

# Solutions of Tutorial VIII

## Discrete Structures (CS21001)

Autumn Semester 2014

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1. The number of solutions is the coefficient of  $x^{17}$  in the expansion of

$$(x^2 + x^3 + x^4 + x^5)(x^3 + x^4 + x^5 + x^6)(x^4 + x^5 + x^6 + x^7)$$

which is 3. Thus, the number of solutions is 3.

2.  $a_k = 2 \cdot 3^k - 1$
3. Applying the binomial theorem to the equality  $(1+x)^{m+n} = (1+x)^m \cdot (1+x)^n$ , shows that  $\sum_{r=0}^{m+n} C(m+n, r)x^r = \sum_{r=0}^m C(m, r)x^r \cdot \sum_{r=0}^n C(n, r)x^r = \sum_{r=0}^{m+n} [\sum_{k=0}^r C(m, r-k)C(n, k)]x^r$ . Comparing the coefficients give the desired identity.