Project Information			
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Group ID	02		

Project Title	HOME: Hotel Optimization and Managing Ecosystem	
Domain	(●) Smart building ( ) Autonomous vehicle	
Type	*Specify the type of the non-residential building (e.g., warehouse, offices) or the type of the autonomous ground vehicle (e.g., delivery van, taxi).*	
	Hotel	
Project Description	**Monitoring**	*Specify what monitoring aspects your system includes.*
		temperature, light, room occupancy, room noise level etc.
	Auotmation	*Specify what automation aspects your system includes.*
		AC (heating/cooling), blinds, lights, window / ventilation, audio adjustment.
	Objective	Assist guests by adapting to their activities. Plan efficient cleaning route.
	Give a link to code repository (e.g., GitHub, Bitbucket, etc.). See slide 56 in slides set "01 Overview and logistics".	
Code Repository Link	https://github.com/SimonNass/SCIoT_G02_2025.git	

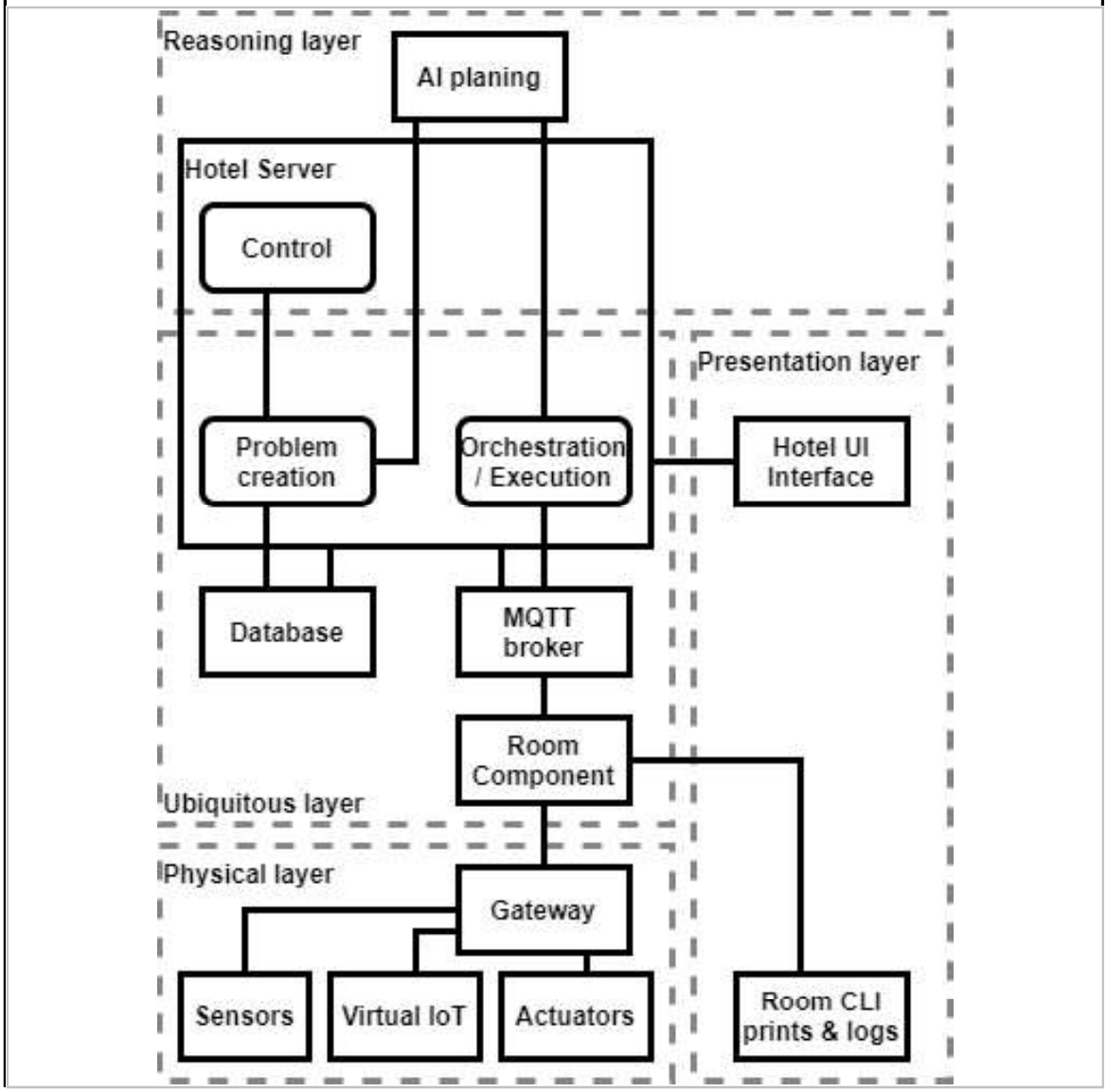
System Design

System components

	Components	Functionality
☑	IoT	Collection of data and execution of planned actions
☑	Context	Ai planing finds activities of guests
☑	Problem generation	PDDL problem with newest IoT state
☑	Planning	plan actuator changes and cleaning order
☑	Execution	mapping actions to actuator change requests
☑	Broker	communication between gateway and backend
☑	Knowledge base	saving curent IoT and system state
☐	Other. *Specify what other logical components your system has.*	

System Architecture Diagram

Include a clear diagram of your system architecture Ensure the diagram is a logical design and is not dependent on deployment and/or implementation.



System Distribution

Number of Machines and Components Distribution

☑ 2+ machines

Specify the type of each machine (e.g., PC, cloud, or Raspberry Pi).

Type
PC (acting as server), Raspberry Pi (acting as gateway for IoT devices)

Specify what logical components are deployed on each machine.

Components
PC: server, broker, frontend, AI planing Raspberry Pi: gateway, sensors, actuators

IoT

Sensors

Sensor *(e.g., temperature)*	Physical	Software-based	Human-based	Simulated	Virtual
RFID	◉	○	○	○	○
temperature, humidit	◉	○	○	○	○
light sensor	◉	○	○	○	○
sound	◉	○	○	○	○

Other. Specify the remaining sensors and their types (if more than 4 sensors)

motion sensor, pressure sensor	physical, simulated

Actuators

Actuator	Physical	Software-based	Human-based	Simulated	Virtual
light	◉	○	○	○	○
motor	◉	○	○	○	○
air conditioning AC	○	○	○	◉	○
heating	○	○	○	X ○	○

Other. Specify the remaining actuators and their types (if more than 4 actuators)

System Integration

Mechanism

- [x] Publish-subscribe
- [ ] Message queue
- [x] One-to-one

Messaging Middleware

- [ ] JMS
- [ ] ZeroMQ
- [ ] Apache Kafka
- [ ] RabbitMQ
- [ ] Redis
- [ ] IBM WebSphereMQ
- [ ] Apache Qpid
- [x] Other:

Mosquitto

Protocol

- [x] MQTT
- [ ] DSS
- [ ] XMPP
- [ ] AMQP
- [x] Other:

REST APIs

Mechanism

Explain briefly which components of your system use indirect communication.

The gateway and backend use indirect communication to exchange sensor and actuator data.

Visualisation

What is displayed

- [x] Latest plan generated
- [x] Current state. *Briefly specify what exactly:*

List of latest IoT values and room occupancy and other metadata

- [ ] User control. *Briefly explain:*
- [ ] Other. *Briefly explain:*

AI Planning

AI Planning Technique

- (●) Classical planning
- ( ) HTN planning
- ( ) Other:

AI Planner

Specify the name and link to the AI planner used in your project:

https://github.com/AI-Planning/planning-as-a-service (dual-bfws-ffparser)

Explain briefly why the chosen AI planner is appropriate for your project:

It was possible to make it run locally within our docker enviornment.

Domain Model

Explain briefly the main components of your domain model:

- potential actuator influences on sensor actions
- actions to detect and check fulfillment of activities
- save energy actions
- cleaning team room topology movement algorithm

Problem Instance

Explain briefly what constitues an initial state in your problem instances:

Initial State: room topology, occupied rooms, IoT state, actuator to IoT map

Explain briefly what constitutes a goal in your problem instances:

Goal: clean with min movement, rooms save energy or fulfill activity

Problem instances are generated

- ( ) Once, before system starts.
- ( ) Whenever a state change happens.
- (●) Other. *Explain briefly:*

after timeout
or if frontend requests a new plan