

Project Scheduling with Risk Management

This project aims to solve a project scheduling problem with a given budget constraint and risk management factors, such as team members being sick. The solution uses a Genetic Algorithm (GA) to find the optimal allocation of working hours for each team member while minimizing the project duration and staying within the budget.

Problem Description

team_members: The number of team members working on the project.

project_hours: The total number of hours required to complete the project.

max_hours_per_day: The maximum number of hours a team member can work per day.

Budget constraints:

budget: The total budget for the project.

normal_rate: The hourly rate for a team member during normal working hours.

overtime_rate: The hourly rate for a team member during overtime.

overtime_threshold: The number of hours after which the overtime rate applies.

Risk management factors:

sick_probability: The probability of a team member being sick during the project.

sick_days: The number of days a team member can be sick.

Genetic Algorithm Parameters

population_size: The number of individuals in the population.

generations: The maximum number of generations to run the GA.

crossover_prob: The probability of applying crossover to two selected parents.

max_generations_without_improvement: The maximum number of generations without improvement before stopping the GA.

Usage

To run the project scheduling optimization, execute the provided Python script:

```
python project_scheduling.py
```

The script will run the GA and output the best individual (hours worked per team member) and the minimum project duration (days). A bar chart visualizing the working hours for each team member will also be displayed.

Customization

To customize the problem parameters, budget constraints, GA parameters, or risk management factors, simply modify the corresponding variables in the script.

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Dependencies

The script requires Python 3 and the following libraries

NumPy

Matplotlib