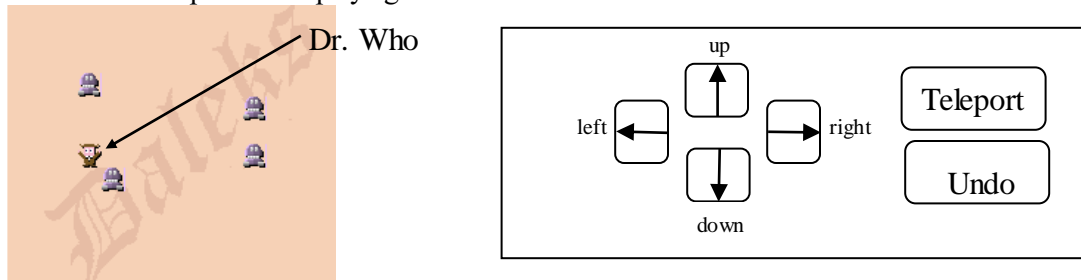


(15 marks) Suppose we are designing a new version of an old game: Dalek Attack. In our version of this game Dr. Who has 5 basic moves on the game's playing area: go up 1 position, go down 1 position, go left 1 position, go right 1 position, and teleport. Corresponding to these moves, the DrWho class has five methods named goUp(), goDown(), goLeft(), goRight(), teleport().

The player uses a remote control with 4 arrow buttons corresponding to the first 4 moves, a button for teleport and a button for undo. The undo button allows the player to undo his/her last move.

Since the system is to be designed according to the Command design pattern there is a command object associated with each button.

Here's an example of the playing area and remote control:



a) To the extent possible, draw a class diagram to illustrate the use of the Command design pattern in our game's design.

b) Assume the remote control has been initialized properly. Suppose the following runs:

1. `ArrayList list = new ArrayList ();`
2. `list .add(new Undo());`
3. `list.add(new LeftCommand());`
4. `list.add(new Teleport());`
5. `list .add(new Undo());`
6. `for (Command c: list) c.execute();`

Show with a sequence diagram the messages that are sent amongst the objects when line 6 executes.