

Level Backgrounds list

*Probed by Wohlstand 25 feb 2014
(100% done)*

Level Background architecture

The background of level represents the picture which moves concerning offset of the camera of the player. The background always repeats in horizontal. If the background doesn't repeat on vertical, it will be offset in proportion heights of section and height of the most background image. If the background repeats on vertical, its vertical offset will match offset of objects on a card concerning movement of the camera of the player. The second background image which repeats across over the main background image is allowed. In that case, vertical offset will be same as in case of vertical repetition.

Speed experiment

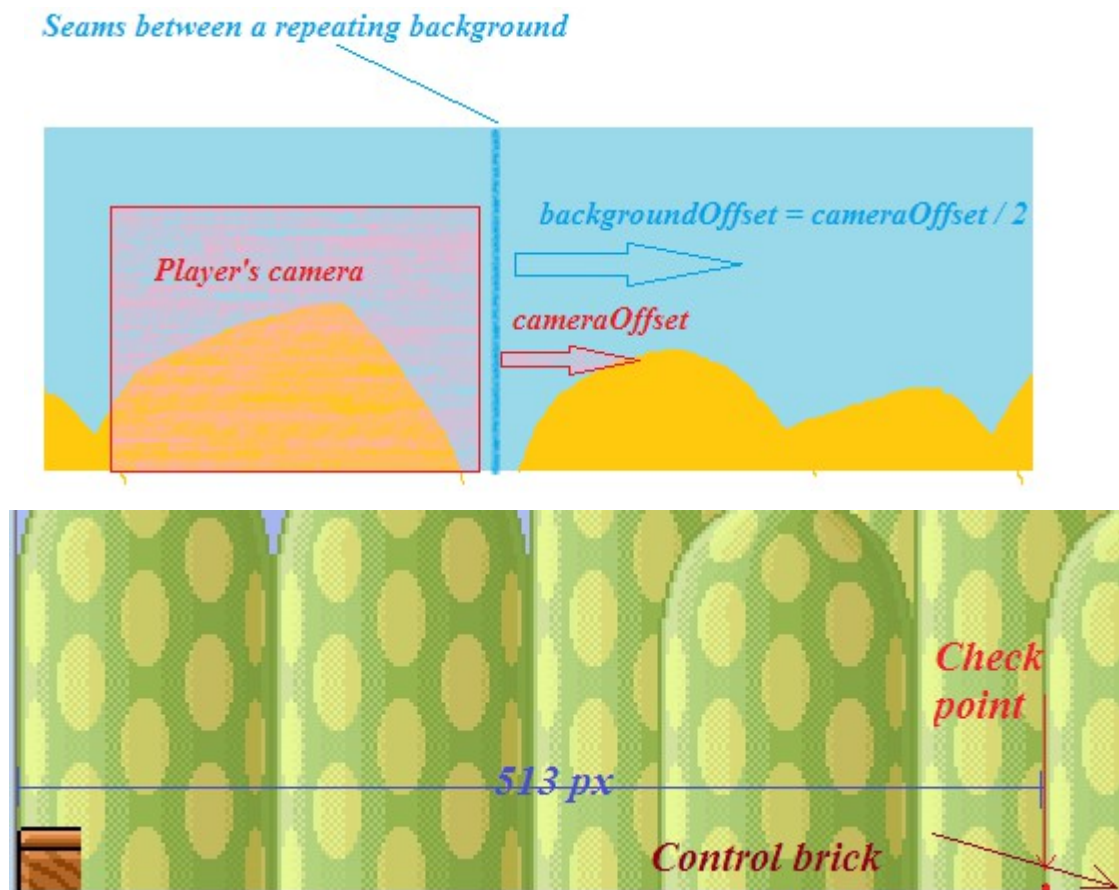
Background horizontal offset equal to half of camera offset

Proof:

We will take two blocks, we will put them at distance, equal to camera width – 800px.

On the background image we will take check point and we will measure distance from the screen edge to a point.

Now, we will move the camera so that the second block will be placed closely to the screen edge in the same way as the first block. And we measure distance from the screen edge to check point:





As we see by results of measurement, the background moves on horizontal with an position twice more slowly than the position of the player's camera.

Horizontal parallax offset formula is:

$$O_{bx} = \frac{P_{(camx)}}{V_{ofst}} \bmod W_b$$

Where:

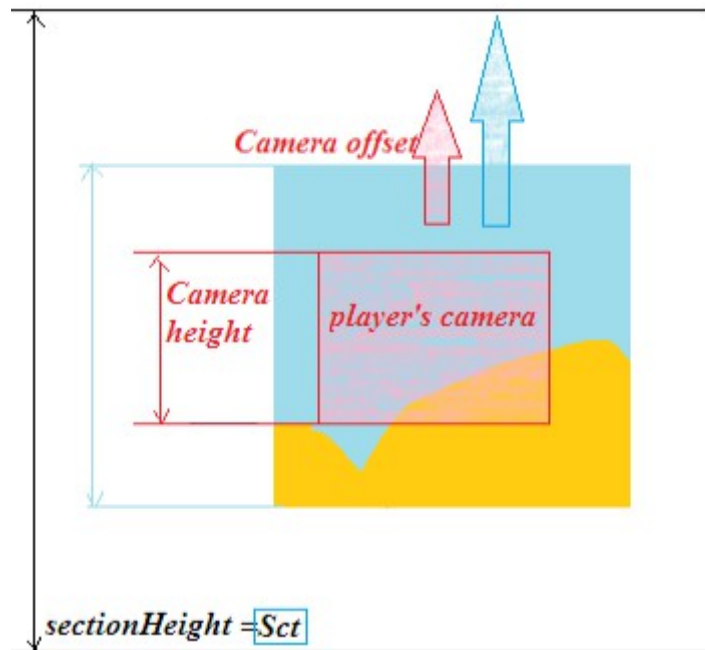
$O_{(bx)}$ – Is a background image horizontal offset on the screen;

$P_{(camx)}$ – is a camera X position on the section. I.e. if value 0 – camera is on left side of section;

V_{ofst} – is a coefficient of horizontal parallax (usually euqal to 2);

W_b – is a width of the background image.

Vertical parallax offset of non-repeat background



Vertical parallax offset formula is:

$$O_{by} = \frac{P_{cam y}}{\frac{H_{section} - H_{screen}}{H_{bg} - H_{screen}}}$$

Where:

$O_{(by)}$ – Is a background image vertical offset on the screen;

$P_{(cam y)}$ – is a camera Y position on the section. I.e. if value 0 – camera is on top side of section;

$H_{(section)}$ – is a height of section;

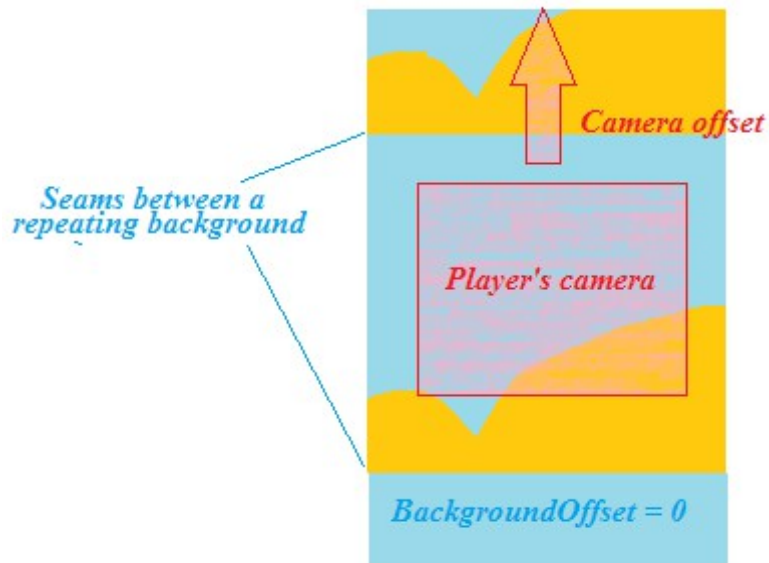
$H_{(screen)}$ – is a height of a screen;

$H_{(bg)}$ – is a height of background image.

If section height greater than height of a background, a background displaces in proportion to position of the camera concerning section height.

If background height greater or is equal section heights, the background doesn't moving, and is attached to a screen bottom.

Vertical offset of repeat background



If the background repeats on verticals, offset of a background is equal to zero, camera offset concerning a background is equal to camera offset concerning section coordinates. Offset, equal to a half of offset of the camera is possible. But it is used by certain background optionally.

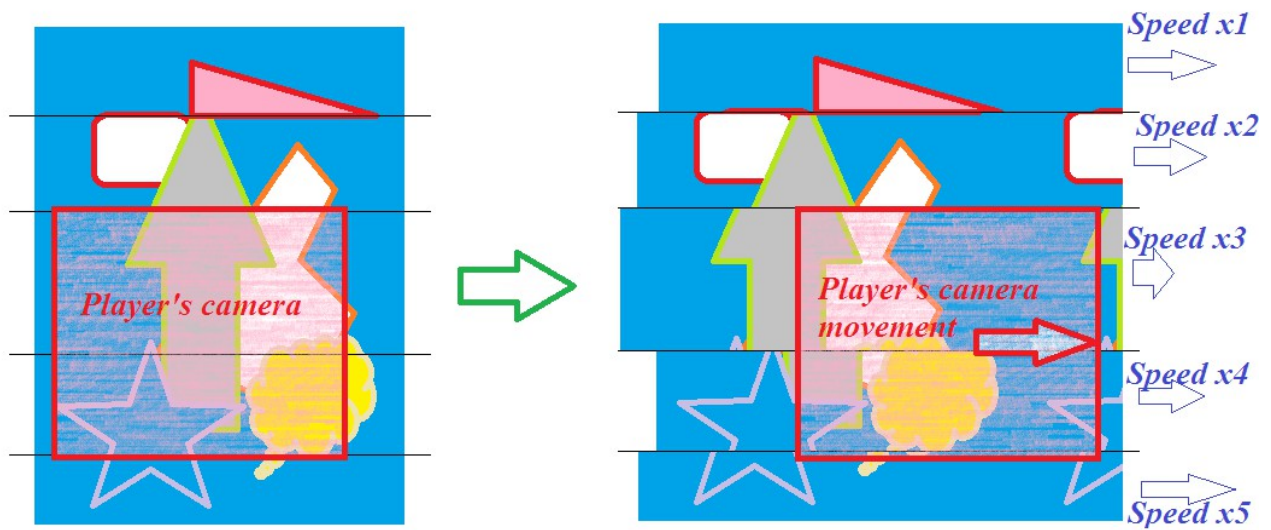
horizontal double-background offset



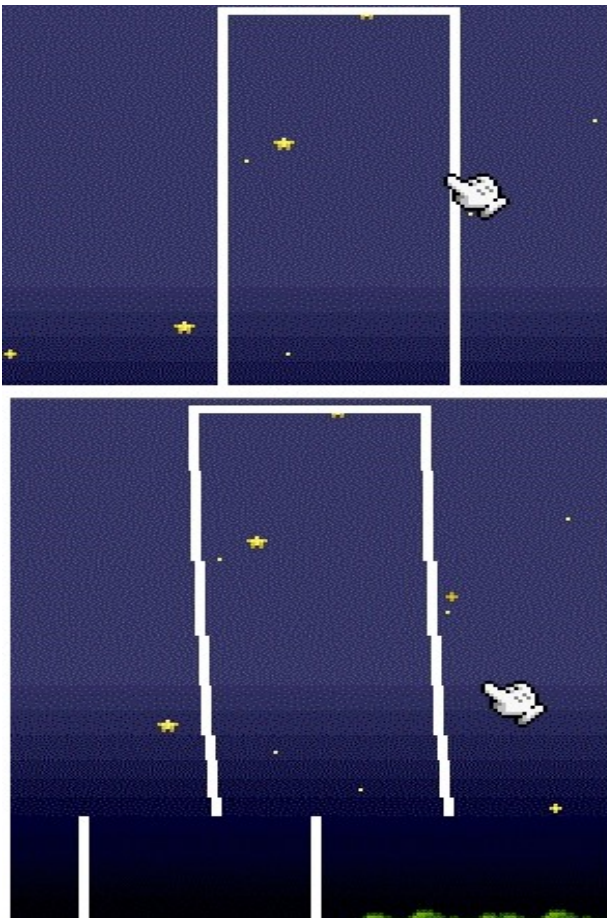
If the background uses two rows of images, the second row is moving horizontal twice slowly than the first row. Vertical offset as at a vertical-repeating background, is absent.

Magic backgrounds

Except normal background which simply move concerning the camera, there are also magic. The magic background: is separated on horizontal strips which move with a different speed.



Example of magic background:



Magic Backgrounds list:

#	Name	magic separators (px relative top)	strips q.
40	Mystic Cave	49,86,124,236,279,334,409,541,615,666,710,816,850,917,954	16
49	Night hills	57,112,162,196,212,228,243,255,267,280	11
50	Mushrooms	216	2
51	Desert	330	2
52	Night desert	59,116,164,196,229,244,269,280	9
56	Underwater	100,346,455	4

Vertical offset types (Vtp):

RP = repeat with cam/2 offset.

RZ = repeat without vertical offset

NR = no repeat, offset is proportional to background and section heights.

ZR = no repeat, offset equal to zero.

Where V_{ofst} - is a horizontal parallax offset coefficient.

Where proportional attach: position calculating by vertical parallax offset formula

where attach “bottom” or “top” - is no vertical parallaxing effect.

Backgrounds list

BG #	Name	repeat	offsets (V_{ofst} ;Vtp)	attach	type
1	Blocks (1 + 2)	horizontal	(2; ZR) + (4; ZR)	bottom	Double-row
2 (13)	Clouds	horizontal	(2; NR)	bottom	Single-row
3 (2)	Hills (3 + 2)	horizontal	(2; ZR) + (4; ZR)	bottom	Double-row
4 (3)	Dungeon	horizontal	(2; NR)	proportional	Single-row
5 (4)	Pipes	both directions	(4; RP)	proportional	Tiled
6 (5)	Trees	horizontal	(2; NR)	bottom	Single-row
7 (6)	Bonus	horizontal	(2; NR)	bottom	Single-row
8 (7)	Underground	horizontal	(2; ZR)	top	Single-row
9 (8)	Night	horizontal	(2; NR)	proportional	Single-row
10 (9)	Night2 (10 + 9)	horizontal	(2; ZR)+(2; NR)	bottom+ proportion	Double-row with imposing
11 (10)	Overworld	horizontal	(2; NR)	proportional	Single-row
12 (11)	Hills	horizontal	(2; NR)	proportional	Single-row
13 (12)	Trees	horizontal	(2; NR)	proportional	Single-row
14	Desert	horizontal	(2; NR)	proportional	Single-row
15	Dungeon 2	horizontal	(2; NR)	proportional	Single-row
16	Crateria	horizontal	(2; NR)	proportional	Single-row
17	Ship	horizontal	(2; ZR)	top	Single-row
18	Ghost house	horizontal, animated (4 frms)	(2; NR)	proportional	Single-row
19	Forest	horizontal	(2; NR)	proportional	Single-row
20	Forest	horizontal	(2; NR)	proportional	Single-row
21	Battle	horizontal	(2; NR)	proportional	Single-row
22	Waterfall (22 + 2)	horizontal, animated (4frms)	(2; ZR) + (4; ZR)	bottom	Double-row
23	Tanks	horizontal	(2; NR)	proportional	Single-row
24	Bowser	horizontal	(2; ZR)	top	Single-row
25	Underground	horizontal	(2; NR)	proportional	Single-row
26	Toad house	horizontal	(2; ZR)	top	Single-row
27	Castle	horizontal	(2; NR)	proportional	Single-row
28	Bonus	horizontal	(2; NR)	proportional	Single-row
29	Night	horizontal, animated (4 frms)	(2; NR)	proportional	Single-row
30	Cave	horizontal, animated (4 frms)	(2; NR)	proportional	Single-row
31	Clouds	horizontal	(2; NR)	proportional	Single-row
32	Hills 2	horizontal	(2; NR)	proportional	Single-row
33	Hills 4	horizontal	(2; NR)	proportional	Single-row
34	Hills 3	horizontal	(2; NR)	proportional	Single-row
35	Snow trees	horizontal	(2; ZR)+(4; ZR)	bottom	Double-row

	(35+36)				
36	Clouds 2	horizontal	(4; NR)	proportional	Single-row
37	Snow hills (37+36)	horizontal	(2; ZR) + (4; ZR)	bottom	Double-row
38	Cave	horizontal	(2; ZR)	top	Single-row
39	Cave 2	horizontal	(2; NR)	proportional	Single-row
40	Mystic cave	horizontal	(2; NR)	proportional	Single-row
41	Castle	horizontal	(2; NR)	proportional	Single-row
42	Castle	horizontal, animated (4 frms)	(2; NR)	proportional	Single-row
43	Castle	horizontal	(2; NR)	proportional	Single-row
44	Castle	horizontal	(2; NR)	proportional	Single-row
45	Brinstar	horizontal	(2; NR)	proportional	Single-row
46	Transport	horizontal	(2; NR)	proportional	Single-row
47	Mother brain	horizontal	(2; NR)	proportional	Single-row
48	Clouds	horizontal	(2; NR)	proportional	Single-row
49	Night Hills	horizontal	(2; NR)	proportional	Single-row
50	Mushrooms	horizontal	(2; NR)	proportional	Single-row
51	Desert	horizontal	(2; NR)	proportional	Single-row
52	Night desert	horizontal	(2; NR)	proportional	Single-row
53	Cliff	horizontal	(2; NR)	proportional	Single-row
54	Warehouse	horizontal	(2; NR)	proportional	Single-row
55	Underwater	horizontal, animated (4 frms)	(2; NR)	proportional	Single-row
56	Underwater	horizontal	(2; NR)	proportional	Single-row
57	Dungeon	horizontal	(2; NR)	proportional	Single-row
58	Desert night	horizontal, animated (4 frms)	(2; NR)	proportional	Single-row