1) Let's start from the data that you fetch from MongoDB, and the following scenario:

We have many devices installed in different fields. These devices are sending events periodically to the database with different informations (field temperature, field humidity, air humidity, air temperature, battery level) in the payload. Each device contains different information according to its type. You can find the ID of the device that sent a specific event in **payload.DID.** The device type is the number before the '_'.

Example 1): **Device 18_84** has the following payload. Its type is 18

(1) ObjectId("602c0fae61c8cf27e36283d8")	{ 6 fields }
_id	ObjectId("602c0fae61c8cf27e36283d8")
topic	iot-2/type/18/id/18_84/evt/status/fmt/json
packet	{ 7 fields }
payload	{ 8 fields }
DID	18_84
FMW	160
TMS	1613499218
bvol	3.63
tem1	3.8
hum1	95.6
solr	31
lwet	0.5
createdAt	2021-02-16 18:32:14.492Z
processed	false

Example 2) **Device 5_182** has the following payload. Its type is 5

(4) ObjectId("602c0fbe61c8cf27e36283db")	{ 6 fields }
_id	ObjectId("602c0fbe61c8cf27e36283db")
topic	iot-2/type/1/id/1_117/evt/status/fmt/json
packet	{ 7 fields }
payload	{ 14 fields }
DID	5_182
FMW	0
TMS	1613499438
bvol	4.74
stm1	18.4
smo1	1.32
stm2	19.6
smo2	0.987
stm3	20.1
smo3	3.568
stm4	20.6
smo4	3.354
BSID	1_117
BFMW	160
createdAt	2021-02-16 18:32:30.767Z
processed	false

2) Now let's inspect the strawberry document

The document provided shows the results of an experiment performed using a model that determines which are the climate conditions that allow the parasites to develop.
You don't need to check the validity of those conditions, in the scope of this challenge we assume they are correct.
If you inspect the document I sent you (which is enough), it is explained that those climate conditions are represented by some variables falling into a specific range of values. Moreover, if those conditions are satisfied for more than a certain amount of time, sporulation is likely to occur.

Now, if you query the MongoDB database for a specific device, you obtain a set of data points that you can use to explore the trend of each variable (hum1, tem1, solr, stm1, stm2, etc) over time.

After reading the document and understanding which type of variables you should work with, you can choose a device that sends those types of information and query its data.
(Hint: you can query the MongoDB database and retrieve which devices contains those info). The constraint of at least 1000 data points was set to allow you to have enough data point to work with.
(Hint 2: Device 18_82, for example, is a good candidate :))

Once you selected a device, you can query its data.

3) Coding

At this point, it's time to code. The algorithm should be able to replicate the experiment explained in the strawberry document. In other words, you should write a model that is able to detect when pesticide should be applied, given the data that you got from the database for the device you chose.

Some hints that might be useful:

- Since most of the times our devices send more than one datapoint for each hour, it might be a good idea to perform an average of multiple values inside a single hour
    - Ex: if you have more than 1 value between 16:00:00 and 16:59:00, average them
- In the document the threshold for accumulated hours after which pesticide should be applied is between 115 - 125 hours. To keep it simpler you can set a fixed value
- Each event contains 2 types of date and time information:
    - createdAt refers to when a event was stored in the database
    - payload.TMS is the actual timestamp of creation **<—— THIS ONE REFERS TO WHEN A CERTAIN CLIMATE INFO WAS RECORDED. USE THIS**

4) Expected Output

The output of your model after you feed it with the device data should be:

- A plot that shows the trend of the cumulated hours of climate conditions that allows parasite's growth (see the strawberry document for an example).
    - Every hour where those climate conditions are satisfied counts as 1 cumulated hour
    - Otherwise the value of cumulated hours remains constant

    - When (and if) it reaches the threshold you defined for fungicide application, it should drop back to 0
- A List of data points where the climate conditions for parasites growth were satisfied
- A List of events corresponding to fungicide applications (if any)

5) SQL database storage

Store the two lists of datapoints mentioned before at point 4) in the Postgres DB as explained in the challenge document