

5. Give pseudocode for a recursive algorithm that computes $n!$ (n factorial).

1 pt.

```
factorial(n)
  if n=1 then
    return 1
  else
    return n * factorial(n-1)
```

6. Let $S = \{a, b, c, d, e, f, g\}$.

a) How many 4-permutations of S are there?

0.5 pts.

$$|S| = 7$$

$$P(7, 4) = \frac{7!}{(7-4)!} = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{3 \cdot 2 \cdot 1} = 7 \cdot 6 \cdot 5 \cdot 4 = 840$$

b) How many 4-combination of S are there?

0.5 pts.

$$C(7, 4) = \frac{7!}{4!(7-4)!} = \frac{7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1}{(4 \cdot 3 \cdot 2 \cdot 1)(3 \cdot 2 \cdot 1)} = 7 \cdot 5 = 35$$