EMBEDDED PROJECT

PROJECT NAME : M2_BLINKLED

ABSTRACT

- This is basically a project made with an ATMEGA 328P microcontroller being the brain of the whole system.
- The Controller takes the input from one of its ports and a particular timing has been assigned so that the pin goes high and low accordingly.
- The pin on the other end is connected with 5 LEDs in parallel to each other with the resistance in between to prevent the damage.
- As the pin goes high, the LEDs turn on and after a particular duration they turn off all at once.This program continues without end, as embedded programs are designed in such a way.

SWOT ANALYSIS

STRENGTH

- Implementation with ATMEGA328P microcontroller.
- Specially made for a particular case.
- Parallel connection have been given, even if one LED fails, the rest will save the circuit.

WEAKNESS

- All LEDs are operated within the same time period.
- No replacement can be done if the port is damaged.

OPPORTUNITIES

- In future, the program can be extended with major functionalities and many sensors integrated to provide feedback.

THREATS

- Only one port is made operational.Hence, No replacement can be done if the port is damaged.

ESSENTIAL W'S AND H

- **WHAT**- It is microcontroller based system to make 5 LEDs blink at equal interval.

- **WHERE**- It is implemented in SIMULIDE and being coded in Visual Studio Code.
- **WHO**- This is basic program which any beginner could use to understand the embedded program.
- **WHEN**- It can be implemented any time .
- **HOW**-By loading the firmware of ATMEGA328P in SIMULIDE as a .elf file that is generated from Visual Studio Code Execution.

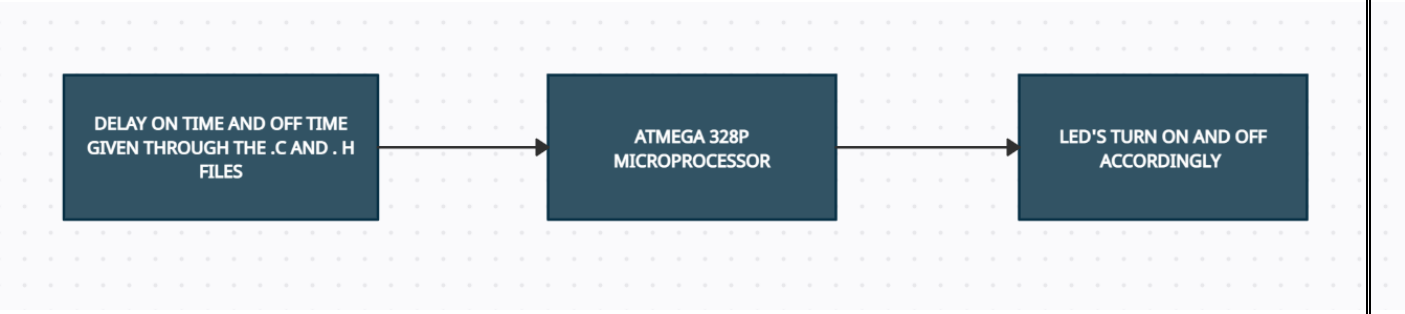
HIGH LEVEL REQUIREMENTS

- HLR_1 - ATMEGA328P MICROCONTROLLER
- HLR_2 - VISUAL STUDIO CODE
- HLR_3 - CROSS COMPILATION

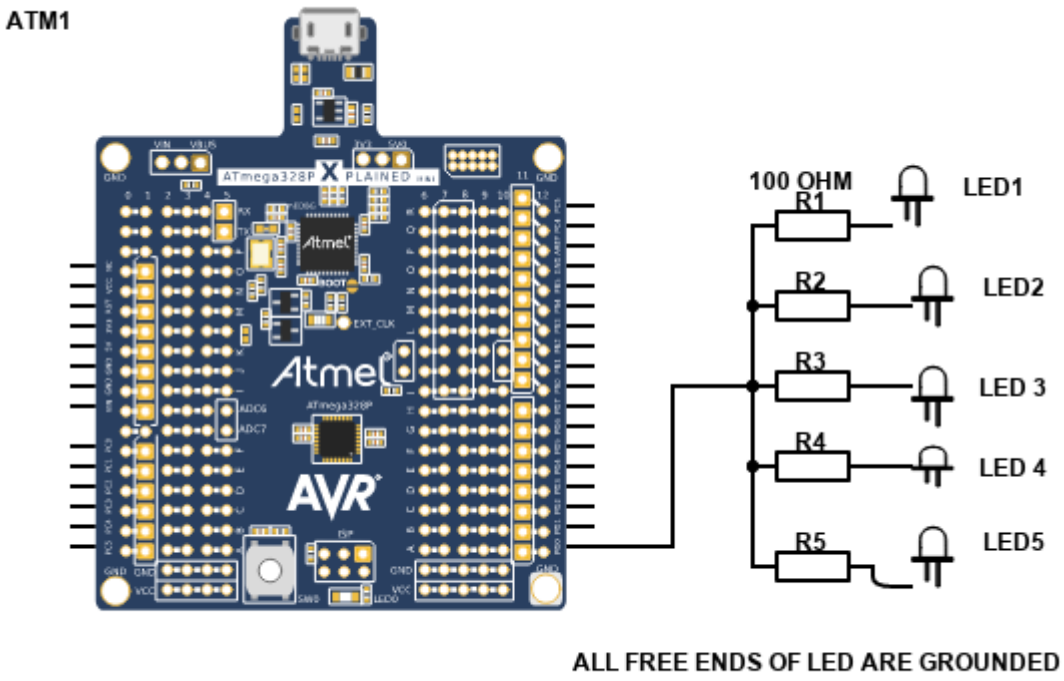
LOW LEVEL REQUIREMENTS

- LLR_1 - UNIT TESTING
- LLR_2 - ASSIGNING TIMER
- LLR_3 - MULTIFILE PROGRAMMING

ARCHITECTURE:



SCHEMATIC:



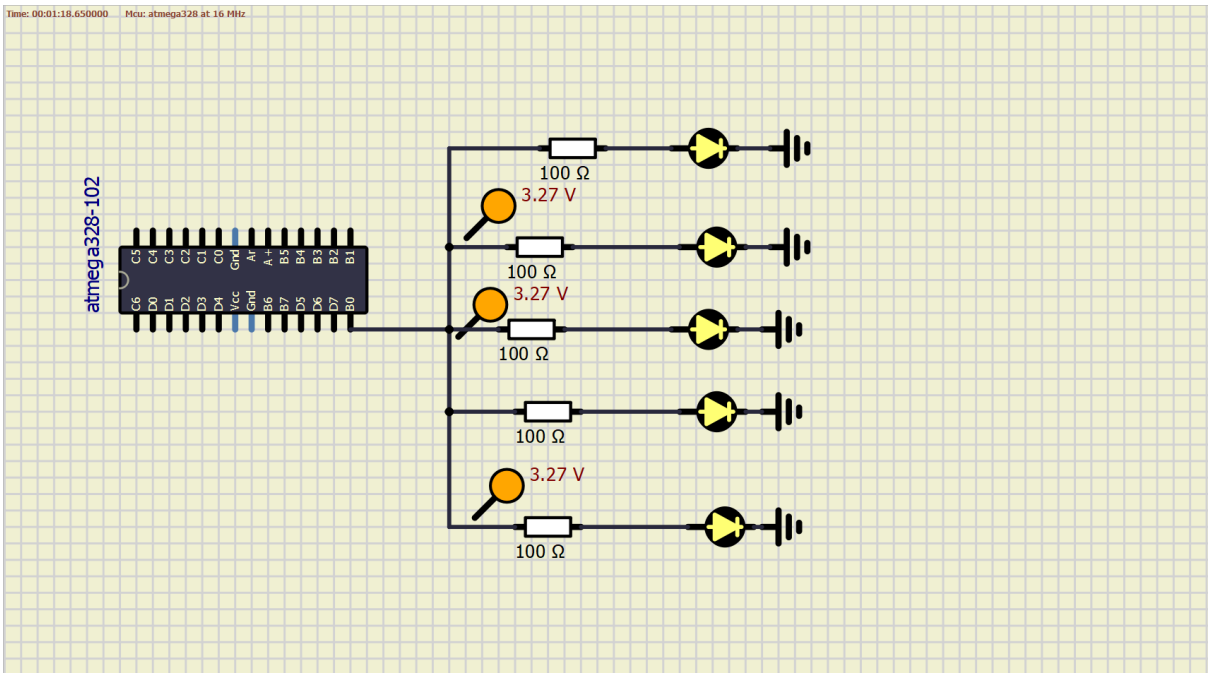
SCREENSHOTS OF EXECUTION:

LED Blink

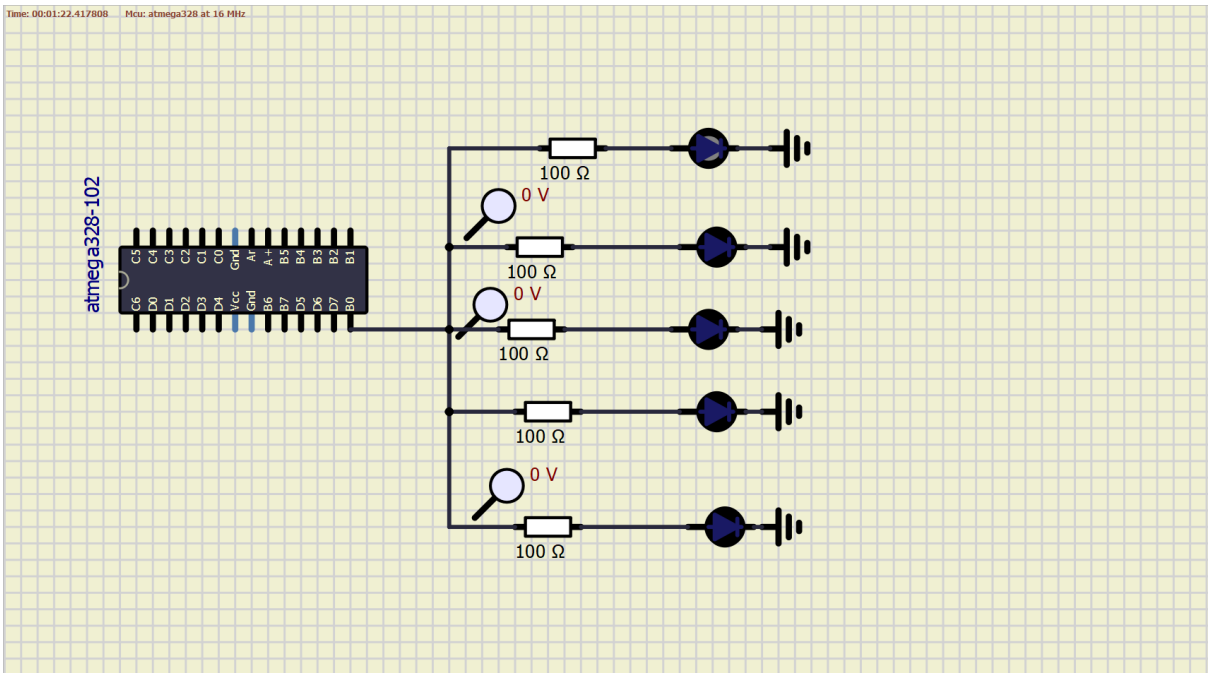
- LED on time is set as 1000 ms and off time is set as 500 ms.
- There are 5 LEDs placed in parallel with each other from a single source
- This program enables all the 5 LEDs at once with the program being loaded on to the ATMEGA328P microcontroller

The output screenshots of execution and the SimulIDE screen have been attached for reference

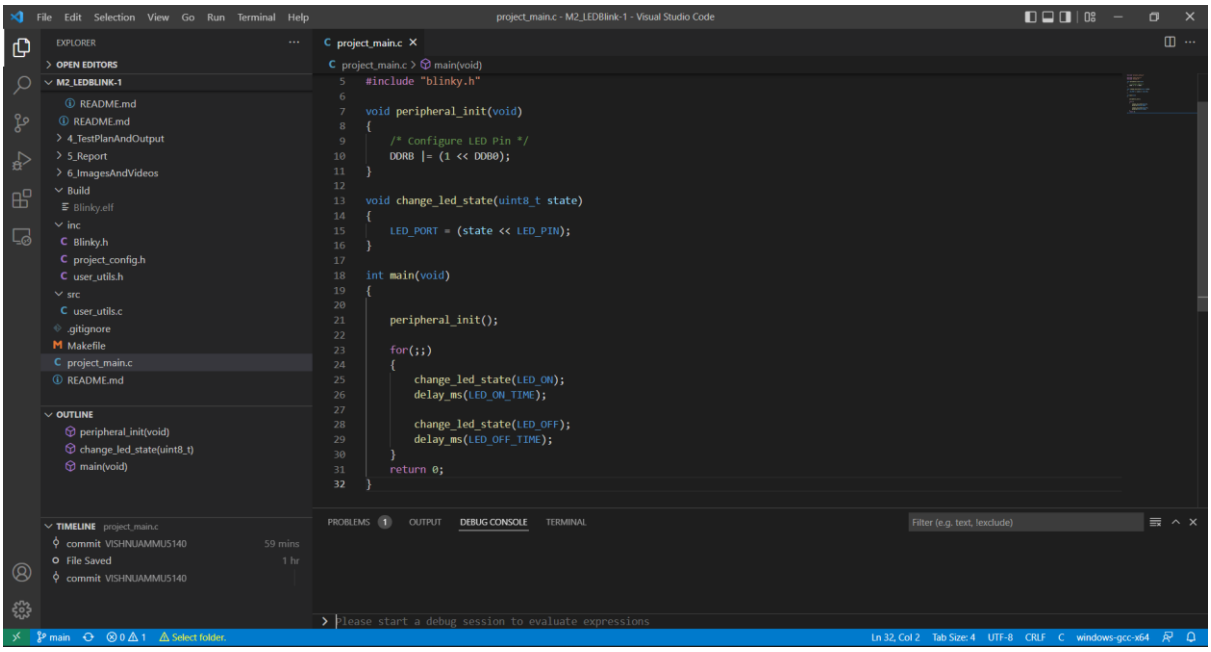
LED ON STATE



LED OFF STATE:



VS CODE EXECUTION:



RESULT:

Thus, the program have been executed successfully meeting all the necessary criteria