

Use Case

これでモデル書いてください。「環境制御爬虫類ケージ コンテキスト」には、大気、環境制御爬虫類ケージ、爬虫類が存在しており、大気はケージに温度と湿度の影響を与える。ケージは温度と湿度を適切にして爬虫類に与える。またケージと大気では熱と大気中の水の交換が行われる。環境制御爬虫類ケージには、温湿度センサー、制御装置、温度調整機器、湿度調整機器がある。温湿度センサーはケージ内の温度と湿度を計測する。制御装置はセンサーからの情報に応じて、温度調整機器と湿度調整機器を操作する。温度調整機器は空気を温めたり冷却する 湿度調整機器は除湿したり加湿したりする。

(Write a model with this. In the “Environmentally Controlled Reptile Cages Context,” there is an atmosphere, an environmentally controlled reptile cage, and a reptile; the atmosphere affects the cage in terms of temperature and humidity. The cage provides the reptile with the appropriate temperature and humidity. The cage and the atmosphere also exchange heat and atmospheric water. Environmentally controlled reptile cages include temperature and humidity sensors, controls, temperature regulators, and humidity regulators. The temperature and humidity sensor measures the temperature and humidity inside the cage. The controller operates the temperature and humidity control devices according to the information from the sensors. Temperature regulators heat or cool the air. Humidity regulators dehumidify or humidify the air.)

package 'Enhanced Environmental Control Reptile Cage PoC' {

```
doc /*
* This package defines an enhanced Proof of Concept (PoC) model for an environmental
* control system within an Exo Terra Glass Terrarium 3090. The model includes a single
* Arduino to manage both temperature and humidity levels based on feedback from DHT22
* sensors. It also integrates an external power supply and considers the influence of
* external air on the cage's internal environment.
*
* Component Overview Table:
* +-----+-----+-----+
* | Component      | Type      | Function                                     |
* +-----+-----+-----+
* | ExternalAir     | part      | Represents the external air surrounding the cage, |
* |                 |           | with attributes for temperature and humidity. |
* +-----+-----+-----+
* | InternalAir     | part      | Represents the controlled air within the cage, |
* |                 |           | with attributes for temperature and humidity. |
* +-----+-----+-----+
* | ReptileCage     | part      | Represents the reptile cage, including a body, |
* |                 |           | control system, and sensor. |
* +-----+-----+-----+
* | CageStructure   | part      | Main physical structure of the Exo Terra Glass |
* |                 |           | Terrarium 3090. Provides an enclosed environment. |
* +-----+-----+-----+
* | Reptile         | part      | Occupant of the controlled environment, typically |
* |                 |           | a reptile species requiring regulated conditions. |
* +-----+-----+-----+
* | ConditionedAirPort | port      | Handles the exchange of conditioned air between |
* |                 |           | ReptileCage and InternalAir. |
* +-----+-----+-----+
* | PowerSupply     | part      | Provides electrical power to the control system, |
* |                 |           | enabling the operation of devices. |
* +-----+-----+-----+
* | TempHumiditySensor | part      | DHT22 sensor for measuring temperature and humidity |
* |                 |           | levels within the cage. |
* +-----+-----+-----+
* | IntegratedControlSystem | part      | Single Arduino controlling temperature and humidity |
* |                 |           | via heating, cooling, humidifying, and dehumidifying |
* |                 |           | devices. |
```

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* +-----+-----+-----+
* | GEX_ExoTerraHeatingTop | part          | Heating device to increase temperature within the |
* |           |           | cage when needed.           |
* +-----+-----+-----+
* | PeltierCoolingUnit | part          | Cooling device to reduce temperature within the cage.|
* +-----+-----+-----+
* | ZensuiFog          | part          | Humidifier to increase humidity in the cage when    |
* |           |           | necessary.           |
* +-----+-----+-----+
* | GexFan             | part          | Fan to reduce humidity by circulating air within the |
* |           |           | cage.           |
* +-----+-----+-----+
*
* Context Overview:
* ExternalAir and PowerSupply are external elements connected to the cage. ExternalAir influences
* the internal environment by allowing heat and humidity flow into InternalAir. PowerSupply provides
* power to the control system, which manages temperature and humidity.
*/

// Model implementation goes here.
}

```

Here are the prompts used for the PoC:

1. **製品群提案依頼**

- 「PoC について考えようと思います。ReptileCage を実現しようとした場合にそれぞれのパーツについて利用可能な商品を提案してください」
- 「Zoo Med Digital Thermostat は温度センサーとこれにつながる機器の制御を行うものなので、これ自体に加熱や冷却の機能はないはずだね。加熱と冷却の両方を持っていないからそれぞれについて利用可能なものを提案してください」
- 「湿度制御装置 (HumidityControlUnit) については、加湿はできるけど除湿できないよね？除湿のためのモジュールについても提案してください」
- 「普通にFanではダメなのかな？」
- 「ケージ本体についても提案してください」
- 「Exo Terra 製ならグラストERRリウムかな」

2. **PoC構成についての依頼**

- 「ではこれからPoC について検討します。ケージ本体はグラストERRリウム3090 を用いるものとします。」

3. **製品群の選定についての依頼**

- 「まず、下記のように製品群を用いることを検討してください」

4. **制御システムの統合についての質問**

- 「今回はArduinoについて温度管理用と湿度管理用に分けていますが、これらをまとめることはできますか？」

5. **モデルの再構成依頼**

- 「PoCといえども、外部の電源から電力を受け取らないといけないね。あと、ケージ内の温度や湿度は外気からの影響も受けるはずなので、コンテキストレベルのところで修正が必要なんじゃないかな？それらを検討した上でモデルの修正をしてください」

1.**Request for product line proposals**

- “I'm going to think about PoC, please suggest products available for each part of the ReptileCage if we try to implement it.”
- Zoo Med Digital Thermostat controls the temperature sensor and the devices connected to it, so it shouldn't be able to heat or cool itself. It doesn't have to have both heating and cooling, so please suggest what is available for each.

- As for the HumidityControlUnit, it can humidify but not dehumidify, right? Please suggest a module for dehumidification.

- "Can't we just use a regular Fan?"

- Please make suggestions about the cage itself.

- If it is made by Exo Terra, then maybe glass terrarium. 2.

2. ****Request for PoC configuration****.

- I'm going to discuss about PoC now. The cage itself should be Glass Terrarium 3090.

3. ****Request for selection of product line**** "First, we will use the following product line.

- "First, please consider using the following product groups. 4.

4. ****Question about integration of control system**** "In this case, we will use Arduino for temperature control system.

- "In this case, we have two separate Arduino's, one for temperature control and one for humidity control, can we combine them?"

5. ****Request for reconfiguration of the model**** "Even though this is a PoC, we are still looking for a way to integrate the two systems.

- "Even though it's PoC, it has to receive power from an external power source, right? Also, the temperature and humidity inside the cage must be affected by the outside air, so I think we need to modify the model at the context level. Please consider those and then modify the model."