S1: Design of a new Agent: Wizard Doctor

Wizard\_Doctor is a new type of Agent that possesses the ability to heal other agents, and who shows similarity with Warriors as he has capabilities to defend himself if under attack. The possible states of a Wizard Doctor are: **Healing**, **Not Healing**, **Attacking**.

Automatic Behavior:

A Wizard\_doctor will first look around in his environment, and then choose the agent with lowest health within his range to be his patient. A Wizard\_doctor is afraid of being caught in the middle of a battle, and therefore he will not consider healing any agents whose current status is “**Attacking**”. However, Wizard\_doctor will heal Non-Warriors (i.e. Peasant) being under attack due to benevolence in his character. If two agents share the same distance from the Wizard\_doctor, he will break the tie using alphabetic order. Once he has determined his patient, he will add 1 to the health of his patient and change his status to “**Healing**”.

A Wizard\_doctor will have the ability to defend himself once under the attack by counterattacking his opponent using poison. If he was healing a patient while being attacked, he will change his status from “**Healing**” to “**Attacking**”. Wizard\_doctor shows similarity with Soldier in that he will continue attacking until his opponent is dead, or the latter is out of his range. In contrary to Warriors, Wizard\_doctor shows no aggressive behavior that he cannot be ordered or actively participate in a combat.

**Initial Values:**

The Wizard\_Doctor is initialized with healing\_strength of 1, attacking\_strength of 1, and the range of 3, and outputs the message “**I’m Healing!**” when he cures his target, and “**Take poison!**” when counterattacking his opponent.

**start\_attacking**: Output **“I don’t want to attack!**” and stays in his current state.

**update**: First, update the agent state, then follow the order below:

If not “**Alive**”, do nothing further.

If **Not healing**, find a new patient using logic described above. If found a patient, output “**Found a new patient!**” with the patient’s name. Otherwise, do nothing further.

If **Healing**, follow the order below:

Check if the patient is still “**Alive**”, if not, output “Patient is Dead” and change state to “**Not Healing**”, discard target pointer with no further action.

Check if the patient in in range, if not, output “Patient out of range” and change state to “**Not Healing**” discard target pointer with no further action.

Output the message “**I’m Healing!**”, and calls the target’s gain\_health() function with Wizard\_doctor’s healing\_strength.

If **attacking**, follow the same behavior as Soldier.

**start\_healing**: A pointer to target will be supplied. There is no need to check if the target is different from “this” Agent because Wizard\_doctor is allowed to heal himself. If the Target is “**Not Alive**”, throws error message that **“I can’t save dead patients!**” If the distance between Wizard\_doctor and the target is greater than range, throw an error that the “**patient is out of range**”. If Wizard\_doctor is asked to heal a patient whose state is “**Attacking**”, error message of “I am not a Medic!” is output. If he is asked to save himself while counterattacking his aggressor, error of “**I’m Busy counterattacking!**” will be thrown. If all is OK, the pointer to target is saved and set his state to “**Healing**”.

**take\_hit**: First, compute new health using Agent::lose\_health function. If he is in “**Attacking**” but no longer “**Alive**”, then sets the state to “**Not Attacking**”. If Wizard\_Doctor was “**Not Attacking**“, and both him and his attacker are “**Alive**”, then counterattack by setting his state to “**Attacking**“. No range check is done in this automatic behavior, as similar to soldier, if the target is out of range, the “**I’m counter-attacking!**” message will still be output.

**describe**: Output “Wizard\_doctor” followed by his description, then followed by healing and attacking state information.

**stop**: The Wizard\_doctor does not override Agent::stop() and will output “I’m stopped.” ; at the same time, setting its state back to “**Not Healing**”.