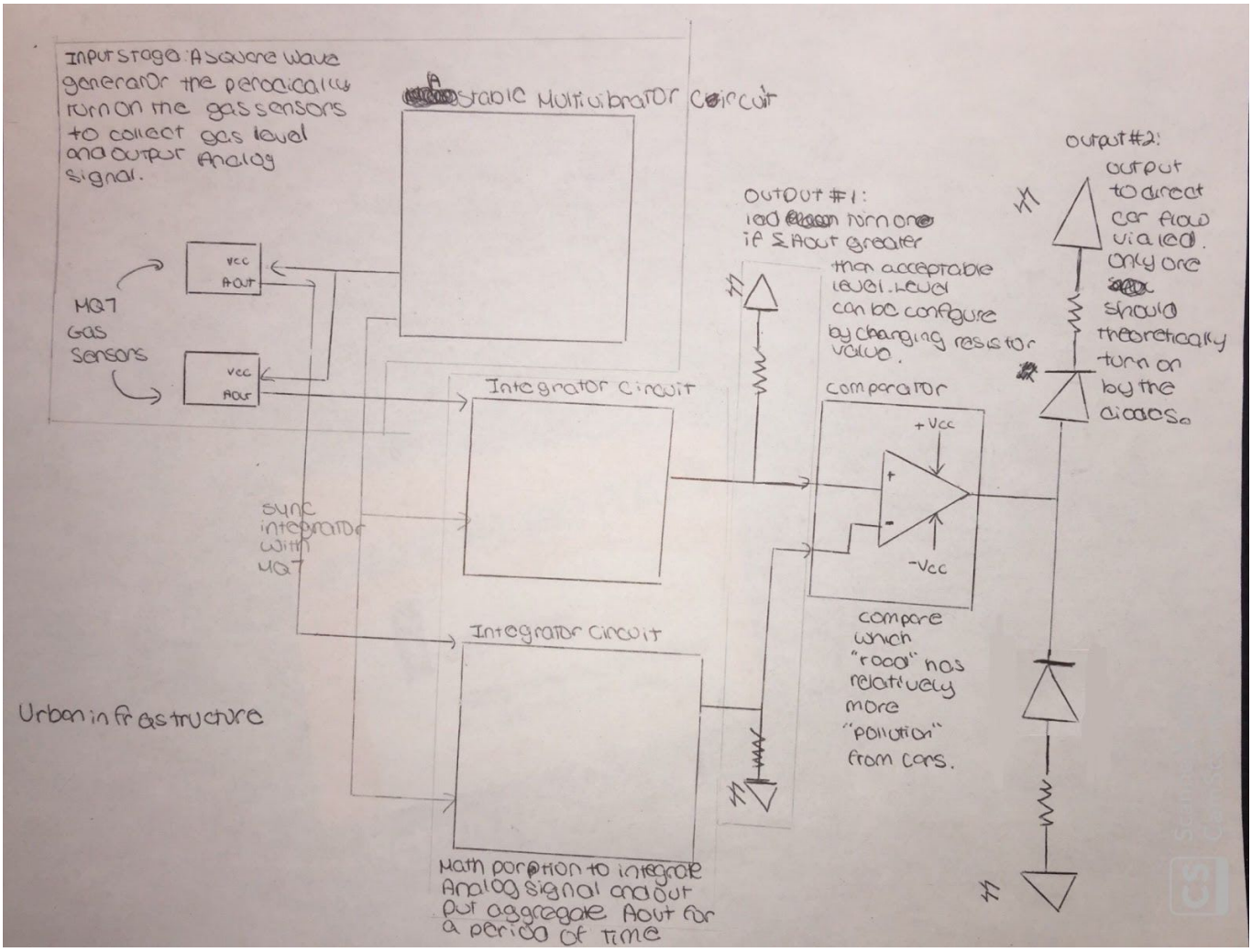
Project Plan Assignment: Vincent Lin, Jack Jiang, Saaif Ahmed

**Project Description**




The circuit uses two gas sensors to detect Carbon Monoxide (CO) gas concentration over a given time period. That time period is controlled by an astable multivibrator driver which tunes the period of signal integration. The two integrated values give the amount of CO concentration over a given time for each of the sensors. From then comparing those values we send an output to determine which of the two sensors represents a less polluted road to travel on. Furthermore there is an additional output that indicates if the gas sensors sensed a pollution level above a known limit via led turning on.

**What is the purpose of the project?**

*Who is the user? Why did you choose this project?*

Our project attempts to increase the quality of life through Urban Infrastructure. We chose this project to address a real concern for urban city residents. In highly populated cities with lots of car traffic, studies indicate there is a real risk of CO poisoning in bikers who ride down streets populated with many vehicles. Our project would provide information to pedestrians about which street would have the highest pollution (CO concentration) and direct them to a better option of travel.

**Milestones**

*Outline your goals and deadlines for at least the upcoming Milestone. Try to fill out as much as you can for the other Milestones so the TA can give you advice.*

**Milestone 1** (Date: )

We did not do Milestone 2

**Milestone 2** (Date: 2/18/20)

Technical Goals:

- Astable Multivibrator that drives enable input to sensors and control signal (PWM) to integrators for period of integration.
- Integrator op amps that gathers the analog output from the gas sensors for a time period as controlled by PWM (user defined)
- Comparator that drives an output which determines which road is safest to travel on.
- Keeping the leds on during the down time of the integrators.

**Milestone 3** (Date: 4/07/20)

- High Pass, Passive filter. It turns on the circuit if and only if many cars pass by in a given time frame
- Transformer to inputs. Design ability for circuit to be connected to a larger power grid and not just a lab supply. And/or lower sensor voltages for so that integrators can be connected to a lower supply.

**Reason for update (if applicable)**

-N/A

**Parts List**

*List an expected number of parts you will need that **are not in your circuits kit**. List the cost of parts you want to purchase.*

- Two MQ9 gas sensors ($10)

**What potential issues do you foresee with this design?**

- The LEDs won't stay on when the integrator is down (D FF?)
- The different sub circuits won't work as expected when put together
- Inability to test our circuits (maybe we put the circuit near a car exhaust?)

**What skills and concepts do you need to learn to do this?**

- How to construct the astable multivibrator
- How to construct an integrator op amp. How to control the period of integration.

**What is your plan if this design does not work?**

We will attempt to reduce the number of output which will reduce the complexity of the circuit. If the situation calls, we will reduce the circuit to just 4 elements; MQ9, integrator, astable multivibrator, and LED to just test if the pollution is above the set safe limit via the resistor.

**Who will be your end-user?**

- Urban city governments to monitor pollution and direct traffic.
- Cyclists to avoid highly polluted paths.
- Individuals; if we remove output 2 and one of the MQ9 to test pollution in an environment.

**Checklist:**

*A TA must check each of these items to pass the plan. Be prepared to answer each of these questions with justification.*

☐ Can the project be completed in the given time?

☐ Do the milestones provide a reasonable pace for the project?

☐ Does the project align well with the learning objectives of the course?

☐ Does the project use at least two building blocks from each Milestone?

☐ Does the block diagram match the desired functionality?

☐ Is the circuit size and cost reasonable?

☐ Can at least 4 Milestone Concepts apply to the design?

**Team Signatures**

**_____SA_____**

**_____JJ_____**

**_____VL_____**

**TA Signature**

**_____**