

**Zadatak 18.** Odredi koeficijent uz  $x^5$  u polinomu

$$(1+x)^5 + (1+x)^6 + (1+x)^7 + \dots + (1+x)^{100}.$$

*Rješenje.* Zapišimo dani polinom kao

$$(x+1)^5 + (x+1)^6 + (x+1)^7 + \dots + (x+1)^{100}.$$

Koeficijenti uz  $x^5$  su:

$$\begin{aligned} \binom{5}{5} + \binom{6}{5} + \binom{7}{5} + \dots + \binom{100}{5} &= \binom{5}{0} + \binom{6}{1} + \binom{7}{2} + \dots + \binom{100}{95} \\ &= \binom{5}{0} + \binom{5+1}{1} + \binom{5+2}{2} + \dots + \binom{5+95}{95} \\ &= \binom{5+95+1}{95} = \binom{101}{95} = \binom{101}{6}. \end{aligned}$$