An Example of how to use GO TUTORIAL on a Wiley Plus (WP) Assignment

On Assignment 2, students have the option of using GO TUTORIAL. Problem 34 is shown below:

Chapter 02, Problem 034

In the figure, a red car and a green car move toward each other in adjacent lanes and parallel to an x axis. At time \( t = 0 \), the red car is at \( x_r = 0 \) and the green car is at \( x_g = 221 \) m. If the red car has a constant velocity of 23.0 km/h, the cars pass each other at \( x = 44.1 \) m. On the other hand, if the red car has a constant velocity of 46.0 km/h, they pass each other at \( x = 76.8 \) m. What are (a) the initial velocity and (b) the (constant) acceleration of the green car? Include the signs.

Since I’ve done problem 34 in class, I recommend that students refer to the class notes.

1. Logon as usual and select assignment 2, click on problem 34 (red arrow).
2. Click on the **red arrow** at the GO Tutorial button, as in the figure below:
3. I've done problem 34 in class. It involves two cars traveling in the opposite directions, one (red) traveling at constant velocity to the right, the other (green) traveling to the left with an unknown initial velocity, \( v_{g0} \), accelerating, \( a_{g} \), at a constant rate to the left. We are asked to find \( v_{g0} \) and \( a_{g} \). The GO tutorial begins by asking the acceleration of the red car (see red arrow).
4. Since this is the right answer you will see a **green check mark**, as below. Click on the next button at the **red arrow** to proceed to the next step.

5. In Step 2 gives you a choice of 4 (p. 4) equations to use on the read car. I select the wrong equation 1 on purpose. This results in a **x No, sorry** as below:
By choosing the correct equation 2, and clicking the check your input button gives the correct green check mark, as in number 4, above. Click next to go to Step 3. 

**GO Tutorial**

Step 3: Solution Step 3 of GO Tutorial 02-034

1. \( v = v_0 + at \)
2. \( x - x_0 = v_0t + \frac{1}{2}at^2 \)
3. \( v^2 = v_0^2 + 2a(x - x_0) \)
4. \( x - x_0 = \frac{1}{2}(v_0 + v)t \)
5. \( x - x_0 = vt - \frac{1}{2}at^2 \)

For the first situation, what is the time at which the cars pass?

Number: ___________ Unit: ___________

The tolerance is +/-5%

For the first situation (see page 1) \( x_r = x_r0 + v_r t \) with \( x_{r0} = 0, x_r = 44.1m \), and \( v_r = 23km/h = 6.389m/s \). Giving \( t = 6.9 \) s. Insert 6.9 and s, and click the next button, as shown by the red arrow.

For the first situation, what is the time at which the cars pass?

Number: 6.9 Unit: ___________

The tolerance is +/-5%

This will take you to STEP 4. If you are cautious you can click the check your input button. But it does not really matter, since if your answer is wrong, clicking the next button will not take you to STEP 4.
6. This will take you to STEP 4, which involves the **green car**, of the GO TUTORIAL as in the figure below. Note that this is the first situation.

This step looks at the accelerating green car described by the equation

\[ x_g = x_{g0} + v_{g0}t + \frac{1}{2}a_g t^2 \]  

with \( x_{g0} = 221 \text{ m}, x_g = 44.1 \text{ m} \) (see page 1), and \( t = 6.9 \text{ s} \).

\[ 44.1m - 221m = (6.9s)v_{g0} + 0.5(6.9s)^2a_g \]. This gives

\[ -176.9m = (6.9s)v_{g0} + 0(23.8s^2)a_g \], which is a linear equation with two unknowns, \( v_{g0} \) and \( a_g \). It is easy to see that the acceleration (\( a_g \)) multiple inputs are 23.8 and \( s^2 \). The velocity (\( v_{g0} \)) multiple inputs are 6.9 and \( s \). The pure number (left hand side) input is simply -176.9 and \( m \). If you input these as and click check your input you will get the green check correct mark as shown above.

**NOTE FOR STUDENTS:** Why did I use \( t = 6.9 \) for the green car? **ANSWER:** The time \( t = 6.9s \) is the instant when the car passes each other, i.e. they are at the same position. \( x_r = x_g = 44.1m \). Student should note that initially (\( t = 0 \)), the cars are note at the same position, with the **red** at \( x_{r0} = 0 \) and the **green** at \( x_{g0} = 221m \). But the **red car** moves right and the **green car** moves left until at \( t = 6.9 \), they meet at \( x_r = x_g = 44.1m \).
7. **This brings you to GO TUTORIAL step 5.** For the second situation
\[ x_f = x_{r0} + v_r t \]
with \( x_{r0} = 0, x_f = 76.8 \text{m} \), and \( v_r = 46 \text{km/h} = 12.78 \text{m/s} \). Giving \( t = 6.01 \text{s} \). Insert 6.01 and s and clicking **check your input** button will give you the right answer as shown below. Click **next** button to go to the next step.
8. This will take you to STEP 6, which involves the green car, of the GO TUTORIAL as in the figure below. Note that this is the second situation.

This step looks at the accelerating green car described by the equation

\[ x_g = x_{g0} + v_{g0}t + \frac{1}{2}a_gt^2 \]

with \( x_{g0} = 221 \text{ m} \), \( x_g = 76.8 \text{ m} \) (see page 1), and \( t = 6.01 \text{ s} \).

\[ 76.8 \text{ m} - 221 \text{ m} = (6.01 \text{ s})v_{g0} + 0.5(6.01 \text{ s})^2a_g. \] This gives

\[ -144.2 = (6.01 \text{ s})v_{g0} + (18.06 \text{ s}^2)a_g, \] which is a linear equation with two unknowns, \( v_{g0} \) and \( a_g \). It is easy to see that the acceleration (\( a_g \)) multiple inputs are 18.06 and \( s^2 \). The velocity (\( v_{g0} \)) multiple inputs are 6.01 and \( s \). The pure number (left hand side) input is simply -144.2 and m. If you input these as and click check your input you will get the green check correct mark as shown above.

On the bottom the GO TUTORIAL states that “Now you have two equations with two unknowns, which can be solved …” for \( v_{g0} \) and \( a_g \). This is the end of the GO TUTORIAL.
9. As stated, there are two equations for two unknowns:

**Situation 1 (page 6):**

\[-176.9m = (6.9s)v_{\text{g}0} + 0(23.8s^2)a_{\text{g}}\]

**Situation 2 (page 8):**

\[-144.2m = (6.01s)v_{\text{g}0} + (18.06s^2)a_{\text{g}}\]

The solution (see class notes) : 
\[a_{\text{g}} = -3.705m/s^2\] and \[v_{\text{g}0} = -12.86m/s\] . Students should verify that this is correct by **direct substitution** into the two equations above!!!

But you must covert the initial (green) velocity to \[v_{\text{g}0} = -46.29km/h\]. Inputting these values and clicking the **submit button** leads to the correct answer for **Problem 34**, as shown below.

![Problem 34 Solution](image)