Practice Material
CSE 327: Software Engineering

Draw a UML class diagram for the following case-study:

A company has decided to enter the market for role-playing game software. You have been contracted to design a software platform to support the fundamental concepts common to many such games. The following common requirements have been identified:

- The game is populated by characters. Characters can be controlled either by a game player (human), or by the game system (AI). All characters have a name, a number of health points, a number of strength points, and an amount of money owned.
- Characters can acquire skills during the course of the game. The number of skills that a character can have is not limited.
- A character can carry two items at a time. Some items are weapons.
- There is a special sort of item that is able to contain others: a container. A character carrying a container is thus able to carry more than two items (indirectly).
- Some items are consumable. Consuming an item can increase a character's health and/or strength, or give the character special properties for a limited time. After an item is consumed, it ceases to exist.
- Games take place in a world consisting of many locations. Each location is a hexagon (i.e. it is six-sided). Each location has a terrain type and a number of health points it costs to traverse.
- A character is located at a single location at a given game time step. A each time step of the game, characters can move to a location neighbouring the location they were in at the last turn.
- Locations can contain items and money. Characters can drop items or money in the location where they are, and pick up items or money that are there.
- When two or more characters are in the same location at the same time, they can interact. There are two kinds of interactions: combat and trading.
- When two characters interact via combat, each loses health points depending on the strength and skills of the other, any weapons they are carrying, and a random factor. If a character's health points fall to zero, it dies. When a character dies, it drops any item(s) and money that it is carrying.
- When two characters interact via trading, each offers a set of items that it is willing to trade. One character then offers money and/or items for an item it wants. The other character can

choose to accept or reject the trade. If the trade is accepted, the items and/or money are exchanged between the characters. This process can be repeated.

You have also been provided with some requirements for a specific game, Wizzo, so that you can illustrate how your platform would support a particular game:

- There are two types of character, magical and non-magical. Magical characters include wizards and elves. Non-magical characters include humans and dwarves.
- Some skills are magical skills, such as the ability to cast a spell. Only magical characters can have magical skills.
- The terrain types are farmland, desert, marsh and water.
- Items include wands, potions (consumable), swords (weapon), axes (weapon), bread (consumable) and backpacks (container).
- When a character consumes a potion, it gets a special property for a fixed number of time steps. There are potions for invisibility, invincibility and endurance.