**First Semester Electronic Engineering Projects:**

**ENGINEERING I : Traffic Signal**

Considerations: How many phases, local speed limit, width of intersection, interaction with other intersections, interaction with emergency vehicles, interaction with RR crossing, traffic density on each phase, etc.

See FailSafe <https://en.wikipedia.org/wiki/Fail-safe>

Traffic signals will go into a flashing mode if the controller detects a problem, such as a program that tries to display green lights to conflicting traffic. The signal may display flashing yellow to the main road and flashing red to the side road, or flashing red in all directions. Flashing operation can also be used during times of day when traffic is light, such as late at night.

Fuse as an example of a failsafe device.

Humor: The circuit was designed in such a way that a $20 component burned out. In doing so it saved a $0.50 fuse.

**ENGINEERING II: RR Crossing**

From the engineer’s viewpoint the detection circuit is NC for safety. (A broken wire is interpreted as train present, not train absent.) Also: stopping distance for a car vs. a truck/trailer. Also: lead distance as function of actual Speed of train, also consideration of pedestrians.

Pieces which could be each in a different cog: Noise generation, flashing lights, gates up/down, rotating stop sign.

Develop each function separately, test it thoroughly, then write the main() routine. OR write main routine and then the individual functions. Which???

Rotating Stop Sign: <https://www.youtube.com/watch?v=Qnst4UyCpB4>

Animation good/bad wiring of lights:

<http://signaldepartment.com/articles/xing-signals/default.html#lights>

Gates: <https://www.youtube.com/watch?v=KHpuBLPFato>) Animation down, never see up, very long!

Timing: (Model RR) <http://home.cogeco.ca/~rpaisley4/AGC11.html>

**Engineering IIIa: Burglar Alarm**

Planning: <http://www.structuredhomewiring.com/AlarmPlan.aspx>

Closed circuit (current loop) necessary for failsafe

Window foil

**Engineering IIIb: FIRE ALARM in commercial building**

Detecting which box is pulled

Fail Safe vs Fail secure:

<http://idighardware.com/wordpress/wp-content/uploads/2012/05/Decoded-Aug12-Fail-Safe-vs.-Fail-Secure.pdf>

Control some things (release door holders, recall elevators to ground floor, turn off or restrict air circulation) failsafe/failsecure

Planning and requirements: <https://en.wikipedia.org/wiki/Fire_alarm_system>

Trapped key system at Notre Dame Van De Graaff