**CHAPTER 6**

**DISCUSSIONS AND CONCLUSION**

**6.1. Discussions**

There is a wide range of control technologies available for elevator control systems. An elevator is a type of vehicle transport equipment for carrying people between floors of a building or other structure. Four main types of elevators are hydraulic, roped, traction and hydraulic traction elevator. In order to drive the elevator, stepper motor is used. Arduino based control system offers a low capital cost and a low installation cost. Several elevator topologies have been successfully performed in industrial and building system applications.

This system has been fully achieved and works well as expected. Stepper motor is used by rotating the up and down direction and dc motors are used by opening or closing the doors. Software package is used by C programming language. The hardware package is composed of many portions which are power supply, sensor, push-buttons, limit switch, seven segment display, motor, Arduino and elevator model. Push-button is used to request the user desired floor. Inductive sensors are used to detect the elevator car when the desired floor is reached. Seven segment display is used as floor indicator.

**6.2. Conclusion**

The elevator control systems were widely used in most buildings. This thesis was based on design and implementation of Arduino microcontroller based elevator control system. The main components were used in this thesis are Arduino microcontroller, push-button, inductive sensor, motor, seven segment display and power supply. The Arduino Mega 2560 microcontroller was used as the main controller unit to display and control section.

In this thesis, a prototype elevator and its control systems have been designed and implemented by using Arduino based circuit. The elevator is operated by using dc

motors and gears along with timing belt. Forward and reverse direction of elevator is operated by using stepper motor. Before implementation of the system, the control circuit has been simulated. It was found that the simulation results are satisfactory and practical systems work very well.

The signals were sent by the host computer section to the Arduino Mega controller. To accomplish the goal of the thesis, commercially available hardware was used. After all, this project has been constructed with low cost, very compact, very low power requirement and high efficiency components.

**6.3. Further Extension**

Several techniques for controlling elevator are exit. The controlling system with Arduino is probably the most family. Arduino controller which have many inputs and output pins are used to meet the desired control system for high rise building. For safety, security features such as smoke detection, fire alarmed, emergency switch and exit, battery backup or generator system, intelligence program system, door motion sensor and spring system for car will be considered.

Opening and closing times of automatic door system can significantly affect waiting time of passengers. In fact, variable frequency driver system is also needed in the real world elevator control system. To accomplish the greatest elevator control system, the observers must be used the sensor that has the highest working frequency range. Sensors are also vital components for elevator control system. To develop the control system, power failure and system failure will be considered.

This thesis can be modified by designing a PLC based controller with a better motor control design such as wiper motor, DC motor and others. Other types of controller with large PLC can be developed in real world elevator control system. To implement additional processes, more devices are required to construct the elevator control system for PLC input and output pin. The performance of the system depends on the structure of the selected motors and the ladder program steps by using the ladder program software.