)^2$.]