**SOFTWARE REQUIREMENTS:**

* STM32 IDE

**COMPONENTS:**

* STM32F407VG Microcontroller Board.

**DESCRIPTION:**

* **STM32F407VG**

The STM32F405xx and STM32F407xx family is based on the high-performance Arm® Cortex®-M4 32-bit RISC core operating at a frequency of up to 168 MHz. The Cortex-M4 core features a Floating point unit (FPU) single precision which supports all Arm single-precision data-processing instructions and data types. It also implements a full set of DSP instructions and a memory protection unit (MPU) which enhances application security. The STM32F405xx and STM32F407xx family incorporates high-speed embedded.

**FEATURES OF STM32F407VG MICROCONTROLLER:**

* Up to 1 Mbyte of Flash memory.
* Up to 192+4 Kbytes of SRAM including 64-Kbyte of CCM (core coupled memory) data RAM.
* 512 bytes of OTP memory.
* Flexible static memory controller supporting Compact Flash, SRAM, PSRAM, NOR and NAND memories.

**WORKING PRINCIPLE:**

* Assume that the automobile is the microcontroller. If the button is hit, the first led (red) will turn on, Clicking again the wiper will start, and the second led (blue) will turn on for a desired rate. If the button is pressed again, the third led (green) will turn on, and the wiper's speed will be increased in comparison to the previous one. The fourth press will turn on the fourth led (orange), and the wiper speed will be increased in accordance with the previous one. The microcontroller (vehicle) is turned off after the fifth click.

**WHAT**

The operational speed of a vehicle wiper is controlled by a wiper speed control mechanism based on rain conditions. To generate, the control system incorporates a rain sensor (30) that detects rain conditions. The amplitude of an analogue signal depends on the detected rain conditions.

**WHY**

To keep the windscreen clean enough to give adequate view at all times. #WHEN The windshield wipers remove rain and snow from the windshield, while the headlights improve visibility at night.

**WHO**

Mark Anderson invented on 1902

**HIGH LEVEL REQUIREMENTS:**

| **ID** | **Description** | **Status** |
| --- | --- | --- |
| HL1 | car wiper using STM32F407VG | Implemented |
| HL2 | Led glowing in sequence | Implemented |
| HL3 | Car on and off | Implemented |

**LOW LEVEL REQUIREMENTS:**

| **ID** | **Description** | **Status** |
| --- | --- | --- |
| HL1-LL1 | Push Button | Implemented |
| HL2-LL2 | Red ,Green ,Blue Led’s | Implemented |

**SWOT ANALYSIS:**

**STRENGTH**

* Low Budget
* Good Reputation
* High Bargaining Power Suppliers
* Big Influence on the Market

**WEAKNESS**

* Structural Inertia
* High Transaction Cost
* No Focus on Private Sector
* Week Focus on Process Innovations

**OPPROTUNITIES**

* Emerging New Markets
* Technological Development
* Demand for Saver Equipments
* Technological Lock in of Product

**THREATS**

* Low Bargaining Power Buyers
* Highly Regulated Industry
* Ethical Pressure
* Economical Crisis