S1: Design of a new Agent: Wizard Doctor

**Behavior Description:**

Witch\_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. A new command “heal” is implemented in order to dictate the Witch\_doctor to heal patients, including himself.

The Witch\_doctor can be in exactly one of “Attacking” or “Healing” at a time.

Automatic Behavior:

A Witch\_doctor will first look around in his environment, and then choose the agent with below full health within his range to be his patient. A Witch\_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, Witch\_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 Witch\_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**”. While his state is “**Healing**”, the Wizard\_doctor will continue healing his patient as long as the latter is not at full health. Once his patient is cured, his state will be changed to “**Not Healing**” and finding new Patient. A Witch\_doctor will always consider healing himself first before considering saving other agents.

A Witch\_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**”. Witch\_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, Witch\_doctor shows no aggressive behavior that he cannot be ordered or actively participate in a combat.

**Initial Values:**

The Witch\_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. Unless specified below, all behaviors should follow default Agent behavior.

**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:

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

2. If “**Attacking**”, follow the same behavior as Soldier.

3. 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 no patient satisfying the conditions, then output nothing and stay in **Not Healing**.

4. If “**Healing**”, follow the order below:

1. 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.

2. 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.

3. Check if the patient is fully health, if so, output “**Patient is now perfectly healthy!”** and change his state to “**Not Healing**”.

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

**start\_healing**:

Witch\_doctor is allowed to heal himself as long as he is not counter-attacking his aggressor. If so, error message of “**I'm busy counter-attacking!**” is output.

If the Target is “**Not Alive**”, throws error message that **“I can’t save dead patients!**”

If the distance between Witch\_doctor and the target is greater than range, throw an error that the “**patient is out of range**”.

If Witch\_doctor is asked to heal a patient whose state is “**Attacking**”, error message of **“I don't want to catch myself between Warriors!**” is output.

If the supplied patient has full health, then output error message “**This patient is perfectly healthy!**”

If all is OK, the pointer to patient is saved and set his state to “**Healing**”.

**take\_hit**: First, compute new health using Agent::lose\_health() function, then setting state to “**Not Healing**“ and “**Attacking**“. Then, stores the target\_ptr and output “**I’m counter-attacking!**” message.

**describe**: Output “Witch\_doctor” followed by his description, then followed by “**Attacking**” and “**Healing**” state information.