Project Report

Surname	Sokolenko	**First name**	Maksym
Student number	160482159		
Project Letter	B	**Project title**	Variable Speed Stepper Motor Control
GIT Hub Link	https://github.research.its.qmul.ac.uk/ECS642-714-EmbeddedSystems/ec16518-Project-B		

1 Information About Your System Requirements

Given Requirement	Status	Detailed Behaviour
1	Completed	The initial position of the motor is the one in which it is when the program starts. The way it is implemented is by initialising the number of steps to zero.
2	Completed	There are only two buttons. One of which is labelled 'start' will allow the motor to start, given it is placed in starting position, and make it move. Upon actually pressing the button state of it will be changed to running state while the number of steps mod 48 is 0.
3	Completed	The motor will rotate a certain amount of times once the 'start' button is pressed, basing on the number of rotations needed in the table of requirements.
4	Completed	The motor turns a specific direction until second button is pressed. Time for how long motor should turn in one side is specified in the requirements table for this project.
5	Completed	Once one move is completed, the 'start' button can be pressed again to perform next move, providing that the motor is at the initial position.
6	Completed	In case the rotation is completed, and the motor is not on the starting position the button 'stop' would be pressed to return it to starting position in order to finish the next rotation. The role of this function is to reset and clear rotations which may be left on it.
7	Completed	Upon pressing the button 'stop'. Once the rotation is completed, it must be restored in the starting position in the minimum number of moves. This number of moves derived by getting the number of moves completed mod 48 and figuring out which direction is nearer to the starting position.
8	Completed	Motor will be turning until the stop button is pressed. Upon pressing the stop button again,

		motor will turn back to the initial position in the minimum number of steps, as given in requirement 7.
9	Completed	The speed of the motor is controlled by the Periodic Interrupt Timer (PIT). The PIT takes a load value calculated by the number of turns and the time taken to complete the turn. Each time there is an interrupt on the PIT, the motor will take one step and the PIT will be reloaded afterwards.

2 Design System

The system is cyclic.

Peripherals:

Periodic Interrupt Timer (PIT)

Stepper Motor

Pins:

Start Button – PTD6, J9 (Pin 12) GND

Stop Button – PTD7, J9 (Pin 12) GND

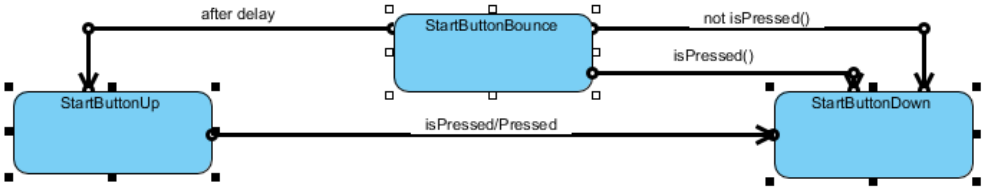
Stepper Motor: Pins – PTE30, PTE29, PTE23, PTE22, J9 (Pin 12) GND, J9 (Pin 4 and 8)

ISRs:

The ISRs used are the ones supplied in PIT., code taken from the available folder lab6.

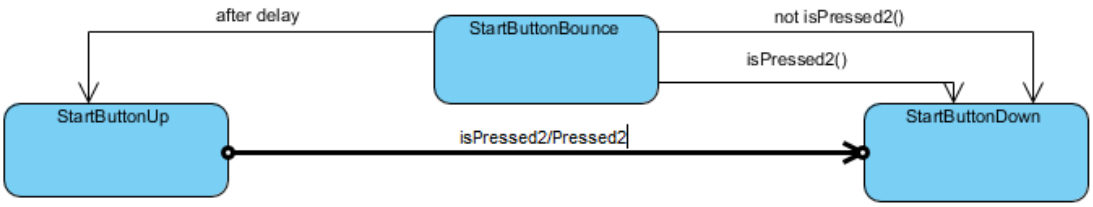
2.1 Task 1

The startPressed() event is detected in task3.



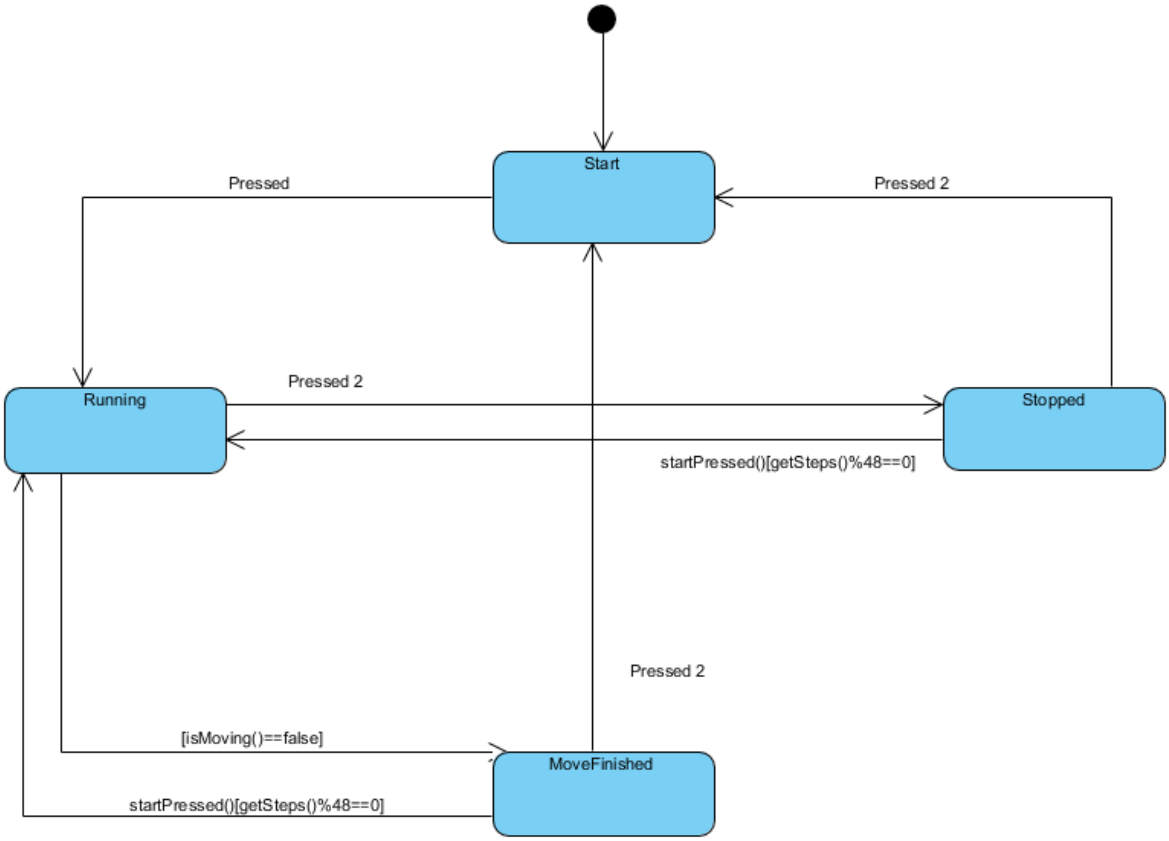
2.2 Task 2

The stopPressed() event is detected in task3.



Task 3

Events startPressed() is triggered by task 1and stopPressed() is triggered by task 2.



Task 4

moveMotor is updated to 1 when the PIT interrupt happens.