Project ID: 331

Senior Division

Mathematics

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Gr. 10

The Optimal Number of People for Indoor Physical Distancing Using Pigeonhole Principle

AWARDS:

CSEF Qualified

This computational study explores the intersection of physical distancing practices and the pigeonhole principle, a fundamental concept in combinatorial mathematics. Physical distancing, a critical measure during the COVID-19 pandemic, involves maintaining safe spaces between individuals to minimize the risk of infectious disease transmission. Research studies support the effectiveness of this measure, particularly in controlling the spread of respiratory droplets carrying infectious agents. The objective is to determine the optimal number of individuals safely occupying a given space, aligning with the pigeonhole principle. For preliminary study, we created a computational approach simulating the random plotting process using Processing/Eclipse in Java. We would like to propose expanding the simulation into a benchmark case where we simulate the virtual disease spread using agent-based model. This study aims to contribute insights into optimizing safe space allocation in the context of infectious disease prevention.