1.1 General

DC motor is a machine that converts electrical energy into mechanical energy by supplying dc power (voltage and current). DC motor can be seen everywhere. For example in home appliances which are washer, rolling mills in factories and robotic arm control in electronic field. These applications demand high speed control accuracy and may be direction too. The DC motor uses in drive system in many industrial applications are still significant. This is all result from the availability of speed controllers in wide range, easily and many ways. For example in speed control using voltage control method, when the motor get the full power supply where the voltage is high, it will rotate at maximum speed. When no power is supplied, the motor will start to slow and eventually stop as the power is decrease. By varying the voltage supplied, the motor will rotate according to the voltage given.
DC motor is useful in many applications because it provide high torque due to flux and torque are perpendicular causes they have less inertia characteristic. By mastering in handling both speed and direction of DC motor will definitely gain advantages in motor performance. The simplicity of control speed made DC motors to be common in devices ranging from toys, house appliances, and robotics to industrial applications.

1.2 Control of DC motor

1.2.1 Speed Controller Method

In this project, the speed of DC motor will be controlled based on the width of the pulse that generated by PIC 18F4550. The pulse generated is called Pulse Width Modulation (PWM). The bigger the width of PWM signal, the speed will become faster and vice versa. The microcontroller will give the pulse signal after receiving command by user by pressing the push button. The speed can be increased or decreased.

1.2.2 Direction Controller Method

For direction control method, it is also will wait for the user command by pressing push button. The PWM signal will be given to motor driver before to the motor. The circuit has two buttons for speed control where the first one for increasing speed and the other one for reducing the speed of DC motor.
1.3 **Objective of project**

The objective is a guideline and goal in completing the project. The main core of this project is to design and implement a system to control both DC motor’s speed and direction using microcontroller. The system is able to control the motor’s speed at desired speed using PWM technique.

1.4 **Scope of Project**

Based on the objective of the project, there are several scopes has been outlined. The first scope of this project is the use of PIC18F4550 as a microcontroller. Secondly, the project built a hardware system for speed control and also forward and reverse directions using permanent magnet DC motor.

1.5 **Project contribution**

This project has a big potential in industry as now many machine is using motor to operate. So by controlling both speed and direction of DC motor will give more advantages or functions that can be applied in many applications. All the functions are