Information Technology Institute

ITI – Intensive Code Camp

FIRMWARE OVER THE AIR

EMBEDDED SYSTEMS TRACK

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FOTA Project

» Introduction «

EMBEDDED SYSTEMS TRACK

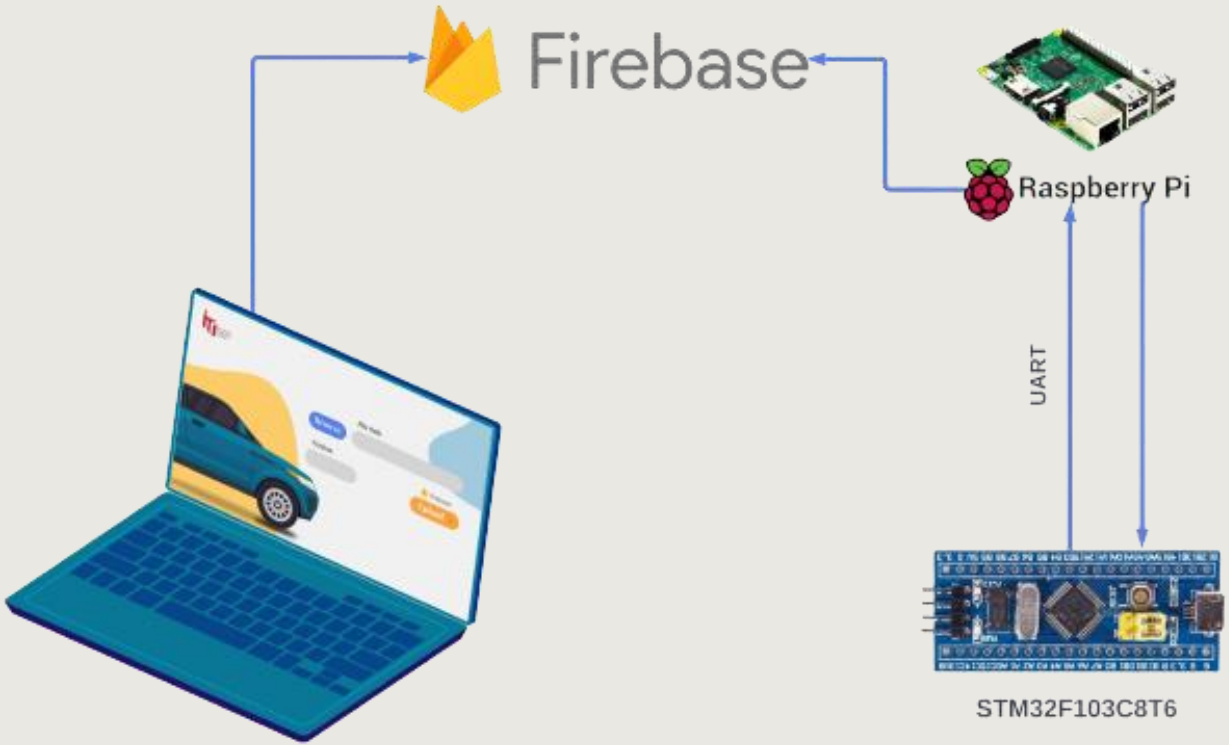
Why FOTA?

FOTA technology makes it possible to:

- Fix bugs and security patch updates.
- Improve system functionality.
- Update firmware versions with no physical contact.

Graduation Project

How does it work?



FOTA Project

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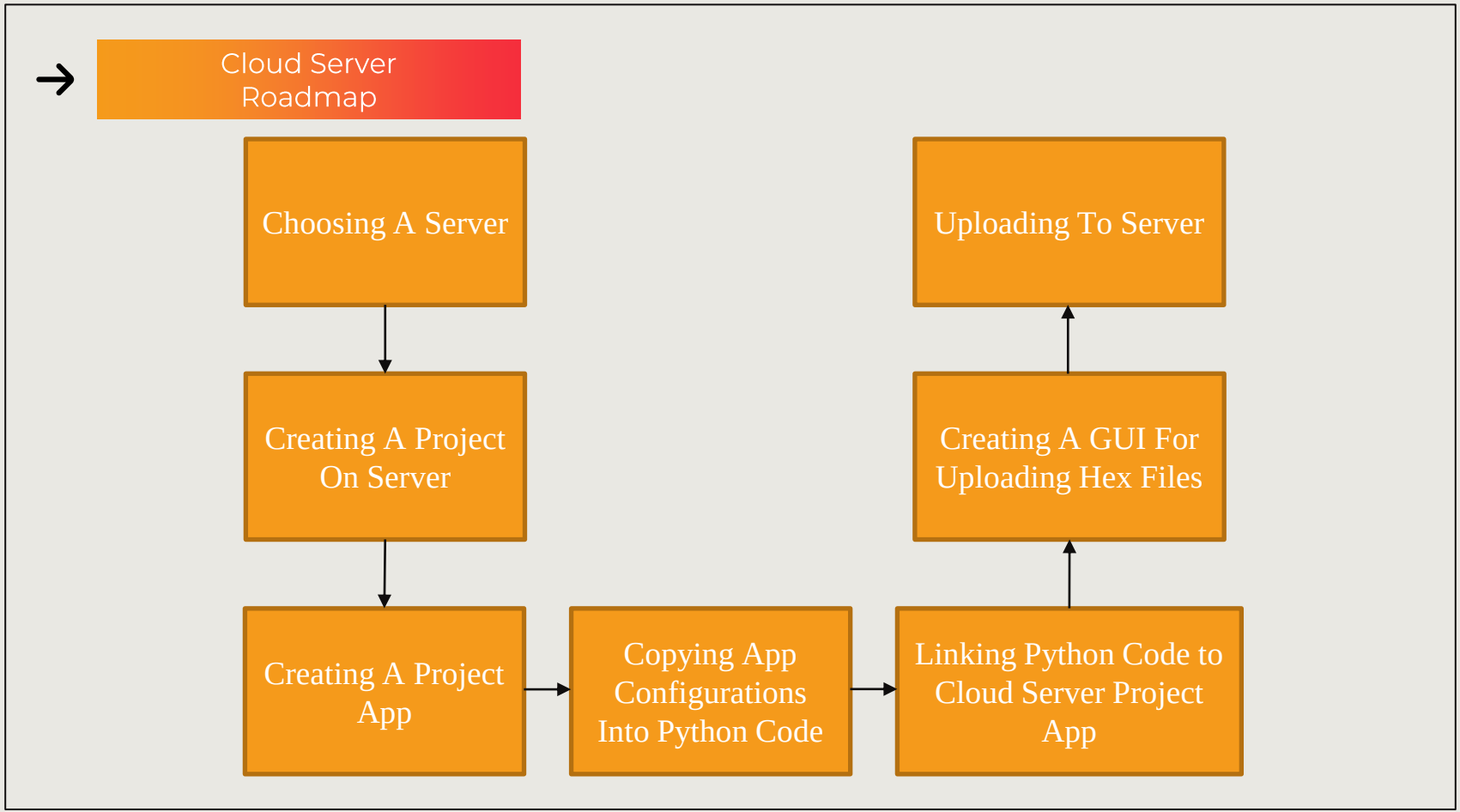
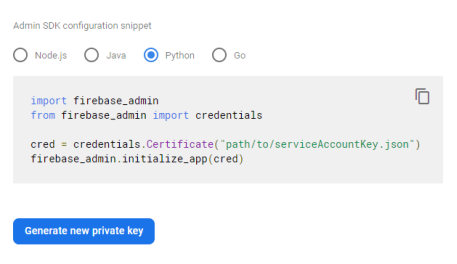
Cloud Server

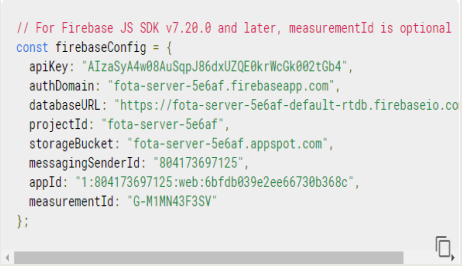
Server to link the car owner with the company management


Cloud Server Roadmap
Choosing A Server
Creating A Project On Server
Creating A Project App
Copying App Configurations Into Python Code
Linking Python Code to Cloud Server Project App
Creating A GUI For Uploading Hex Files
Uploading To Server

» Why Firebase? «

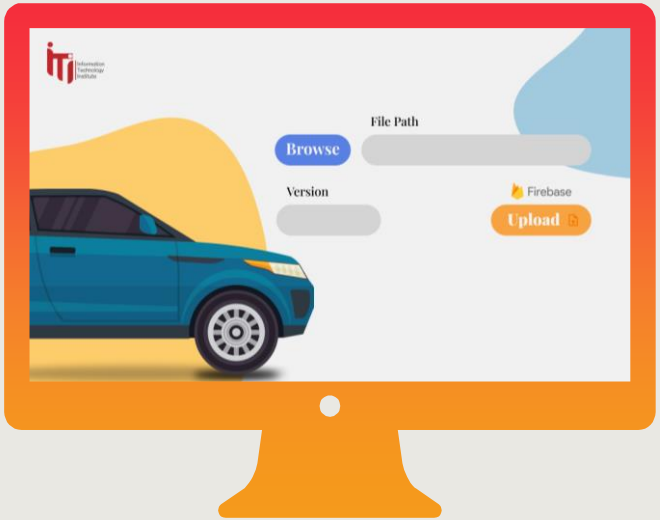


Cloud Security Key



Easy to handle with python

Realtime Database



DESKTOP GUI

GUI based on Tkinter and Python.

FOTA Project

FOTA Project

Raspberry Pi

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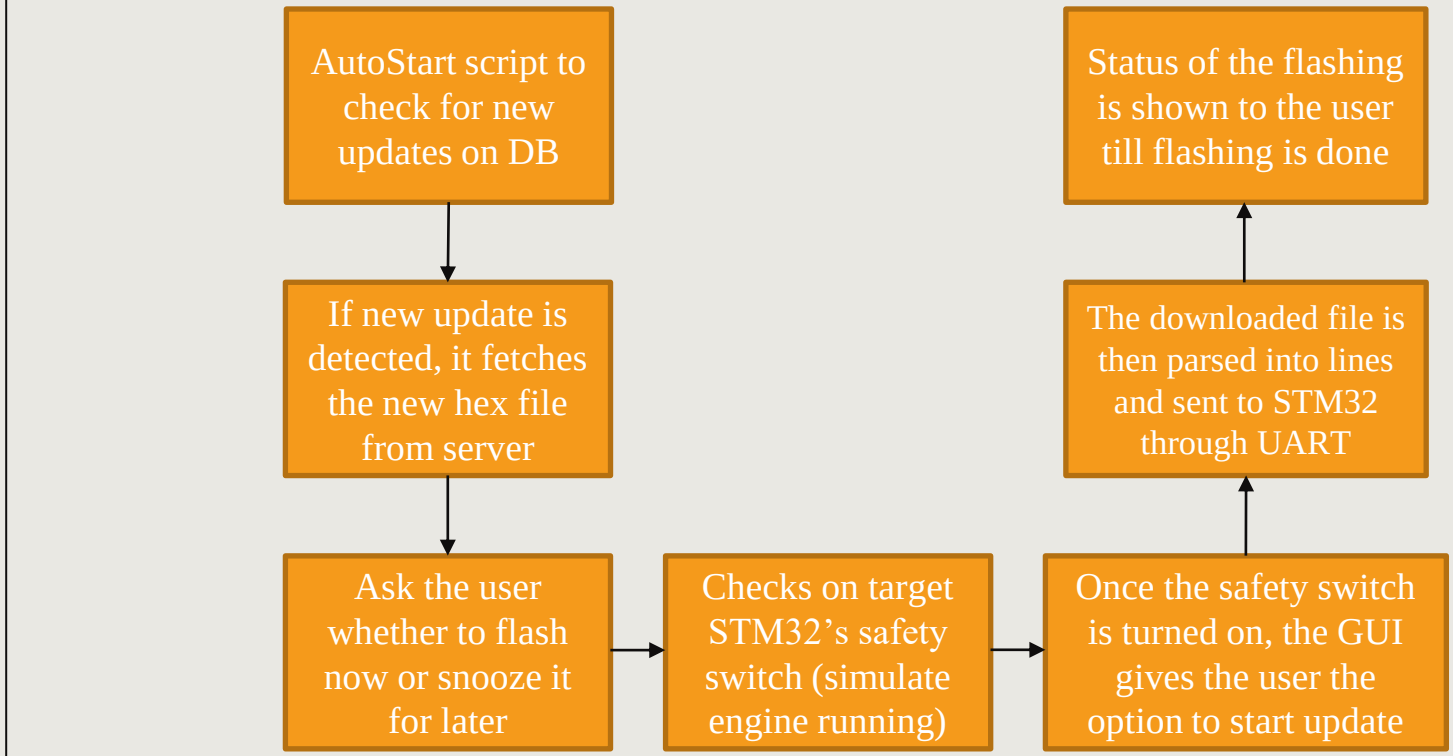
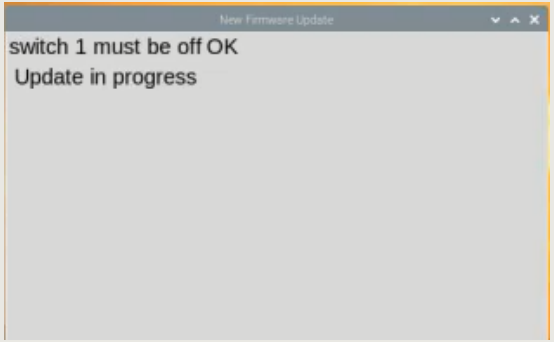
Raspberry Pi Work Sequence





Why Raspberry Pi?

1. OS Based
2. Suitable memory and easily programmable
3. Background script
4. Open source

» BootLoader «

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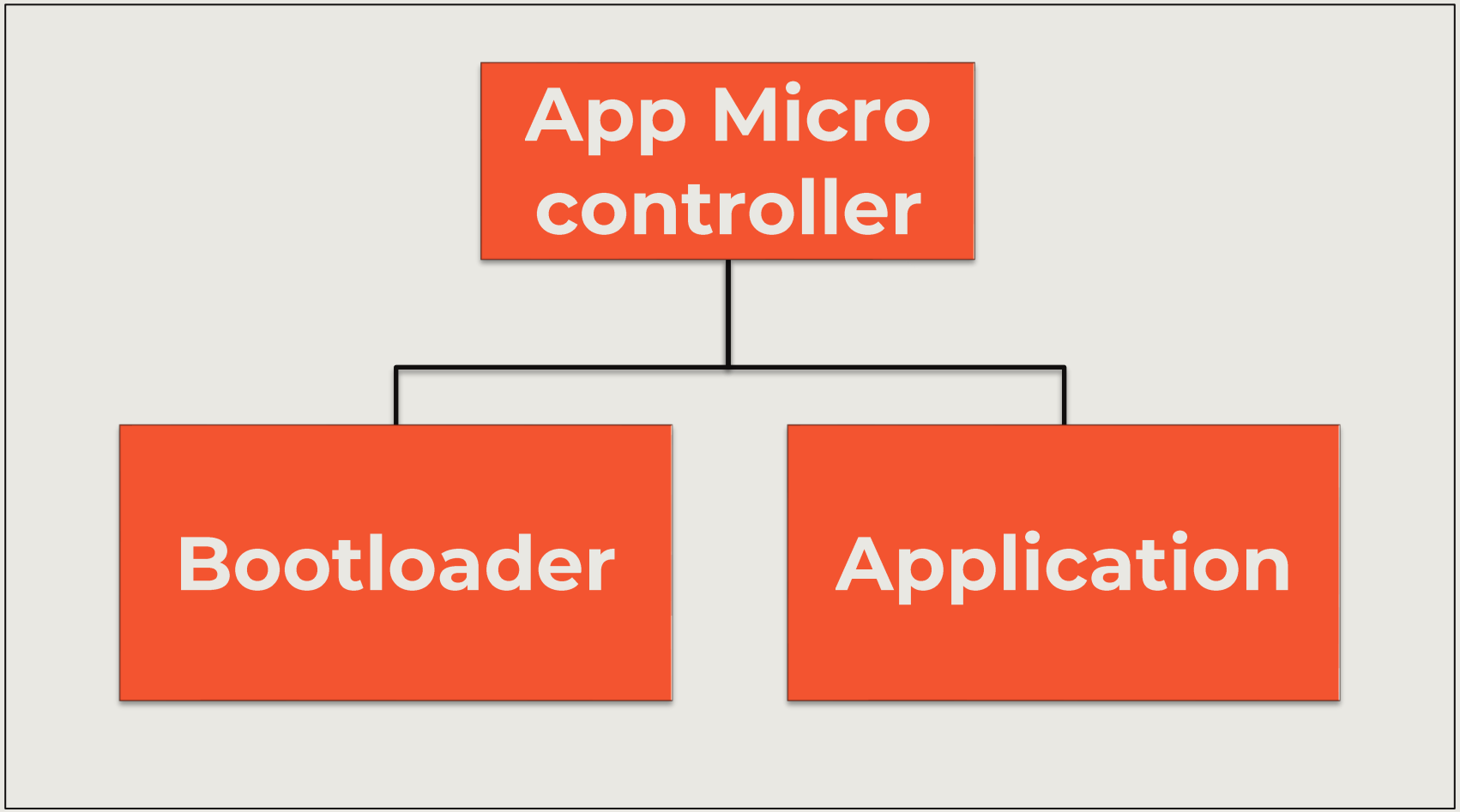
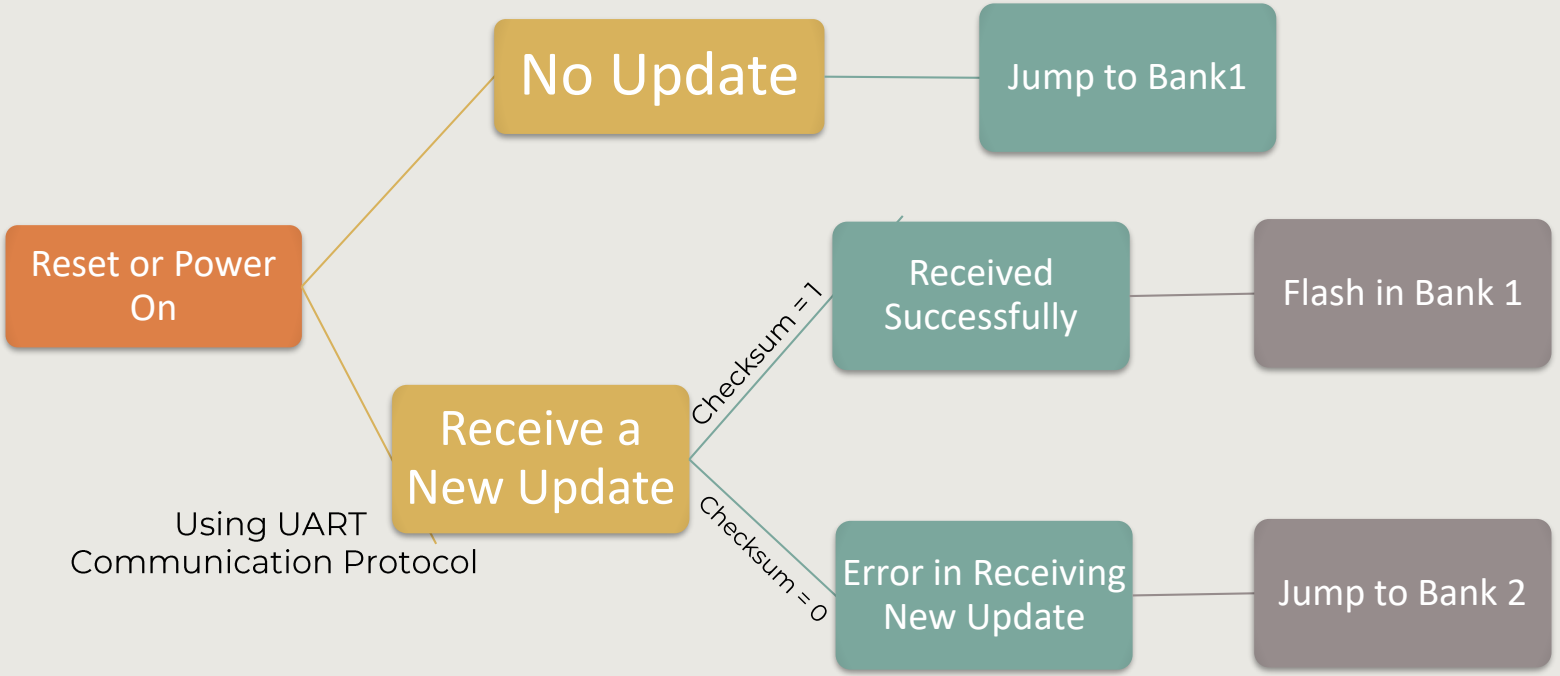

App Micro controller
Bootloader
Application

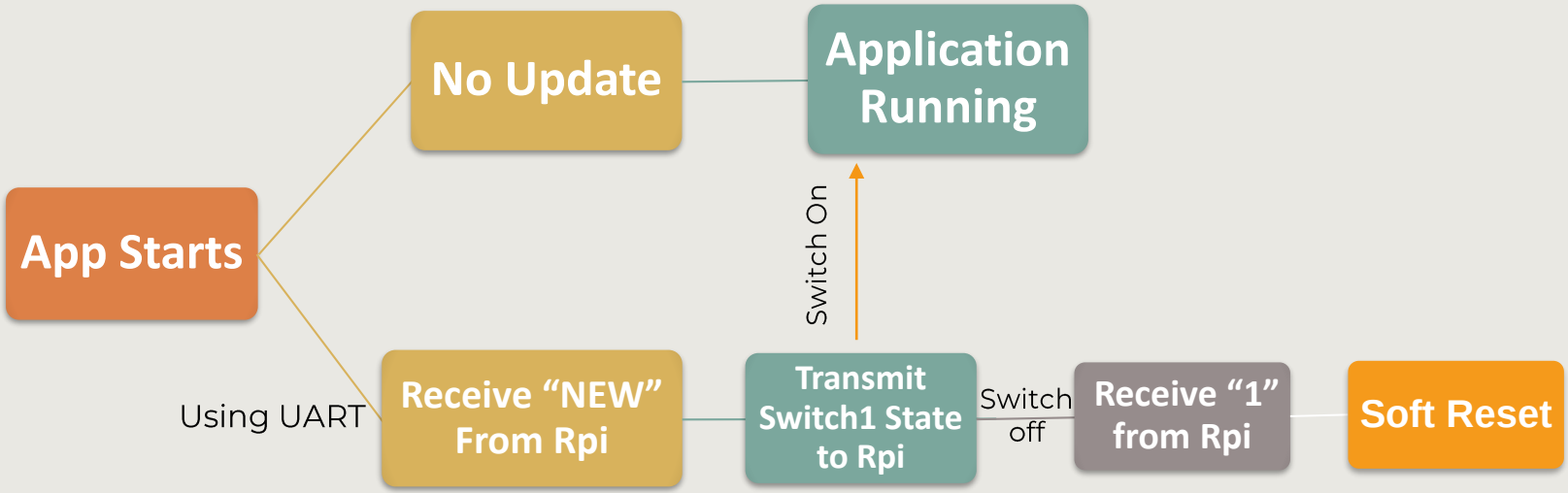
Flash Memory Arrangement

- Total Size : 64 KB
- Bootloader : 4 KB
- First Bank : 30 KB
- Second Bank : 30 KB

» Bootloader Possible Scenarios «



Application Scenarios



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» Video Demo «

» Future Work «

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Future Work

1. Upgrade the communication protocol between the Raspberry Pi and target MCUs to a better communication protocol (e.g., CAN - LIN)
2. Implementing more advanced secure application
3. Implementing a Cybersecurity protocol
4. Creating our own cloud server

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References

References

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5. https://www.youtube.com/watch?v=WurCpmHtQc4
6. https://towardsdatascience.com/how-to-easily-convert-a-python-script-to-an-executable-file-exe-4966e253c7e9

» THANK YOU «

Does anyone have any questions?