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**MICROPROCESSOR & EMBEDDED SYSTEM LAB**

**Fall 21-22**

**Lab Report-4**

# 1.Title:

Familiarization with Visual Designer for Arduino™ AVR and implementation of a

temperature sensing and control system using Drag - Drop - Play

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# 2. Abstract:

From this experiment, our main goal is to design a cooling system using microcontroller. In the experiment, to design the cooling system Arduino Uno board is needed. Firstly, Arduino basic should be known which is an open-source platform can perform many types of interactive electronic projects. Here a temperature sensing and control system will be designed. Have learnt how to design a flow chart and using the flow chart to control the cooling system from this experiment. The cooling fan act different in different temperature which has been observed. Different output has been observed using oscilloscope also. The led light has showed three different lights because of different input. Main finding that was wanted is to see is how the cooling fan works at various input and using three different input got different output. The simulations using the principles that learnt in class have correctly built. During the time using Proteus 8.9 Professional, no issues has found.

# 3. Objective:

There are some objectives of this experiment. The goal of this experiment is to familiarize with Humidity sensor, Arduino 328, OLED Grove 128 \* 64 display, a motor protector, LED breakout board. Design a temperature sensing and control system.

# 4. Results:

## 4.1. Simulation Environment:

Here we are using Proteus for this simulation.

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We have to click new project.

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Click on next.

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Next.

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Select Create Flowchart Project for Arduino Uno.

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|  |

Click on finish.

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This is the microcontroller board.

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|  |

This is the visual designer.

Here we are using Proteus for this simulation.

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We have to click new project.

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Click on next.

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Next.

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Select Create Flowchart Project for Arduino Uno.

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Click on finish.

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This is the microcontroller board.

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|  |

This is the visual designer.

## 4.2. Simulation Result

Now we shall to design the circuit and the temperature sensor.

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| Figure 1: Visual design for Cooling Fan |

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| Figure 2: Cooling fan is off when temperature is bellow 30 |

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| Figure 3: Cooling fan is running in half speed when temperature is greater than 30 bellow 40 |

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| Figure 4: Cooling fan at full speed when temperature is greater than 40 |

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| Figure 5: No pulse in oscilloscope when temperature is bellow 30 |

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| Figure 6: Pulse in oscilloscope when temperature is more than 30 bellow 40 |

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| Figure 7: Pulse in oscilloscope when temperature is greater than 40 |

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| **Figure 8: Visual design for Visual Warning** |

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| Figure 9: Visual Warning: Green Light temperature is bellow 30 |

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| Figure 10: Visual Warning: Yellow Light temperature is greater than 30 bellow 40 |

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| --- |
|  |
| Figure 11: Visual Warning: Red Light temperature is greater than 40 |

## 4.3. Discussion/Comments on Simulation Results:

We may adjust the temperature sensor device after completing this experiment. We utilized a cooling fan to control the system in the experiment. The cooling fan was configured to run under three situations. When the temperature falls below 30 degrees, the cooling fan is turned off. The cooling fan will turn on when the temperature reaches 30°F or is more than 30°F but less than 40°F, however it will only run at half speed. However, if the temperature is more than or equal to 40 degrees Fahrenheit, the cooling fan will reach its maximum speed. A green light will turn on when the cooling fan is turned off. When the cooling fan is set to half speed, the yellow light replaces the green light. A red light will turn on and the yellow/green light will switch off when the cooling fan is running at maximum speed. We simulated all of the processes and provided the findings in the simulation results section above using proteus software.

# 5. Lab Task:

Questions for Report Writing:

1. Modify the design to implement a low-cost fan control system.
2. Replace the DHT 11 sensor with a Thermistor based temperature sensor.
3. Design flowchart to implement following functionality.

**Answer of 1, 2, 3:** All the part has been added in simulation result section.

# 6. Conclusion:

We obtained the knowledge to design and execute a replication using Arduino TM AVR and to execute a temperature detecting and control framework using Drag - Drop – Play in this project. In the Peripheral Gallery, a Visual Designer provides a large and growing number of safeguards and breakout sheets that can be controlled at an irrefutable level using flowchart approaches. The CPU strategies in the Visual Designer IDE allow the Arduino library orders to pass through, allowing us to control the peripherals with flowchart commands in any situation. Some difficulties faced during adding some libraries to the proteus software while managing the project. Still, tried best to install the libraries and subsequently completed the work effectively.

# 7. References:

1) https://www.arduino.cc/.

2) https://www.labcenter.com/visualdesigner/