

COSC201: Tutorial Week 8

Data Structure Choice

A set data type simply contains the items put into it. A map data type contains a mapping from a key to a value. A `HashSet` is a set implemented as a hash table, whereas a `TreeSet` is a set implemented as a binary search tree. `HashMap` and `TreeMap` are similarly defined, but for maps instead of sets. In each of the situations below, which of the Java library classes `HashSet`, `TreeSet`, `HashMap`, or `TreeMap` would be the most appropriate representation of the data? Include a brief justification (of a sentence or two in each case).

1. The intended application is for a vocabulary learning flash card application that allows users to lookup the meaning of words as well as testing them on the meaning of words.
2. The intended application is for an inventory in an online shop. Shoppers want to search for items, check if they are in stock, and get a description and cost of the item. Shop owners want to print a list of all items in their shop in alphabetical order with the stock numbers.
3. The intended application is for access to a building using an ID card. The card reader will read the user's ID and grant access if it is on the list of allowable IDs.
4. The intended application is to store a character's inventory in a role-playing game. Each possible item has an associated weight, and each character can only carry a limited total weight.
5. The intended application is to provide access to items in a shop in a role-playing game. The most common use case is to require a list of all available items whose cost lies in a particular range (i.e., to answer questions like "What can I buy for between 100 and 150 gold pieces?").
6. The intended application is to store the names of all the individual characters in a role-playing game.