Solution to Problem 20

Problem. Suppose that A, B are r.e. sets. If a number n appears in the A-generating algorithm at moment 4, when will this number appear in the algorithm generating all elements of the union $A \cup B$?

Solution. According to the posted lecture, if the A-generating algorithm generates a number at moment k, then the union-generating algorithm generates this number at moment $2k - 1$.

In this problem, $k = 3$, so the union-generating algorithm generates the number n at moment $2 \cdot 4 - 1 = 7$.