

Solution to Problem 19

Problem. Suppose that A, B are r.e. sets. If a number n appears in the A -generating algorithm at moment 3 and in the B -generating algorithm at moment 5, when will this number appear in the algorithm generating all elements of the intersection of A and B ?

Solution. According to the posted lecture, if a number was generated by the A -generating algorithm at time k and by the B -generating algorithm at time ℓ , then it is produced by the intersection-generating algorithm by the time $\max(2k - 1, 2\ell)$.

In this problem, $k = 3$ and $\ell = 5$, so the number n will be produced by the intersection-generating algorithm by the time $\max(2 \cdot 3 - 1, 2 \cdot 5) = \max(5, 10) = 10$.