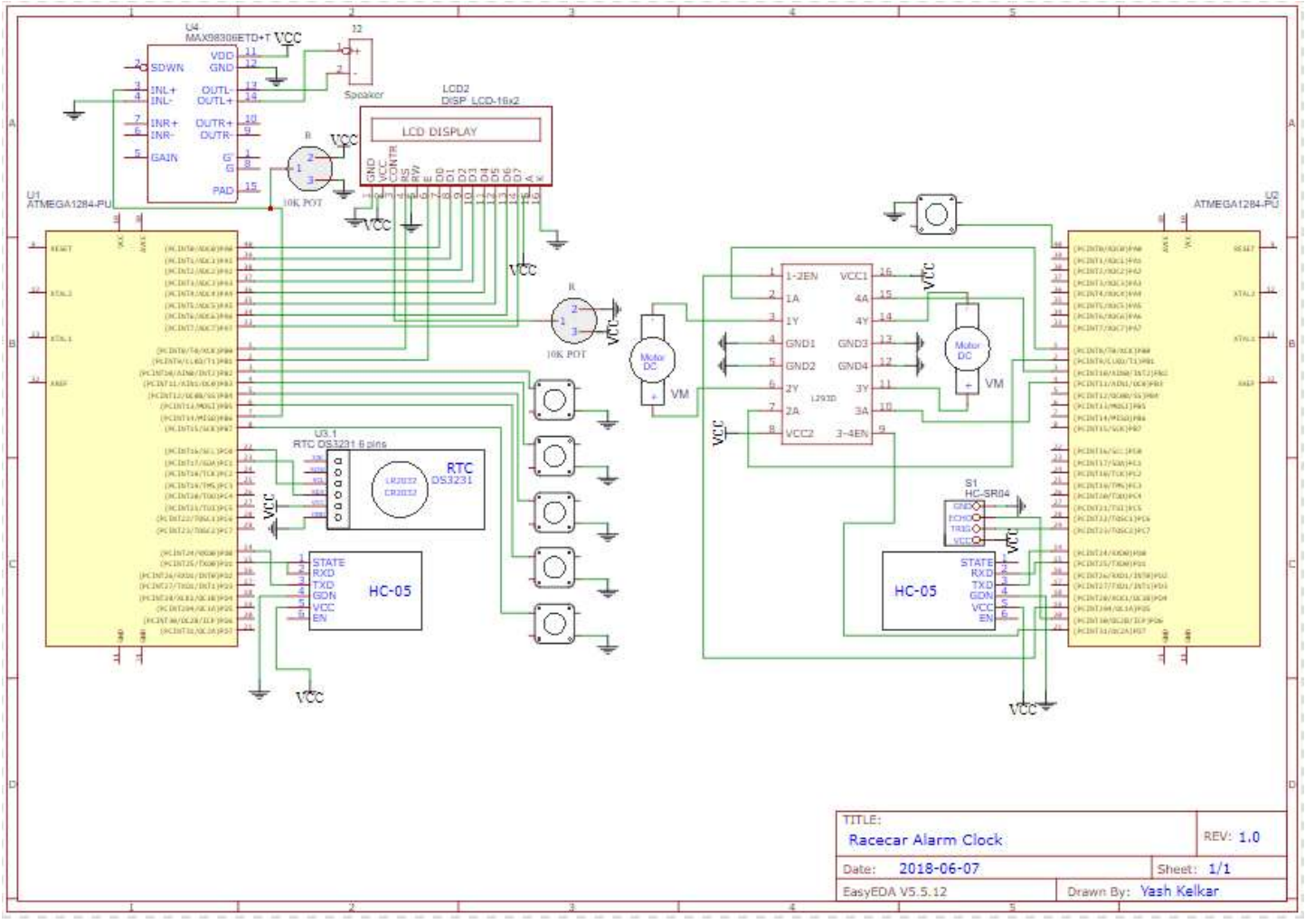
Design Document: Racecar Alarm

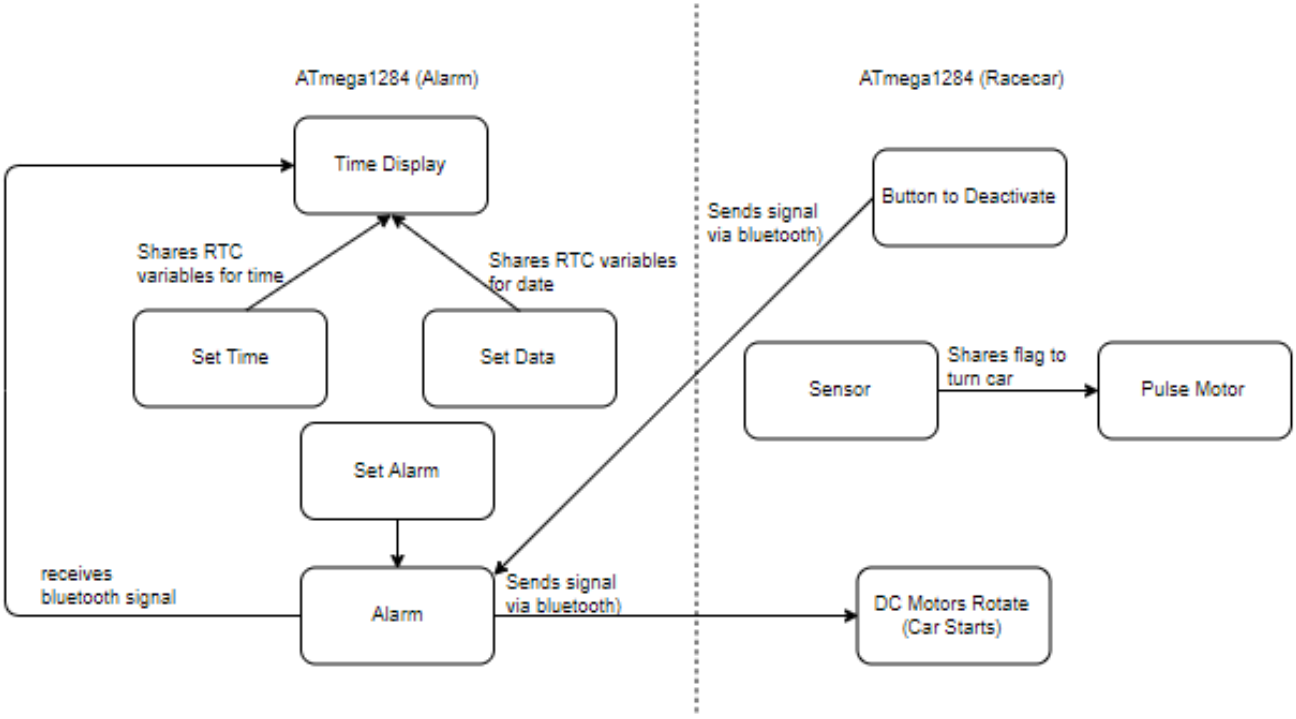
Introduction

For a lot of people, the typical alarm clock does not prove very effective. First and foremost, many people find it difficult to wake up in the morning to start their day. This causes people to simply hit the snooze button on their alarms which allows them to sleep more. For a better way to wake people up, I have created a product which will force the consumer to get out of bed. My product is the racecar alarm clock. The racecar alarm clock works such that after the alarm goes off a signal is sent to a mobile car to turn it on. The only way to turn off the alarm is to chase the car and press the button located on the car to turn off the alarm. This will help get people out of bed because they need to get up to catch the car to turn off the alarm.

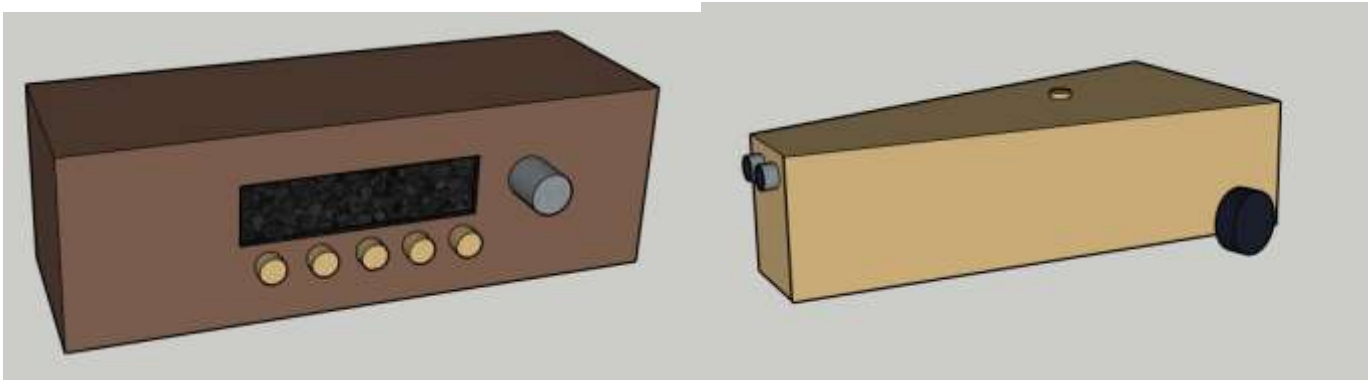
Circuit Diagram



Code Block Diagram



Design Diagram



Alarm Clock

Racecar

Time Allocations

Topic	**Allocation**
Documentation	**15**
RTC/I2C Library Construction	3
DC Motor Coding	2
Alarm Clock Coding	3
PWM Library Construction	7
Research	**18**
RTC/I2C Research	5
Bluetooth Research	5
PWM Research	8
Design	**10**
Racecar Design	5
Alarm Design	5
Assembly	**35**
Alarm Assembly	18
Racecar Assembly	17
Testing	**25**
General Development	**40**
Total	**153**

Milestones

- Get basic components of project working by first demonstration (Week 5): DC Motors, Serial Communication, RTC Module, LCD, Speaker, Distance Sensor
- Get Bluetooth Working and Integrate with project (Week 6)
- Get PWM working for motors (Week 7)
- Design housing for alarm clock and racecar (Week 8)
- Complete integration of all components (Week 9)
- Build housing and combine with components (Week 10)

Roadblocks

- TFT LCD Screen was challenging to convert Arduino library to AVR library.

- Figuring out and integrating the bluetooth modules
- Using 2 separate PWM with the DC Motors was challenging to figure out
- Combining the PWM of the motors with the distance sensor
- Building an axel for the 3rd wheel of the car

Bill of Materials

Part	Qty
HC-05 Bluetooth module	2
HC-SR04 Sensor	1
DC Motors	2
LCD Screen 16x2	1
ATmega 1284	2
Adafruit Speaker 3" Diameter	1
L293D Motor driver	1
Small breadboards	2
Push buttons	6
D3231 RTC module	1
Max98306 amplifier	1
Wheels	3
9V battery	1
L7805CV Voltage Regulator	1
10 K Potentiometers	2

GitHub Repository

https://github.com/ykelkar/UCR_CS179J