CODeSMART Ventilation System

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Outline

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- Project Schedule
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Introduction – The System

CODeSMART Ventilation System

CO: Carbon Monoxide

De: Detection

&

S: Self

M: Monitoring

A: Air

R: Refreshing

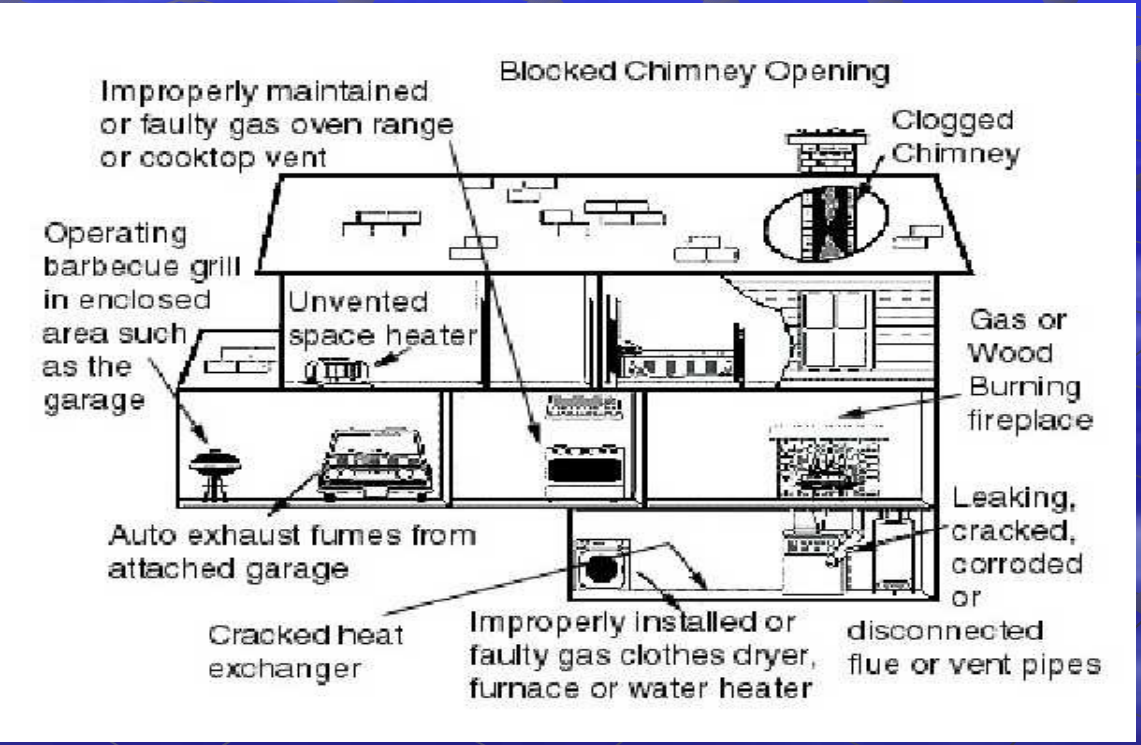
T: Technology

Motivation

- Carbon monoxide (CO) is the number one cause of poisoning deaths in the United States:
  - There are approximately 2,100 unintentional deaths from carbon monoxide (CO) every year in the U.S.
  - More than 10,000 CO injuries occur annually from this poison.
  - Exposure can lead to significant loss of lifespan due to damage to the heart muscle.

Motivation … contd

How prone are we to CO in our everyday lives?



CO Detecting systems can prevent/reduce the number of casualties.

Project Objective

Primary Objective:

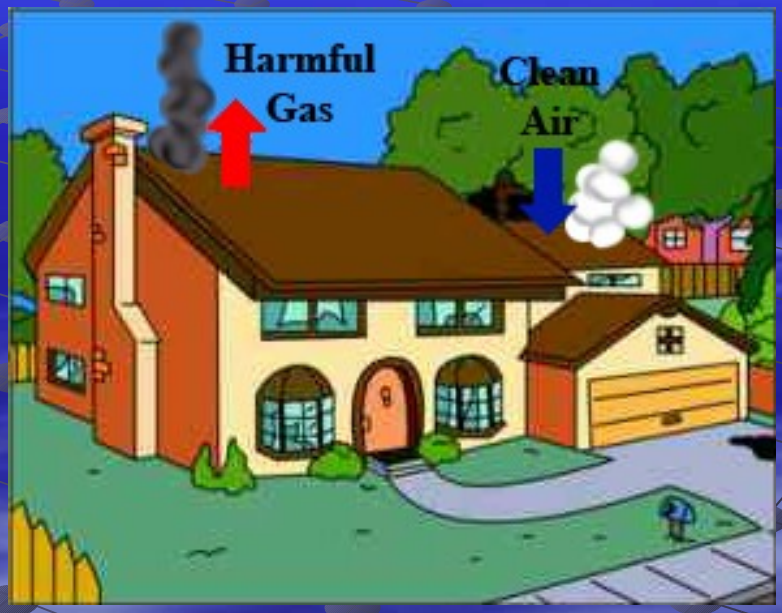
- Automatically activate the exhaust system when it detects unsafe levels of CO.
- Automatically activate the intake system to bring in fresh air.

Additional features:

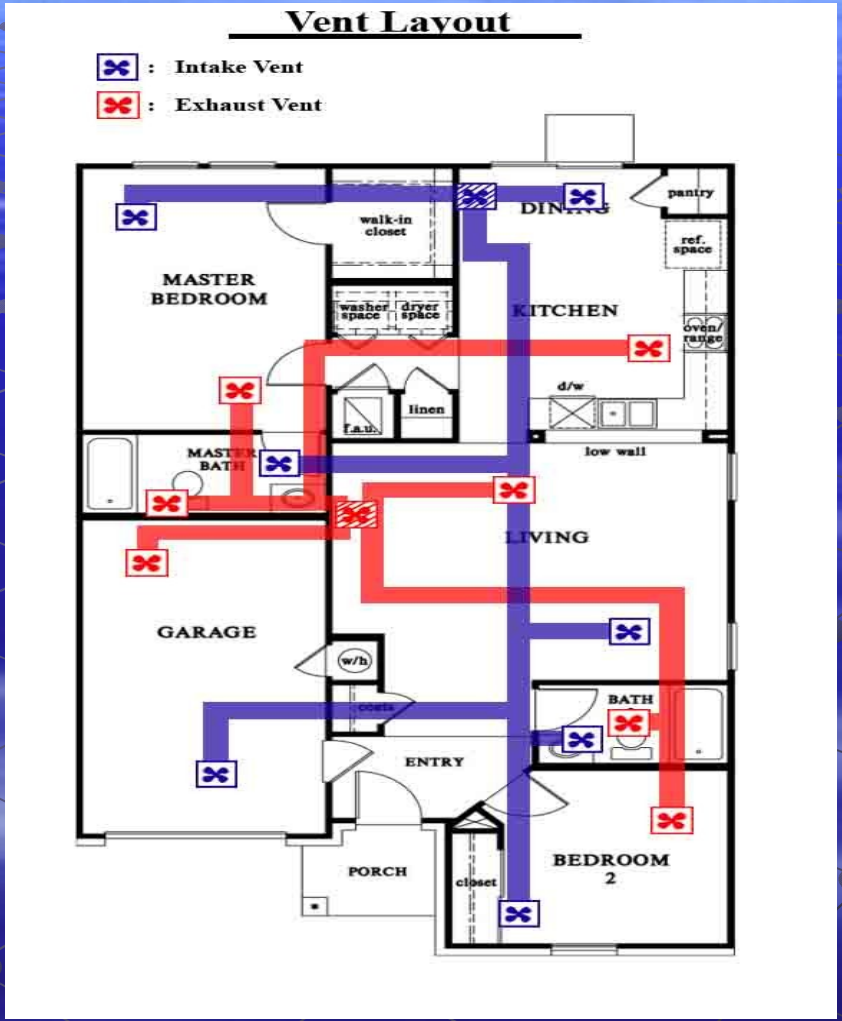
- An Air Refreshing Technology System that will spray air-freshener in each room at user specified intervals.
- Also detect levels and work the same way for Humidity and Smoke.

Project Theory

- Sensors are used to indicate when a harmful gas is detected in the air.
- The microcontroller interprets the signal and activates both exhaust and intake fans simultaneously.
- This action will remove any harmful air located within the house while refilling the house with pure air from outside.

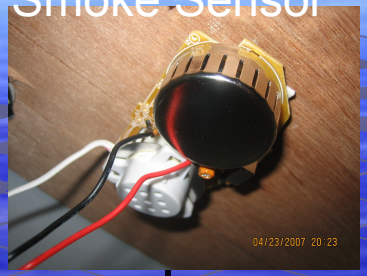


System Layout



Hardware Design

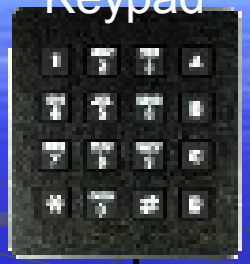
Smoke Sensor



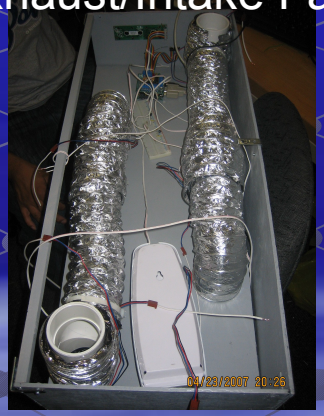
CO Sensor

Humidity Sensor

Keypad



Exhaust/Intake Fans



TB 1

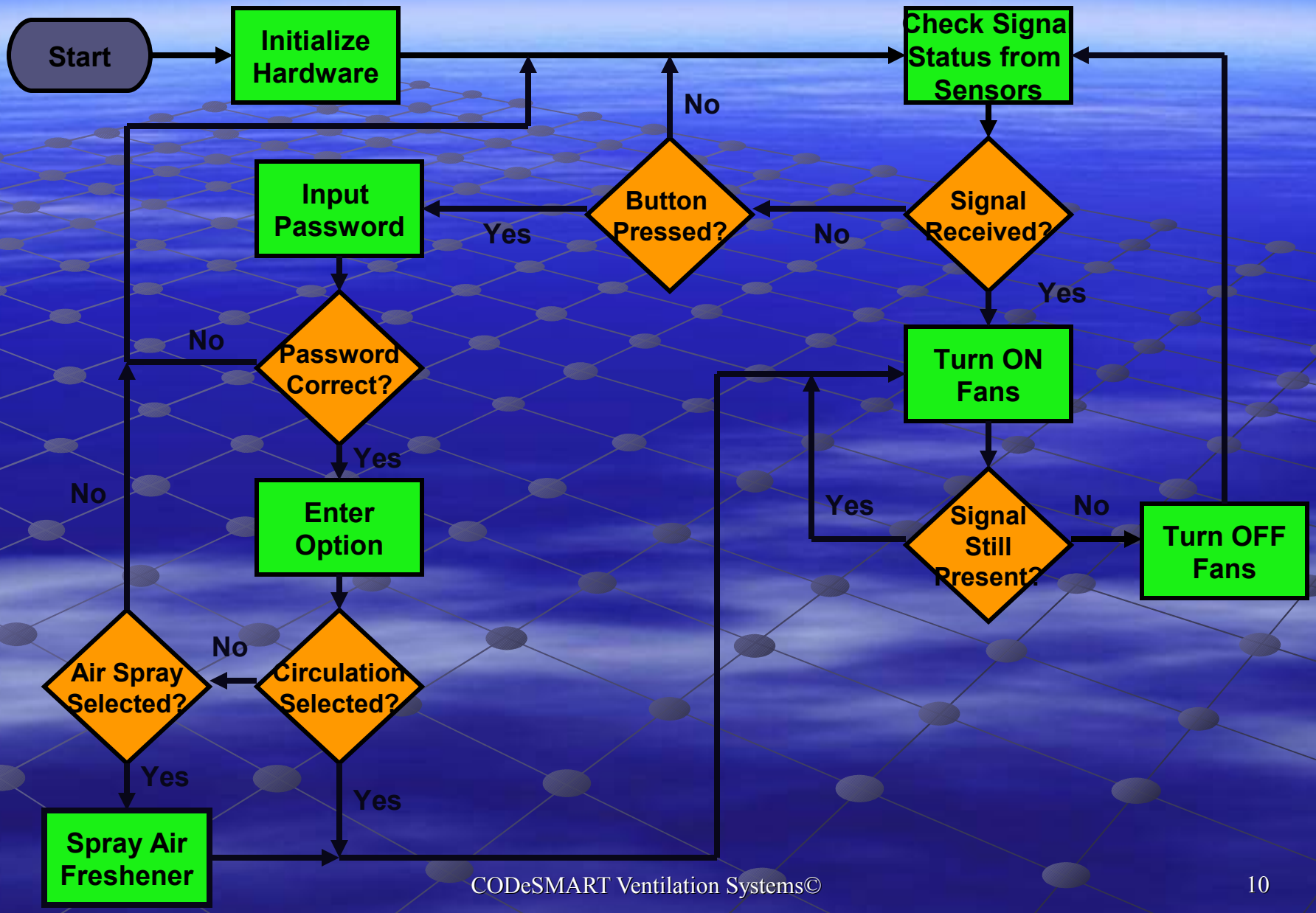
Microcontroller

Relay

Air Freshener

LCD

Software Design



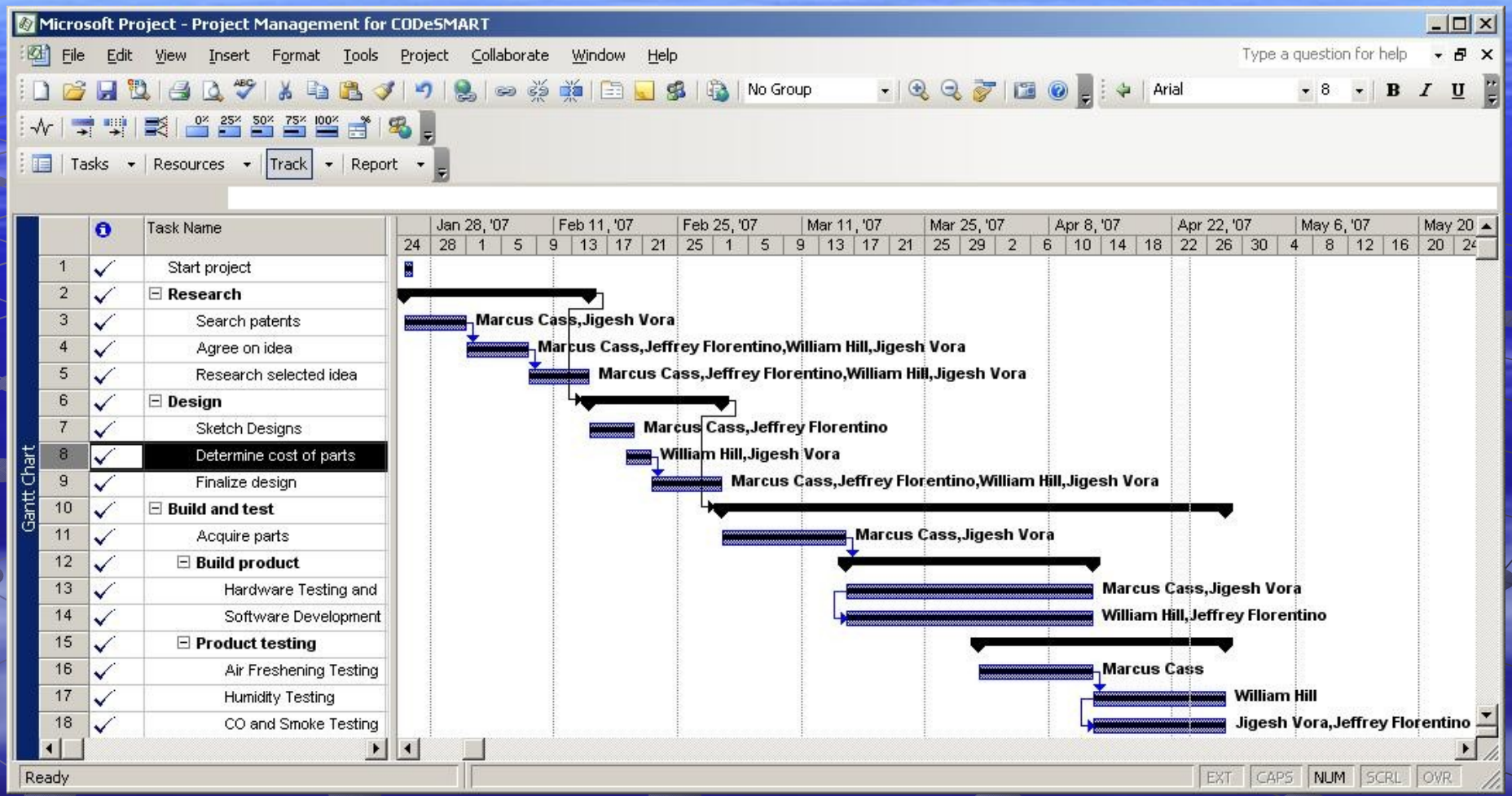
Extra Features

- **Built in Air Freshening System that can be timed to activate at set times or in intervals.**

- **Circulation System installed for airing out the house for either a timed interval or manually by switch.**

- **Humidity sensors installed for bath and laundry rooms to automatically eliminate humidity without wasting much energy.**

Project Schedule



Cost Analysis - Parts

Item	Est. Cost	Actual Cost
Microcontroller	$60.00	$60.00
Training Board	$39.00	$39.00
LCD	$7.00	$7.00
Keypad	$15.00	$15.00
Relay	$10.00	$29.00
Fans	$40.00	$30.00
Humidity Sensor	$10.00	$2.00
Air Freshener and motor	$15.00	$ 11.99
Ducts	$15.00	$11.99
CO and Smoke sensors	$60.00	$102.29
Wood panels	$20.00	$10.00
Misc. (nails, glue)	$10.00	$6.00
Smoke Test Spray	N/A	$5.95
PCB	N/A	$3.00
CO Testing Kit	N/A	$14.88
Total	$301.00	$348.10

Cost Analysis Cont'd - Labor

Team Member	Hours Worked	Wage Per Hour	Total
Marcus Cass	150	$30	$11250
Jeffrey Florentino	150	$30	$11250
William Hill	150	$30	$11250
Jigesh Vora	150	$30	$11250
TOTAL	**600**		**$45000**

Actual formula used: Assumed dream salary ($/hour) * 2.5 * hours = $Total.

Cost Analysis Cont'd – Lab Equipment

Item	Quantity	Cost
DC Dual Power Supply	1	$574
2-Channel Oscilloscope	1	$2500
Digital Multimeter	1	$335
Computer	1	$800
TOTAL	**4**	**$4209**

Verification

Sensors

- Gas sensor output signal testing
- Input from the keypad

Signal Integrity

- Microcontroller's ability to poll the sensor
- Microcontroller's ability to send a signal to the fans

Hardware

- Ability of fans to move sufficient airflow

References

Parts:
[http://www.bipom.com]

CO Information:
[http://healthandenergy.com/carbon_monoxide_poisoning.htm]
[http://en.wikipedia.org/wiki/Carbon_monoxide_poisoning]

Questions?

Thank You