

## Homework 3

There is code in the Itslearning system that you need to be aware of. Remember that you must explain your solutions if asked.

1. (4 points) Ensure that you follow the principles presented in the course. Create a class `Train` that uses the `Carriage` class from the previous assignment (in Itslearning). The `Train` is based on a list of carriages.
  - (a) The constructor is given at least one carriage for initialization.
  - (b) Each train must have at least one carriage.
  - (c) Carriages must be able to be added to the train.
  - (d) Carriages must be able to be removed from the train.
  - (e) Carriages have a specific order in the train, which must be considered when adding and removing.
  - (f) It must be possible to reserve a seat from a suitable carriage in the train.
  - (g) All reserved and free seats in the train must be visually reportable on the screen (a text-based visualization is acceptable).
  - (h) The train has a unique identifier.
  - (i) The train can be associated with a departure location and a destination.
  - (j) Information about the various features of the train must be obtainable in the same way as from a carriage.

Write meaningful comments for all methods and comprehensive preconditions. Test all your code.

## Object-Oriented Programming 2025 Spring

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2. (3 points) Ensure that you follow the principles presented in the course.

Add a shop to the StoneAge context where items are for sale, and the shopkeeper is an NPC. You can build the NPC based on the player character. Items in the shop must be purchasable. It must be possible to sell items from the player character's backpack to the shop. Implement a gambling feature in the shop where the player character can attempt to exchange an item from their backpack for a specific item in the shop. If the gamble is successful, a random item from the backpack is removed, and an item from the shop appears in the backpack. The shopkeeper is involved in the exchange of items.

Implement the necessary classes. Write meaningful comments for the method signatures and comprehensive preconditions.

3. (3 points) Ensure that you follow the principles presented in the course.

Implement a world in the StoneAge context where players can exist and move in a grid-based environment with an appropriate logic. There can also be items in the grid squares. Players can pick up items in a consistent manner. The world can have multiple players and numerous items.

Implement the necessary classes. Write meaningful comments for the method signatures and comprehensive preconditions.