7-2017

Introduction to Signal Timing & Traffic Control

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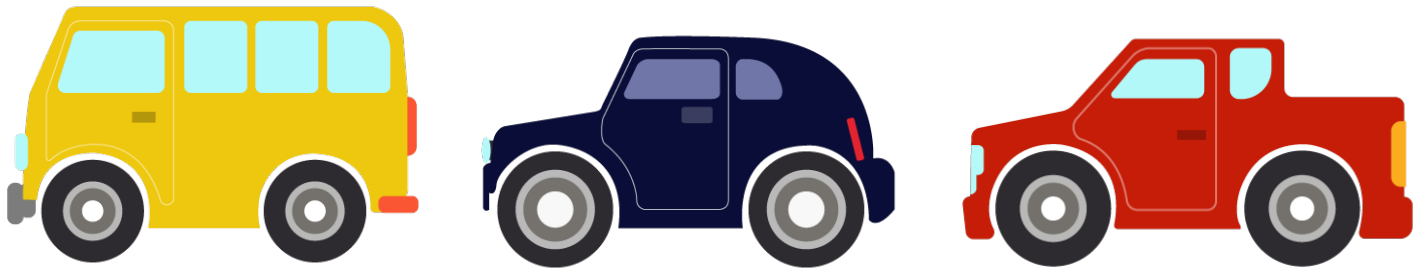
INTRODUCTION TO TRANSPORTATION

Maritime Transportation Research and Education Center



Want to answer? Have a question? PLEASE RAISE YOUR HAND.

INTRODUCTIONS

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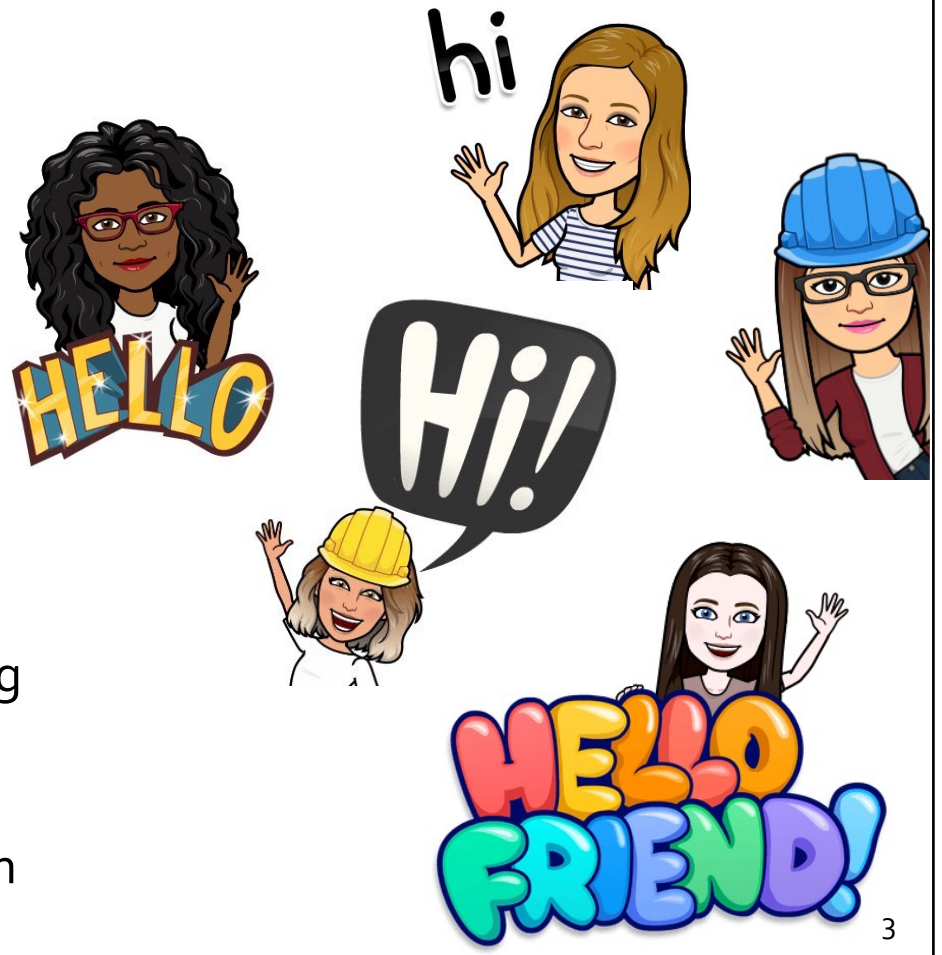
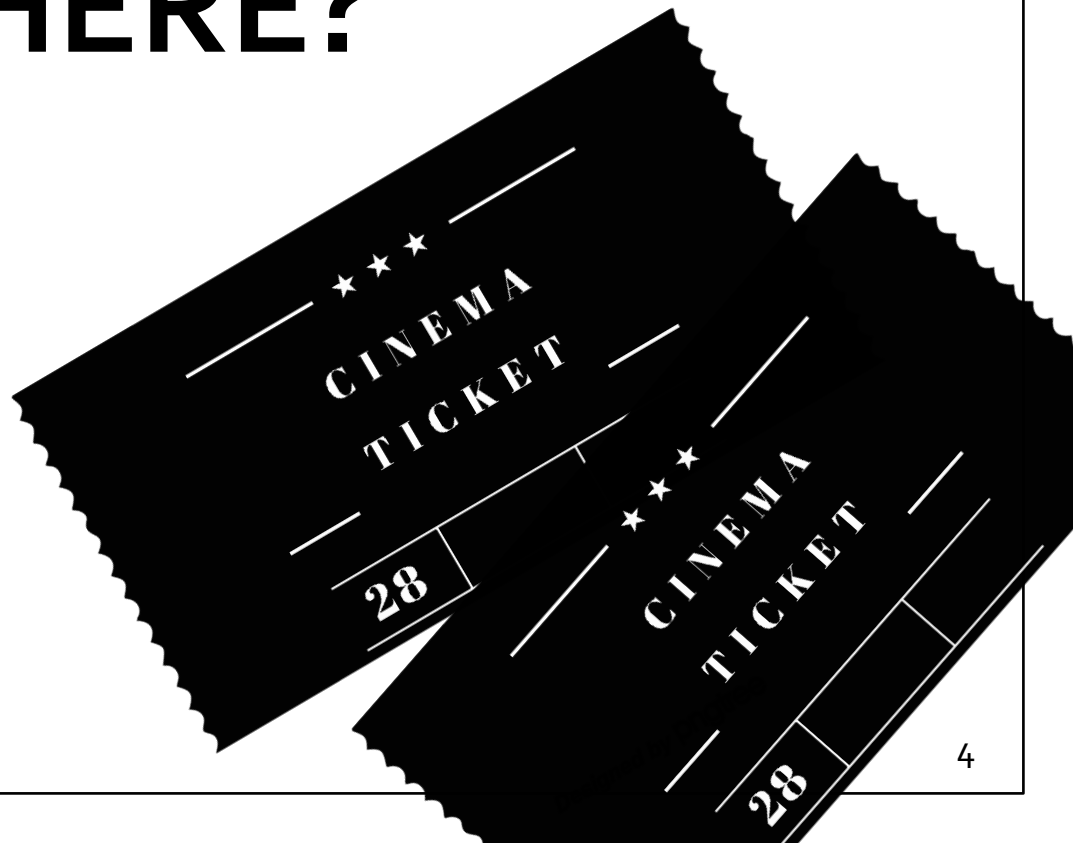


WHEN YOU GO TO THE MOVIES, HOW DO YOU GET THERE?

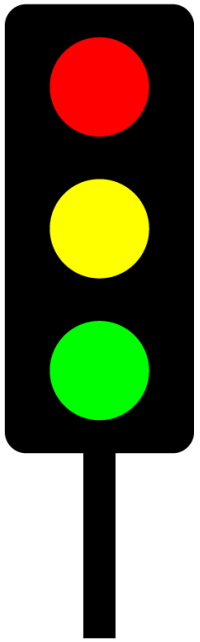


WHAT'S YOUR FAVORITE COLOR?

When other people see it,

what does your favorite color make them think of?

COLORS IN TRANSPORTATION



Colors are used in transportation as a communication tool.

RED: Stop

YELLOW: Slow / Yield

GREEN: Go!

BLUE: ???

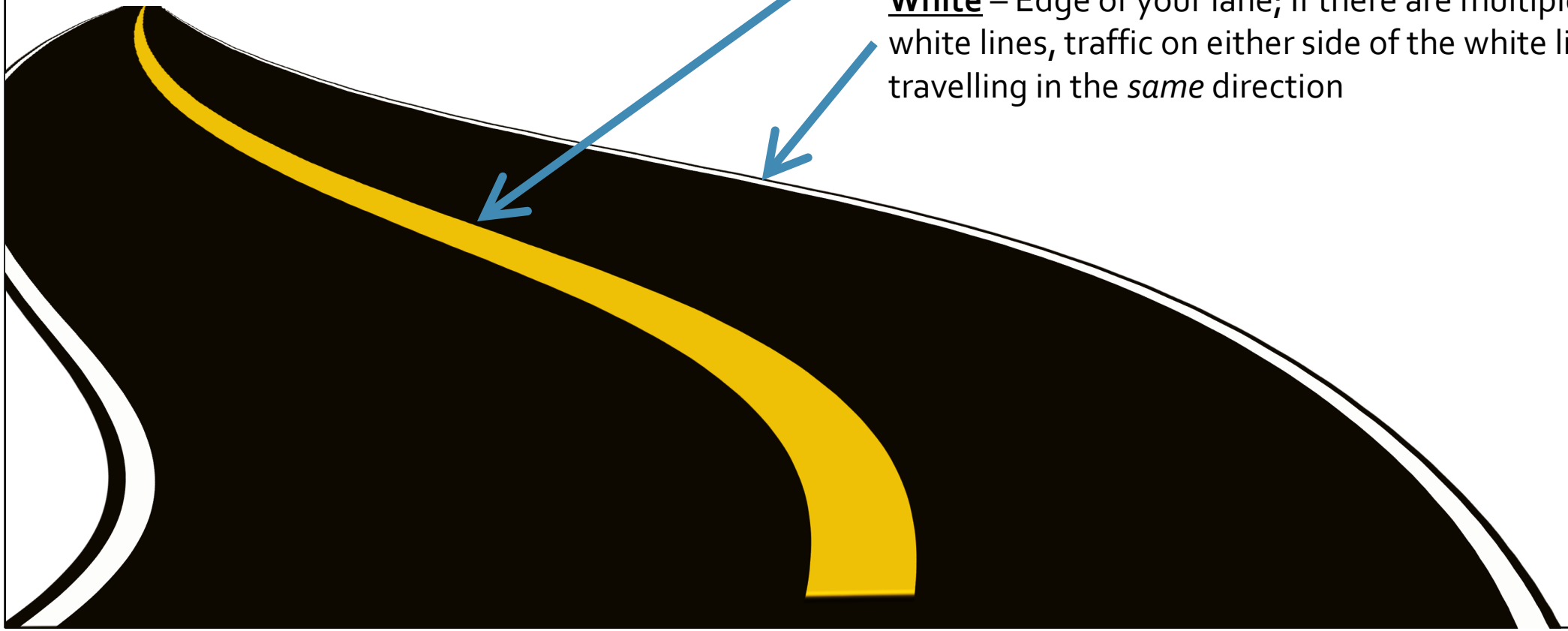
ORANGE: ???

WHITE: ???

EVEN THE COLOR OF THE LINES ON THE ROAD HAVE MEANING

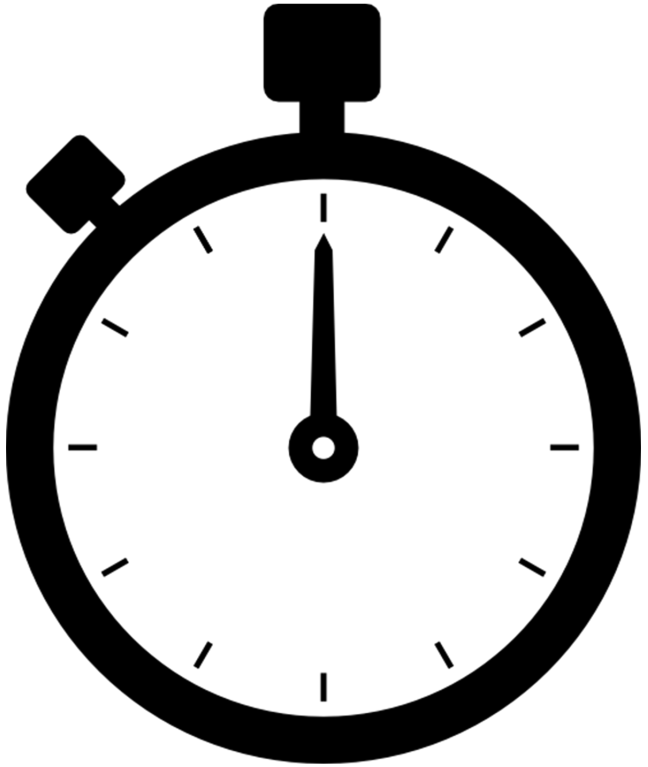
Yellow – Traffic on the other side of this line is travelling the *opposite* direction

White – Edge of your lane; If there are multiple lanes with white lines, traffic on either side of the white lines will be travelling in the *same* direction



VOCABULARY

- *Traffic lights operate in **phases** and are indicated by colors. (They sometimes include arrows, too.)*
- *The **timing** of these traffic lights refers to the amount of time (usually in seconds) that is dedicated to each phase.*

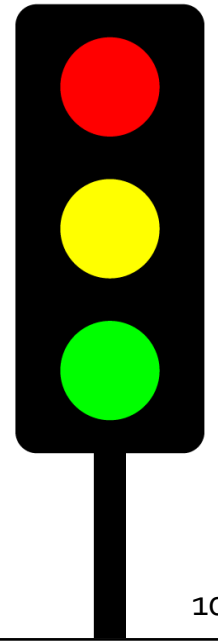


WHEN WE'RE STUCK AT A RED LIGHT

and we have somewhere important to be…

- How do we feel?
- What are we thinking?
- Should other people at the intersection get to go first?
- Who is most important at the intersection?

…and why?

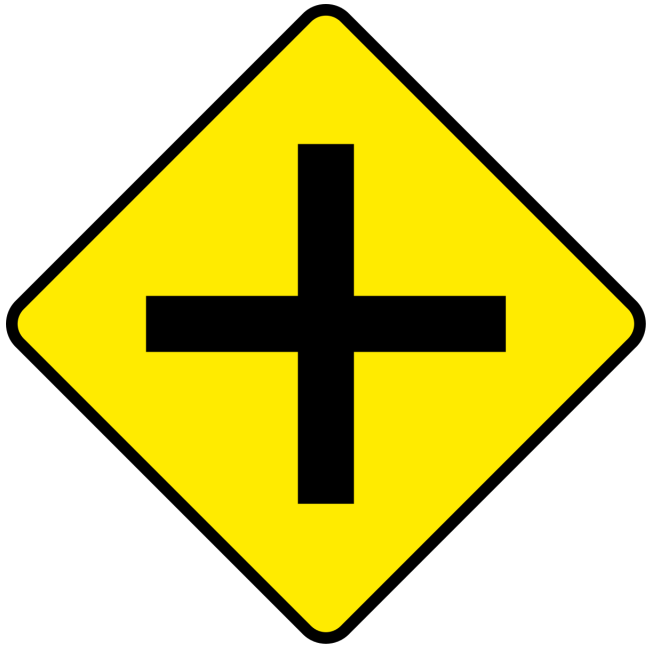


WHILE IT MAY BE FRUSTRATING…

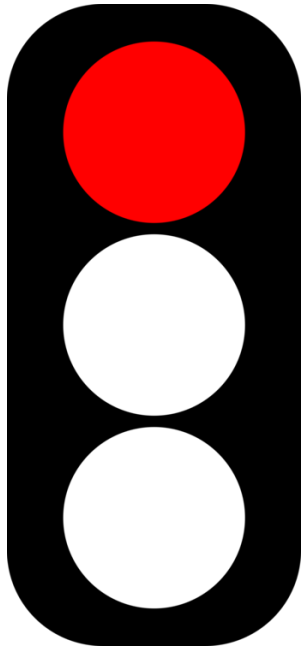
***our first priority as transportation engineers is* <u>SAFETY</u>.**

<u>SAFETY</u> includes making our intersections

- Consistent
- Predictable
- Efficient



BUT WE ALSO DON'T WANT PEOPLE WAITING UNNECESSARILY



*When people are stopped at a red light, it causes what is referred to as a **delay**.*

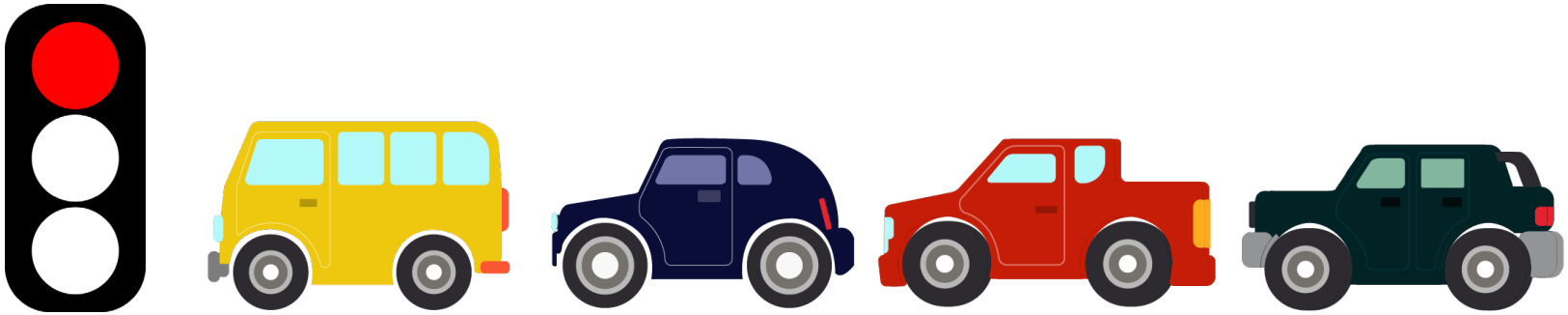
*The time it takes for the light to complete both the red and green phases is called a **cycle**.*

What happens if we have a really long cycle?

What happens if we have a really short cycle?

IF THE LIGHT STAYS RED FOR A LONG TIME, CARS BEGIN TO FORM A LINE.

*This is referred to as a **queue**.*



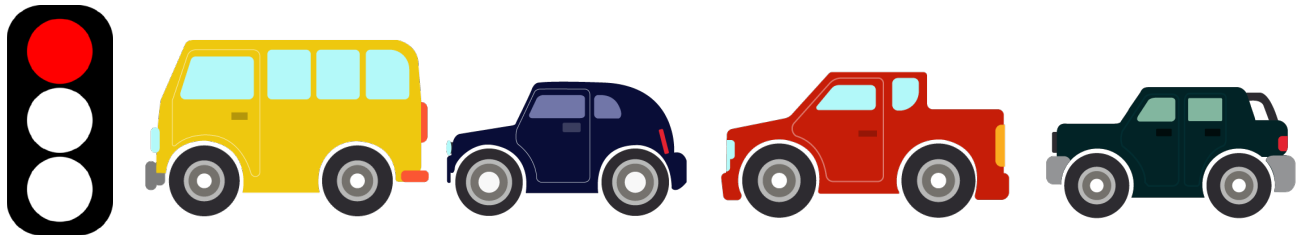
EFFICIENCY

Efficiency *refers to the ability of the traffic signal timing to minimize the queue.*

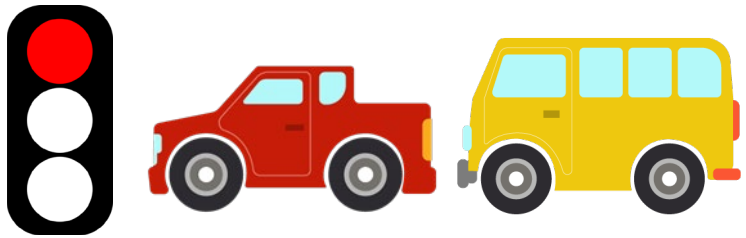
If both traffic lights have the same amount of cars traveling down their road, which traffic light's timing must be more efficient?

1 or 2?

1



2



YOUR TURN

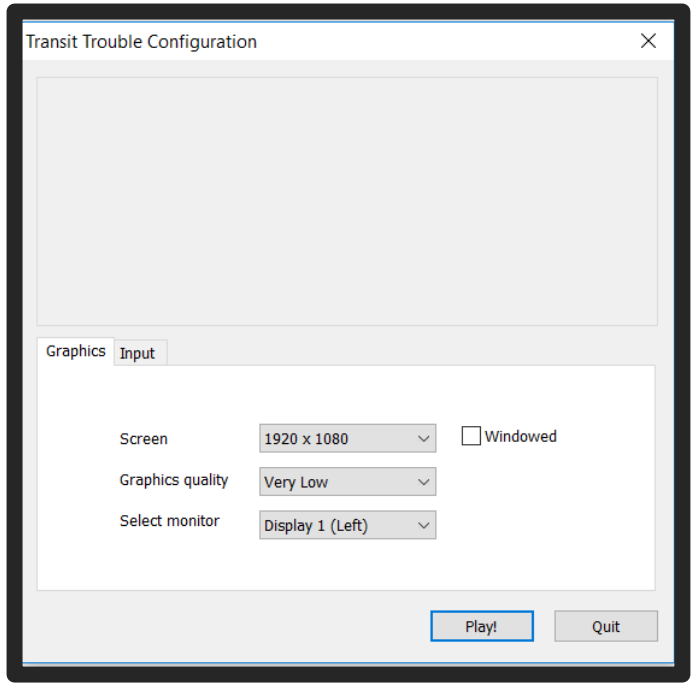

Frustration
Level 7 Score: 4300
24
4
3
2
1
Intersection 1
Intersection 2
Intersection 3
Intersection 4
5
5

ON YOUR DESKTOP

1. Click on the Transit Trouble game

2. Click on Play!

3. Choose Arcade Mode



HOW TO PLAY


Frustration
Level 1 Score: 200
38
Frustration Meter:
Timer!
Every level lasts for
60 seconds
Traffic Light!
Click on the traffic
light at an
intersection to
change it.
Get Help!
Click on it
NOW

FIRST ONE TO COMPLETE

LEVEL 4

GETS A PRIZE!

MANUAL TRAFFIC CONTROL

Levels 1-4 involve **manual traffic control**, meaning that an individual is changing the traffic signals as they observe the traffic's behavior and based on its current needs.

Can you think of a time that you have seen manual traffic control?

**Hint: Stoplights don't normally operate this way, but people do.*


STOP
GO

FIXED-TIME CONTROL

Levels 5+ involve **fixed-time control**, which means that the phases of stoplights last the same amount of time every time and are pre-set. These phase times are based off of historical data.

If done correctly, fixed-time control can be a more *efficient* method than manual traffic control.

Let's give it a try!

NEW OPTIONS IN THE BOTTOM LEFT CORNER

WHO COMPLETED ALL THE STAGES THE QUICKEST?

WHO HAD THE LEAST AMOUNT OF FRUSTRATION ON THEIR METER?

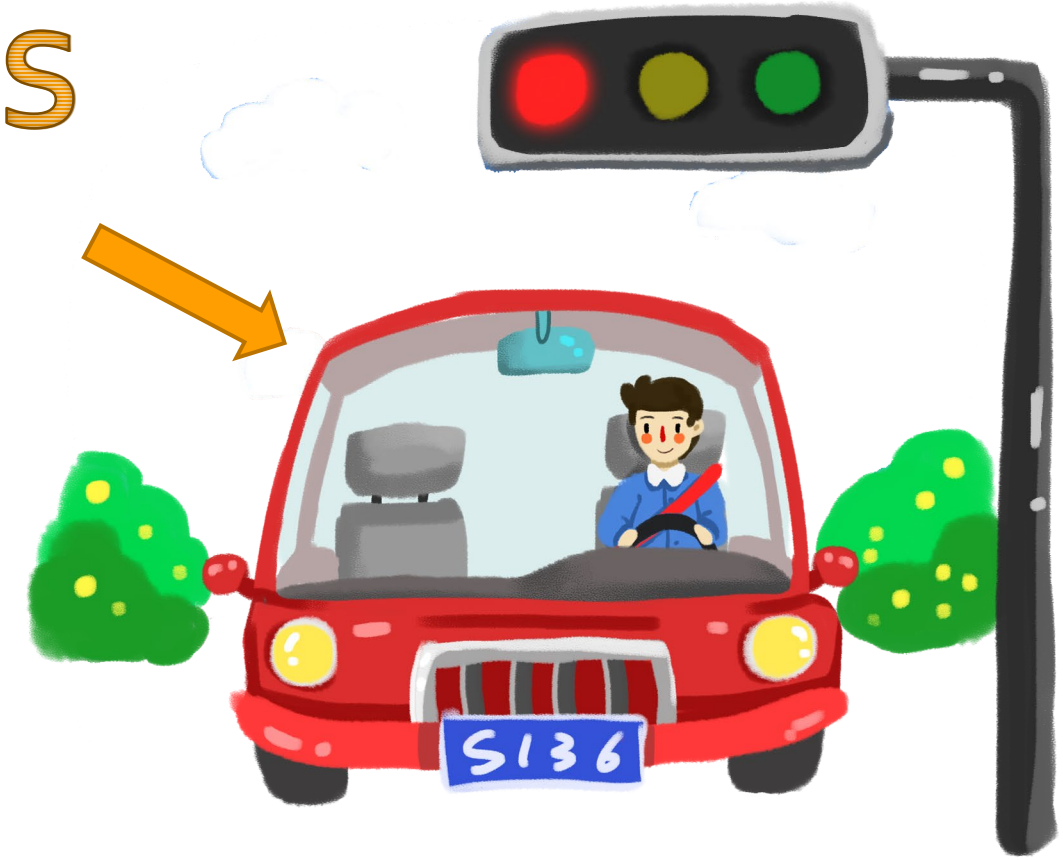
WHO SUCCESSFULLY COMPLETED ALL EIGHT STAGES?

ACTUATED SIGNAL CONTROL

Actuated signal control uses sensors to detect cars (like a giant metal detector), which changes the traffic lights to avoid *delays*.

This technology is complex and expensive, but is the most *efficient* method by which traffic is controlled today.

THIS IS SAM



SAM IS THE ONLY ONE AT THIS LIGHT

TO THE CVEG LOUNGE!

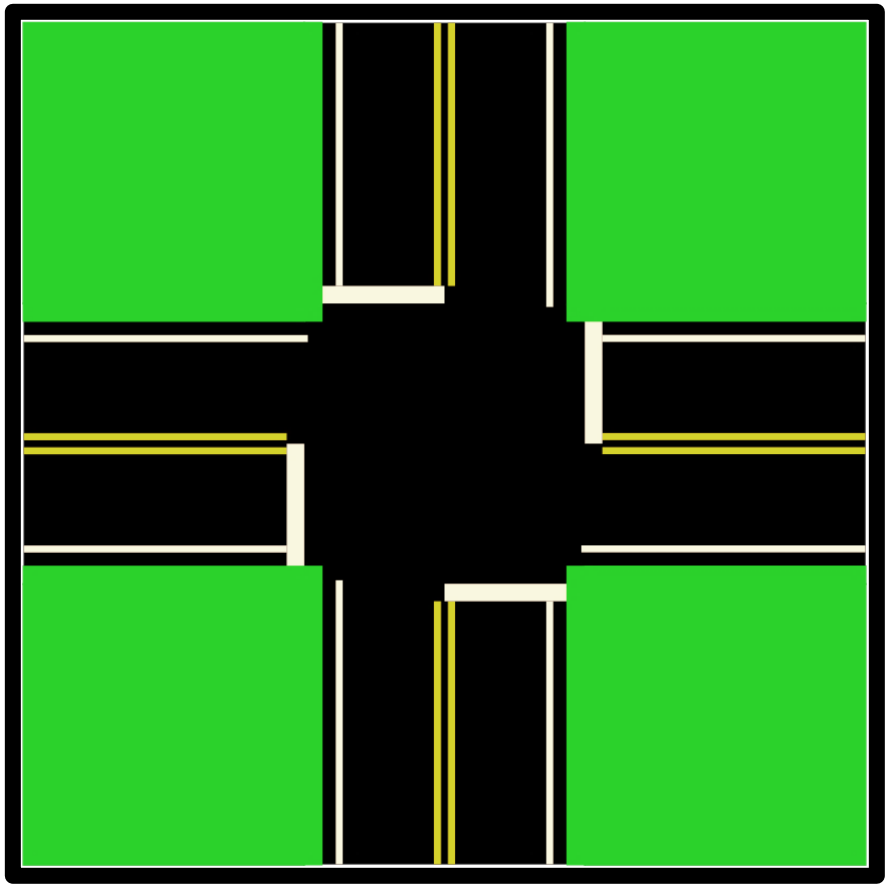
OVERVIEW:

1. Live Simulation with Manual Signal Timing
2. Live Simulation with Fixed-Time Control
3. Introduction of Roundabouts

YOU WILL NEED:

- Your packet
- Your pencil
- Your personal belongings
- The traffic route assignment taped to the bottom of your chair

FOUR-WAY INTERSECTIONS



UNDER CONSTRUCTION

STREET SIGN KEY:

Cars may not enter this side of traffic

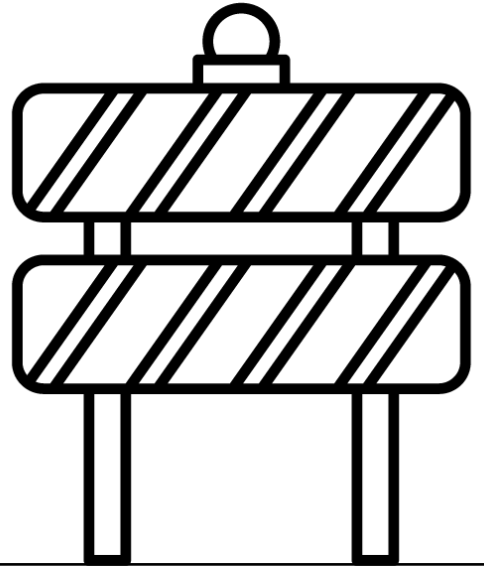
The upcoming intersection is a roundabout

Cars are not required to stop but need to be aware of others and the right-of-way

There is a traffic signal ahead

Drivers may not drive faster this speed

Cars must come to a complete stop



LINE KEY:

Cars may *not* switch lanes

Cars may switch lanes