**Guide:**

A) INPUTS and CHANGE STATES: (Raul y Alex)

Hay he hacer estados: int current\_state = 0;

Entonces, a medida que se pase de "pantalla", se va actualizando:

0 - welcome

1- tutorial

2- data input

3- selection between test and final data

4- test

5- final data (final frame, newton y representación)

0) le das a RETURN para continuar

1) le das a RETURN para continuar

2) Se pone en input como está hecho ya (vas poniendo el input y RETURN para seguir). RETURN para llegar a la selección

3) int integrator\_sel = 0;

Se le pedirá que escriba 1 si quiere el test o 2 si quiere final data. Cualquier otro número le mostrará en pantalla que es un error y que pruebe el número 1 o 2

4) frame por frame, al final muestra final frame, newton y con RETURN vuelve al estado 1

6) final data, si le das al RETURN vuelve al estado 1.

B) REDACTADO/GUÍA (Albert)

0)

- - - - - - Welcome to the Verlet Integrator - - - - - -

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This project has been done for CITM-TTC under the MIT License.

Press RETURN to continue.

Press ESC / 0 to exit.

1)

- - - - - - How this code works - - - - - -

Instructions will be shown all the time.

The first step is to INPUT THE DATA:

Use the numbers to input the data you are being asked for and press RETURN once you have finished writing.

You will be asked for the initial data: position x and y, speed vx and vy, acceleration ax and ay, a radius, a density and elapsed time. Also forces in the x and y axis and a coefficient of friction and elasticity can be added.

The second step is to choose what you need to know:

If you want to print every frame, you will need to choose "TEST OF THE INTEGRATOR". You will need to write "1" when asked. Take into account that while the code is calculating each frame, you will be able to pause and unpause the representation.

If you only want the final data, you will need to choose "FINAL DATA". This will show you the data of the first and last frame, the final data calculated with Newton's Laws and a representation of the ball's movement.

Finally, to return to this screen, you will need to press RETURN again.

You can always use ESC to exit the Verlet Integrator.

Press RETURN to continue.

Press ESC / 0 to exit.

2)

- - - - - - Initial Data Input - - - - - -

// tal i com està a l'integrador, cal afegir el següent //

Press RETURN to continue.

Press ESC / 0 to exit.

// que no comenci a calcular els frames directament!!! //

Initial position ***xo*** (m):

Initial position ***yo*** (m):

Initial velocity ***vxo*** (m/s):

Initial velocity ***vyo*** (m/s):

Initial acceleration ***axo*** (m/s2):

Initial acceleration ***ayo*** (m/s2):

Side of the cube ***L*** (m):

Initial horizontal force ***Fxo*** (N):

Initial vertical force ***Fyo*** (N):

Coefficient of friction ***mu***\*:   
0<=mu<=1, otherwise it will be set to 0.

0 for inelastic collision, 1 for elastic collision\*:  
\*if the value is differrent from 0 or 1, it will be set to 0

Elapsed time ***dt*** (s):

Density of the cube ***ro*** (kg/m3) :

3)

- - - - - - Select the integrator mode - - - - - -

Here you should choose between two modes:

[PRESS 1] TEST OF THE INTEGRATOR  
If you want to show all the frames in the integration. At the end, you will be able to compare the results with the Newton's Laws.

[PRESS 2] FINAL DATA  
If you want to show only the final data. The initial data you inputed, the data of the last frame computed by the integrator and by the Newton's Laws and a graphic representation of the CUBE's movement will be shown.

Press ESC / 0 to exit.

4)

- - - - - - Test of the Verlet Integrator - - - - - -

// data com surt ara a l'integrador, frame per frame, només els resultats //

// quan acabi //

Press RETURN to go to "How this code works".

Press ESC / 0 to exit.

5)

- - - - - - Verlet Integrator: Final results - - - - - -

// data primer frame o data inputed //

// data de l'últim frame: POSICIÓ, VELOCITAT, ACC, TEMPS, FORCES //

// data en la posició de l'últim frame calcualda amb NEWTON //

// representació gràfica comenci //

Press RETURN to go to "How this code works".

Press ESC / 0 to exit.

INTEGRATOR

Final position ***xf*** (m):

Final position ***yf*** (m):

Final velocity ***vxf*** (m/s):

Final velocity ***vyf*** (m/s):

Final acceleration ***axf*** (m/s2):

Final acceleration ***ayf*** (m/s2):

NEWTON'S LAWS

Final position ***xf,N*** (m):

Final position ***yf,N*** (m):

Final velocity ***vxf,N*** (m/s):

Final velocity ***vyf,N*** (m/s):

Final acceleration ***axf,N*** (m/s2):

Final acceleration ***ayf,N*** (m/s2):