Task1

Customer Requirements (Moving Robot)

- Robot has four motors.

- Robot can move in the four directions (Forward- Backward- Right- Left)

- Robot has character LCD to display the moving direction.

- At Power Up:

* Robot moves forward with increasing speed from 0% to 100% speed for 5 seconds.
* Robot enters Running state.

- At Running State:

* Robot decreases its speed gradually to 50% in 5 seconds.
* Robot rotates right 90 degrees clockwise.
* Robot decreases its speed gradually to 0% in 5 seconds.
* Requirements Analysis:
* Software Modules
* DC Motors
* Character LCD 2\*16
* Timer
* DIO
* DIO Driver APIs

1. void DIO\_InitPin (u8 Pin , bool Direction );

2. void DIO\_ReadPin (u8 Pin, u8 \* Data);

3.void DIO\_WritePin (u8 Pin, u8 Data);

* define pins of Atmega32

#define PIN0 0

.

.

#define PIN31 31

1. Robot has four motors.

* DC Motor Module is needed for motor control.
* Motor APIs:
  + 1. Motor\_Init () ;
    2. Motor\_start (Motor name);
    3. Motor stop (Motor name);

1. Robot has character LCD to display the moving direction.

* LCD APIs

1. LCD\_Init () ;
2. LCD\_Display ( );

* LCD will interface with DIO
* Define LCD pins and Mode
* LCD has 2 mode (8bit mode – 4bit mode)
* #define RS PINA1
* #define EN PINA2

3. Timer module

* Timer module is needed for speed control and time.
* Timer APIs

1. Timer\_Init ();
2. Timer\_Start () ;
3. Timer\_IsExpired();

* To control speed we have to define Timer mode and make APIs
* Timer\_PWM ();
* Implementation Atmega32 with all Drivers