

Putnam Exam Questions

1:

Suppose we have a necklace of n beads. Each bead is labeled with an integer and the sum of all these labels is $n - 1$. Prove that we can cut the necklace to form a string whose consecutive labels x_1, x_2, \dots, x_n satisfy

$$\sum_{i=1}^k x_i \leq k - 1 \quad \text{for } k = 1, 2, \dots, n.$$

2:

Suppose that each of 20 students has made a choice of anywhere from 0 to 6 courses from a total of 6 courses offered. Prove or Disprove : there are 5 students and 2 courses such that all 5 have chosen both courses or all 5 have chosen neither course.