Projectile Motion Calculator and Visualizer User Guide

Quick Start

1. Extract the contents of the zip archive. You can download the archive from here.
2. In your terminal or environment of choice navigate to the folder containing the project files.
3. Make sure you have Python version 3.x.x installed.
4. Make sure you have *pip* installed. It normally comes preinstalled with Python but if it is missing you can install it following these instructions.
5. Install the required packages automatically (substitute *pip* with *pip3* if it fails):

   pip install -r requirements.txt

   Or install them manually. The packages used are:
   - *Pygubu*
   - *Matplotlib*
   - *Termcolor*
   - *Ttktheme*
6. Run the app from the folder containing the project files (substitute *python* with *python3* if it fails):

   python main.py
7. Extras:

   - The project includes an automatic testing suite for core functions (find the tests run in automatic_test.py):

   python automatic_test.py

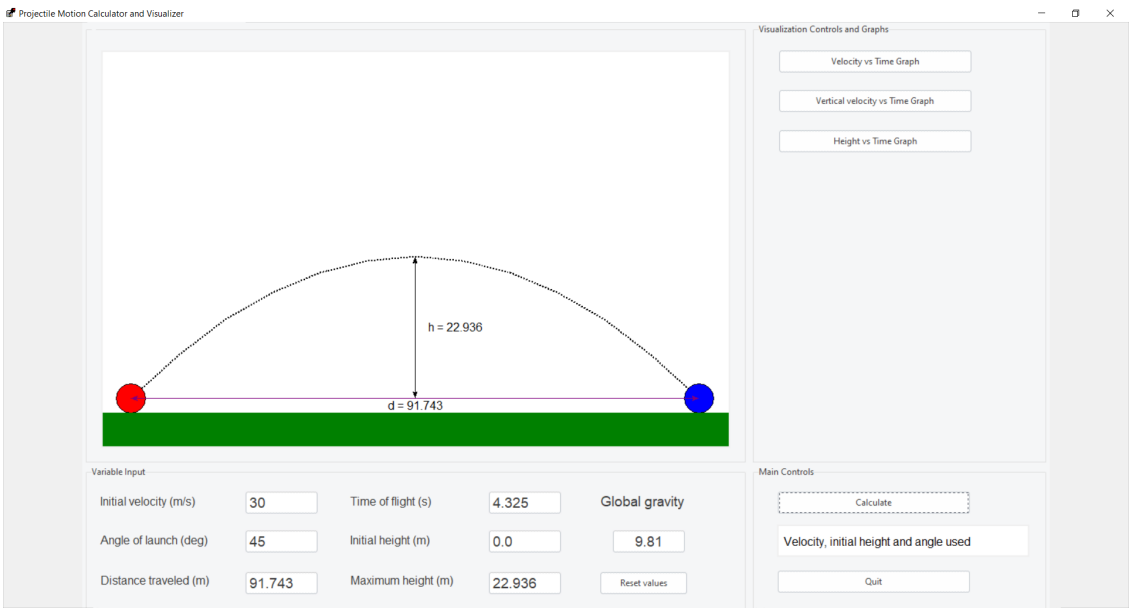
   - A manual test file is also included:

   python Test.py

   - If you want to uninstall the packages needed for this project run:

   pip uninstall -r requirements.txt

Usage Guide



- Type the known variables in the appropriate input boxes in the *Variable Input* section.
- Press the *Calculate* button in the *Main Controls* section to trigger the calculation. The program will select the appropriate function for the input and fill the other boxes with the resulting values for the other variables and display which input was used or display an error if it failed.
- There are four input combinations available:
    - Launch velocity, launch angle and initial launch height
    - Time travelled, launch angle and initial launch height
    - Time travelled, distance travelled and initial launch height
    - Time travelled and initial height (this input has only maximum height as output)
- Press the *Reset* button in the *Variable Input* section to set all input back to 0 and gravity to 9.81.
- In the *Visualization Controls and Graphs* section, you can choose to see the graphs related to the results of the calculation.
- Press the *Quit* button in the *Main Controls* section to exit the program.

Known issues

- There is no trajectory line when the initial height is non-zero because we can't draw it properly using Tkinter's canvas.
- The graphical elements are slightly off on Windows machines but the general layout is kept.
- Input fields unexpectedly pass the validation and create unexpected behaviours.