Set 2

Coding Club, IIT Jammu

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I

Task: Building a Library Management System in Python

Objective: Implement a basic library management system using Python classes to model books, patrons, and library operations.

Requirements:

Book Class:

Create a Book class with the following attributes:

`title`**:** Title of the book (string)

`author`**:** Author of the book (string)

`isbn`**:** ISBN (International Standard Book Number) of the book (string)

`available_copies`**:** Number of available copies of the book (integer)

`total_copies`**:** Total number of copies of the book (integer)

Implement a method `display_info()` that prints out the book information.

Patron Class:

Create a Patron class with the following attributes:

`name`**:** Name of the patron (string)

`patron_id`**:** Unique identifier for the patron (string or integer)

`books_checked_out`**:** List to store the books checked out by the patron (list of Book objects)

Implement methods to:

`checkout_book(book)`**:** Allow a patron to check out a book.

`return_book(book)`: Allow a patron to return a book.

Library Class:

Create a Library class that manages books and patrons.

Implement methods to:

`add_book(book)`**:** Add a book to the library's collection.

`remove_book(book)`**:** Remove a book from the library's collection.

`register_patron(patron)`**:** Add a patron to the library's system.

`remove_patron(patron)`: Remove a patron from the library's system.

`display_books()`: Display information about all books in the library.

`display_patrons()`: Display information about all registered patrons.

Instructions:

Design your solution using proper class structures and principles of object-oriented programming.

Write a simple script to demonstrate the functionality of your library management system. For example, create instances of books, patrons, and the library, and perform checkouts and returns.

Provide comments and docstrings to explain your code.

Test your implementation with meaningful scenarios.

II

Welcome to the year 2912, where your data science skills are needed to solve a cosmic mystery. We've received a transmission from four lightyears away and things aren't looking good.

The Spaceship Titanic was an interstellar passenger liner launched a month ago. With almost 13,000 passengers on board, the vessel set out on its maiden voyage transporting emigrants from our solar system to three newly habitable exoplanets orbiting nearby stars.

While rounding Alpha Centauri en route to its first destination—the torrid 55 Cancri E—the unwary Spaceship Titanic collided with a spacetime anomaly hidden within a dust cloud. Sadly, it met a similar fate as its namesake from 1000 years before. Though the ship stayed intact, almost half of the passengers were transported to an alternate dimension!

To help rescue crews and retrieve the lost passengers, you are challenged to predict which passengers were transported by the anomaly using records recovered from the spaceship’s damaged computer system.

Help save them and change history!

In this competition your task is to predict whether a passenger was transported to an alternate dimension during the Spaceship Titanic's collision with the spacetime anomaly. To help you make these predictions, you're given a set of personal records recovered from the ship's damaged computer system.

File and Data Field Descriptions

`train.csv` - Personal records for about two-thirds (~8700) of the passengers, to be used as training data.

> `PassengerId` - A unique Id for each passenger. Each Id takes the form gggg_pp where gggg indicates a group the passenger is travelling with and pp is their number within the group. People in a group are often family members, but not always.
>
> `HomePlanet` - The planet the passenger departed from, typically their planet of permanent residence.
>
> `CryoSleep` - Indicates whether the passenger elected to be put into suspended animation for the duration of the voyage. Passengers in cryosleep are confined to their cabins.
>
> `Cabin` - The cabin number where the passenger is staying. Takes the form deck/num/side, where side can be either P for Port or S for Starboard.
>
> `Destination` - The planet the passenger will be debarking to.
>
> `Age` - The age of the passenger.
>
> `VIP` - Whether the passenger has paid for special VIP service during the voyage.
>
> `RoomService, FoodCourt, ShoppingMall, Spa, VRDeck` - Amount the passenger has billed at each of the Spaceship Titanic's many luxury amenities.
>
> `Name` - The first and last names of the passenger.
>
> `Transported` - Whether the passenger was transported to another dimension. This is the target, the column you are trying to predict.

`test.csv` - Personal records for the remaining one-third (~4300) of the passengers, to be used as test data. Your task is to predict the value of Transported for the passengers in this set. Also prepare annotated notebook justifying your choices in the process.

Problem II from kaggle.com