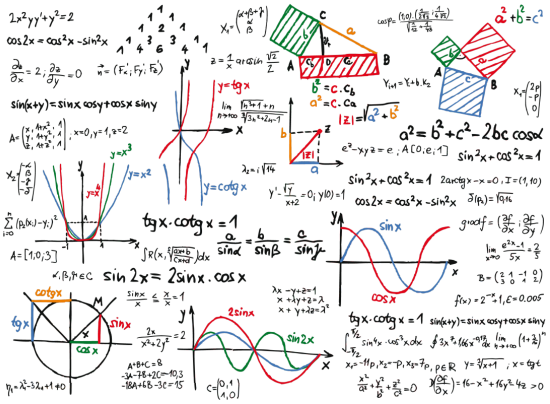

B1- Mathematics

B-MAT-100

101pong

Vectors and video games

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Pong game

Vectors and video games

binary name:	101pong
repository name:	101pong_$ACADEMICYEAR
repository rights:	ramassage-tek
language:	C, C++, perl 5, python 3 (≥ 3.5), ruby 2 (≥ 2.2), php 5.6, bash 4
group size:	1 to 2
compilation:	via Makefile, including re, clean and fclean rules

- Your repository must contain the totality of your source files, but no useless files (binary, temp files, obj files,...).
- All the bonus files (including a potential specific Makefile) should be in a directory named *bonus*.
- Error messages have to be written on the error output, and the program should then exit with the 84 error code (0 if there is no error).

Subject

Pong, developped as an arcade game in 1972 by Ralph Baer (Atari), is the first ever successful video game. It was inspired by the very first video game, *Tennis for Two*, developped in 1958 by William Higinbotham on an oscilloscope.

The goal of this project is to work on a 3d version of this game (or of the Brick Break game by the way...) ; only one bat will be considered, moving only in the 0-altitude plan (which happens to be (Oxy)).

Bounces on the bat and ends of game will not be taken into account ; in other words, only the ball movement is considered, whatever the context.

Your program have then to print :

- the coordinates of the ball speed vector,
- the ones of the ball in a given amount of time,
- the angle at which the ball will hit the bat (if ever the ball will indeed hit the bat, at anytime from t=0).

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Usage

```
Terminal
~/B-MAT-100> ./101pong x0 y0 z0 x1 y1 z1 n
```

x0 ball abscissa at time $t-1$
y0 ball ordinate at time $t-1$
z0 ball altitude at time $t-1$
x1 ball abscissa at time t
y1 ball ordinate at time t
z1 ball altitude at time t
n time shift (greater than or equal to zero, integer)

Bonus

- ball acceleration management,
- a graphical interface,
- a full 2d Pong game,
- a full 2d Brick Breaker game,
- a full 3d Pong game,
- a full 3d Brick Breaker game,
- a spherical bat,

Examples

```
Terminal
~/B-MAT-100> ./101pong 1 3 5 7 9 -2 4
The speed vector coordinates are :
(6.00;6.00;-7.00)
At time t+4, ball coordinates will be :
(31.00;33.00;-30.00)
The ball won't reach the bat.
```

```
Terminal
~/B-MAT-100> ./101pong 1.1 3 5 -7 9 2 4
The speed vector coordinates are :
(-8.10;6.00;-3.00)
At time t+4, ball coordinates will be :
(-39.40;33.00;-10.00)
The incidence angle is :
16.57 degrees
```

The incidence angle should be contained between 0 and 90 degrees.

Mind the float numbers precision !

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