

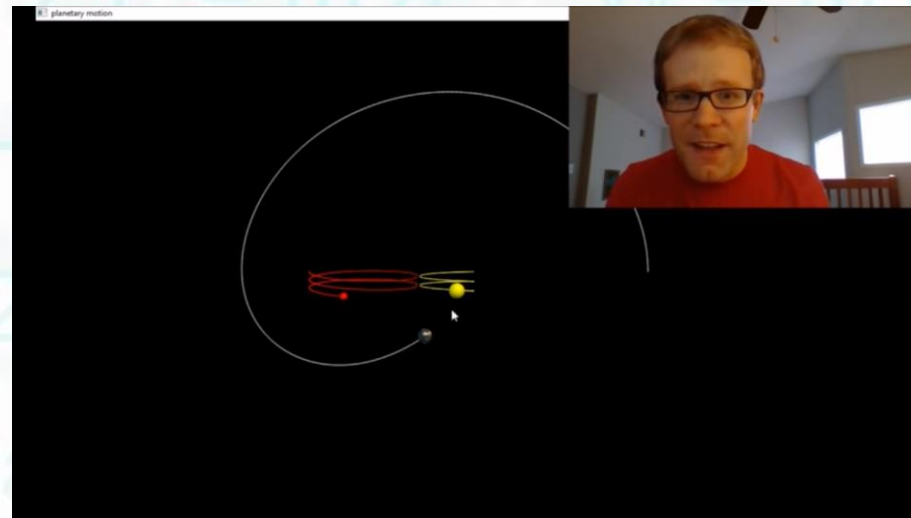
LET'S CODE PHYSICS

A PLAYFUL APPROACH TO LEARNING
COMPUTATIONAL PHYSICS

W. BRIAN LANE - JACKSONVILLE U. - @LETSCODEPHYSICS

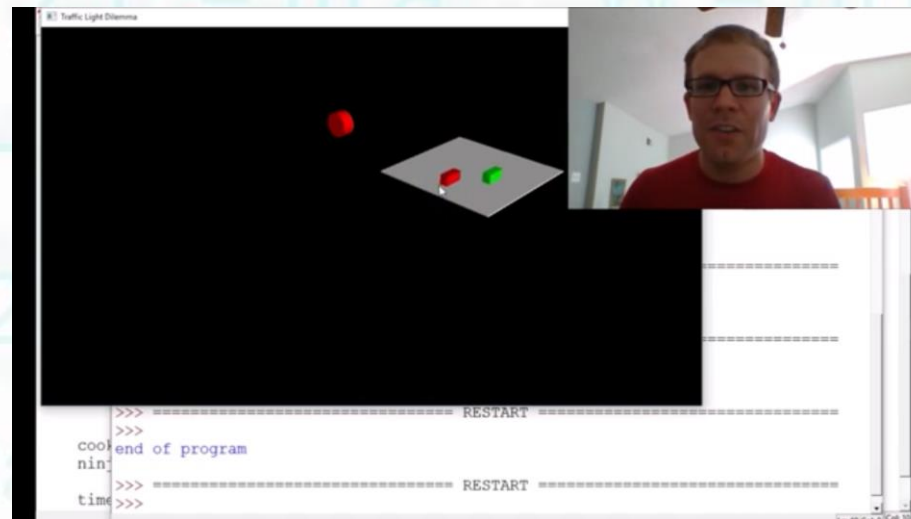
LET'S CODE PHYSICS (LCP)

- What is a Let's Code video?
- Goals of LCP
- Growth and successes
- Case Study: FTL series
- What's next?



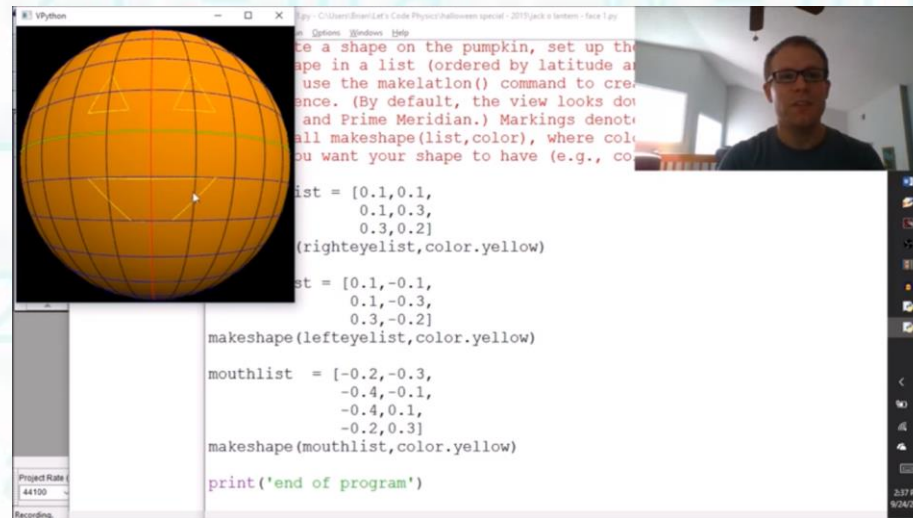
WHAT IS A LET'S CODE VIDEO?

- Record the development and implementation of a computer program.
- Make the code available so the viewer may “play along.”
- Offer commentary on the planning and revision.
- Discuss feedback with viewers.



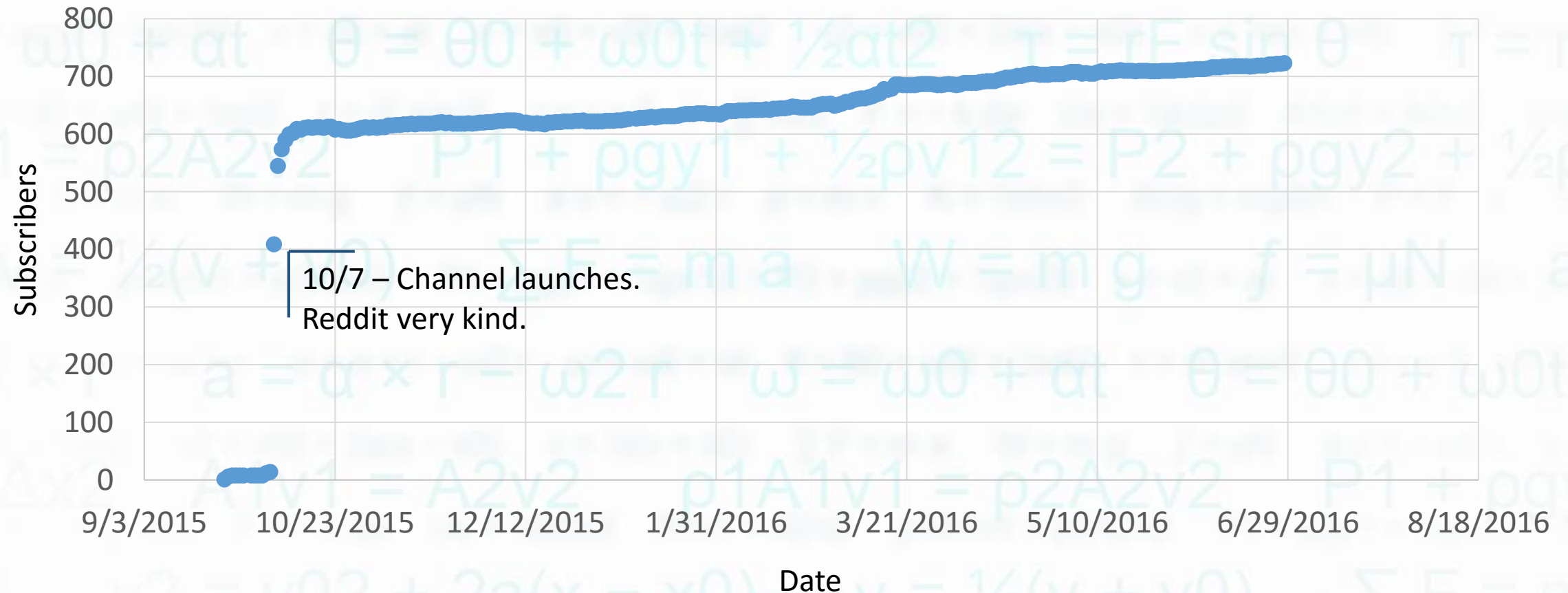
GOALS OF LCP

- Spread interest in computational physics.
- Demonstrate successful coding practices.
- Share ideas with viewers.
- Reduce programming's perception of dry formality.



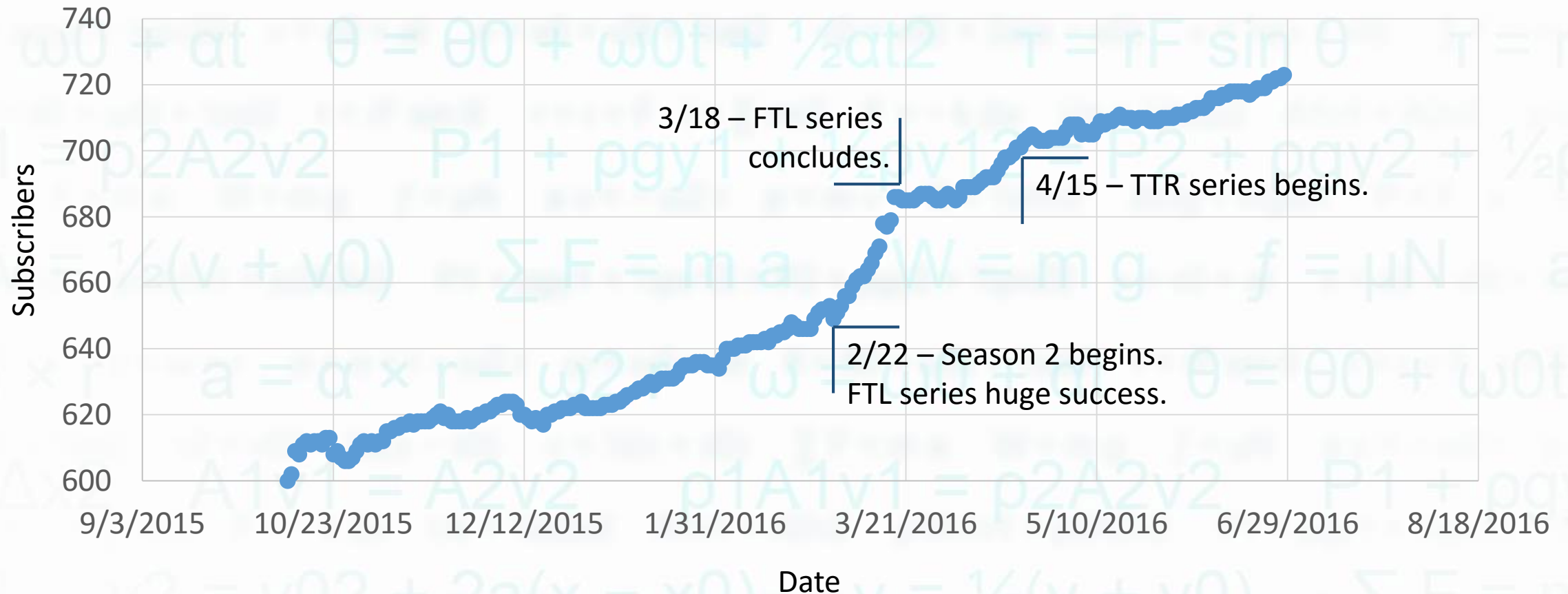
GROWTH AND SUCCESSES – SUBSCRIBERS

Subscribers (cumulative)



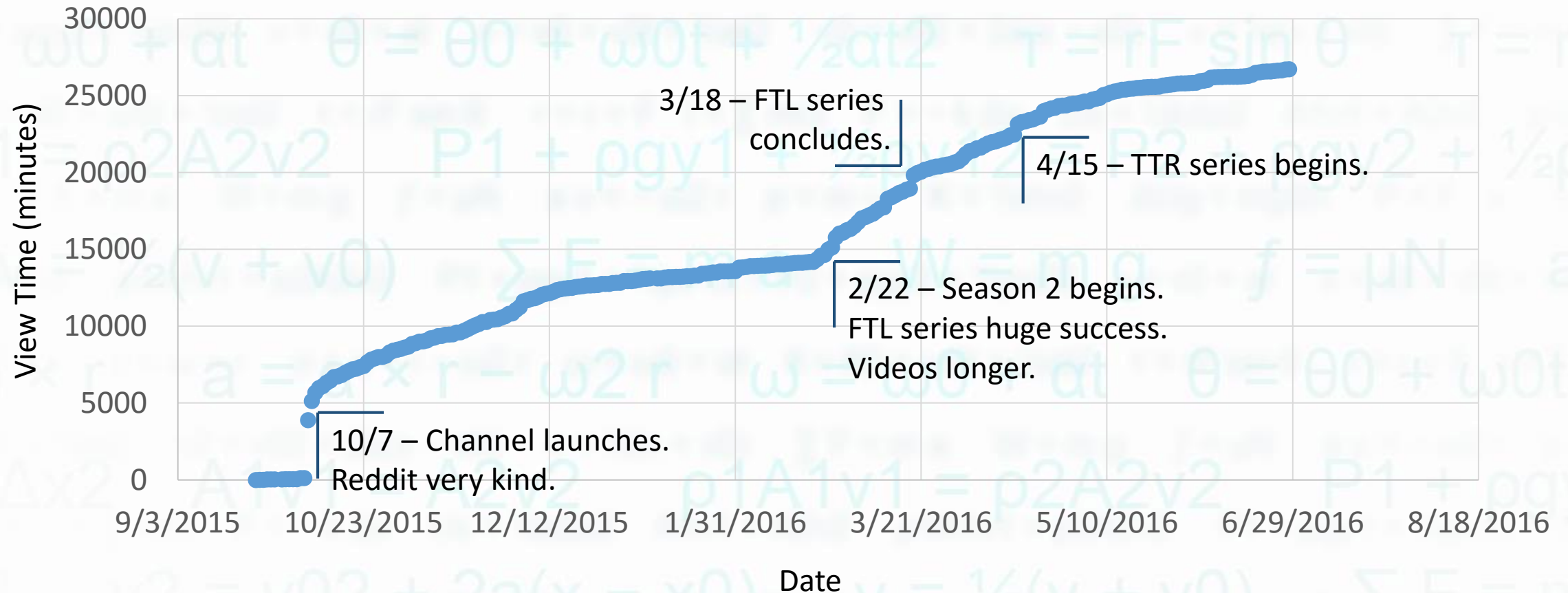
GROWTH AND SUCCESSES – SUBSCRIBERS

Subscribers (cumulative)



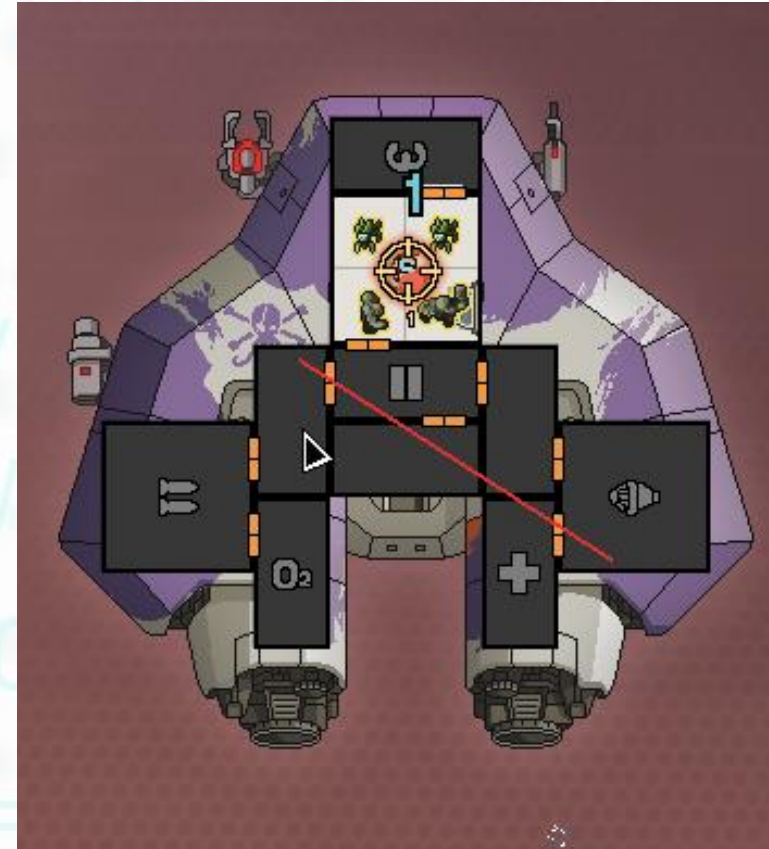
GROWTH AND SUCCESSES – VIEW TIME

View Time (Cumulative)



CASE STUDY – FTL SERIES

- Basic Problem: Cut through the most rooms* in an enemy ship** using a beam***.
 - *Damage calculation can vary.
 - **Ship is randomized.
 - ***Beams have different lengths.
- Largely trial and error.
- Series developed code to find optimal beam geometry.



CASE STUDY – FTL SERIES

↑ [-] mekloz 3 points 5 days ago*

↓ Cool. Takes a loong time to process if there are more than a couple rooms, or is that just my PC being slow?

 **Let's Code Physics** 5 days ago

+fdagpigj E I'd love to see it! I also need to try taking advantage of the ship's symmetry (for example, you only need to try half the combinations for a left-right symmetric ship, then print a mirror image along with the final result).

Reply · 👍 🗑️

 fdagpigj E 5 days ago

+Let's Code Physics Well that would obviously almost halve the running time, but there have got to be better improvements you can make. I haven't read through your source so I can't tell you what but if I understood right you're doing a full rotation, testing how many rooms the beam goes through? You could probably just pick two rooms and see if the beam could possibly be long enough to connect them and if it is, see how many rooms it could hit on the way or something like that. Well, I'm not sure yet how I'll go about it, but I'm thinking a mathematical approach would be faster than a brute-force approach.

Show less

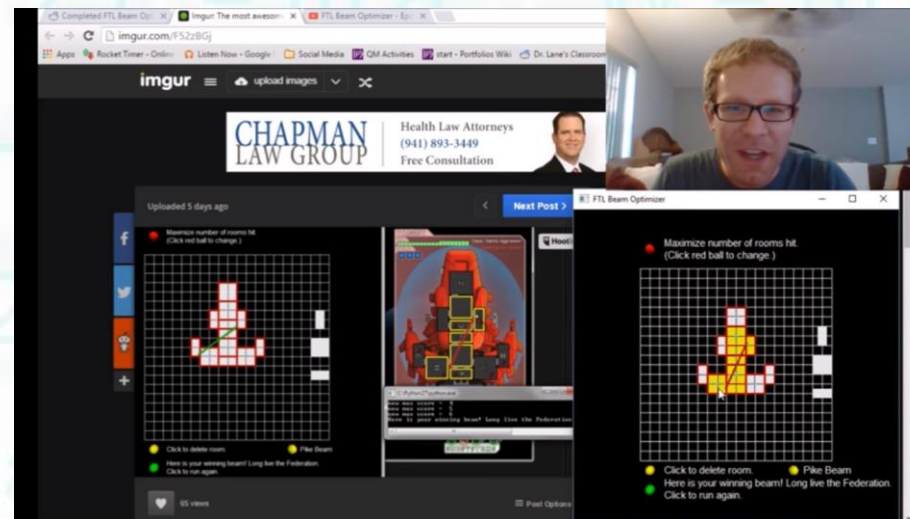
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consider half the beam combinations (with the other half being flipped across the central axis).

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CASE STUDY – FTL SERIES

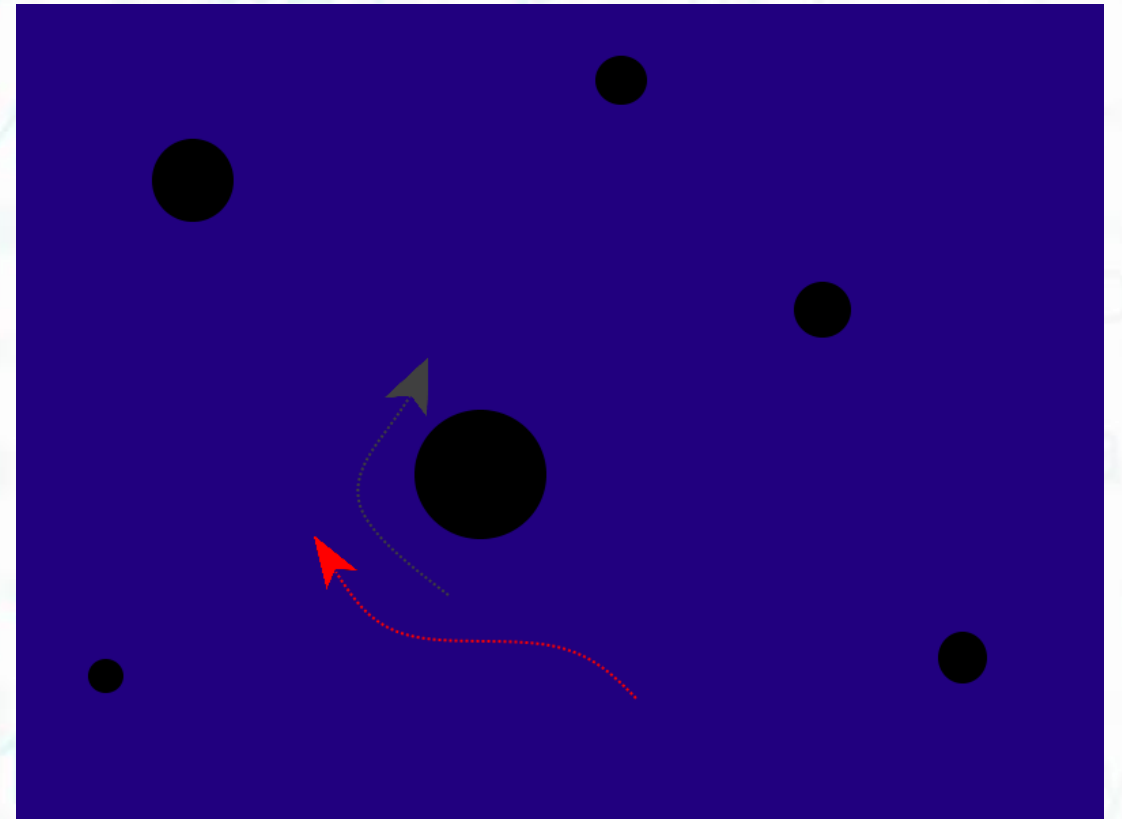
- Series largely a success because...
 - The topic solves a non-trivial problem the viewer regularly faces.
 - The primary audience is already technically oriented.
 - The primary audience is a centralized niche group.



LET'S CODE
PHYSICS

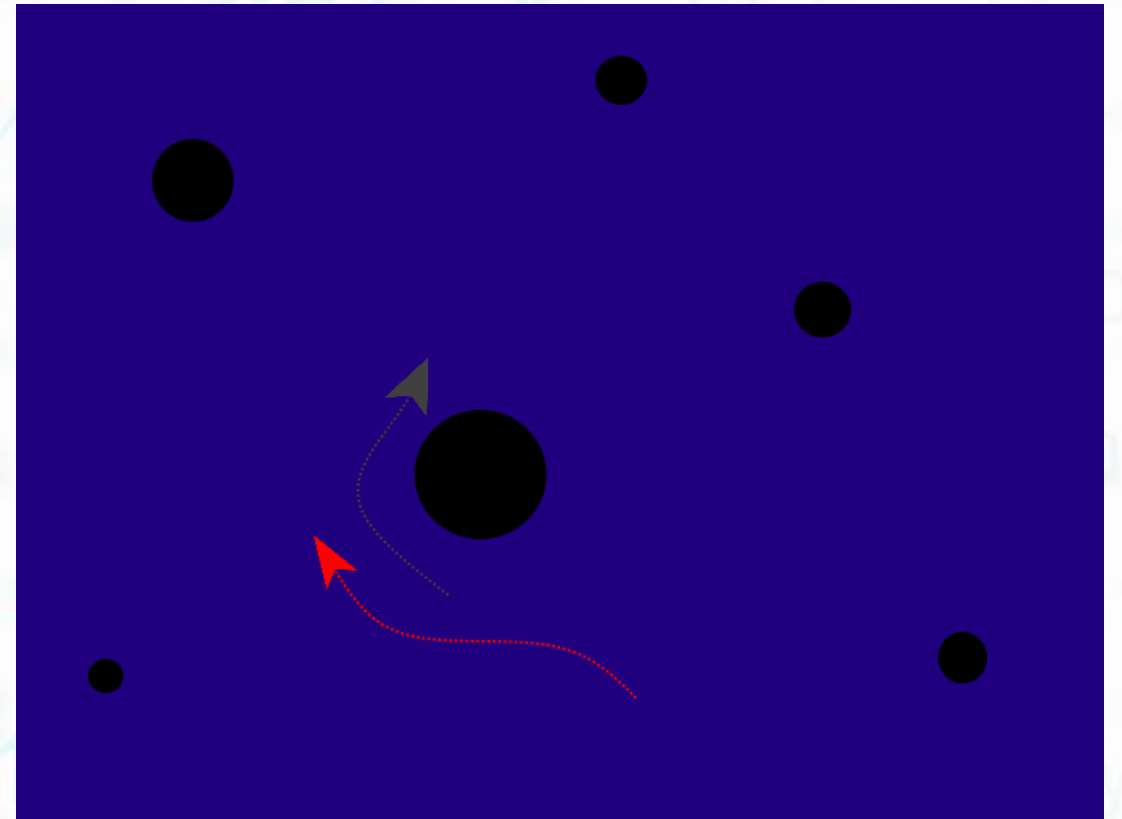
WHAT'S NEXT? BLACK HOLE BATTLES!

- Game premise: Outmaneuver your opponent in a randomized field of black holes.
- Physics elements: Inverse square law, conservation of energy & angular momentum, controlling force versus velocity.



WHAT'S NEXT? BLACK HOLE BATTLES!

- Programming elements:
Randomized array of black holes (relatively easy), computer controls of opponent ships (daunting).
- Currently learning Unity game engine.
- Will develop and test game on video, with requests for feedback.



SEASON 3 PREMIERES AUGUST 15!

LET'S CODE PHYSICS

- What is a Let's Code video?
- Goals of LCP
- Growth and successes
- Case Study: FTL series
- What's next – Black Hole Battles!

SEASON 3 PREMIERES AUGUST 15!

LET'S CODE
PHYSICS