

Sprint 01

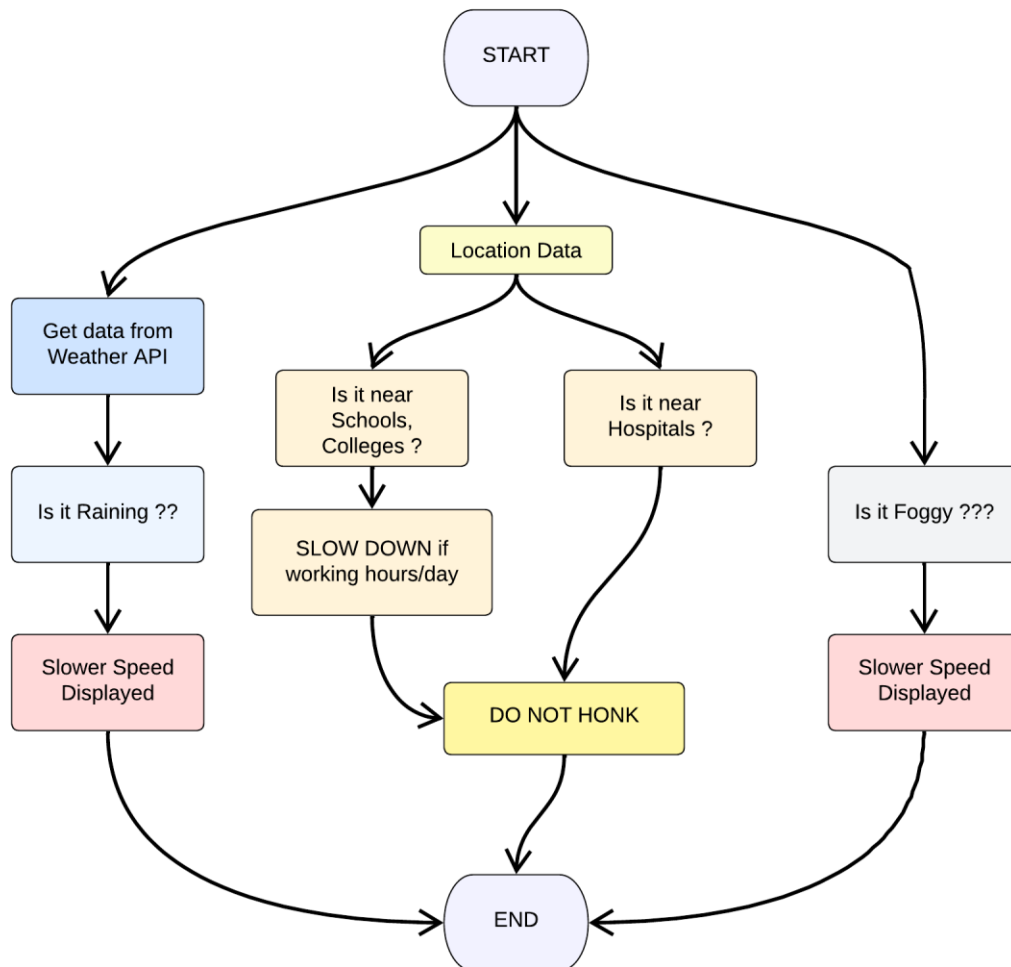
Signs with Smart Connectivity for Better Road Safety

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Sprint Goals:

1. Create and initialize accounts in various public APIs like Open Weather API.
2. Write a Python program that outputs results given the inputs like weather and location.

Code Flow:



Program Code:

> weather.py

This file is a utility function that fetches the weather from OpenWeatherAPI. It returns only certain required parameters of the API response.

Python code

import requests as reqs

def get(myLocation,APIKEY):

 apiURL = f"https://api.openweathermap.org/data/2.5/weather?q={myLocation}&appid={APIKEY}"

 responseJSON = (reqs.get(apiURL)).json()

 returnObject = {

 "temperature" : responseJSON['main']['temp'] - 273.15,

 "weather" : [responseJSON['weather'][_]['main'].lower() for _ in
range(len(responseJSON['weather']))],

 "visibility" : responseJSON['visibility']/100, # visibility in percentage where 10km is 100% and
0km is 0%

 }

 if("rain" in responseJSON):

 returnObject["rain"] = [responseJSON["rain"][key] for key in responseJSON["rain"]]

 return(returnObject)

> brain.py

This file is a utility function that returns only essential information to be displayed at the hardware side and abstracts all the unnecessary details. This is where the code flow logic is implemented.

#Python code

IMPORT SECTION STARTS

import weather

from datetime import datetime as dt

```

# IMPORT SECTION ENDS

# .....

# UTILITY LOGIC SECTION STARTS

def processConditions(myLocation,APIKEY,localityInfo):

    weatherData = weather.get(myLocation,APIKEY)

    finalSpeed = localityInfo["usualSpeedLimit"] if "rain" not in weatherData else
localityInfo["usualSpeedLimit"]/2

    finalSpeed = finalSpeed if weatherData["visibility"]>35 else finalSpeed/2


    if(localityInfo["hospitalsNearby"]):

        # hospital zone

        doNotHonk = True

    else:

        if(localityInfo["schools"]["schoolZone"]==False):

            # neither school nor hospital zone

            doNotHonk = False

        else:

            # school zone

            now = [dt.now().hour,dt.now().minute]

            activeTime = [list(map(int,_.split(":"))) for _ in localityInfo["schools"]["activeTime"]]

            doNotHonk = activeTime[0][0]<=now[0]<=activeTime[1][0] and
activeTime[0][1]<=now[1]<=activeTime[1][1]


    return({

        "speed" : finalSpeed,

        "doNotHonk" : doNotHonk

    })


# UTILITY LOGIC SECTION ENDS

> main.py

```

The code that runs in a forever loop in the micro-controller. This calls all the util functions from other python files and based on the return value transduces changes in the output hardware display.

Python code

IMPORT SECTION STARTS

import brain

IMPORT SECTION ENDS

.....

USER INPUT SECTION STARTS

myLocation = "Chennai,IN"

APIKEY = "bf4a8d480ee05c00952bf65b78ae826b"

```
localityInfo = {
    "schools" : {
        "schoolZone" : True,
        "activeTime" : ["7:00","17:30"] # schools active from 7 AM till 5:30 PM
    },
    "hospitalsNearby" : False,
    "usualSpeedLimit" : 40 # in km/hr
}
```

USER INPUT SECTION ENDS

.....

MICRO-CONTROLLER CODE STARTS

print(brain.processConditions(myLocation,APIKEY,localityInfo))

'''

MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 2 AS PER OUR PLANNED SPRINT SCHEDULE

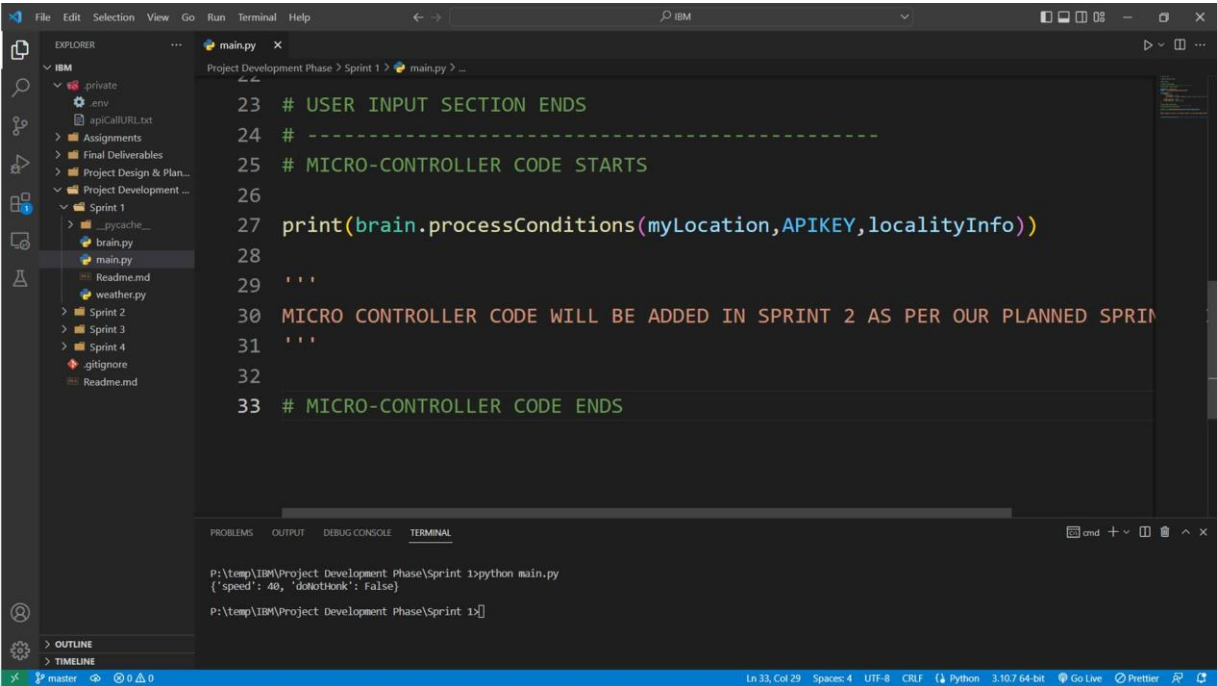
'''

MICRO-CONTROLLER CODE ENDS

Output:

Code Output

{'speed': 40, 'doNotHonk': False}



The screenshot shows a Visual Studio Code editor window. The Explorer sidebar on the left displays a project structure with folders for 'private', 'Assignments', 'Final Deliverables', 'Project Design & Plan...', 'Project Development ...', 'Sprint 1', 'Sprint 2', 'Sprint 3', 'Sprint 4', and 'gitignore'. The 'Sprint 1' folder is expanded, showing files like 'brain.py', 'main.py', 'Readme.md', and 'weather.py'. The 'main.py' file is open in the editor, showing the following code:

```
23 # USER INPUT SECTION ENDS
24 # -----
25 # MICRO-CONTROLLER CODE STARTS
26
27 print(brain.processConditions(myLocation,APIKEY,localityInfo))
28
29 '''
30 MICRO CONTROLLER CODE WILL BE ADDED IN SPRINT 2 AS PER OUR PLANNED SPRINT SCHEDULE
31 '''
32
33 # MICRO-CONTROLLER CODE ENDS
```

The terminal at the bottom shows the command `P:\temp\IBM\Project Development Phase\Sprint 1>python main.py` and its output: `{'speed': 40, 'doNotHonk': False}`. The status bar at the bottom indicates the file is on the 'master' branch, with 0 changes, and the editor is using Python 3.10.7 64-bit with Prettier formatting.

