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**COMSATS UNIVERSITY ISLAMABAD**

**MICROPROCESSOR SYSTEMS AND INTERFACING**

**LAB REPORT 1**

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Introduction to Development Tools and Lab Software’s

**Objectives**

• Learn to use software development tools such as Arduino, Integrated Development Environment (IDE) (Atmel Studio, AVR Studio), Compiler (WinAVR), and Simulator (Proteus) for the AVR ATmega 328P microcontroller.

• Learn to program Arduino and ATmega328P

**IN LAB TASKS:**

**Task 1: Arduino Learning Tutorial**

PROCEDURE:

Firstly, Launch Arduino IDE. Then Click on the toolbar menu: File > Examples > Basics > Blink. This will turn an LED on Arduino board on and off with some delay. After which Compile the sketch and upload the code to the Arduino board. Following results were obtained

**CODE:**

Graphical user interface, text, application

Description automatically generated

**A picture containing text

Description automatically generated**

**Task 2: AVR Studio Learning Tutorial**

PROCEDURE:

For this task the code in given in the lab manual. I copied that code and run the code and generate .hex file for the code and will use it further for simulation and hardware implementation of program.

A screenshot of a computer

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**Task 3: Atmel Studio Learning Tutorial**

PROCEDURE:

For this task the code in given in the lab manual. I copied that code and run the code and generate .hex file for the code and will use it further for simulation and hardware implementation of program.

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**Task 4(1): Proteus Introductory Learning Tutorial**

PROCEDURE:

Open the proteus to simulate microcontroller using proteus. Then construct the circuit as shown below containing microcontroller ATmega328P from pick library and animated LED in series with resistor. Following circuit is obtained, after loading a program in microcontroller through hex file created in atmel in previous task and then changing frequencies of ATmega 328P to 1Mhz and clock frequency to 16MH, the circuit was simulated and run and observed that led started blinking.

A picture containing table

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**Task 4(2):**

a. The following code is written to generate fibonacci series output at PortB which is given as (0, 1, 2, 3, 5, 8, 13, 21, 34, 55).

b. Build the following code in AVR Studio or Atmel Studio. Read the error messages, identify and correct any syntax errors and rebuild the solution.

c. Use Debugging mode of AVR Studio or Atmel Studio to debug and correct the code to get the desired output. In debug mode, open watch window to check the value of the variables.

**CORRECT CODE:**

A screenshot of a computer

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**Conclusion:**

In this lab we were able to get a brief overview about AVR studio and Proteus. It is clearly evidential that AVR studio is one of those platforms used to program microcontrollers. We discussed about the different types of Arduinos and its working. Although this was a general overview which explained how to create project, running the program and to upload it on proteus we could have done a bit more in this lab such as helping us understanding the limitations of this software and to debug a problem when the software is not working or when the output files are not being generated.