Will Legg

03-08-2024

REFLECTION PROMPT:

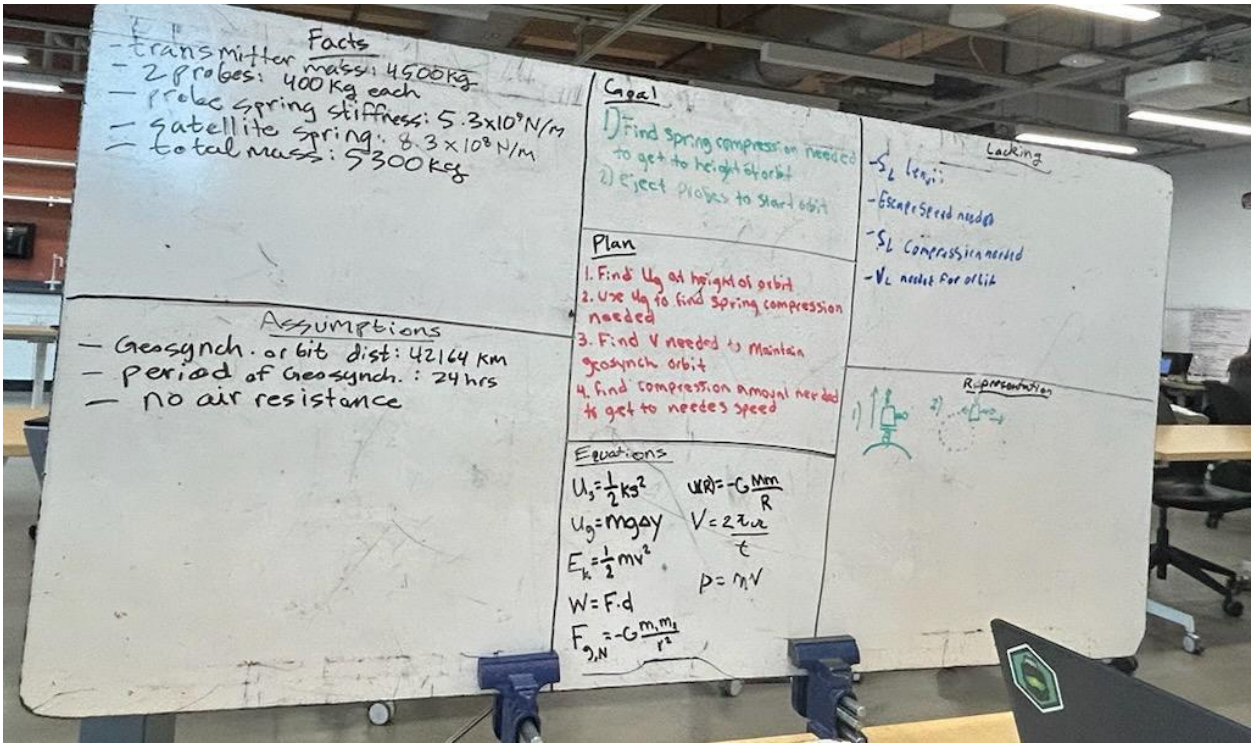
Reflecting on this week in class, were you able to improve on what you said last week? Why or why not? Be specific and provide supporting examples from class.
In our recent class sessions, we successfully implemented a numbering system for our representations and plans, carrying it through to our problem-solving process—a detail we overlooked in the previous week. I perceived that my contribution to the group was on par with that of other members, and I was pleased with my active involvement in our analysis and solution-seeking efforts. Work distribution within the group allowed me to engage in writing, drawing, and proposing ideas, facilitating my comprehension of the material.

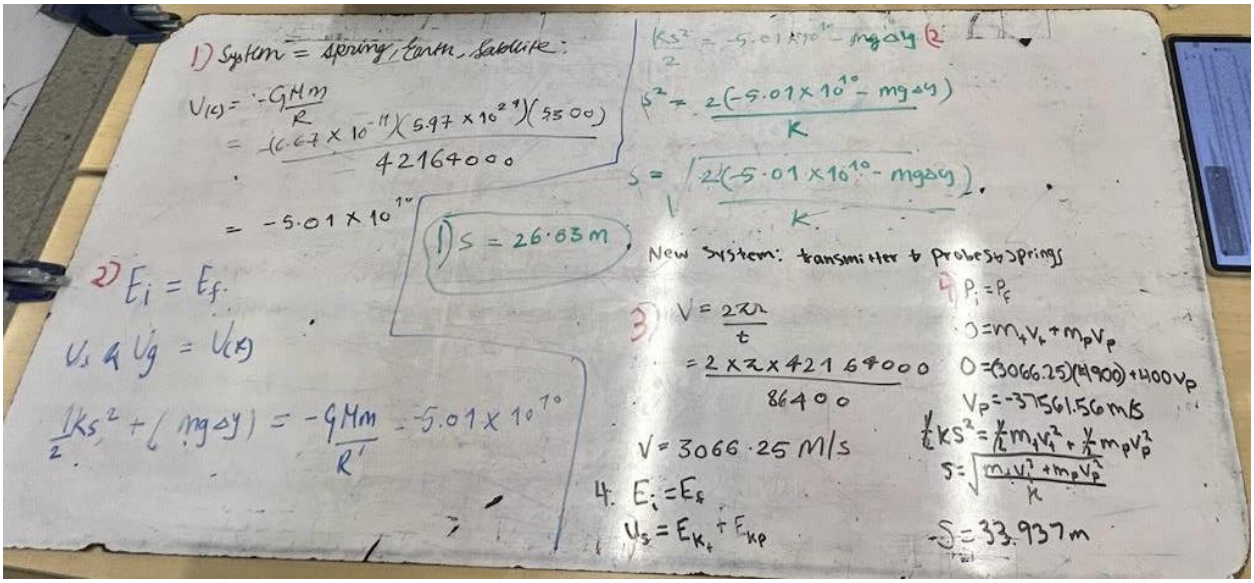
With the Group Project coming up on Thursday, what do you want to contribute to your group next week? What strategies might you try? Be specific.
With the Group Project approaching on Thursday, I intend to contribute actively to my group by building on the successful practices we implemented this week. Specifically, I want to maintain an equal level of engagement, drawing upon my effective contributions in writing, drawing, and proposing ideas during our recent class activities. To enhance my contributions further, I plan to complete some of the homework problems before our group meeting. This strategy has proven beneficial in the past, offering me a better understanding of the material and enabling me to actively participate in crafting plans and setting up equations during our collaborative sessions. In addition to individual preparation, our group will leverage the collaborative power of Google Docs to work simultaneously on our project. This real-time collaboration platform will facilitate seamless communication and coordination, allowing us to contribute efficiently and synergistically. Furthermore, to ensure our representations are clean, precise, and legible, we will utilize iPads for drawing and illustrating. This approach not only enhances the visual clarity of our work but also streamlines the collaborative process, contributing to the overall effectiveness of our group efforts.

Additionally, consider a member of your current group: 1. Who is someone that you think is contributing positively as a group member, and describe what it is they are doing. 2. What have you learned from them that you think you will apply in your next group?

Nicole and Miray have both had a strong influence in the current organization of our white boards, they always make sure to include relevant equations along with our usual four quadrants. We have also developed a numbering system and a plan to go along with solving process. I'd like to bring both of these things to my future group as they have helped make our process as legible as possible. Noah and Arunima have also been very eager to share the workload with other classmates and always volunteer to write/draw/solve any parts of the process. All of my group members have been very courteous and are always trying to make sure all of us are following the process and have a clear understanding of the concepts we are covering.

PASTE IMAGES OF YOUR THUSDAY WHITEBOARDS HERE:





1. 1st System: Satellite, Earth + spring because energy had to be conserved; this system accounts for all forces acting on the Satellite. 2nd System: transmitter, Probes + Springs because the energy was conserved and this system accounts for all forces on transmitter

2. To correct the over-compression, the top Probe could be disconnected which would give the transmitter a small downward velocity to return it to the orbit

3. This would change the gravitational potential energy which means the compression would have to be greater.

4. Friction would play the biggest role during the launch by putting in negative work the compression would have to be larger to make up for this.

5.

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```
#Objects
Earth = sphere(pos=vector(0,0,0), radius=6.4e6, color=color.blue)
Satellite = sphere(pos=vector(-42164000,0,0), radius=1e6, color=color.red, make_trail=True)

parrow = arrow(color=color.green)   #defines arrow for momentum
pscale = 0.5

farrow = arrow(color=color.purple) #defines arrow for net force
fscale = 5000

#Parameters and Initial Conditions
G = 6.7e-11
mEarth = 6e24
mSatellite = 4500
vSatellite = vector(0,3.074e3,0)
pSatellite = mSatellite*vSatellite
pHat=1/mag(pSatellite)*pSatellite   #defines pHat for calculating Fnet Parallel
#Time and time step
dt = 10
t = 0

#MotionMap/Graph
graphEnergy = PhysGraph(3)      #sets up energy graph
#Calculation Loop
while t < 60*365*24*60*60:
    rate(500)

    r = Satellite.pos - Earth.pos
    Fgrav = -G*mEarth*mSatellite*r/mag(r)**3

    Fnet = Fgrav

    Fpar = (Fnet.dot(pHat))*pHat        #Calculation to find Fnet Parallel
    Fper = Fnet-Fpar        #Calculates Fnet perpendicular

    pSatellite = pSatellite + Fnet*dt
    Satellite.pos = Satellite.pos + pSatellite/mSatellite*dt

    parrow.pos = Satellite.pos  #Updates momentum arrow while orbiting
    parrow.axis = pscale*pSatellite

    farrow.pos = Satellite.pos #Updates net force arrow while orbiting
    farrow.axis = fscale*Fnet

    if mag(r) < Earth.radius:   ##IGNORE THIS LINE
        break                   ##IGNORE THIS LINE
    Ug = -G*mEarth*mSatellite/mag(r)    #Defines gravitational potential energy
    Ek = 0.5*mSatellite*mag(vSatellite)**2   #Defines kinetic energy
    TME = Ug+Ek    #Defines total mechanical energy
    graphEnergy.plot(t, Ug, Ek, TME)   #Creates the graph of gravitational potential, kinetic, and total mechanical energy

    t = t + dt
```

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Edit this program Screenshot