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## MUD Project or Dungeon & Dragons

MUD is a Multi-User Dungeon game where players connect to a server and wander in a virtual world built from a map comprised of rooms connected via passages. Some rooms contain items and other might contain various types of enemies like fire breathing dragons. You can read about the first game in the genre at: <https://en.wikipedia.org/wiki/MUD>

The interaction within the game will be via a textual interface along the style of the original game ZORK from the 70`.

To get an go to <https://classicreload.com/zork-i.html> and play. You enter commands as verbs and nouns, try the following three commands

- look
- Open mailbox
- Read leaflet
- North
- North
- Climb tree
- Take egg

Some commands have synonyms. For instance you can say: get egg, go north, etc.

Your task as dungeon programmer is to design and then code a MUD server in C++ that enables multi players to play on the same virtual world.

## Game High Level Requirements

1. The game is a client/server network application. Players can use a telnet client to connect to the server using TCP.
2. Players enter textual commands and will see the server response to these commands in a console.
3. Implement using OO, design patterns in C++.

## World

Game world will be loaded from a text file describing the world map. The world is a labyrinth built from a collection of rooms connected by passages. Some of these passages are closed with doors. Some of these doors are locked. You can open a locked door with the suitable key.

## Room

A room has has name, description, walls color, location and passages to other rooms.

A room can be either empty or contains some items in it like swords, food or treasure.

A room can also host a dragon or some other fancy monster, usually fire breathing one.

A room can obviously host players.

A room can be connected via passages to other rooms. These passages can either be open or have a door. The door can either be closed and a player can open it easy or the door can be locked and the player will need a key in order to open it.

## Player

Players roam the world looking to make a fortune while trying to stay alive.

When a player is first connected to the game server she is greeted with a welcome message and expected to identify herself with a unique nickname.

Once the player is identified with a nickname she is placed in the entrance room to the dungeon.

Player state is comprised from:

1. Nickname - unique name
2. Location - where he stands in the map
3. Life: a counter that start at 42. It decreases if the player is hit by an attack and it increases if he rests or eats. If it reaches 0 the player dies.
4. Money: a counter that starts at zero, it increases if player find and take treasures. When it reaches 1000 player wins the game.
5. Sword: at most one sword at a time. Sword has a strength factor [1..10]. Player can drop his sword and can pick a newly found sword. Player start with a sword of strength 4

6. Shield: at most one shield. A shield has a protection factor in the range [1..10]. Player starts with no shield.
7. Keys: player has a collection of keys. She starts with none.
8. Direction: The player has a direction. Direction can be changed by turning to the left or right 90 degrees.
9. Movement: Player can either walk or run forward or backwards along her direction.

## Commands

Player interacts with the game using text commands. The game supports the following commands: ( arguments in [ ] are mandatory, arguments in { } are optional.

Command	Synonyms	Description
id [nickname]	name [nickname]	Connect to game
Look {around}		Describe the room
walk	go   forward	Walk forward
back	backwards	Walk backwards
left	turn	Turn left
right		Turn right
Take	pick   get	Take the item in the room
Take [item]	pick get [item]	Take the specific item
Open {door}		Open door
Close {door}		Close door
unlock {door}		Unlock door
lock door		Lock door
Talk [text]		Talk with other creatures in the room
Shout [text]		Talk with all creatures in the dungeon
attack {creature}	slash   hack	Attack said creature
rage	berserk	Rampage through room
help	info	Display help on commands

## Battles

Battles are fought between player and between players and monsters. The outcome of a battle depends on the strength of the fighting parties and their protection level. In principle there are two types of fight: focused attacks and rampages.

### Simple attacks:

Simple attacks are one on one. Either player vs player or player vs a dragon. The outcome of such attack is determined by relative strengths and protection of the fighting entities and will reflect on their life juice.

Use a formula:

```
[alpha] = min(0, [attacker's sword strength] - [attacked shield])  
[beta] = min(0, [attacked sword strength]/3 - [attacker shield])
```

```
[Attacked life] -= random([alpha]..[alpha]*2+10)  
[Attacker life] -= random([beta]..[beta]*1.2+4)
```

### Rampage:

Rampage is allowed only if there is more than one other creature in the room and only if the player has life counter equal or greater than 42. The rampaging has a 0.42 chance of attacking any other creature in the room (order is random).

In a rampage you calculate the outcome using

```
[alpha] = [attacker's sword strength]*1.5 - [attacked shield]  
[beta] = [attacked sword strength]/5 - [attacker shield]/2)
```

```
[Attacked life] -= random([alpha]..[alpha]*3+12)  
[Attacker life] -= random([beta]..[beta]*1.3)+3
```