Logic and Constraint Programming - Second assignment - Drools A.Y. 2021/2022

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Smart Room

The scenario is composed of a different class of smart devices in a way to realize a smart room with a studying area, a relaxing area and a sleeping area.

The various smart devices have been simplified to allow suitable management according to the project's objective.

Below is a list of the classes that have been implemented to create the smart room:

- Air quality sensor: used to identify if the quality of the air inside the room is suitable for working;
- Motion sensor: used to identify if anyone is standing in front of the desk;
- Smart Speaker: Used to allow the playback of music or an alarm clock;
- Media Center: Used to allow playback of a movie;
- Smart Device: used to represent a generic smart device whose functions are made explicit by the assigned name;
- User: used to identify the presence of the room user.

To achieve the correct functioning of the system, the following rules are defined:

- Work Environment Not recommended: The rule deals with identifying an unsuitable work environment and reporting it to the user (ex. via telephone notification). The rule is activated when the following facts occur:
    - The user is present inside the room;
    - The air quality sensor detects a quality not recommended for working;
    - The previous point has not already been reported;
    - The motion sensor is detecting the presence of someone in front of the desk.
- Work Environment Available: The rule deals with identifying a suitable work environment and reporting it to the user (ex. via telephone notification). The rule is activated when the following facts occur:
    - The user is present inside the room;
    - The air quality sensor detects a quality recommended for working;
    - The previous point is the result of a previous report.
- Ambient work On: The rule deals with identifying the presence of someone in front of the desk and proposing a comfortable work environment. The rule is activated when the following facts occur:
    - The user is present inside the room;
    - The motion sensor is detecting the presence of someone in front of the desk;

- Ambient work Off: The rule has the objective of identifying the absence of someone in front of the desk and consequently deactivating the work environment if previously activated. The rule is activated when the following facts occur:
    - The motion sensor does not detect someone's presence;
    - The working environment is active.
- Unwanted presence at the desk: The rule has the objective of identifying the non-presence of someone in front of the desk in relation to the non-presence of the user in the room and in case of reporting it to the user (ex. via telephone notification). The rule is activated when the following facts occur:
    - The user is not present inside the room;
    - The motion sensor is detecting the presence of someone in front of the desk.
- Speakers On: The rule aims to identify the presence of a device that is reproducing audio to activate the speakers and provide a better environment. The rule is activated when the following facts occur:
    - The user is present inside the room;
    - A device is reproducing audio.
- Speakers Off: The rule has the objective of identifying the absence of the user so as to deactivate the unused speakers. The rule is activated when the following facts occur:
    - There is an unused speaker;
    - The user is not present inside the room.
- Movie ambient On: The rule has the objective of identifying the presence of a media center that is playing a movie in order to activate the suitable environment. The rule is activated when the following facts occur:
    - The user is present inside the room;
    - A media center is reproducing a movie.
- Movie ambient Off: The rule has the objective of identifying the absence of a media center that is playing a movie to deactivate the suitable environment. The rule is activated when the following facts occur:
    - The user is present inside the room;
    - A media center is reproducing a movie.
- Wake Up Ambient: The rule aims to identify a SmartSpeaker that is ringing an alarm to create the right environment. The rule is activated when the following facts occur:
    - The user is present inside the room;
    - A SmartSpeaker is ringing an alarm.

Below is the command to run the executable containing the test run to verify the correct functioning of the defined rules:

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java -jar SmartRoom.jar
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