BAL

The Game for Smart People

by Fred Bolder

Index

Foreword

The name of this game is the dutch word bal which means ball and the game contains of course many different balls.
The first Bal game was programmed by Fred Bolder in Turbo Pascal. Later it was converted by Fred Bolder to C# and many levels and new objects were added. During a webdevelopment course, Fred Bolder made together with Michał Kotkowicz, Donnie Avant and Diana Sahlean the web site Games From Scratch including the game Bal.
Bal was totally rewritten for JavaScript. The series 1 levels were copied from the C# bal game, but most of the other levels were made during the course. The C# bal game has more level series, but they were not copied.
Later Fred Bolder decided to make a separate Bal web site based on the Bal code from Games From Scratch, but most of the code had to change a lot, because of the many new objects and possibilities. There were many new levels added, including most levels from the C# bal game.
It is best to play this game on a PC, but there are also a lot of small size levels included that were made to play on a phone. The recommended browser for playing this game is Google Chrome, but many other browsers can also be used.
This documents gives perhaps more information than you want to know. Decide for yourself if you prefer to discover new objects while playing or if you want to be prepared.

Bal - The Game for Smart People
https://bal-online.onrender.com/

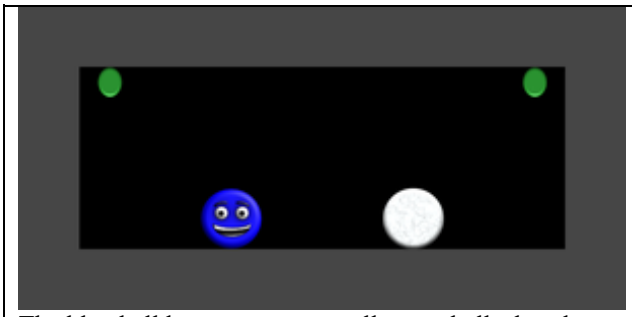
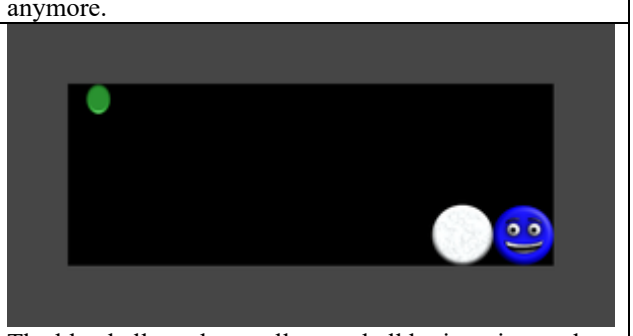
Official Bal YouTube channel
https://www.youtube.com/@Bal-TheGameForSmartPeople

Playing the game

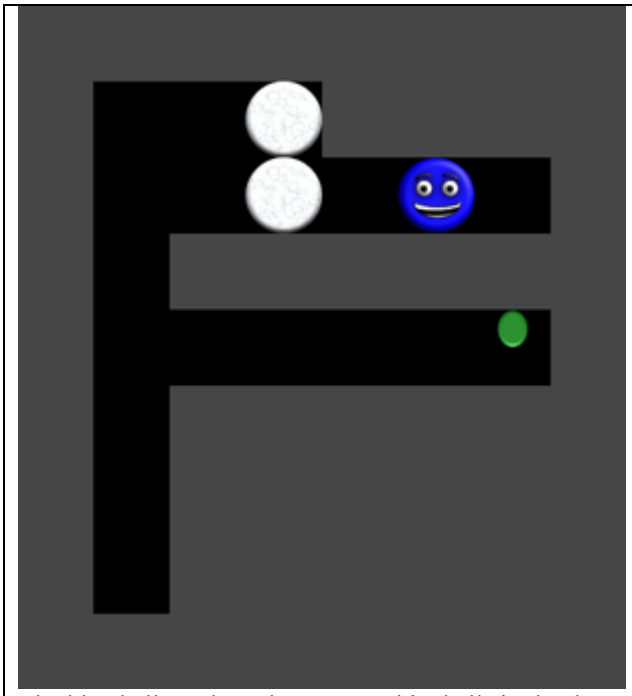
In every level you control the blue ball with the happy face. You have to eat all the small green balls. You can push the white balls and the light blue balls, but not more than 2 at the same time. The light blue balls are floating balls and they will always stay at the same height. Red balls and red fish are very dangerous. If you push a yellow ball, it will continue as far as possible. You cannot push more yellow balls at the same time or push a yellow ball together with another ball. You can push a yellow ball in the directions left, right, up and down. A purple ball is almost the same as a yellow ball, but when you push a purple ball, it will go only one position further. You cannot push a ball through a one direction, a teleport, a game rotator or a door with a lock. You can control the blue ball with the letter keys, the arrow keys or the arrow buttons. In the water you can swim in every direction.
When you solve a level, you will get a code that gives you access to the next level whenever you want by pressing the Code button, so it is important to write down the code. If you don't delete your browser data, you can also use the Overview page. Some levels are very difficult. If you can't solve a certain level, you can press the ? button and choose Hint or start with another series.

Tips

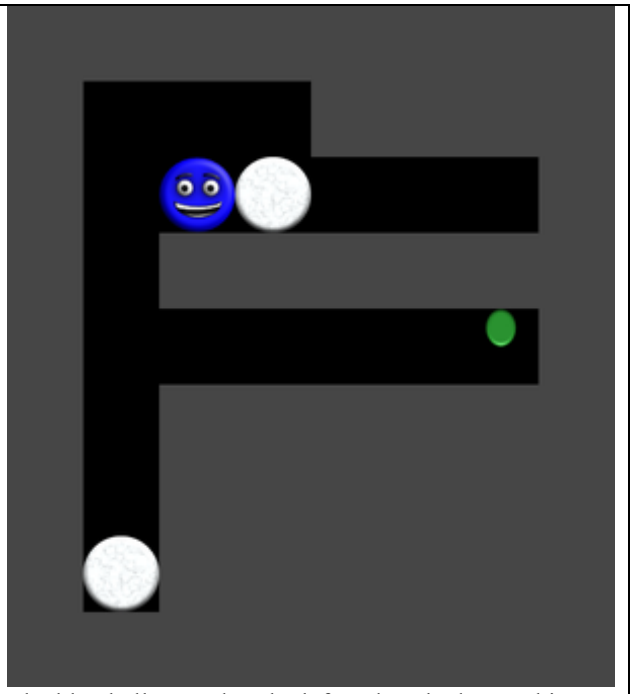
When you use a white ball, keep in mind that you might also need it for something else.

<table>
<tr>
<td> 
The blue ball has to eat two small green balls, but they are both to high to reach, so it has to use the white ball.</td>
<td> 
The blue ball moved the white ball totally to the right and jumped on top of it. Now the blue ball can eat the small green ball, but it is impossible to eat the other small green ball, since the white ball can not be used anymore.</td>
</tr>
<tr>
<td> 
In this example, the blue ball moved the white ball as far as needed to the right and jumped on top of it.</td>
<td> 
The blue ball ate the small green ball by jumping to the right. Now the white ball can be moved to the left to eat the other small green ball.</td>
</tr>
</table>

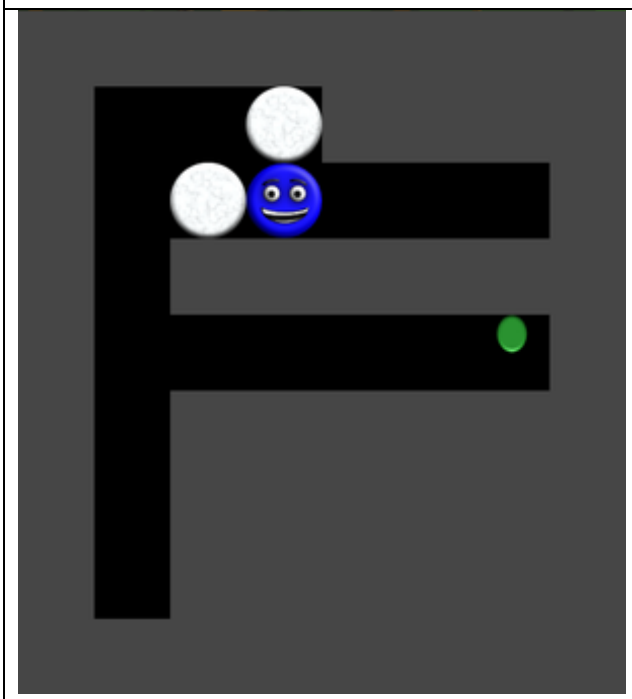
Make sure that you can get all the white balls you need.



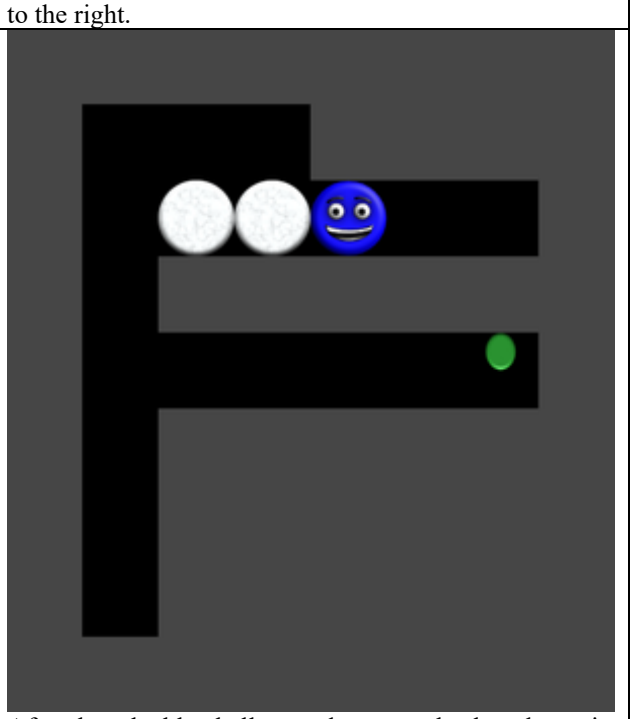
The blue ball needs to throw two white balls in the deep hole, otherwise it can not jump out.



The blue ball moved to the left and pushed one white ball in the hole, but now it can push the white ball only to the right.



In this example, the blue ball moved only two steps to the left.



After that, the blue ball moved one step back and now it can push two white balls in the hole, jump to the right, move to the right and eat the small green ball.

Moving and taking actions

You can control the blue ball with the happy face by pressing keys. There are also arrow buttons available for tablets and phones, but playing the game is much easier with a PC.

Direction	Letter key	Arrow key
Walk left / Swim left	A	Arrow left
Walk right / Swim right	D	Arrow right
Jump / Push up / Swim up	W	Arrow up
Jump left / Swim up left	Q	Shift + Arrow left
Jump right / Swim up right	E	Shift + Arrow right
Push down / Swim down	S	Arrow down
Swim down left	Z or Y	-
Swim down right	C	-

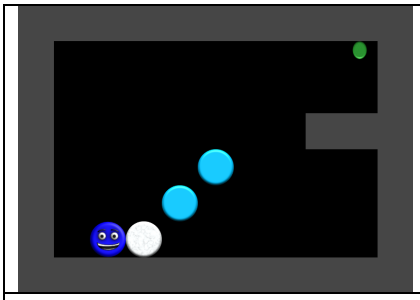
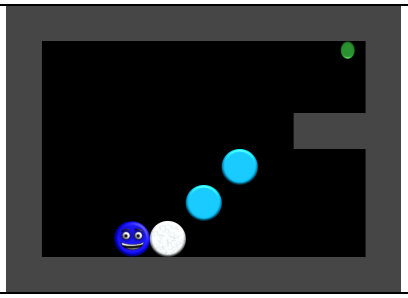
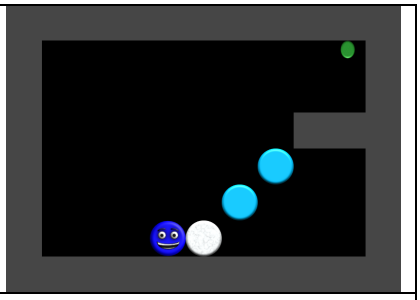
There are handy keyboard shortcuts available.

Key(s)	Action
Space	Takes an action (for example moving an object by using telekinetic power)
B	Sets which blue ball you control when the blue ball is duplicated
R	Try again (initialize level)

When you press first the letter K followed by another key or key combination, you can execute the following tasks. It doesn't matter if you hold the Shift key while pressing the K.

Key(s) after K	Task
H	Show the objects the blue ball has
L	Move a 2-step stairs to the left
R	Move a 2-step stairs to the right
Shift + L	Move a 3-step stairs to the left
Shift + R	Move a 3-step stairs to the right

If you are familiar with this game, you know that it is often needed to make stairs and to move them. This requires many keystrokes with the chance of pressing the wrong key. Here's an example of how you can easily move a 3-step staircase to the right using a built-in macro. Please note that if there are objects in the way, the results may be different. In that case, it is not a good idea to use the macro. Let a macro always finish, before pressing again a key.

		
Correct start positions	Positions after pressing K followed by Shift + R	Positions after again pressing K followed by Shift + R

When the space bar is pressed and the blue ball can do more actions, a menu is shown to select the action. When you want to drop a ball, you can also press Shift-D followed by the first letter of the color.

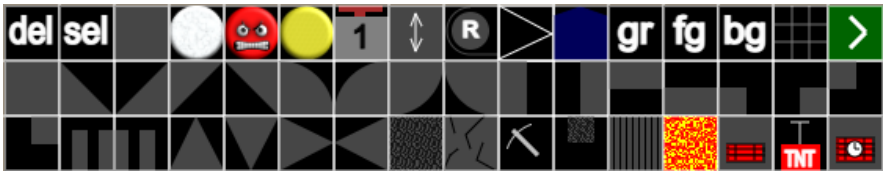
Key(s) after Shift-D	**Action**
W	Drop white ball
L	Drop light blue ball
Y	Drop yellow ball
R	Drop red ball
P	Drop purple ball
Shift P	Drop pink ball
O	Drop orange ball

Creating levels

It is possible to create your own levels. It would be great if you send them to me, so I can add them (if they are suitable). Of course you can also create levels just for you and your friends.

Important
Remember to save your creation (not only when it is ready) by choosing Export level from the Level menu.

The easiest way to create a level is by enabling Create level in the Level menu. Under the level appears a menu. The top row of it is always the same, except when you click the green button with the right arrow in the top row for the next menu page. The contents of the second and third rows depend on the cell in the top row you clicked.
To place an object choose it from the menu and click on a position on the level where you want it. In the same way you can also replace an object or change a setting.
To delete an object click on del in the top row and then on the object(s) in the level that you want to delete.



You can change the dimensions of the level by first selecting a cell and then use the command(s) Insert column (Shift-C), Insert row (Shift-R), Delete column and/or Delete row in the Level menu. To select a cell, click on sel in the top row and click on the level. You can also hold the Shift key and click on the level.
To apply an action to multiple cells, select a cell (the first corner of the selection window), choose an action from the menu, and then, while holding the Ctrl key, click a second cell (the opposite corner).
When you are ready placing all objects (or earlier), you can test the level by disabling Create level in the Level menu. Enable Create level again to make changes. It doesn't matter if you changed the level by testing it. A valid level will be the same as before the test.
Make sure that you export the level to a file when Create level is enabled, so that nothing is changed.
You can change a level setting by choosing Level setting from the Level menu. The format is described later in this document. To change the group of an object at position 7, 12 to 2 you have to type $group: 7, 12, 2. A group can be changed much easier by using the menu (top row gr), but not all settings are in the menu.

Here is an overview of the abbreviations and icons that are used in the menu.

Menu	**Abbreviation or icon**	**Description**
Main (top row)	del	Delete
Main (top row)	sel	Select
Main (top row)	gr	Groups
Main (top row)	fg	Foreground colors
Main (top row)	bg	Background colors
Main (top row)		Next main menu items
Delete	fg	Delete all foreground color settings
Delete	bg	Delete all background color settings
Select	copy	Copy selected object (click on the level to paste the copied object)
Select	move	Move selected object (click on the level for the new position)
Balls		Direction horizontal or vertical for changers
Balls		Colors for changers
Red balls	s0	Intelligence not smart
Red balls	s1	Intelligence a little smart

Red balls	s2	Intelligence smart
Pistons	s	Sticky
Pistons	i	Inverted
Elevators		Direction up or down for elevators, direction left or right for horizontal elevators and direction left, right, up, down, up left, up right, down left or down right for movers
Elevators		Active sides for movers
Elevators	i	Inverted for movers
Conveyor belts		Direction left, right or none
Water		Color palette for tropical fish
Water	↕	Body height of tropical fish
Water	tail	Tail of tropical fish
Water	fins	Fins of tropical fish
Water	)))	Stripes of tropical fish
Foreground colors	del	Delete foreground color
Foreground colors		Next palette
Background colors	del	Delete background color
Background colors		Next palette
Info	x, y	Position (click somewhere on the level to see the coordinates)
Info	?	Info (click on an object in the level to see information about it)
Music boxes		Top part
Music boxes		Middle part
Music boxes		Bottom part (also suitable for top and middle when there must be no black key)
Music boxes		Direction left, right, up or down
Music boxes	i	Instrument
Music boxes	1 oct	1 octave for the door mode melody
Music boxes	2 oct	2 octaves for the door mode melody
Music boxes	C4 - B5	Music box single note
Music boxes	tr	Transpose
Misc	t=	Game ticks
Answer balls	Q	Question for question stones
Answer balls	A	Answer for question stones and answer balls
Answer balls	mode	Mode for answer balls

Colors

In the menus Foreground colors and Background colors, you can choose another palette by clicking on the green button with the right arrow in the bottom row. If the color that you need is not available in one of the palettes, you can set your own color (see $bgcolor and $fgcolor).

Undo

If an action gave a wrong result, you can mostly revert it by choosing Undo (Ctrl-Z) from the Level menu. The following actions can be reverted: Change background color(s), Change foreground color(s), Delete all background color settings, Delete all foreground color settings, Delete background color(s), Delete column, Delete foreground color(s), Delete row, Import level, Insert column, Insert row, Load from memory, Move object, Multiple cells action, New level and Single cell action
You can go back a maximum of 10 steps, but the entire level is only saved once to the undo buffer. For the actions Delete column, Delete row, Import level, Insert column, Insert row, Load from memory, Multiple cells action and New level, the entire level is saved.
If you undo one action too many, you can redo it by selecting Redo (Ctrl-Y) from the Level menu. Only one action can be redone. You can also undo the action that you have redone.

Not everything is possible in the build-in editor. If you need more you can edit the text file (see Editing or creating a level file).

Editing or creating a level file

A level is saved in a text file. To be able to test a level in Bal with Import level, the file needs to have the extension .txt. Here is an example of an almost empty level that is handy for creating a new level. In the chapter “Overview of objects” you can see what the codes mean (1 = stone, 2 = blue ball, 3 = small green ball, 4 = white ball, space = empty). You can copy this super easy level and solve it. Change the data and learn how to create your own levels.

```
11111111111111111111111111111111
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
1                               1
13                              1
1                               1
1               2     4         1
11111111111111111111111111111111
```

Every line (row) must have the same number of characters (columns). It is important that you use a monospaced font in your text editor. A monospaced font is a font where every character takes up the same amount of horizontal space. In Windows you can for example use Notepad as a text editor. Often it is handy to enable the overtype (or overwrite) mode. With the Insert (or Ins) key, you can mostly switch that mode on and off.

Level settings

The text file can also contain lines with settings. They have to start with the character $. It is best to put them before the game raster.
Lines that start with // are comments. You can also comment out a setting by preceding it with //.

Setting	Description	Example(s)
$activesides: x, y, side1, side2 etc.	Sets the active sides (bottom, left, right or top) of an object (mover).	$activesides: 10, 5, top $activesides: 20, 10, left, right
$addnotes: x, y, note1, note2, note 3 etc.	Adds notes to a music box after the existing notes (- = hold, _ = rest, * = loud, . = soft, & = and, 2 = two note sequence, 3 = three note sequence, T = triplet)	$addnotes: 10, 5, D5, -, F5, A5 $addnotes: 12, 4, *C, E, G $addnotes: 12, 15, E4&G4&B4 See $notes for more examples.
$answer: x, y, text	Sets the answer for an answer ball or a question stone (the text may also include commas)	$answer: 5, 20, 25 $answer: 4, 10, 1, 2
$answerballmode: x, y, mode	Sets the mode of an answer ball (scale or answerball which is the default)	$answerballmode: 4, 5, scale
$background: x, y, width, height, object (code 2)	Puts a new object on the background	$background: 5, 3, 1, 1, 25
$bgcolor: x, y, width, height, color	Sets the background color of the specified area	$bgcolor: 0, 0, 32, 10, lightblue
$changer: x, y, horizontal, color 1, color 2	Set the colors (all, lightblue, orange, pink, purple, red, white or yellow) of a changer and if the direction is horizontal (yes or no)	$changer: 5, 10, yes, lightblue, yellow
$conveyorbeltmode: x, y, mode	Sets the mode of a conveyor belt (nonerightleft, rightleft, noneright, noneleft, none, right, left or notrigger which is the default)	$conveyorbeltmode: 10, 5, rightleft
$direction: x, y, direction	Sets the direction of a conveyor belt (left, right or none) a mover (left, right, up, down, upleft, upright, downleft or downright), a music box (left, right, up, down) or a pusher (left, right, up, down)	$direction: 10, 5, left
$displaysize: columns, rows	Sets the size (minimal 10, 10) of the displayed area of the level (default 0, 0 = all)	$displaysize: 0, 0 $displaysize: 20, 10
$fgcolor: x, y, width, height, color	Sets the foreground color of the specified area	$fgcolor: 0, 0, 16, 20, #FFFF00
$fins: x, y, number	Sets the fins of a tropical fish (1-4).	$height: 12, 15, 1
$gameticks: name, ticks	Sets the number of game ticks for an object or ability (conveyorbelt, disappearingstone, elevator, fish, ice, lava, mover, phaseability, pinkball, timebomb or yellowslowdowner)	$gameticks: fish, 20 $gameticks: conveyorbelt, 10
$gameticksxy: x, y, ticks	Sets the number of game ticks for an object (delay) at the specified position	$gameticksxy: 6, 5, 3
$group: x, y, group	Sets the group number (1-32) to which an object (conveyor belt, music box, pistons trigger, piston or	$group: 6, 10, 2

	teleport) belongs	
$has: object name	Adds an object or ability (coilspring, divingglasses, freezegun, key, ladder, lightblueball, orangeball, pickaxe, pinkball, propeller, purpleball, redball, selfdestructingteleportscreator, shrinker, telekineticpower, teleportscreator, weakstone, whiteball or yellowball) to what the blue ball has or removes everything	$has: divingglasses $has: nothing
$height: x, y, number	Sets the height of a tropical fish (1-3).	$height: 10, 9, 3
$hint: text	Sets the text that is shown when the player asks for a hint	$hint: Don't give up!
$ignorepattern: x, y, width, height	Sets the area for which the stone pattern is ignored	$ignorepattern: 5, 3, 2, 2
$instrument: x, y, name, volume	Sets the instrument (accordion, altsax, bass, bassdrum, bell, bouzouki, clarinet, cowbell, crashcymbal, crossstick, drums, guitar, hammondorgan, harp, harpsichord, hihat, kalimba, piano, pipeorgan, noisedrum, ridecymbal, snaredrum, splashcymbal, squarelead, strings1, strings2, tom, trombone, trumpet, vibraphone or xylophone) and volume percentage of a music box	$instrument: 10, 5, kalimba, 90
$inverted: x, y, yes or no	Sets the inverted mode of a piston or a mover	$inverted: 5, 4, yes
$lavacanmove: yes or no	Lava objects will only move when this setting is set to yes (default value is no to prevent unneeded time consuming checking)	$lavacanmove: yes
$movermode: x, y, mode	Sets the mode of a mover (blueball, directionchanger, grayball, lightblueball, orangeball, pinkball, purpleball, redball, whiteball, yellowball or all which is the default)	$movermode: 4, 7, purpleball
$musicbox: x, y, mode, delay	Sets the mode (keyboard, song, near, door, chord1, chord2, chord3, chord4, interval1, interval2, firstcount or note which is the default) and the note delay (game ticks) of a music box	$musicbox: 10, 5, song, 5
$noteoverride: x, y, note	Sets the note override for a music box (none = no override)	$noteoverride: 10, 5, C4 $noteoverride: 10, 5, none
$notes: x, y, note 1, note 2, note 3 etc.	Sets the notes of a music box (- = hold, _ = rest, * = loud, . = soft, & = and, 2 = two note sequence, 3 = three note sequence, T = triplet)	$notes: 10, 5, C4, -, E4, G4 $notes: 12, 4, *D, .F, .A, - $notes: 10, 10, C4&E4&G4, D4&F4&A4 Notes that are separated by & are played simultaneously except for note sequences.

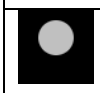
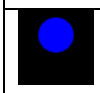
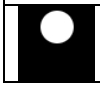
		$notes: 10, 5, 2C4&C4 With a two or three note sequence, the notes that are separated by & are played as a sequence evenly distributed over one step. $notes: 12, 15, TC4&E4&G4, - With triplets, the notes that are separated by & are played as a sequence evenly distributed over two steps. The note after the triplet sequence is ignored. It is best to notate that note as -.
$octaves: x, y, octaves	Sets the number of octaves of a music box for the door mode melody.	$octaves: 5, 5, 2
$palette: x, y, number	Sets the color palette of a tropical fish (1-10).	$palette: 10, 10, 3
$part: x, y, part	Sets the part of a music box (top, middle or bottom)	$part: 10, 5, bottom

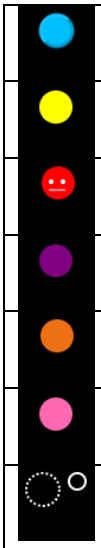
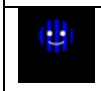
$pattern: x, y, value 1, value 2 etc.	Sets the timing pattern (default: 5, 3) of a disappearing stone (an uneven number of values results in a complex pattern, since the values that were used for the on times are used for the off times in the next cycle)	// on time = off time
		$pattern: 5, 5, 4, 4
		// on time > off time
		$pattern: 5, 5, 6, 3
		// on time < off time
		$pattern: 5, 5, 2, 5
		// on 1 = off 1, on 2 > off 2
		$pattern: 5, 5, 3, 3, 4, 2

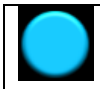
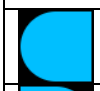
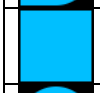
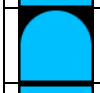
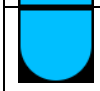
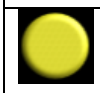
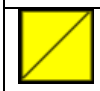
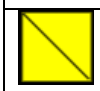
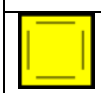
$pistonmode: x, y, mode	Sets the mode of a piston (momentary, repeatfast, repeatslow, blueball, whiteball, lightblueball, yellowball, redball, purpleball, orangeball, pinkball or toggle which is the default)	$pistonmode: 7, 1, repeatfast
$question: x, y, text	Sets the question for a question stone (the text may also include commas)	$question: 10, 4, 2+7
$sound: object (code 2), when	Sets when a sound is played (when = default, never or player)	$sound: 22, player
$startlevelmessage: text	Message that is shown at the start of a level	$startlevelmessage: Good luck!
$stepspermeasure: x, y, value	Sets the number of steps per measure of a music box (needed for firstcount mode)	$stepspermeasure: 4, 5, 8
$sticky: x, y, yes or no	Makes a piston sticky or not sticky	$sticky: 20, 5, yes
$stonepattern: number	Sets the stone pattern of stones (0 = none, 1 = dark cave 1, 2 = dark cave 2, 3 = cave, 4 = castle)	$stonepattern: 1
$stripes: x, y, number	Sets the stripes of a tropical fish (0 = no stripes, 1-7 = normal 1-7 stripes, 8-12 = thin / normal alternating 4 - 8 stripes, 13-16 = thick 1-4 stripes)	$stripes: 10, 12, 4
$tail: x, y, number	Sets the tail of a tropical fish (1-6).	$tail: 10, 9, 3

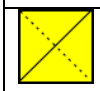
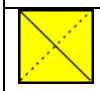
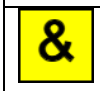
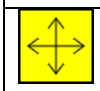
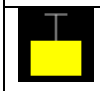
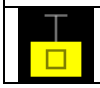
Overview of objects

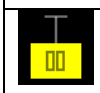
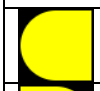
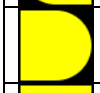
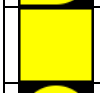
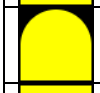
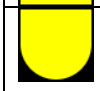
Code 1 is used in the data files and is converted to Code 2 for further use. Code 1 has always a length of one character.
Normally the background color is black, unless otherwise defined in a level data file.
Also the foreground color can be defined in a level data file, but it does not affect all objects.
Stones can also be used to represent wood, ice, sand, leaves etc. Per level you can set which stone pattern is used for most stone objects (see $stonepattern). If the stone pattern is greater than 0 (none), the color will be ignored. You can ignore the stone pattern for certain cells with the $ignorepattern setting.
In a level you can click on the following objects to see the details of it: Delay, Music box, Piston and Pistions trigger

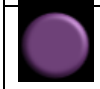
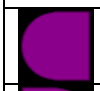
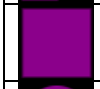
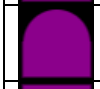
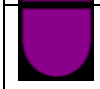
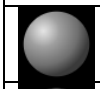
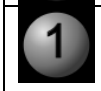
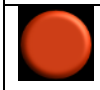
Image	Name	Code 1	Code 2	Description
	Blue bal	2	2	The blue ball is the player.
	Blue ball with sad face	2	2	When the blue ball is dying, it has a sad face.
	Blue ball wearing diving glasses	2	2	The blue ball can only swim when it is wearing diving glasses.
	Blue ball with propeller	2	2	When the blue ball has a propeller, it can fly.
	Blue ball with phase ability	2	2	When the blue ball has phase ability, it can walk through walls, closed doors, palm trees and one direction ports in the wrong direction, but after one object there must be an empty space. This means that it can not walk through a wall that is two cells think. The possible phase through directions are right, left, up and down.
	Small green ball	3	3	A small green ball is food for the blue ball. The goal of the game is to eat all the small green balls.
	Small silver ball	°	140	When the blue ball takes a small silver ball, it has telekinetic power. By pressing the Space bar or the A button it can move the following objects that are close to it (one at the time): white ball, light blue ball, yellow ball, purple ball, answer ball, moveable gray ball, orange ball, pink ball, direction changer, time bomb, conveyor belt part, mover The object that will be moved when using telekinetic power is highlighted.
	Small blue ball	%	168	When the blue ball takes a small blue ball, it duplicates itself. By pressing the B key or the S button you set which blue ball you control. The blue ball that you control is highlighted. If one of the blue balls takes for example a key or diving glasses, also the other blue ball has it. When there is a travel gate, there can not be a small blue ball.
	Small white ball	6	192	When the blue ball takes a small ball that is white, light blue, yellow, red, purple, orange

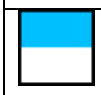
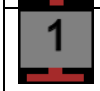
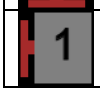
	Small light blue ball	Б	195	or pink, it can drop one normal ball with that same color at the right by pressing the Space bar or the A button. If there is no space on the right, the ball is dropped on the left if there is space there. It is also possible to drop the ball after using a teleport or a travel gate. The blue ball can only take one small ball of each color at the time. A dropped red ball is not smart.
	Small yellow ball	Л	196	
	Small red ball	Э	201	
	Small purple ball	Ъ	197	
	Small orange ball	ӟ	202	
	Small pink ball	ѥ	204	
	Shrinker	Љ	199	When the blue ball takes a shrinker, it can shrink white, light blue, yellow, red, purple, orange and pink balls by pressing the Space bar or the A button and after that pressing a move key or button to indicate the direction (for example the right arrow key). Diagonal directions are also possible. Shrinked objects float and do not fall. The blue ball can take a shrinked object with it (see small white ball). When a red ball is shrinked, it loses its intelligence.
	Phase ability	Ж	207	When the blue ball takes phase ability, it can walk through walls, closed doors and more for some time. You can set the time with the $gameticks setting and the object name phaseability. See the blue ball object for more information.
	White ball	4	4	White balls can be pushed to the left and to the right, but not more than two at the same time.
	White answer ball	Ӆ	245	A white answer ball is like a white ball, but when it comes close to a question stone and the answer is correct, the question stone disappears. Answer balls can also be used for other purposes. See the answer balls chapter for more information.
	White ball synchroniser	Ѧ	200	When there are more white ball synchronisers connected, white balls don't go through the synchroniser until there is a white ball at every synchroniser of the connected synchronisers, the balls were all going in the same direction and there is place for all balls to continue after the synchroniser. You can see it like the white balls are waiting for each other and when they are complete they will continue. The blue ball can move a white ball synchroniser to the left, to the right, up and down, but only one at the time.

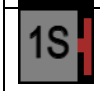
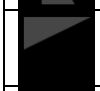
	Light blue ball	5	5	Light blue balls float and do not fall. They can be pushed to the left and to the right, but not more than two at the same time.
	Light blue bar left	é	126	Light blue bars float and do not fall. A horizontal light blue bar consists of a left part, a right part and possibly one or more middle parts. It can be pushed to the left or to the right by the blue ball when there is no weight on the top or on the bottom, but not at the same time with other objects. A vertical light blue bar consists of a top part, a bottom part and possibly one or more middle parts. It can be pushed up (when there is no object directly above it) or down by the blue ball (when there is no object directly below it), but not at the same time with other objects. Light blue bar parts are also useful as decoration to make a level look nicer. In that case, it doesn't have to be a valid light blue bar. Code 1 for the middle part is an e without two dots, since the e with two dots can be difficult to type on a keyboard.
	Light blue bar right	è	127	
	Light blue bar middle	e	128	
	Light blue bar top	É	129	
	Light blue bar bottom	È	130	
	Yellow ball	9	9	Yellow balls float and do not fall. They can be pushed to the left, to the right, up and down, but only one at the time. When a yellow ball is pushed, it continues until it can not go further. The direction can be changed with a yellow direction changer.
	Yellow direction changer 1	C	84	Yellow direction changer 1 changes the direction of yellow balls as follows: Right to Up Left to Down Up to Right Down to Left The blue ball can move a yellow direction changer to the left, to the right, up and down, but only one at the time.
	Yellow direction changer 2	c	85	Yellow direction changer 2 changes the direction of yellow balls as follows: Right to Down Left to Up Up to Left Down to Right The blue ball can move a yellow direction changer to the left, to the right, up and down, but only one at the time.
	Yellow direction changer 3	+	86	Yellow direction changer 3 changes the direction of yellow balls as follows: Right to Left

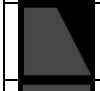
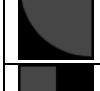
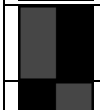
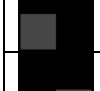
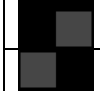
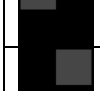
				Left to Right Up to Down Down to Up A yellow direction changer 3 can also change the direction of horizontal yellow bars from right to left or from left to right and it can change the direction of vertical yellow bars from up to down or from down to up. The blue ball can move a yellow direction changer to the left, to the right, up and down, but only one at the time.
	Yellow direction changer 4	Â	138	Yellow direction changer 4 works as a yellow direction changer 1, but after it is used it changes into a yellow direction changer 5 that works as a yellow direction changer 2. The blue ball can move a yellow direction changer to the left, to the right, up and down, but only one at the time.
	Yellow direction changer 5	â	139	Yellow direction changer 5 works as a yellow direction changer 2, but after it is used it changes into a yellow direction changer 4 that works as a yellow direction changer 1. The blue ball can move a yellow direction changer to the left, to the right, up and down, but only one at the time.
	Yellow ball synchroniser	&	155	When there are more yellow ball synchronisers connected, yellow balls pause until there is a yellow ball at every synchroniser of the connected synchronisers, the balls were all going in the same direction and there is place for all balls to continue after the synchroniser. You can see it like the yellow balls are waiting for each other and when they are complete they will continue. The blue ball can move a yellow ball synchroniser to the left, to the right, up and down, but only one at the time.
	Yellow pusher	Ψ	115	A yellow pusher can push one or more yellow balls or bars, but only one per direction. All yellow pushers are activated at the same time by the yellow pushers trigger which can be used multiple times. The blue ball can move a yellow pusher to the left, to the right, up and down, but only one at the time.
	Yellow pushers trigger	ψ	116	A yellow pushers trigger triggers all yellow pushers at the same time when something (such as the player's weight) is placed on it. If the blue ball (player) has a propeller, it stands on a ladder or it hangs in a rope, pushing down is needed to activate. The color of the handle can be changed with the $fgcolor setting.
	Yellow stopper	Σ	131	A yellow stopper stops all moving yellow balls and yellow bars when something (such

				as the player's weight) is placed on it. If the blue ball (player) has a propeller, it stands on a ladder or it hangs in a rope, pushing down is needed to stop. The color of the handle can be changed with the $fgcolor setting.
	Yellow pauser	ρ	136	A yellow pauser pauses or unpauses all yellow balls and yellow bars when something (such as the player's weight) is placed on it. If the blue ball (player) has a propeller, it stands on a ladder or it hangs in a rope, pushing down is needed to pause or unpause. The color of the handle can be changed with the $fgcolor setting.
	Yellow slowdowner	~	156	When the blue ball takes a yellow slowdowner, all yellow balls and yellow bars will move slower for some time.
	Yellow bar left	ó	121	A horizontal yellow bar consists of a left part, a right part and possibly one or more middle parts. A vertical yellow bar consists of a top part, a bottom part and possibly one or more middle parts. Yellow bars float and do not fall. They can be pushed by the blue ball or a yellow pusher, but not at the same time with other objects. It is not possible to push a yellow bar to the left or to the right when there is weight on the top or on the bottom. It is not possible to push a yellow bar up when there is an object directly above it and it is not possible to push it down when there is an object directly under it. When a yellow bar is pushed, it continues until it can not go further. It will not stop going to the left or the right when there comes weight on the top or the bottom. Moving horizontal yellow bars will move objects with weight on the bar that are directly above or directly below with it. Yellow bar parts are also useful as decoration to make a level look nicer. In that case, it doesn't have to be a valid yellow bar.
	Yellow bar right	ò	122	
	Yellow bar middle	ö	123	
	Yellow bar top	Ó	124	
	Yellow bar bottom	Ò	125	
	Red ball	8, s, S	8, 93, 94	Red balls are very dangerous. A red ball will shoot the blue ball with a laser if it is in the same vertical position and nothing blocks the view. If the blue ball is hit, it dies. With the help of mirrors, red balls can also see and shoot the blue ball in other positions. How smart a red ball is, depends on the code. Code 8 (8) is not smart. It will not move. Code s (93) is a little smart. It can move, jump and use elevators, but it will not try to find the blue ball. It will not move objects. Code S (94) is smart. It will try to find the blue ball. It will not move objects. Red balls can multiply themselves by using a copier. They can <u>not</u> be electrocuted. A red ball can swim without wearing diving glasses.

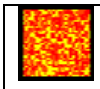
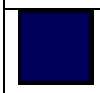
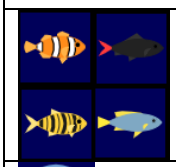
	Mirror 1	α	95	Red balls can see more by using mirrors. When the red ball is at the left of mirror 1, it can also view up. When the red ball is at the right of mirror 1, it can also view down. Mirrors can also be combined.
	Mirror 2	β	96	Red balls can see more by using mirrors. When the red ball is at the left of mirror 2, it can also view down. When the red ball is at the right of mirror 2, it can also view up. Mirrors can also be combined.
	Light bulb	λ	105	If a red ball that is a little smart eats a light bulb, it becomes a smart red ball.
	Purple ball	p	28	Purple balls float and do not fall. They can be pushed to the left, to the right, up and down, but only one at the time.
	Purple answer ball	ч	242	A purple answer ball is like a purple ball, but when it comes close to a question stone and the answer is correct, the question stone disappears. Answer balls can also be used for other purposes. See the answer balls chapter for more information.
	Purple bar left	á	100	A horizontal purple bar consists of a left part, a right part and possibly one or more middle parts. A vertical purple bar consists of a top part, a bottom part and possibly one or more middle parts. Purple bars float and do not fall. They can be pushed by the blue ball, but not at the same time with other objects. It is not possible to push a purple bar to the left or to the right when there is weight on the top or on the bottom. It is not possible to push a purple bar up when there is an object directly above it and it is not possible to push it down when there is an object directly under it. Purple bar parts are also useful as decoration to make a level look nicer. In that case, it doesn't have to be a valid purple bar.
	Purple bar right	à	101	
	Purple bar middle	ä	102	
	Purple bar top	Á	103	
	Purple bar bottom	À	104	
	Gray ball	.	83	Gray balls float and do not fall. Normal gray balls can not be pushed.
	Gray ball one move	o	82	Gray balls one move float and do not fall. They can be pushed to the left, to the right, up or down, but only onces. After pushing a gray ball one move, it will turn into a normal gray ball.
	Gray ball two moves	δ	98	Gray balls two moves float and do not fall. They can be pushed to the left, to the right, up and down, but only twice. After pushing a gray ball two moves, it will turn into a gray ball one move.
	Orange ball	O	40	Orange balls can be pushed to the left and to the right, but only one at the time. When an orange ball is pushed, it continues until it can not go further. When it falls (normal gravity and no force) on a Triangle stone bottom left,

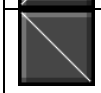
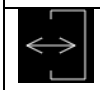
				it continues to the right. When it falls (normal gravity and no force) on a Triangle stone bottom right, it continues to the left.
	Pink ball	Ю	203	Pink balls are like white balls, but they fall normally slowly. They can be pushed to the left and to the right, but not more than two at the same time. You can adjust how fast the pink balls fall with the $gameticks setting and the object name pinkball.
	Changer	Ъ	244	When a ball is at a side of a changer with a matching color, the ball goes through the changer and changes into the color of the side where it comes out. Answer balls are ignored. To prevent looping, the next change is possible after there are no objects for a moment at both used sides or the changer is moved. With the $changer setting the direction and the colors can be changed. The blue ball can move a changer to the left, to the right, up and down, but only one at the time.
	Pistons trigger	m	158	A pistons trigger tries to activate or deactivate all toggle mode or momentary mode pistons that belong to the same group as the pistons trigger. If the blue ball (player) has a propeller, it stands on a ladder or it hangs in a rope, pushing down is needed to control the pistons trigger. The default group of a pistons trigger is 1, but you can change that with the $group setting. The number on a pistons trigger indicates the group. A pistons trigger can also start or stop a music box that is in song mode, control a conveyor belt or move a pusher. The color of the handle can be changed with the $fgcolor setting.
	Piston up	Ù	159	If a piston up is activated it moves a moveable object that is on top of it one position up. If needed, it moves also other moveable objects. See the Piston chapter for more information.
	Piston up extended part	Û	160	This image is used to show that a piston up is activated.
	Piston down	Ì	161	If a piston down is activated it moves a moveable object that is directly under it one position down. If needed, it moves also other moveable objects. See the Piston chapter for more information.
	Piston down extended part	Î	162	This image is used to show that a piston down is activated.
	Piston left	Ö	163	If a piston left is activated it moves a moveable object that is directly at the left of

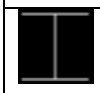
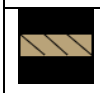
				it one position to the left. If needed, it moves also other moveable objects. See the Piston chapter for more information.
	Piston left extended part	Ô	164	This image is used to show that a piston left is activated.
	Piston right	Ë	165	If a piston right is activated it moves a moveable object that is directly at the right of it one position to the right. If needed, it moves also other moveable objects. The S indicates that it is a sticky piston, so in this case the piston was modified with the $sticky setting. See the Piston chapter for more information.
	Piston right extended part	Ê	166	This image is used to show that a piston right is activated.
	Pusher	ь	209	If a pusher is moved by a pistons trigger, it moves a moveable object one position in the indicated direction. If needed, it moves also other moveable objects. See the Pusher chapter for more information.
	Empty space	(Space), 0	0	An empty space has not object inside.
	Stone	1	1	A stone blocks everything. The color of the stone can be changed with the $fgcolor setting.
	Question stone	Ч	241	When an answer ball comes close to a question stone and the answer is correct, the question stone disappears. The text is always white, so you must not set $fgcolor to white.
	Triangle stone bottom left	G	15	A triangle stone is often used to make the graphics look nicer. Bottom left means that the 90-degree corner is at the bottom left. This object can be used as a glide for the blue ball and the red, white, orange and pink balls. If a ball glides depends on the gravity direction and the influence of force objects. The color of the stone can be changed with the $fgcolor setting.
	Triangle stone bottom right	H	16	
	Triangle stone top left	I	17	
	Triangle stone top right	J	18	
	Stone shape	ЬЖ	210	The stone shapes in this section can combined to create large triangles. They can be used as a glide for the blue ball and the red, white, orange and pink balls. If a ball glides depends on the gravity direction and the influence of force objects. The color of the stone can be changed with the $fgcolor setting.
	Stone shape	ьж	211	
	Stone shape	ѯ	212	
	Stone shape	ѯ	213	
	Stone shape	V	214	
	Stone shape	v	215	

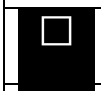
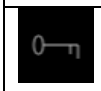
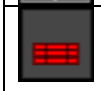
	Stone shape	V̆	216	
	Stone shape	v̆	217	
	Stone shape	Oy	218	
	Stone shape	oy	219	
	Stone shape	O	220	
	Stone shape	o	221	
	Stone shape	C͡O	222	
	Stone shape	c͡o	223	
	Stone shape	G̈O	224	
	Stone shape	w̄	225	
	Quarter circle stone bottom left	i	141	A quarter circle stone is used to make the graphics look nicer. Bottom left means that the 90-degree corner is at the bottom left. Quarter circle stone can be used as a glide for the blue ball and the red, white, orange and pink balls. If a ball glides depends on the gravity direction and the influence of force objects. The color of the stone can be changed with the $fgcolor setting.
	Quarter circle stone bottom right	í	142	
	Quarter circle stone top left	ì	143	
	Quarter circle stone top right	î	144	
	Half stone left	ü	145	A half stone is used to make the graphics look nicer. The color of the stone can be changed with the $fgcolor setting.
	Half stone right	ú	146	
	Half stone top	ù	147	
	Half stone bottom	û	148	
	Quarter stone bottom left	á	149	A quarter stone is used to make the graphics look nicer. The color of the stone can be changed with the $fgcolor setting.
	Quarter stone bottom right	é	150	
	Quarter stone top left	í	151	
	Quarter stone top right	ó	152	

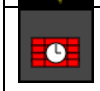
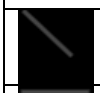
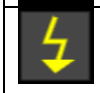
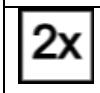
	Pattern 1	ή	153	A pattern is used to make the graphics look nicer. The patterns 1 and 2 must not be used in levels with a game rotator. The color of the stone can be changed with the $fgcolor setting.
	Pattern 2	ώ	154	
	Pattern 3	Ђ	234	
	Pattern 4	ђ	235	
	Pattern 5	Ѡ	236	
	Pattern 6	ѡ	237	
	Pattern 7	Ѧ	238	
	Pattern 8	ѧ	239	
	Pattern 9	Ѩ	240	
	Spike up	:	174	When the blue ball is on top of a spike up or when it is pushed by force against the point of a spike, it dies. Spikes can be used as a glide for the blue ball and the red, white, orange and pink balls. If a ball glides depends on the gravity direction and the influence of force objects. Spikes can also be used as decoration. The color of a spike can be changed with the $fgcolor setting.
	Spike down	;	175	
	Spike right	,	176	
	Spike left	'	177	
	Weak stone	y	35	Weak stones can be mined with a pickaxe.
	Damaged stone	F	12	When there is for too long a weight on top of a damaged stone, it will break. Damaged stones can be mined with a pickaxe. The color of the stone can be changed with the $fgcolor setting.
	Pickaxe	Y	34	With a pickaxe you can mine weak stones, damaged stones and ice. The color of the pickaxe can be changed with the $fgcolor setting.
	Small weak stone	π	99	If the blue ball has taken a small weak stone, there is a weak stone created at every previous position of the blue ball. This can be very handy, but the blue ball can also block itself.
	Disappearing stone	Ц	198	A disappearing stone disappears and appears again. The timing pattern of disappearing and appearing can be set by the $pattern setting. With the $gameticks setting you can control the speed of the timing pattern. In level 3305 you can see some nice examples of what you can do with disappearing stones.

	Lava	V	22	When the blue ball or a red ball falls into the lava it dies. The blue ball dies also when a green ball is destroyed. Lava can be used to get rid of balls. Lava can be stopped by stones, but not by weak stones, damaged stones or disappearing stones.
	Water	w	23	When the blue ball is wearing diving glasses, it can swim in the water, but red fish are dangerous.
	Water surface	W	20	The water surface contains waves.
	Water surface right	ς	113	This is a triangle stone with water surface on the right side.
	Water surface left	σ	114	This is a triangle stone with water surface on the left side.
	Diving glasses	d	26	The blue ball needs diving glasses for swimming. Without diving glasses it will die.
	Red fish	f	27	Red fish are very dangerous for the blue ball. They are chasing the blue ball when it is in the water. A red fish can be electrocuted.
	Tropical fish	҂	243	Tropical fish are harmless. A tropical fish can be electrocuted. With the settings $palette, $height, $tail, $fins and $stripes you can change the fish.
	Jellyfish	Ң	248	Jellyfish are dangerous for the blue ball, but it is safe to be on top of it. The blue ball can push a jellyfish down. A jellyfish can be electrocuted.
	Freeze gun	Ж	205	If the blue ball takes a freeze gun, it can freeze the surface of water.
	Water with a layer of ice on top	ж	206	The ice melts after some time. You can set the time with the $gameticks setting and the object name ice. If the blue ball points the freeze gun at ice, the time resets. Ice can be mined with a pickaxe.
	Propeller	X	81	If the blue ball takes a propeller, it can fly.
	Palm tree trunk part	P	21	A palm tree can be made with palm tree trunk parts and green triangle stones. This object must not be used in levels with a game rotator.
	Elevator	D, U	6, 106	Elevators can be used to move the blue ball and white, red, orange and pink balls up or down. The code D (6) means that the elevator goes first down after the level is loaded.
	Horizontal elevator	L, R	7, 107	Horizontal elevators can be used to move the blue ball and the white, red, orange and pink balls to the left or to the right. The code L (7) means that the elevator goes first to the left after the level is loaded.

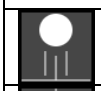
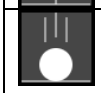
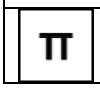
	Elevator direction changer 1	Ꮋ	246	Elevator direction changers are like yellow direction changers, but the elevator moves not through it, since that would give problems when the elevator moves objects with it. When there is an elevator direction changer directly at the left side or the right side of a horizontal elevator, the elevator is converted into a normal elevator. when there is an elevator direction changer directly above or below a normal elevator, the elevator is converted into a horizontal elevator. When a normal elevator moves objects with it and the gravity is down, it can only be converted to a horizontal elevator by an elevator direction changer that is directly below it. The blue ball can move an elevator direction changer to the left, to the right, up and down, but only one at the time.
	Elevator direction changer 2	ꮋ	247	
	Elevator entrance and exit	E	39	If the blue ball, a red, white, orange or pink ball is waiting on top of this object, the ball will be automatically taken into the elevator. If there is a ball inside the elevator, it will be pushed out when there is place. The foreground color can be changed with the $fgcolor setting.
	Conveyor belt left	{	171	A complete conveyor belt consists of a left part, a right part and possibly one or more middle parts in the correct order. An R in the left part indicates that the direction is to the right and an L indicates that the direction is to the left. When the direction is none, the conveyor belt is not active and there is no letter shown. Only a complete conveyor belt can move objects with weight. An R or an L (turning or not) does not indicate that the conveyorbelt is complete. The letter just shows what will happen when the conveyor belt is complete. When the mode is not notrigger, the conveyor belt can be controlled by a pistons trigger that belongs to the same group (see the $conveyorbeltmode setting). When the mode is none, right or left, the conveyor belt is set to that direction and after that the direction can not be changed anymore. The blue ball can move a conveyor belt part to the left, to the right, up and down, but only one at the time. A piston can move also the complete conveyor belt. The color of the conveyor belt can be changed with the $fgcolor setting.
	Conveyor belt middle	Ø	172	
	Conveyor belt right	}	173	
	Mover	ɳ	178	A mover moves an object (with or without weight) that is at an active side of it one step in the indicated direction (when there is space). The active sides are indicated by light green lines and can be set with the

				$activesides setting. The possible directions are left, right, up, down, upleft, upright, downleft and downright (see the $direction setting). See the Mover chapter for more information.
	Ladder	=	25	The blue ball can use a ladder to move up or down. A ladder does not block the view and objects can pass by it. It is drawn on the background layer. The color of the ladder can be changed with the $fgcolor setting.
	Horizontal ladder	h	90	The blue ball can use a horizontal ladder to move to the left or to the right. A ladder does not block the view and objects can pass by it. It is drawn on the background layer. The color of the ladder can be changed with the $fgcolor setting.
	Small ladder	Λ	108	If the blue ball has taken a small ladder, a ladder part will be created under the blue ball when the blue ball jumps straight up in an empty space. When a blue ball has taken also a small weak stone, it can not create ladders.
	Horizontal rope	_	80	The blue ball can walk on top or hang under a horizontal rope. A rope does not block the view and objects can pass by it. It is drawn on the background layer.
	Vertical rope	ι	137	The blue ball can climb in a vertical rope. A rope does not block the view and objects can pass by it. It is drawn on the background layer.
	Coil spring	j	118	If the blue ball has taken a coil spring, it can jump higher. When there is not enough space for a high jump, it will do a normal jump. The color of the coil spring can be changed with the $fgcolor setting.
	Force up	Ω	109	A force object moves the blue ball and the white, red and orange balls as far as possible in the indicated position. The blue ball can push a force object, but not against the force direction. Force down seems perhaps not useful, because of the gravity, but it works also in the water. A gravity changer can change the gravity direction. A moving yellow ball will continue against a force.
	Force down	ω	110	
	Force right	Φ	111	
	Force left	φ	112	
	Teleport	T	31	Only the blue ball can travel from one white teleport to the other white teleport in the same group. The blue ball has to enter from the left or the right and it has to exit to the left or to the right. The default group of a teleport is 1, but you can change that with the $group setting. The number on a teleport indicates the group.
	Self-destructing teleport	τ	92	Only the blue ball can travel from one white self-destructing teleport to the other white self-destructing teleport in the same group. The blue ball has to enter from the left or the

				right. The teleport self-destructs after use. The default group of a teleport is 1, but you can change that with the $group setting. The number on a teleport indicates the group.
	Purple self-destructing teleport	Π	170	Only a purple ball can travel from one purple self-destructing teleport to the other purple self-destructing teleport in the same group. The teleport self-destructs after use. A purple ball can be pushed from any direction into a purple teleport. For other objects it is like a purple teleport does not exist. The default group of a teleport is 1, but you can change that with the $group setting. The number on a teleport indicates the group.
	Teleports creator	Я	193	When the blue ball takes a teleports creator, it can create teleports by pressing the Space bar or the A button and after that pressing a move key or button to indicate the direction (for example the right arrow key). Diagonal directions are also possible.
	Self-destructing teleports creator	я	194	
	Travel gate	g	132	The blue ball can travel to a different world by using a travel gate. The color of the travel gate can be changed with the $fgcolor setting. There can be only one travel gate in a level.
	Door	ß	169	The blue ball can not open a door by pushing. A piston can move a door. The combination of a door, a sticky inverted piston down and one or more pistons triggers make a door that can be opened by a blue ball.
	Locked door	l	30	Only a blue ball that has a key can open a locked door. The blue ball can not push balls or other objects throught the door. The color of the stone can be changed with the $fgcolor setting.
	Key	k	29	The blue ball can open locked doors with a key. The color of the key can be changed with the $fgcolor setting.
	One direction port right	>	10	Only the blue ball and smart red balls can go through a one direction port and only in the indicated direction. The foreground color can be changed with the $fgcolor setting.
	One direction port left	<	11	
	One direction port up	^	87	
	One direction port down	v	88	
	Bomb	B	36	When a bomb explodes, it destroys the stone in which it is. Use the detonator to detonate all bombs at the same time. The color of the stone can be changed with the $fgcolor setting.
	Detonator	b	37	The detonator sets off all bombs at the same time when something (such as the player's weight) is placed on it. If the blue ball has a propeller, it stands on a

				ladder or it hangs in a rope, pushing down is needed to detonate. The color of the handle can be changed with the $fgcolor setting. There can be only one detonator in a level.
	Explosion	*	38	This image is used as an animation for an exploding bomb.
	Time bomb	Ξ	117	A time bomb is activated by moving it. Some time (see $gameticks) after it is activated, it explodes and it destroys the objects that are around it, including the blue ball, red balls, red fish and tropical fish. A purple teleport will not be destroyed. The timer resets every time the bomb is moved, but once the bomb is activated, it can not be deactivated. If the bomb destroys a small green ball (food), the blue ball will die. A time bomb floats and does not fall. It can be moved alone to the left, to the right, up and down. Moving by a piston has no influence on the timer. The color of the stone can be changed with the $fgcolor setting.
	Trap door	-	13	The blue ball can walk over a trap door, but when it stays too long on top, it will open. White balls, orange balls and red balls can also fall through a trap door.
	Trap door half open		14	This image is used as an animation for an opening trap door.
	Electricity	!	91	When a blue ball walks under this object, there is a chance that it will be electrocuted. The color of the stone can be changed with the $fgcolor setting.
	Magnet	µ	119	When the blue ball comes near a magnet, it loses metal objects (coil spring, freeze gun, key, pickaxe, shrinker). The color of the stone can be changed with the $fgcolor setting.
	Copier	Δ	97	A copier copies a white, red, orange or pink ball that is on top of it, if there is place for the original ball that comes out of the left side and the copy that comes out of the right side. Answer balls are ignored.
	Yellow copier	Θ	208	A yellow copier copies a non moving yellow ball that is touching a side, if there is place for the original ball and the copy. When a yellow ball is on top or directly under the copier, the original ball will come out of the left side and the copy will come out of the right side. When a yellow ball is at the left side or at the right side, the original ball will come out of the top and the copy will come out of the bottom. The balls that come out of a copier will continue moving if there is place.
	Time freezer	u	120	When the blue ball takes a time freezer, the time stands still for a moment for several objects. Elevators, conveyor belts, red balls

				and fish will stop moving, red balls will not shoot and red fish will not attack. Electricity will not be activated, but if it was on, it will remain activated. The elapsed time for time bombs will be paused. The color of the clock can be changed with the $fgcolor setting.
	Music box	M	157	A music box is a very advanced object that can play a musical note or even a whole song depending on the mode. See the Music box chapter for more information.
	Major chord	ш	186	Chord type objects are placed in the level by a music box in the mode chord1 (major or minor), chord2 (augmented or diminished), chord3 (suspended second or suspended fourth) or chord4 (dominant seventh or major seventh) after it has played the notes of a chord. If a major chord was played, the blue ball has to take the major chord to open the door. If a minor chord was played, the blue ball has to take the minor chord to open the door etc. If the blue ball takes the wrong chord type, it will die.
	Minor chord	щ	187	
	Augmented chord	Ц	188	
	Diminished chord	Ч	189	
	Suspended second chord	И	190	
	Suspended fourth chord	Й	191	
	Dominant seventh chord	Ґ	226	
	Major seventh chord	ґ	227	
	M2 interval (major second)	ң	231	Interval objects are placed in the level by a music box in the mode interval1 (P4, P5 or P8) or interval2 (M2, m3 or M3), after it has played the notes of an interval. If a perfect fifth was played, the blue ball has to take the P5 interval to open the door. If a perfect eighth (octave) was played, the blue ball has to take the P8 interval to open the door etc. If the blue ball takes the wrong interval, it will die.
	m3 interval (minor third)	Ҥ	232	
	M3 interval (major third)	ҥ	233	
	P4 interval (perfect fourth)	Ң	230	
	P5 interval (perfect fifth)	Ҡ	228	
	P8 interval (octave)	ҡ	229	
	Delay	)	167	When there is an object with weight on top of a delay, it will fall through the box after the set number of game ticks has elapsed. The default number of game ticks is 3, but you can adjust it with the $gameticksxy setting. A game tick has normally a duration of 50 milliseconds.
	Game rotator right	t	89	When the blue ball walks through a game rotator right, the whole game rotates 90 degrees clockwise. A game rotator can only

				be used for levels in which the number of columns is the same as the number of rows.
	Game rotator left	Ä	183	When the blue ball walks through a game rotator left, the whole game rotates 90 degrees counterclockwise. A game rotator can only be used for levels in which the number of columns is the same as the number of rows.
	Gravity changer up	Є	184	When the blue ball walks through a gravity changer, the gravity direction changes to the indicated direction. When the gravity direction is up, objects with weight like the blue ball and white balls will “fall” up and the blue ball and the red balls are displayed upside down. A gravity changer can not be used in a level with water or lava. The color of the stone can be changed with the $fgcolor setting.
	Gravity changer down	З	185	
	Panagiotis	@	24	The greek letter Π (pi) indicates that the level is made by Παναγιώτης (Panagiotis).

Piston

When a piston is activated it moves a moveable object that is directly in front of it one position up, down, left or right, depending on the direction setting. If needed, it moves also other moveable objects. That an object is not moveable by the blue ball doesn't mean that a piston can also not move it. A piston can move an unlimited number of objects at the same time. A piston up or a piston down can move a light blue ball vertically.

A piston can move the following objects: blue ball, white ball, light blue ball, yellow ball, red ball, purple ball, moveable gray ball, orange ball, direction changer, synchroniser, copier, force, yellow pusher, time bomb, door, conveyor belt, mover, pusher, answer ball, changer

If a piston is sticky, it pulls the attached object back when deactivating. By default, a piston is not sticky, but with the $sticky setting you can change that.
Unlike a yellow pusher, a piston moves a yellow or orange ball only one position, then the ball stops.
How a piston is activated depends on the mode. When a piston is in toggle (default) or momentary mode, it is activated when a pistons trigger that belongs to the same group as the piston is pressed.
With the $pistonmode setting you can change the mode of a piston. You can also invert a piston with the $inverted setting when it is not in a ball detection mode.
The default group of a piston is 1, but you can change that with the $group setting. The number on a piston indicates the group. An exclamation mark (!) indicates that a piston tries to activate, but it can not. When it tries to activate, it will activate at the moment it can (for example when an object moves out of the way).
If a piston is in a ball detection mode such as whiteball or lightblueball, it has the color of the ball that it detects and it only activates when there is a matching ball directly in front of it. The blue ball can move an inactive piston that is in a ball detection mode, except when the piston is in the blueball mode and the blue ball is directly in front of it.
Click on a piston to see its settings.

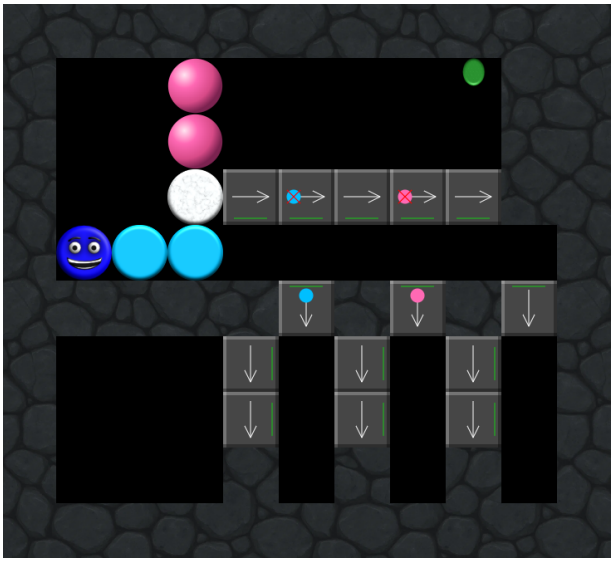
Pusher

If a pusher is moved by a pistons trigger, it moves a moveable object one position in the indicated direction. If needed, it moves also other moveable objects. That an object is not moveable by the blue ball doesn't mean that a pusher can also not move it. A pusher can move an unlimited number of objects at the same time. A pusher up or a pusher down can move a light blue ball vertically.
When a pusher moves horizontally, it does not take the objects with it that are on top.
The blue ball can move a pusher to the left, to the right, up and down, but only one at the time.

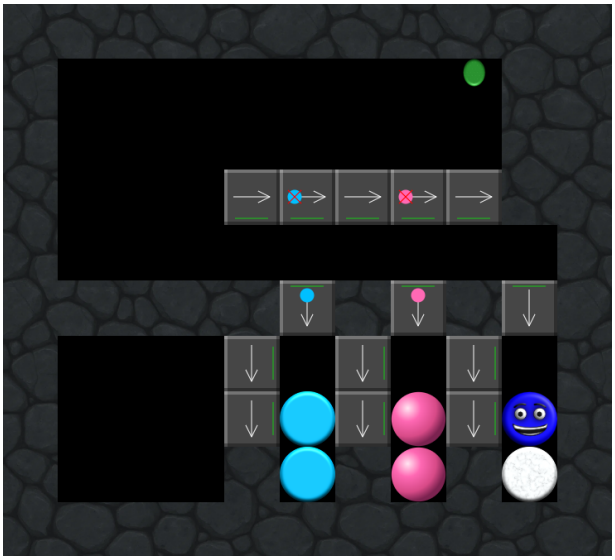
A pusher can move the following objects: blue ball, white ball, light blue ball, yellow ball, red ball, purple ball, moveable gray ball, orange ball, direction changer, synchroniser, copier, force, yellow pusher, time bomb, door, conveyor belt, mover, pusher, answer ball, music box, changer, pistons trigger

Mover

A mover moves an object (with or without weight) that is at an active side of it one step in the indicated direction (when there is space). The active sides are indicated by light green lines and can be set with the $activesides setting. The possible directions are left, right, up, down, upleft, upright, downleft and downright (see the $direction setting). There are cases in which an object will be moved through the mover. When the direction is down and the top is active, the object that is on top of the mover will be placed under the mover.
In some cases a mover will not move a blue ball or a red ball to prevent that it will be trapped in a loop.
The following objects can be moved (one at the time): blue ball, white ball, light blue ball, red ball, yellow ball, purple ball, moveable gray ball, orange ball, pink ball, direction changer, conveyor belt part, answer ball, changer
If you want to move only one kind of object (for example purple balls), you can change the $movermode setting. In that case a filled circle (ball) or square (direction changer) with the color of the object is shown at the beginning of the arrow. If you want all moveable objects to be moved except of one kind, you can set $inverted to yes which is indicated by a cross through the object. Here is an example of a simple sorting mechanism to move the light blue balls in the left hole, the pink balls in the middle hole and the rest in the right hole.



Before sorting



After sorting

By default an object is moved immediately, but with the $gameticks setting, you can set a delay. A value of 0 (immediately) for ticks is valid for a mover.
A mover can be moved to the left, to the right, up and down by the blue ball when the blue ball is not at an active side. A piston can also move a mover.

Music box

A music box is a very advanced object that can play a musical note or even a whole song depending on the mode (see $musicbox setting). It uses a built-in synthesizer (additive and subtractive) that is also created by Fred Bolder. For the instruments bassdrum, cowbell, hihat, hihat2, noisedrum, ridecymbal, snaredrum, splashcymbal and tom, the note is used for variations of the sound. The note C4 is the default sound. At the moment that I write this, there is for every instrument a variation at the note D4. For example the hihat with the note D4 is a open hi-hat. For the tom there are also variations at the notes E4 and F4. If another note than C4 sounds the same as C4 you should not use it, since the sound might change in the future. In that case, just set the note to C4.
The instrument drums is a collection of drums, cymbals and percussion instruments. This means that you need only one music box for a rhythm when there are no instruments played at the same time. Since the bass drum and the snare drum are often not played at the same time, you can use one music box for both instruments. Here is the note mapping for the drums instrument.

Note	Instrument
C4	Bass drum 1
D4	Bass drum 2
E4	Snare drum 1
F4	Snare drum 2
G4	Closed hi-hat 1
A4	Open hi-hat 1
B4	Tom 1
C5	Tom 2
D5	Tom 3
E5	Tom 4
F5	Cowbell 1
G5	Cowbell 2
A5	Noise drum 1
B5	Noise drum 1
C6	Splash cymbal 1
D6	Splash cymbal 2
E6	Ride cymbal
F6	Ride bell
G6	Closed hi-hat 2
A6	Open hi-hat 2
B6	Crash cymbal 1
C7	Crash cymbal 2
D7	Cross stick 1
E7	Cross stick 2

note

The default mode of a music box is note. When there is an object with weight on top of a music box, it will fall through the box and a musical note is played. The default note is C4. With the $notes setting, you can set one or more notes (comma separated). When there are more notes set, the next time a ball falls through the box, the next note will be played. A music box plays always one note at the time. For playing chords you can use more music boxes, but you can also use the & character (example: A3&C4&E4) to play more notes at the same time. The default instrument is xylophone. With the $instrument setting you can set the instrument and the volume.

song

When a music box is in song mode (see $musicbox), it can be started or stopped by a pistons trigger that is in the same group.

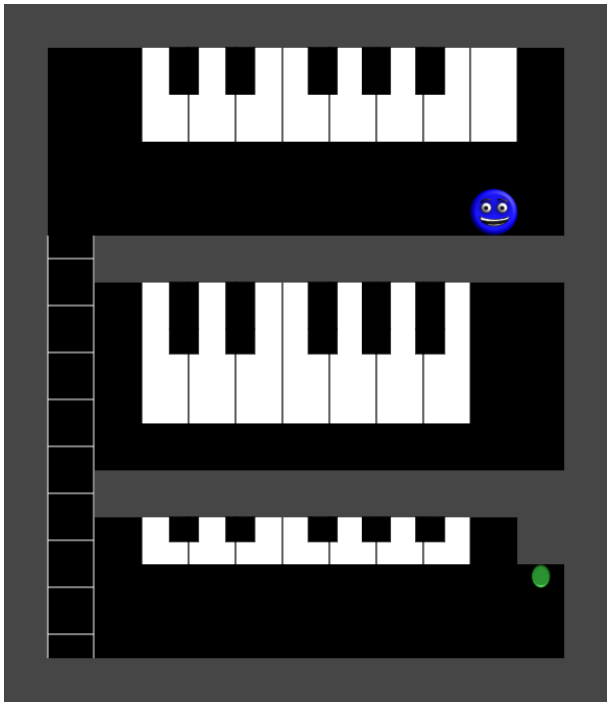
near

The near mode is almost the same as the song mode, but the music starts when the blue ball comes near and the music stops when the blue ball goes away.

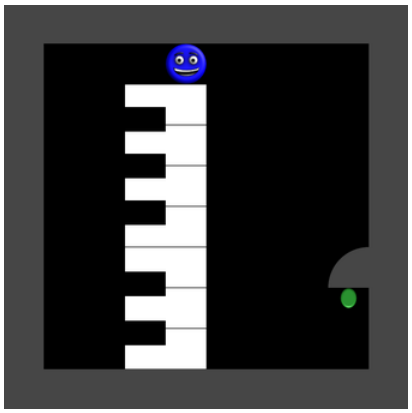
firstcount

The firstcount mode is almost the same as the song mode, but when the music box is active, the blue ball comes near to it and the music is not at count 1 (± 250 msec), the blue ball will die. When the blue ball came near on count 1, it can stay there. For this mode, the stepspermeasure setting must be correct. The number of steps per measure is often not the same as the number of beats per measure.

keyboard



When a music box is in keyboard mode, it looks like a part of a piano keyboard depending on the notes and part settings. To display a key there must be set only one note and it can not be a flat or a sharp. The black keys are shown to be able to identify the white key notes, but they can not be played (yet). C4 and A5 are valid notes for the keyboard mode, but Bb4 is invalid. On the picture you can see some possible keyboard layouts. The upper keyboard is made with 2 rows of 8 music boxes. The notes from left to right are C4, D4, E4, F4, G4, A4, B4 and C5. In the first row the part setting of all music boxes is up except of the last one. The part setting of that music box (C5) is bottom to avoid displaying a part of a black key (C#5 or Db5). In the second row the part setting of all music boxes is bottom.
The middle keyboard is made with 3 rows of 7 music boxes. The notes from left to right are C4, D4, E4, F4, G4, A4 and B4. In the first row the part setting of all music boxes is up. In the second row the part setting of all music boxes is middle. In the thrid row the part setting of all music boxes is bottom.
The lower keyboard is made with 1 rows of 7 music boxes. The notes from left to right are C4, D4, E4, F4, G4, A4 and B4. The part setting of all music boxes in that row is middle.
When the blue ball or a light blue ball comes directly under a key, a note is played, so for the upper keyboard and the lower keyboard in this example it has to jump. To be able to play all melodies, it is best to leave 2 rows empty below the keyboard, so the blue ball has to jump.
It is possible to have a different order of the notes, but then the keyboard looks weird, except when only bottom parts are used. This can be nice if you want a melody when the blue ball moves in one direction. In that case it is best to leave only one row empty below the keyboard.
It is also possible to have a rotated layout depending on the $direction setting (left, right down or up which is the default). This means that there can be a keyboard and a game rotator in the same level. Normally the directions of all music boxes that are used for the same keyboard have to be the same. If the direction of a music box is set to left, the blue ball has to come directly at the right of the music box to play a note.
Here is an example of a rotated layout. When the blue ball moves one step to the right, it falls and all notes from high to low are played.



A music box in keyboard mode can be moved (one at the time) by the blue ball left, right, up and down. If you don't want that, you can place one or more objects. In the previous example there is no music box that can be moved, since you can not move more music boxes at the same time.

door

When a music box is in door mode, it is a locked door that only opens when the right melody or rhythm is played on a keyboard that is in the same group. To hear the melody that needs to be played, the blue ball has to be close to the door. The melody stops when the blue ball goes away from the door. While playing the melody or rhythm, the timing is not important. Only the order of the notes is checked. The melody is not repeated, so it is clear what has to be played. To hear the melody again, the blue ball has to go away from the door and come again close to the door. When there are less than 2 notes, a random melody is used. In that case, every time a level is played, the melody can be different (also when retrying the level). If you want to use a random melody, make sure that there is a keyboard in the same group as the door with the notes C4, D4, E4, F4, G4, A4, B4 and C5 when octaves is 1 (see $octaves). When octaves is 2, the keyboard must also have the notes D5, E5, F5, G5, A5, B5 and C6. You can define your own random melodies by using the | character (example of 3 melodies: C4, E4, G4, |, G4, E4, C4, |, D4, F4, A4). When there are more doors in the same group, the notes of the first found door will be copied to all doors. It is best to set by yourself the same notes for the doors that are in the same group.
When checking drum patterns, you might need the $noteoverride setting. When the note override is not none, the note override will be used to play the sound. For checking, the original note will be used.

chord1

The chord1 mode is a kind of door mode. When the blue ball comes close to the door, it plays the notes of a major chord or a minor chord. After that it places a major chord ball and a minor chord ball in the level. If a major chord was played, the blue ball has to take the major chord to open the door. If a minor chord was played, the blue ball has to take the minor chord to open the door. If the blue ball takes the wrong chord type, it will die.
When you create a level with a music box in chord1 mode, make sure there is place for the chord balls.

chord2

The chord2 mode is almost the same as the chord1 mode. Instead of the major and minor chords, augmented and diminished chords are used.

chord3

The chord3 mode is almost the same as the chord1 mode. Instead of the major and minor chords, suspended second (sus2) and suspended fourth (sus4) chords are used.

chord4

The chord4 mode is almost the same as the chord1 mode. Instead of the major and minor chords, dominant seventh (7) and major seventh (maj7) chords are used.

Interval1

The interval1 mode is a kind of door mode. When the blue ball comes close to the door, it plays the notes of a perfect fourth (P4) interval, a perfect fifth (P5) interval or a perfect eighth (P8) interval. After that it places a P4 ball, a P5 ball and a P8 ball in the level. If a perfect fifth was played, the blue ball has to take the P5 interval to open the door. If a perfect eight was played, the blue ball has to take the P8 interval to open the door etc. If the blue ball takes the wrong interval, it will die.

Interval2

The interval2 mode is almost the same as the interval1 mode. When the blue ball comes close to the door, it plays the notes of a major second (M2) interval, a minor third (m3) interval or a major third (M3) interval. After that it places a M2 ball, a m3 ball and a M3 ball in the level. If a major second was played, the blue ball has to take the M2 interval to open the door. If a minor third was played, the blue ball has to take the m3 interval to open the door etc. If the blue ball takes the wrong interval, it will die.

Answer ball

A purple answer ball is like a purple ball and a white answer ball is like a white ball, but when it comes close to a question stone and the answer is correct, the question stone disappears.
Since there can not fit a long text in an answer ball, there are special codes for icons.

%car	%fish	%flower	%heart	%house	%star	%train	%tree	
								

For color answers the following codes can be used: %black, %blue, %brown, %gray, %green, %orange, %pink, %purple, %red, %white, %yellow

Answer balls can also be used to make horizontal (top to bottom) or vertical (left to right) comparisons. When a comparison is correct, the involved answer balls disappear.
Examples of valid comparisons: 1+2=3, 4=2+2 and 6-1=2+3
Use “x” to multiply and “/” to divide.
It is also possible to make comparisons with some musical symbols, but they must not be combined with numbers.
Examples of valid comparisons: %w=%h+%q+%q and %q.=%q+%s
Here is an overview of the supported musical symbols.

%w	%h	%q	%e	%s	%w.	%h.	%q.	%e.	%s.
									
%w..	%h..	%q..	%e..	%s..					
									

When the mode of an answer ball is set to scale (see $answerballmode), it measures the weight of the balls that are on top of it and sets that as the answer. You can use scales in comparisons. Blue, white, red and orange balls have a weight of 1 and a pink ball has a weight of 0.5.