Task (0) | The Secret Box | Workday (3) | 12.3.24

Today's output Hardware:

- Today was all about getting the database part done with data logged there with a timestamp and knowing how it all will work. It was about deciding the final box material and shape too.
- Considering box material and shape first, I called El-Warsha and he said it's perfectly fine to just describe it for him without the need for a SolidWorks file, first problem done perfect!
- Next, I described the desired system/box for him and he about its application, I don't know was the answer but all I care about is it absorbing falls/shocks and not to break.
- He mentioned if looking fancy is important then acrylic would be our go to, if it being strong enough not to break easily then 6mm wood is fine, but the ultimate option is ARTINOL, same as Esraa told me about her friends' graduation project, looks nice smart and doesn't break when falls. However, it's costly, the (20x20x20) cm^3 I want would cost 1000 pounds, so for future versions this will be considered for now I'll go for 6mm wood.
- The exact prototype in my head is Adam's toy as mentioned previously, I'll take it with me for reference, pictures of it are attached down below in *Attachments Section*.
- We discussed too the way of it closing and it can have knee joints or تتعَشّق and the latter is perfect here, again exactly like Adam's toy.
- The edges of the box are to be covered with plastic parts to not be sharp edges and therefore be harmed easily, a rounded plastic form to cover all edges→Adam's toy.
- This toy has perfect aeriation since it has many holes/shapes in it, I'll consider just two circles/holes and of a much smaller radius. Or to have a rectangular hole at the very bottom from one side, a 20x0.5 cm^2 for example for aeriation and any future need to get wires into and out of the box. This hole has a mesh on it so nobody throws anything from it.
- The same exact rectangular hole is done again but at the opposite cube face and now at the very top of the box, one has air in and the other out, again like an RMU unit.
- He mentioned I can go tomorrow Wednesday to describe the system for him then have it done by Thursday Insha'Allah.

Today's output Software:

- Started with searching RTC and how it works, it basically takes an initial time and date, and it keeps on counting for forever, there's a built-in RTC in the ESP32, its independent of the main processor and any sleep modes, yet not quite sure till what extent it would be reliable, we can consider an external RTC, but I'll go with this for now.
- It just fetches the current date and time using NTP (Network Time Protocol) when it's connected as station to WI-FI then it keeps on counting internally. This will be used for timestamping data.
- Next was the database part, asking Esraa and searching Google/YouTube they led to Google Fire Base, quite an interesting and easy way to have a real-time database connected directly to your ESP32 through WI-FI and sending/receiving data between them easily. Tested the connection and it works perfectly fine. A lot of example codes are available out there.
- Didn't develop any codes today but rather had an overview of how thing would be done later, maybe tomorrow after going to El-Warsha.
- The final notification part would be a matter of firebase-app connection and the ESP32 now has nothing to do with, a little video explained stuff clearly, found down in *Attachments Section*.
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Next Coding Steps:

- I'll develop with the help of example sketches the rest of project modules as discussed above.

Hardware Configuration:

- By Thursday I'll put everything together, for now I'll work with Adam's toy=).
- How to mount the MPU6050 and US sensor facing upfront is still a problem, I'll detach them from the breadboard maybe and stick them with glue or whatever in the right position…

To do next:

- Remember him wanting it to be a Bluetooth connection? I see it of no use to be honest WI-FI is much better and fitting for all above features, to be thought of again anyway.
- Don't forget the 2 7-segments or LCD part for showing battery percentage.
- Start with your presentation from now!

Done for today, hoping all will be done by Wednesday maximum!