YP Projectiles 1.1

A projectile motion simulator.

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Price (Shareware): $20 US

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Program description:
YP Projectiles is a projectile motion simulator used in physics classes.   To simulate a trajectory, the user chooses the initial velocity (magnitude and direction), the vertical displacement component and the gravitational acceleration.   The software then draws the parabolic trajectory and writes its main characteristics: range, maximum height reached, etc.
During the simulation, it is possible to display three vectors: acceleration, velocity and position, and four graphs: acceleration, velocity, position and energy versus time.   Many trajectories can be superposed in the same window.   Trajectories, numerical data and graphs may be printed or copied to be used in other software.   Trajectories may be also saved as PICT files.

New in this version:
YP Projectiles 1.1 features a new graph displaying mechanical energy, kinetic energy and gravitational potential energy versus time.

Required Hardware and Software: YP Projectiles runs on any Macintosh computer with Mac OS 7.0 or later.   It needs about 250 Kb on your hard disk and 1 Mb of RAM.   The software runs on older Macs with 68000 processors (Mac Plus, Mac Classic), but simulations are slower.

Getting Started:
On launch, YP Projectiles displays three windows on the screen: the animation, the numerical results, and the initial conditions.
Select the "Start Animation" item from the "Trajectories" menu to see a trajectory animated in the animation window, and its characteristics displayed in the numerical results window.
The initial conditions dialog allows you to change the initial velocity and the

vertical component of displacement.
Change the gravitational acceleration with the "Gravity" item in the "Trajectories" menu.
Choose an item from the "Vectors" menu to display the corresponding vector during the animation: acceleration, velocity or position.
Choose an item from the "Graphs" menu to display the corresponding graph during the animation: acceleration, velocity, position or energy versus time.

Using YP Projectiles:

Note: To help you explore all menus of the program, you may use balloon help (with the "?" menu, in the top right corner of the screen).

The main windows:
- Animation window: When you choose the "Start Animation" item from the "Trajectories" menu, trajectories are animated in this window.   When several trajectories are displayed in this window, you can select one of the trajectories by clicking on it.   When the animation window is active, the coordinates of the mouse are displayed in the bottom right corner of the window.   You can move and resize this window.

-   Numerical results window: This window displays the main characteristics of the last drawn trajectory, or the selected trajectory: the magnitude and orientation of the initial velocity, the gravitational acceleration, the vertical component of displacement, the range (horizontal component of displacement), the maximum height reached (relative to the initial position of the projectile), and the time of flight.

-   Initial conditions dialog: In this dialog box, you can type the characteristics of the trajectory that you want to simulate: the magnitude and orientation of the initial velocity, and the vertical displacement component.   The numerical values may be written in scientific notation if desired (ex: +3.5E-4   ;   the exact syntax depends on the settings of your operating system, in the "Numbers" control panel).

Menus:

"Apple" Menu:

Use this menu to
        - open an item from the Apple Menu Folder
        - read information about YP Projectiles
        - consult online help
        - unlock your copy of the program.

- "About YP Projectiles..." item : When you select this item from the Apple menu, a dialog box showing information about the version number and copyright is displayed, as well as whether your copy of the software has been registered or not.

"Unlock" button: This button is visible only if your copy of the software has not been personalised.   After receiving your personal unlocking code, click on this button to open another dialog box so that you may enter (or paste) your name and your unlocking code in the appropriate zones.

"Help & Info" Button: This button gives you access to online help.

"File" Menu:

Use the "File Menu" to
        - save the contents of the active window as a PICT file,
        - close the active window,
        - print the active window,
        - quit the application YP Projectiles.

"Save as PICT..." item:

When you select this item from the "File" menu, trajectories that are displayed in the animation window are saved as a PICT file, which can be open by any draw or paint program.

"Close Window" item:

When you select this item from the "File" menu, the program closes the active window.

"Page Setup..." item:

Use this item when you want to use a different paper size, or orientation.

"Print" item:

Use this item to print the content of the active window.   You can print trajectories and graphs.

"Quit" item:

Use this item from the file menu to quit the program "YP Projectiles".

"Edit" Menu:

The "Cut", "Copy", "Paste" and "Delete Selection" items are available when a dialog box allowing text typing is active.
The "Copy" and "Delete Selection" items are also available when the animation window is active, so you can copy trajectories into the clipboard, or delete the selected trajectory   (select a trajectory by clicking on it with the mouse).
Use the "Delete all Trajectories" item to erase all of the trajectories displayed in the animation window.

"Trajectories" Menu:

Use this menu to:
     - start the simulation,
     - display the characteristics of the
        trajectories,
     - set initial conditions,
     - choose gravitational acceleration or units,
     - select the auto delete option.

"Start Animation" item:

Use this item from the "Trajectories" menu to start the animation.

"Show info" item:

When you select this item from the "Trajectories" menu, the numerical results window is displayed on screen (if it had been closed).

"Initial Conditions"   item:

When you select this item from the "Trajectories" menu, the initial conditions dialog is displayed on screen (if it had been closed).

"Gravity" item:

Use this item to change the numerical value of gravitational acceleration (at startup, acceleration is 9.8 m/s^2).   A pop-up menu allows you to choose the gravitational acceleration on any planet of the solar system, but you can also enter the desired value from the keyboard.

"Units" item:

By default, all numerical values are in meters and in seconds at startup.
If you want, you can use this hierarchical menu to choose other units: centimeters, kilometers, inches, feet, miles, minutes or hours.

"Auto Delete" item:

When this item is checked, only one trajectory is displayed at any one time in the animation window, the previous trajectory being deleted automatically.
If this item is not checked, the new trajectory is traced over the the previous trajectories.

"Slow Motion" item:

If you use a fast computer, you may want to show an animation in slow motion, for example to have a better view of the relation between a vectorial representation and a graph during the animation.   Then you should find this item useful.

"Vectors" Menu:

Use this menu to display a graphical representation of the acceleration, velocity and position vectors.   You must then use the "Start Animation" item from the "Trajectories" menu to see the vectors.   It is possible to display all 5 vectors simultaneously, but the quality of animation may suffer.   For best performances, display only one or two vectors at a time.

"Graphs" Menu:

Use this menu to display one or several of the following graphs during animation:
- Horizontal acceleration component
  versus time
- Vertical acceleration component
  versus time
- Horizontal velocity component
  versus time
- Vertical velocity component
  versus time
- Horizontal displacement component
  versus time
- Vertical displacement component
  versus time
- Mechanical energy, kinetic energy,
  gravitational potential energy
  versus time

Use the "Start Animation" from the "Trajectories" menu to see the progression of the graphs during the animation. It is possible to display all 7 graphs simultaneously, but the quality of animation may suffer.
(By using the appropriate items of the "File" and "Edit" menus, it is possible

to print, copy or save these graphs as PICT files).

YP Projectiles supports Balloon Help.   Use this menu to show or hide help balloons, and to display online help.

Ordering information:
YP Projectiles is shareware.   The unregistered version of YP Projectiles may be freely distributed to allow anybody to try it before registering.   You are permitted to upload it to a BBS, distribute it on a CD-ROM, or give a copy to a friend.

If you want to use YP Projectiles on a regular basis, you must pay for a user licence.   You will then receive an unlocking code that will allow you to personalise your copy of the program.

The unregistered version have the following limitations:

- the mention "This copy is for evaluation only." is permanently displayed in the main window.

- one item from the "Vectors" menu and one item from the "Graphs" menu are not available (the unavailable animation is chosen randomly at startup).

Your unlocked version will have the following advantages:

- the mention "This copy is for evaluation only." will never be displayed again in the main window.

- all items of the "Vectors" and "Graphs" menus will be available.

- in addition, you will be able to unlock all future updates of YP Projectiles with the same unlocking code.

Methods of Payment:

You can pay your license to one of those two companies: Kagi (located in the United States) and ShareIt! (located in Germany).

If you use Kagi, it is possible to pay by credit card (Visa, Master Card, American Express), by check or postal money order (in american dollars), with cash, or by "First Virtual".   For more information about registering YP Projectiles with Kagi, please read the file "Registering with Kagi".

If you choose ShareIt!, you can pay by credit card (Visa, Mastercard/Eurocard, American Express and Diner's Club), by bank transfer/wire, by check, by eurocheque, or cash.   For more information about registering YP Projectiles with ShareIt!, please read the file "Registering with ShareIt!".

Detailed Prices:

Single User License: A $20.00 US registration fee will license one copy of YP Projectiles for use on any one computer at any one time. For example, one copy may be used by any number of people and may be freely moved from one computer to another as long as there is no possibility of it being used simultaneously on more than one machine.

Site License: A license covering all locations for your organization within a 160 kilometer radius of your site (100 miles), is available at the price of $300.00 US.

Technical Support:
If you have any comments or suggestions, please feel free to email me at pelletier@kagi.com   (or ch865@freenet.carleton.ca).

Other Physics Software From Yves Pelletier:
Ray Optics:
        YP Image constructs ray diagrams explaining
            image formation by mirrors and thin lenses.
        YP Reflection simulates the reflection of a
            laser ray on plane mirrors.
        YP Refraction simulates the reflection of a
            laser ray in a prism.
Classical Mechanics:
        YP Projectiles is a projectile motion
             simulator.
        YP Circular is a uniform circular motion and
            simple harmonic motion simulator.

Mechanisms:

YP Slider Crank simulates the motion of a piston activated by a slider crank mechanism.

YP Planetary Gear is a planetary gear train simulator.

To download the latest versions: http://www.kagi.com/pelletier