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## **Description**

Phys9000 is a multipurpose program designed to solve a variety of physics problems, even if the user does not know the formula they need. The program is aimed at high school students, and thus anyone in post-secondary education might find that the program is not advanced enough. I wrote this during my grade 11 University level physics course from the beginning of the year up until exam day, making sure not to miss a single formula. It should be useful to students in other grades as well, though.

## **Problem Types that can be solved**

- Time, distance, velocity
- Acceleration and time
- Acceleration and distance
- Gravity problems
- Net force problems
- Coefficient of friction
- Friction affecting acceleration
- Work and power
- Potential kinetic energy
- Potential gravitational energy
- Heat transfer with 1 or 2 objects  
(built in list of material types)
- Electrical circuit problems  
(coulombs law, electrical charge, current,  
voltage, resistance, power, transformers)
- Universal equation solver
- Trigonometry formulas
- Unit conversion
- And more

## **Using the Program**

Phys9000 uses a menu based system, divided into categories and subcategories. You can navigate the menus by scrolling or by typing the number of the list item you want. (the standard TI-Basic list system) Once you have selected a problem, the program will ask you for the necessary variables. You must enter all of them except one. For the variable you don't know, simply type "X". The formula will be displayed, along with the answer, with and without scientific notation. Phys9000 does not net have a significant digit feature, so remember the sig-dig rules when recording the answer on paper.

## **Calculator Requirements**

10,094 bytes of available memory

PhysLib and Pic1 must both be installed for the program to work. There is not yet any way to disable the title screen without changing the source code, but TI-Basic users should find it very easy. If the line that shows Pic1 is removed, the program will fall back to a text based title screen already included.

## **Trouble Shooting**

1. Solver takes forever, then crashes.

Make sure you entered the variables correctly. If this doesn't help, then the solver just isn't capable of solving your problem. There's not much else you can do.

2. The program returns a wrong answer.

Try it again with a different problem. If the program still returns a wrong answer, send me an email detailing the problem and I'll try to fix it in the next release.

3. I want to add a new problem type.

Try using the universal equation solver instead.  
You can manually add a new problem type by editing the program.

(if you know TI-Basic) Follow this simple template:

In this example, we'll solve a  $V = d \cdot t$  problem.

```
LABEL [ANYTHING AFTER P]  
CLRHOME  
DISP "X = UNKNOWN"  
DISP ""  
INPUT "SPEED? ", STR1  
INPUT "DIST? ", STR2  
INPUT "TIME? ", STR3  
STR1 -> Y1 // CONCATENATION OF STRINGS WILL VARY FOR EACH PROBLEM  
STR2 + "*" + STR3 -> STR4 // BUT HOPEFULLY YOU GET THE IDEA...  
STR4 -> Y2  
PRGMPHYSLIB  
PAUSE  
GOTO Z
```

Don't forget to edit the menu system as necessary.

If you aren't comfortable with TI-Basic, send me an email requesting the feature you want and I'll try to include it in the next release. I take support emails for my programs seriously, so you can be sure I'll read your message and take it into consideration. I also reply to all support emails, so you'll know if I got it. You can expect a reply within one week.

### **To do List**

- Make a lite version without the title screen
- Fix the frequency to period solver
- Put the unit conversions in a separate category
- Add more unit conversions
- User friendliness upgrade
- Add stuff specific to grade 12 physics
- Complete menu system overhaul

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