# AUTOMATING AND OPTIMIZING TIMETABLE ON MUNTINLUPA ELEMENTARY SCHOOL USING FIREFLY SWARM ALGORITHM

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## INTRODUCTION

The scheduling of activities and events in accordance with the resources that are available is what is meant to be "timetabling" This is done so that we may achieve the highest possible level of productivity. The use of the Firefly Swarm Algorithm (FSA) was the most important component that led to the accomplishment of the study's mission. After this study has completed, it would be possible to construct, based on the FSA, appropriate for use in primary public schools and aided in attaining the goal. The study focuses on the development of an automated system aimed at creating class schedules. It also aims to identify and incorporate various constraints pertinent to class timetabling and teacher scheduling. The study encompasses three main areas: class, teacher, and constraint allowance. Study encompasses the study of the following tools:8:8 Maintainability, Maintainable Limitations, and Limitations of the Study. Study also focuses on developing a system using the Firefly Algorithm with the Firefly Swarm Algorithm. This method was developed as a way of overcoming the challenges associated with scheduling. Primary public schools have limited access to a variety of resources. They are nonetheless required to develop their own timetables for the many subjects they teach. The FSA was effective in finding answers to a broad variety of problems. It endeavors to balance these constraints to ensure equitable distribution and effective utilization of resources while also designing a system that allows for constraint adjustments based on user preferences. It is expected that this trend will continue for at least the foreseeable foreseeable future. Teachers who want to adjust their schedules also benefit from this study.

## METHOD

The study focused on the development of a website application for automating andoptimizing timetables at an elementary school using the Firefly Swarm Algorithm. The project design, project development, operation and testing procedure, and evaluation procedure of the study are listed below. The study is based on the Kanban workflow, which is a visual representation of the workflow, displaying tasks in columns representing different stages of completion. The system monitors the timetable for potential conflicts, such as teacher availability clashes or room allocation. The Firefly Swarm Algorithm generates an initial timetable that satisfies all constraints and minimizes conflicts. The system automatically assigns teachers to courses based on their qualifications, experience, and teaching. It should optimize room usage to minimize room conflicts and maximize space utilization. It allows for exporting the timetable in various formats, such as PDF and Excel sheets, for sharing and further analysis. It was evaluated by the users who handle elementary school scheduling and teacher allocation. The application allows users to highlight, copy and paste, drag, drop elements inside, adjust preference in a slider for the FSA.

## RESULTS

The system aims to enhance efficiency, reduce errors, and adapt tovarieties of input parameters. It generates schedules for grades 1 to 6, automating a traditionally manual process. The system functions without an internet connection, benefiting schools with limited internet access. It passed the acceptability level based on the ISO 25010 criteria. The project structure, project capabilities and limitations, and project evaluation are discussed. The application is a platform for teachers that provides easy implementation and scheduling of classes based on DepEd Curriculum.

## DISCUSSION

Firefly Algorithm offers a robust and efficient solution for elementary school timetable scheduling. A series of recommendations have been proposed to refine the automated scheduling system. The Firefly Algorithm effectively addresses the complex constraints of elementary school timetable scheduling. The initiative provides the framework for future improvements and expanded implementation, eventually improving educational administration operations. The Firefly Algorithm is available for download from the Google Play store.