Traffic Light Control System

Task Submission

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Contents

1. case study

- ## Requirements

1. The system should control traffic lights for a four-way intersection with pedestrian crossing functionality.

2. Pedestrian requests should be triggered by push-button inputs.

3. After a request is processed, the corresponding interrupt should be disabled for 45 seconds to ensure smooth traffic flow.

- ## Assumptions

1. No setup or shut down for micro-controller.

2. No maintenance for micro-controller.

3. The traffic light LEDs and LCD modules are reliable and do not fail.

4. Button inputs for pedestrian requests are fully functional and accurately detected.

.5. No power constrains

- ## Versioning

1. Real-time monitoring and control via a remote interface or mobile app.

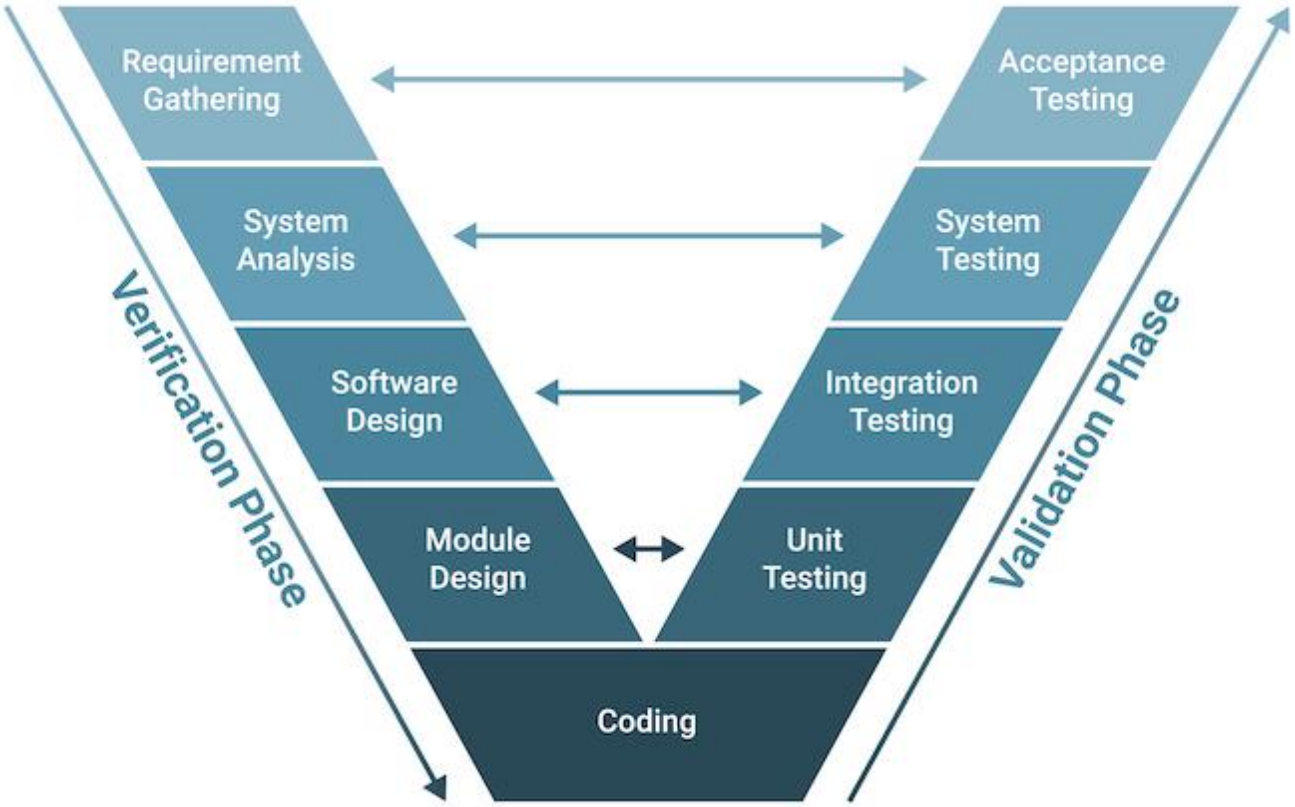
2. Adaptive traffic control based on vehicle density using external sensors.

3. Adding radars and cameras for drivers monitoring.

2. Method

- Software developing life cycle & software testing life cycle

The (SDLC) & (STLC) will be approached according to the V-Model.



3. Space Exploration

Micro-controller : **stm32f103c6** SoC as it meets all technical requirments needed for this project as it is marked by : small size and contains acceptable flash memory as well as being cost efficient and have a suitable processor which is : **ARM Cortex-M3** 32bit with 72 MHz operating frequency.

- Features

operating voltage range -> 2 : 3.6 V.

64Kbytes Flash memory.

20KbytesSRam.

CRC calaculation unit , 96bit unique id.

Two 12bit, 1µs A/D converter (up to 10 channels).

7 channel DMA controller , 3 genral purpose timer & 1 advanced

Controller timer.

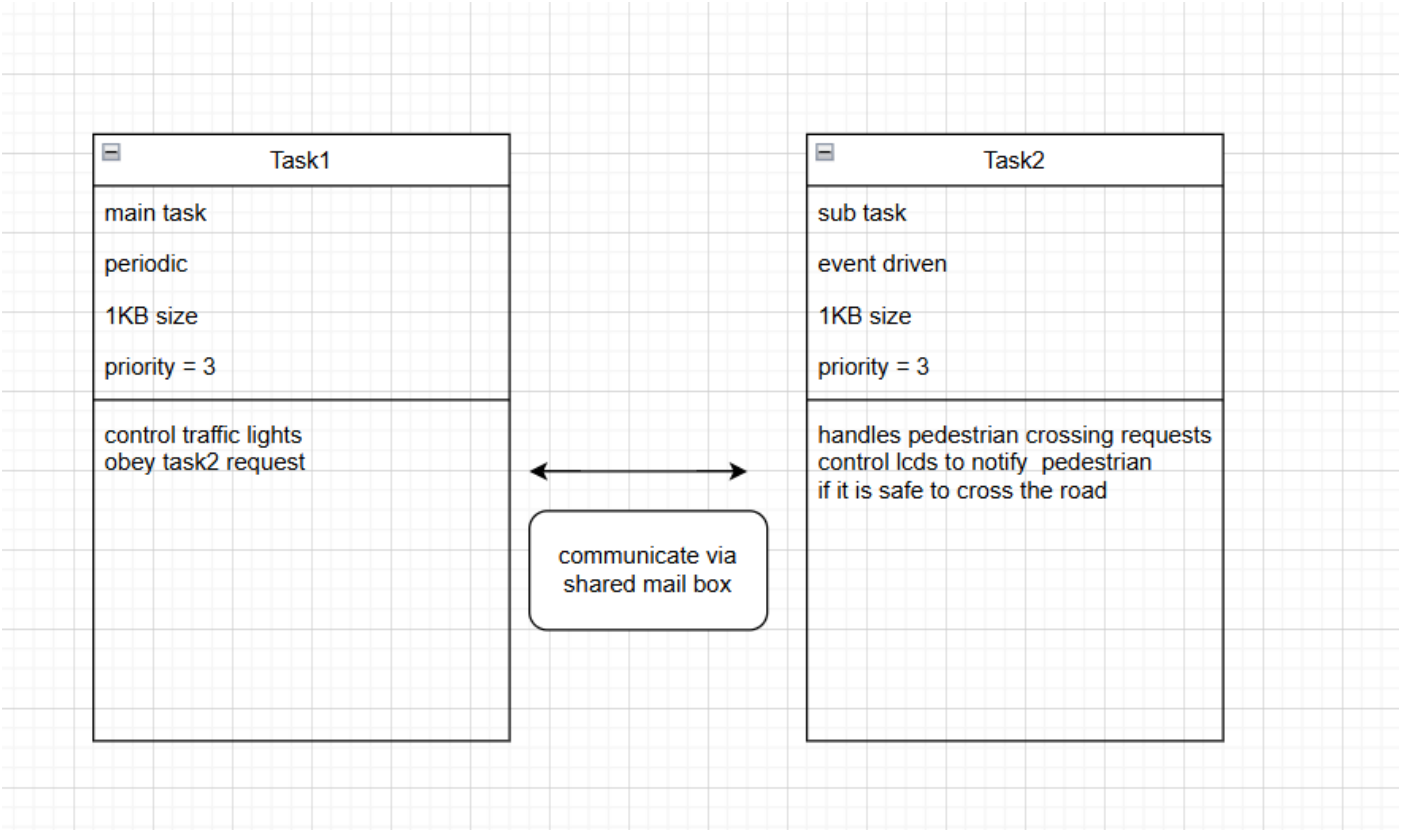
37 fast I/O ports.

Serial wire debug (SWD) & JTAG Interfaces .

Two SPI , two I2C , three USART , one USB & one CAN interfaces.

Ambient operating temperature range from -40˚C to 85˚C.

4. Tasks Diagram



5. ACTIVITY DIAGRAM