

Manual annotations of SMB scenes : Pattern analysis

following <https://doi.org/10.1145/2427116.2427117>
Using maps from <https://nesmaps.com/maps/SuperMarioBrothers/SuperMarioBrothers.html>

Level segmentation procedure - setting up the env

- 1- Create a virtual env
- 2- Install stable-retro following the [dev installation guide](#)
- 3- Clone [mario dataset](#) + [mario.stimuli](#) through datalad
- 4- To have access to the spreadsheet with all the values regarding the segmentation:
 - 1- Go inside the mario directory
 - 2- Make sure to be using the [events branch](#): `git checkout events`
 - 3- `cd code/scenes/`
 - 4- open and edit scenes_mastersheet.csv (see next slide)

Level segmentation procedure - doing the thing !

5- Proceed to the segmentation of the level in this GSlides

6- For every segmented scene, annotate the content based on the different game patterns as defined in Table 1 of [Dahlskog & Togelius \(2012\)](#)

7- Add the info about the content of the scene in the scenes_mastersheet.csv

8- To get the Entry point and the Exit point of the scene:

1- Open the GUI: `cd stable-retro` and `./gym-retro-integration`

2- Load game (select the rom.nes file in the mario.stimuli/SuperMarioBros-Nes directory)

3- Load state... Use to select a specific state/level

4- To see the value: Window/Show scenario info... in the GUI

5- Look for: level_layout; player_x_posHi; player_x_posLo

6- To get the actual value for Entry/Exit point: $\text{player_x_posHi} * 256 + \text{player_x_posLo}$

Level annotation procedure - validating the thing !

To make sure the annotations make sense for all the segmented scenes, one proposition is to visualize the gameplays across trials and participants for each scene.

1- Make sure you ran `datalad get sub*/ses*/func/*event*` and `datalad get sub*/ses*/gamelogs/*bk2`

2- Run the clip_extractor.py script to segment the gameplays in scene:

```
python clip_extractor.py --datapath <path_to_bids_dataset> --output <path_to_save_outputs> --clip_extension mp4
```

3- Check if the annotations we have done bellow watch what is happening in the scenes. Add your observation to this google slides for each corresponding level

Level annotation procedure - automating the thing !

[Insert steps]

w1l1

Scene 0 :
- Beginning

Scene 1 :
- Enemy
- 2-path
- Risk/reward
- Roof

Scene 2 :
- Empty valley

Scene 3 :
- Enemy valley
- Enemy

Scene 4 :
- Enemy valley
- 2-hord

Scene 5 :
- Gap
- 2-path

Scene 6 :
- Gap
- 3-path
- Risk/reward
- 2-hord

Scene 7 :
- Gap
- 3-path
- Risk/reward
- 2-hord

Scene 8 :
- 3-path
- Risk/reward
- 2-hord
- Enemy

Scene 9 :
- 3-path
- Risk/reward
- 4-horde

Scene 10 :
- Enemy stair valley
- Stair up

Scene 11 :
- Gap stair valley

Scene 13 :
- 2-path
- 2-horde
- R/R
- Roof

Scene 14 :
- Stair up
- Flagpole

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WORLD 1-1

LEGEND

- Coin
- Magic Mushroom or Fire Flower
- Starman
- 1 up Mushroom
- Little Goomba
- Koopa Troopa

12

Scene 12 :
- Reward

w1l2

Scene 0 :
- 2-hord
- 2-path
- Risk-reward

Scene 1 :
- Enemy stair
valley
- 2-path
- Risk-reward

Scene 2 :
- 2-hord
- 2-path
- Risk-reward
- Roof

Scene 3 :
- 3-hord
- Reward
- Roof
- 3-path
- Risk-reward
- Roof

Scene 4 :
- Enemy
- 2-hord
- 3-path
- Risk-reward
- Roof

Scene 5 :
- Gap
- 2-path
- Reward

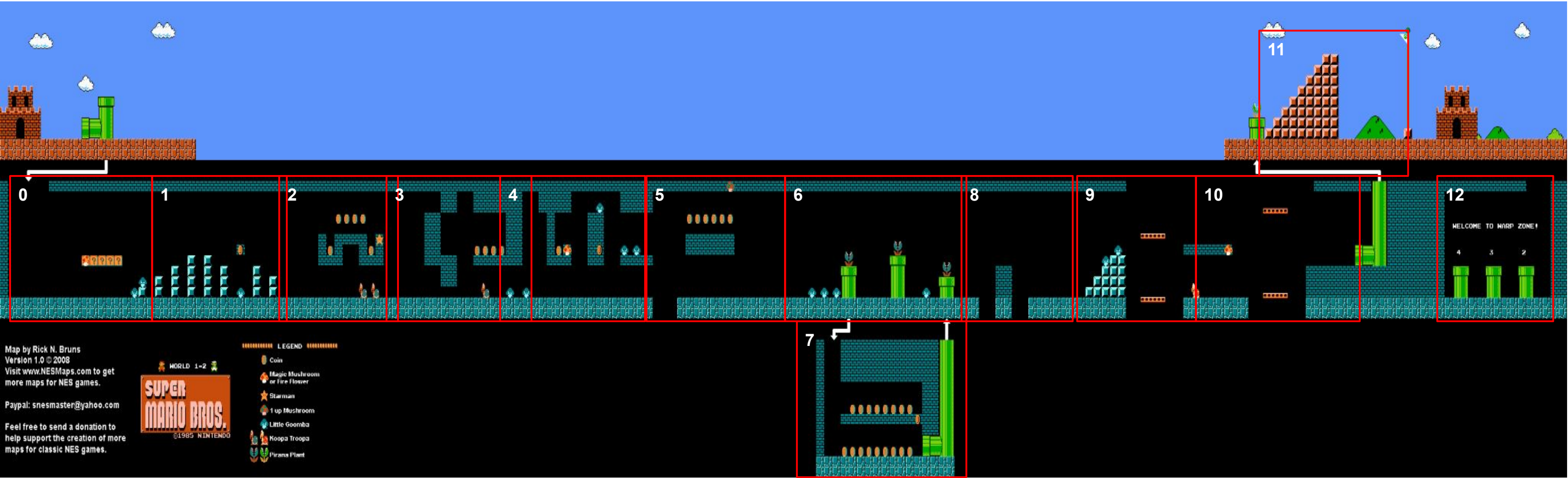
Scene 6 :
- 3-hord
- Enemy valley
- Pipe valley

Scene 8 :
- Pillar gap

Scene 9 :
- Stair up
- 2-hord
- Enemy
- 2-path
- Gap
- Moving
platform

Scene 10 :
- Risk/Reward
- Gap
- Moving
platform
- Roof

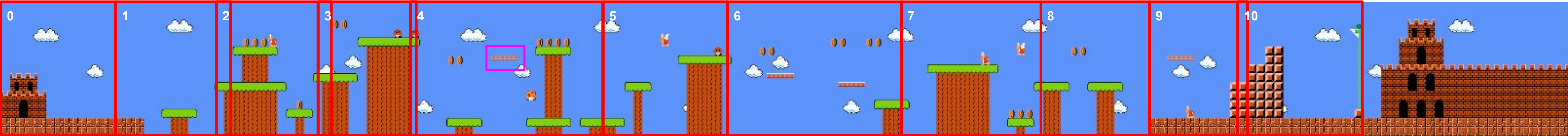
Scene 11 :
- Stair up
- Flagpole



Scene 7 :
- Reward

w1l3

0	1	2	3	4	5	6	7	8	9	10
- Beginning	- Variable gaps	- 2-Path - Enemy - Variable gaps	- 2-horde - Gap	- Variable gaps - 2-path - Moving platform - Risk/Reward	- Variable gaps - 2-path -	- Variable gaps - Moving platform	- Variable gaps - 2-horde	- Multiple gaps	- Moving platform - Enemy	- Stair up - Flagpole



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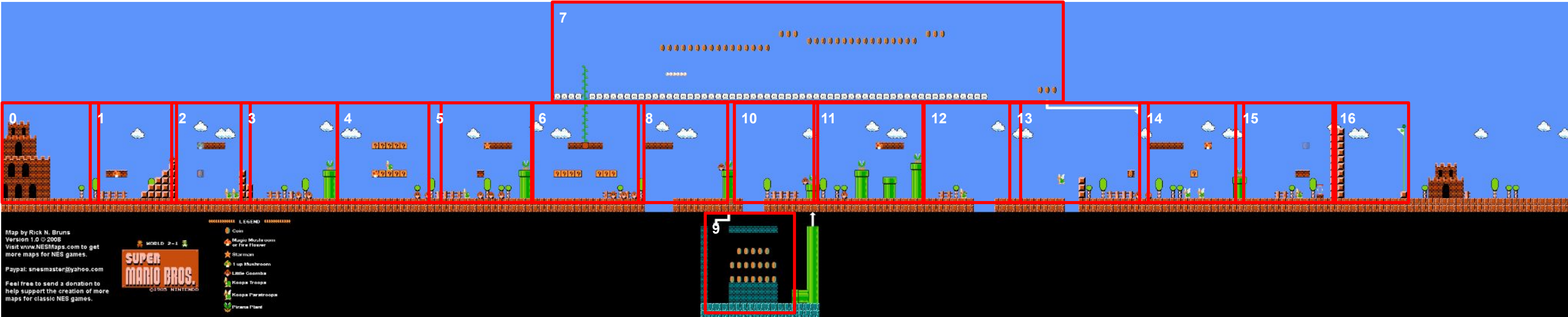
WORLD 1-3

LEGEND

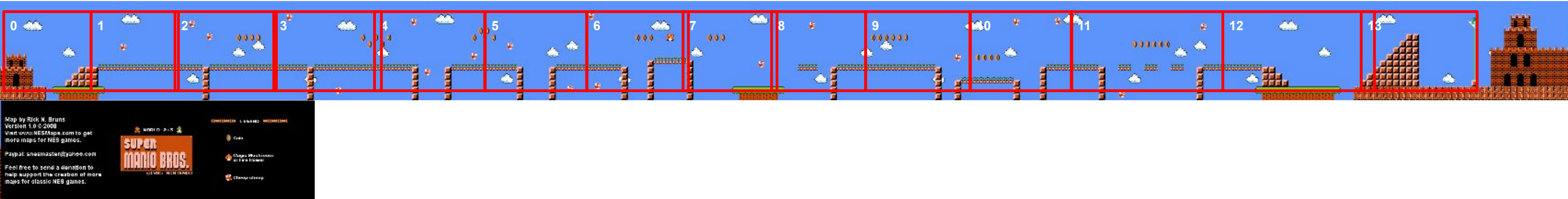
- Coin
- Magic Mushroom or Fire Flower
- Little Goomba
- Koopa Troopa
- Koopa Paratroopa

w2l1

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
- Beginning	- 2-path - Stairs up - Roof	- 2-path - 2-hord - Risk/Reward	- Enemy valley - 2-hord	- 2-hord - 3-path - Risk/Reward - Enemy - Roof	- 3-hord - 2-path - Risk/Reward	- 3-hord - 3-path - Roof	- Bonus zone - Moving platform	- 2-path - enemy - gap	- bonus zone	- Gap - enemy	- Enemy valley - Empty valley - 2-path - Risk/Reward	- gap - enemy	- gap - enemy	- 4-hord - 2-path - risk/reward	- enemy - 2-path - roof	- flagpole

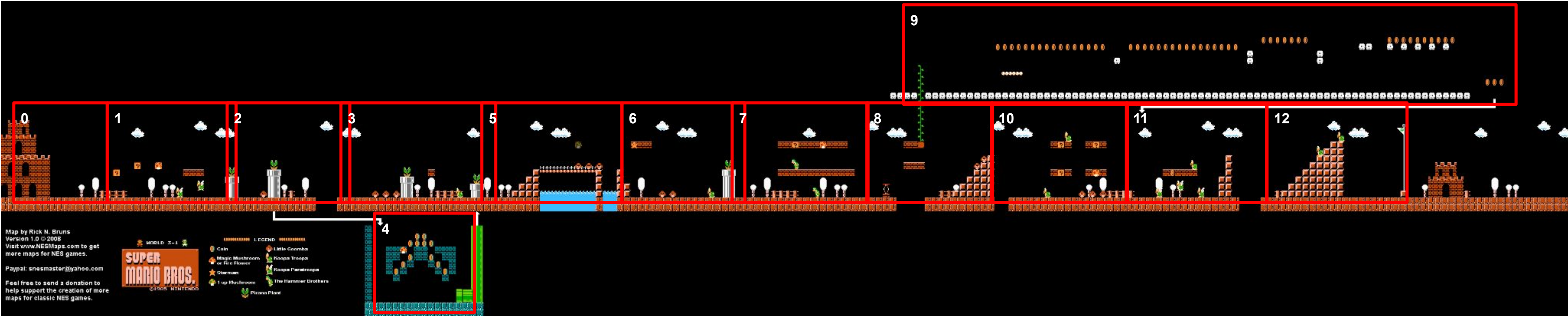


0	1	2	3	4	5	6	7	8	9	10	11	12	13
<div><div>- Beginning</div><div>- Stair up</div><div>- Gap</div></div>	<div><div>- Enemy</div></div>	<div><div>- Enemy</div></div>	<div><div>- Enemy</div></div>	<div><div>- Enemy</div><div>- Gap</div></div>	<div><div>- Enemy</div><div>- Gap</div></div>	<div><div>- Enemy</div><div>- Gap</div><div>- Risk/Reward</div></div>	<div><div>- Enemy</div><div>- Gap</div></div>	<div><div>- Enemy</div><div>- Variable gaps</div></div>	<div><div>- Enemy</div><div>- Gap</div></div>	<div><div>- Enemy</div><div>- Gap</div></div>	<div><div>- Enemy</div><div>- Multiple gaps</div></div>	<div><div>- Enemy</div><div>- Gap</div><div>- Stairs down</div></div>	<div><div>- Stairs up</div><div>- Flagpole</div></div>

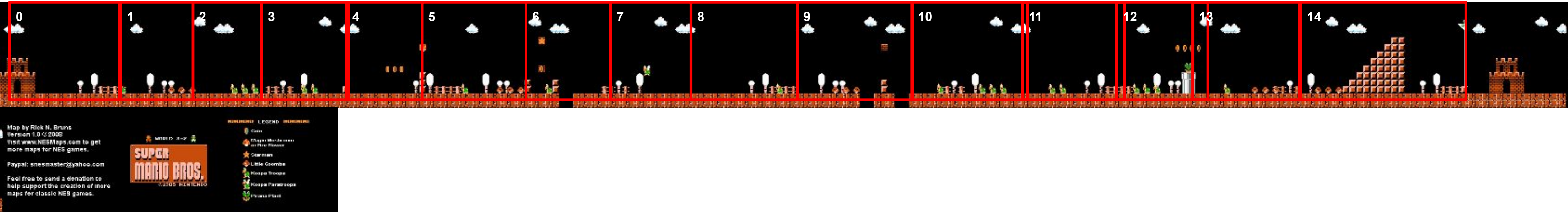


w3l1

0	1	2	3	4	5	6	7	8	9	10	11	12
<ul style="list-style-type: none">- Beginning	<ul style="list-style-type: none">- 2-hord- Risk/reward- Roof- 2 path	<ul style="list-style-type: none">- Enemy valley- Gap	<ul style="list-style-type: none">- 3-hord- enemy valley- Roof- 2-path	<ul style="list-style-type: none">- Bonus zone	<ul style="list-style-type: none">- stairs up- 3-hord- gap- risk/reward	<ul style="list-style-type: none">- 2-hord- Enemy valley- 2-path- Risk/reward-	<ul style="list-style-type: none">- 3-path- Risk/reward- Enemy- Roof	<ul style="list-style-type: none">- 3-path- Stairs up- 2-hord- Gap-	<ul style="list-style-type: none">- Bonus zone	<ul style="list-style-type: none">- 3-hord- Enemy- 3-path- Risk/reward- Roof	<ul style="list-style-type: none">- Roof- Enemy- 3-hord- Gap	<ul style="list-style-type: none">- 2-hord- Stairs up- Flagpole

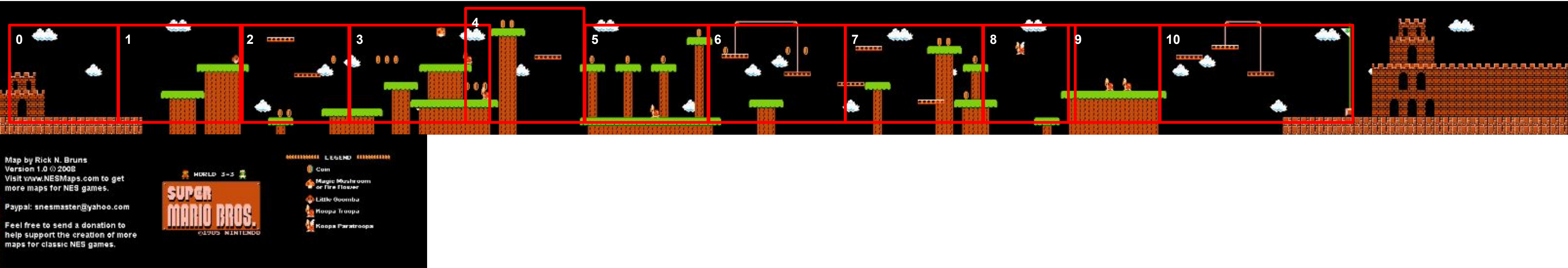


0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<ul style="list-style-type: none">- Beginni ng- Enemy	<ul style="list-style-type: none">- 3-hord	<ul style="list-style-type: none">- 3-hord	<ul style="list-style-type: none">- 2-hord	<ul style="list-style-type: none">- Empty valley	<ul style="list-style-type: none">- Risk/Re ward- Enemy valley- 3-hord-	<ul style="list-style-type: none">- Enemy valley- Roof- Risk/Re ward gap	<ul style="list-style-type: none">- Enemy	<ul style="list-style-type: none">- Enemy	<ul style="list-style-type: none">- 3-hord- Multiple gaps	<ul style="list-style-type: none">- Enemy- 3-hord	<ul style="list-style-type: none">- 2-hord	<ul style="list-style-type: none">- 3-hord	<ul style="list-style-type: none">- Enemy- 3-hord	<ul style="list-style-type: none">- 3-hord- Stairs up- Flagpole



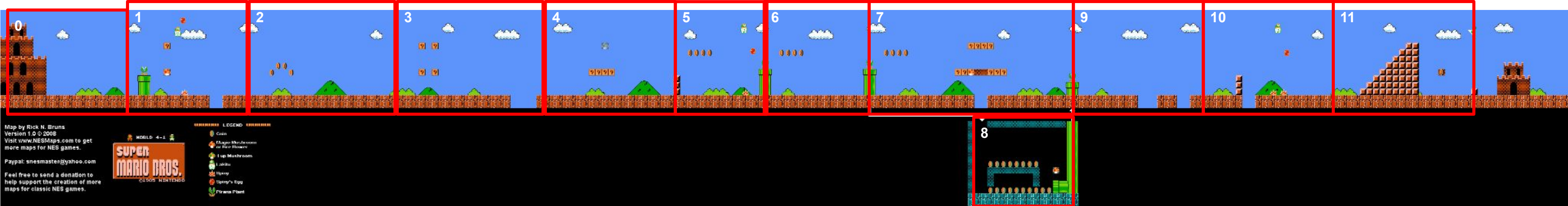
w3l3

0	1	2	3	4	5	6	7	8	9	10
- Beginning	- Gap - Enemy	- Moving platform - Variable gaps	- Gap - Risk/Reward - Enemy - 2-path	- Moving platform - gap	- Enemy - 2-path	- Moving platforms - Variable gaps	- Moving platforms - Variable gaps - 2-path	- Gap - Enemy	- 2-hord	- Moving platforms - Variable gaps - Flagpole



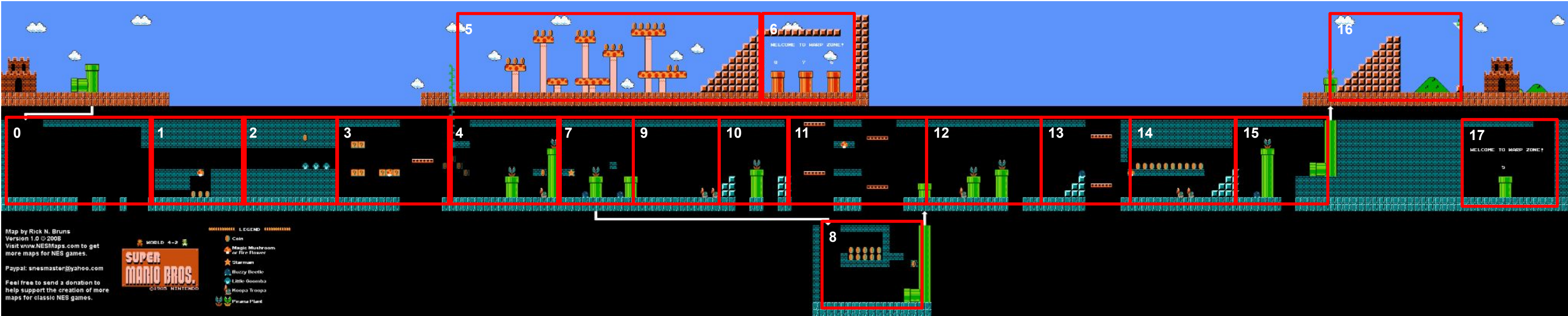
w4l1

0	1	2	3	4	5	6	7	8	9	10	11
- Beginning	- Enemy - Risk/Reward - gap	- Enemy	- enemy - gap -	- 2-path - risk/reward	- Enemy - valley	- Pipe valley	- Gap - 3-path - Risk/reward - Enemy	- Bonus zone - Reward	- Variable gaps - Enemy	- Gap - enemy - 2-hord	- Stairs up - flagpole



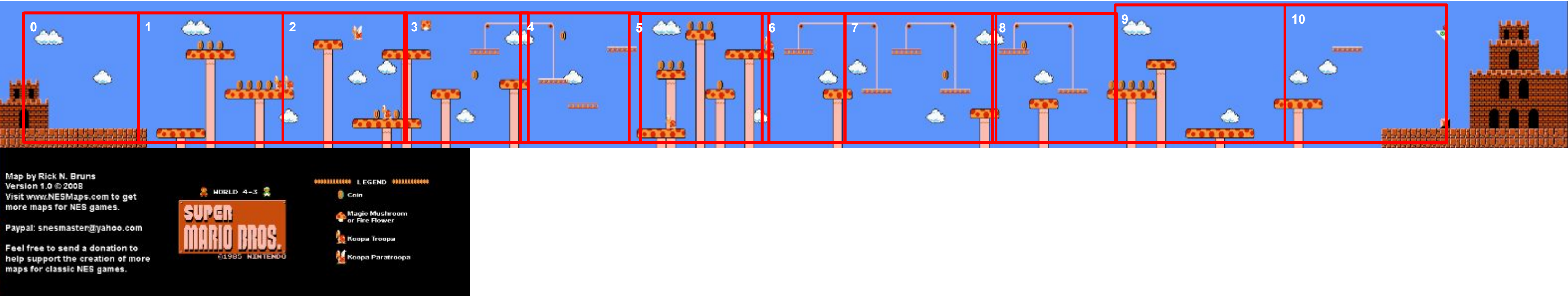
w4l2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<ul style="list-style-type: none">- Beginning- Variable gaps	<ul style="list-style-type: none">- Reward	<ul style="list-style-type: none">- 3-hor d- roof	<ul style="list-style-type: none">- 2-pat h- Risk/Reward- Moving platfo rm- Gap	<ul style="list-style-type: none">- Enemy valley- Roof- 2-pat h	<ul style="list-style-type: none">- Bonu s zone- Stairs up	<ul style="list-style-type: none">- Bonu s zone	<ul style="list-style-type: none">- Enemy valley- Risk/Reward- Roof- 2-pat h	<ul style="list-style-type: none">- Bonu s zone	<ul style="list-style-type: none">- 2-hor d- Enemy valley	<ul style="list-style-type: none">- Multi ple gaps	<ul style="list-style-type: none">- 3-pat h- movi ng platfo rms- risk/r ewar d	<ul style="list-style-type: none">- Enemy valley- Pipe valley	<ul style="list-style-type: none">- Stairs up- movi ng platfo rms- multi ple gaps-	<ul style="list-style-type: none">- risk/r ewar d- 2-hor d- roof- Stairs up	<ul style="list-style-type: none">- enem y valley gap	<ul style="list-style-type: none">- Stairs up- Flagpole	<ul style="list-style-type: none">- Bonu s zone



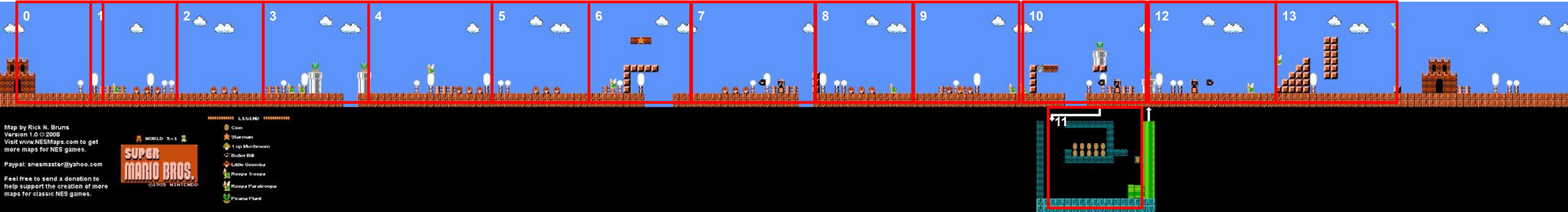
w4l3

0	1	2	3	4	5	6	7	8	9	10
<ul style="list-style-type: none">- beginning	<ul style="list-style-type: none">- Variable gaps- 2-hord	<ul style="list-style-type: none">- enemy- 2-path- variable gap	<ul style="list-style-type: none">- 2-path- reward- moving platform- Variable gaps	<ul style="list-style-type: none">- Moving platforms- Variable gaps- 2-path	<ul style="list-style-type: none">- enemy- 3-path- Variable gaps	<ul style="list-style-type: none">- Variable gaps- moving platforms	<ul style="list-style-type: none">- Variable gaps- moving platforms	<ul style="list-style-type: none">- Variable gaps- moving platforms	<ul style="list-style-type: none">- Variable gaps- 2 path	<ul style="list-style-type: none">- Variable gaps- moving platforms- flagpole



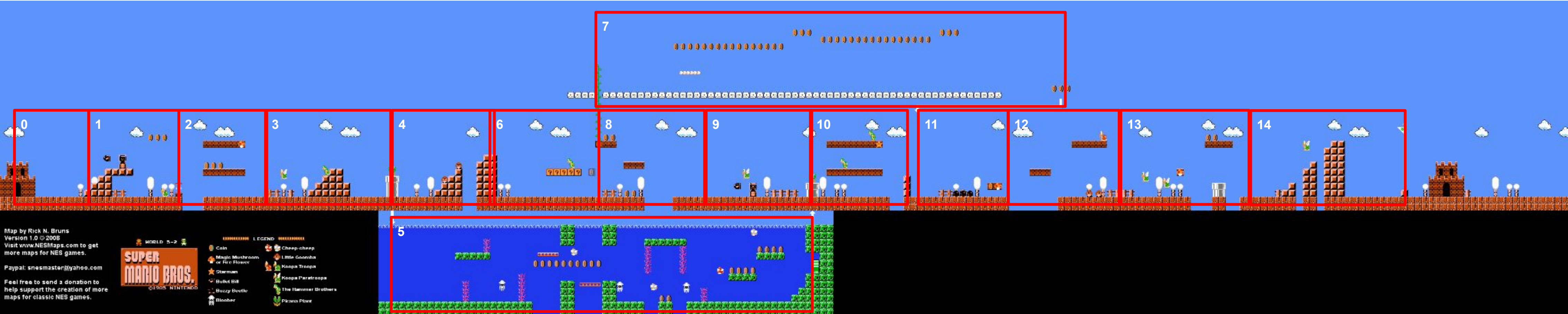
w5l1

0	1	2	3	4	5	6	7	8	9	10	11	12	13
- beginnin g	- enemy - 3-hord	- 3-hord	- 2-hord - gap - pipe valley	- enemy - 3-hord	- 3-hord	- enemy - gap - reward 2-path	- 3-hord - gap - enemy	- 3-hord - enemy	- 3-hord	- 2-hord - gap - reward enemy	- bonus zone	- enemy - 2 hord	- stairs up - flagpole



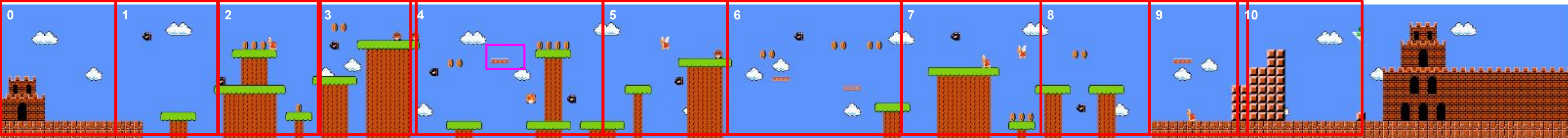
w5l2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
<ul style="list-style-type: none">- beginnin g	<ul style="list-style-type: none">- stairs up- enemy-	<ul style="list-style-type: none">- gap- 3-path- reward	<ul style="list-style-type: none">- enemy- stairs up	<ul style="list-style-type: none">- 2-hord- stairs up- gap	<ul style="list-style-type: none">- bonus zone (aquawo rld)	<ul style="list-style-type: none">- 2-path- enemy	<ul style="list-style-type: none">- bonus zone (sky)- moving platform	<ul style="list-style-type: none">- 2-path- gap	<ul style="list-style-type: none">- enemy	<ul style="list-style-type: none">- 3-path- enemy- risk/rew ard- gap- roof	<ul style="list-style-type: none">- 3-hord- risk/rew ard- roof	<ul style="list-style-type: none">- gap- 2-path- enemy- 2-hord	<ul style="list-style-type: none">- 2-hord- 2-path- risk/rew ard- Variable gaps	<ul style="list-style-type: none">- enemy- multiple gaps- stairs-up- flagpole



w5l3

0	1	2	3	4	5	6	7	8	9	10
- beginning	- Variable gaps - enemy	- Multiple gaps - enemy	- gaps - 2 hord - enemy - 2-path	- Variable gaps - enemy - moving platform - 2 path - reward	- Variable gaps - enemy	- Variable gaps - enemy - moving platform	- Variable gaps - enemy	- Variable gaps - enemy -	- moving platform - enemy	- stairs-up - flagpole



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WORLD 5-3



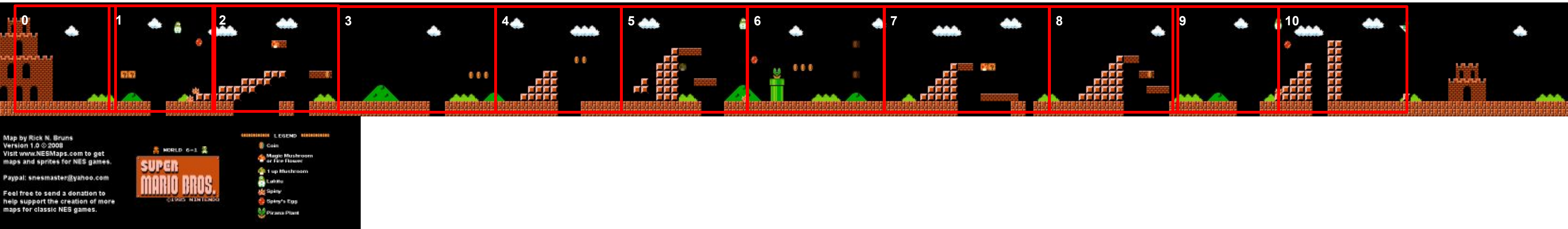
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LEGEND

- Coin
- Magic Mushroom
or Fire Flower
- Little Goomba
- Koopa Troopa
- Koopa Paratroopa
- Bullet Bill

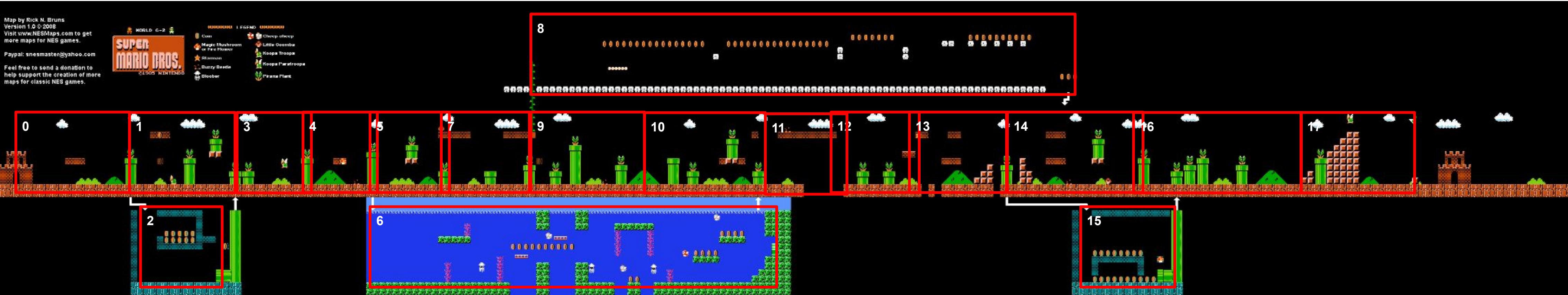
w6l1

0	1	2	3	4	5	6	7	8	9	10
- beginning	- gap - enemy - 2-hord -	- stairs up - 2-path - risk/reward - enemy - Variable gaps	- gap - enemy	- stairs up - gap - enemy	- stairs up - enemy - risk/reward - gap	- enemy	- stairs up - reward - enemy - roof - Variable gaps	- stairs up - gap - enemy	- gap - enemy	- stairs up - gap - flagpole - enemy



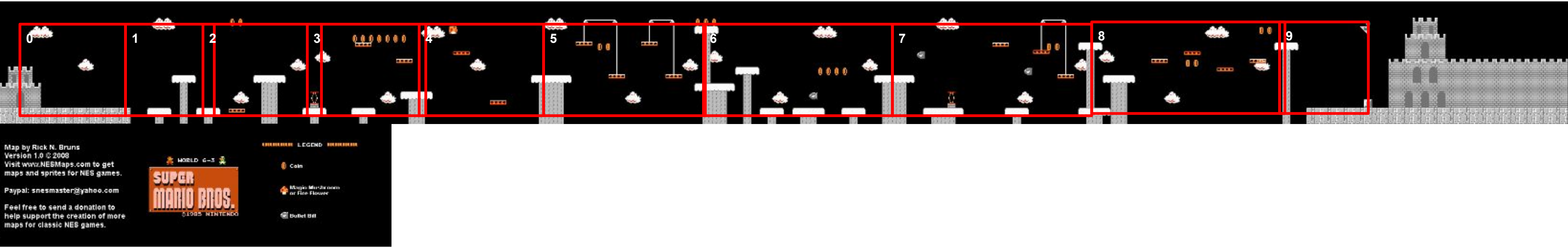
w6l2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<div><div>- beginnig</div><div>- 2-path</div></div>	<div><div>- enemy valley</div><div>- pipe valley</div><div>- 2-path</div></div>	<div><div>- bonus zone</div></div>	<div><div>- enemy valley</div><div>- pipe valley</div></div>	<div><div>- enemy valley</div><div>- risk/reward</div><div>- roof</div><div>- pipe valley</div></div>	<div><div>- enemy valley</div><div>- pipe valley</div></div>	<div><div>- bonus zone (waterworld)</div></div>	<div><div>- pipe valley</div><div>- 2-path</div></div>	<div><div>- bonus zone (clouds)</div><div>- moving platform</div></div>	<div><div>- pipe valley</div><div>- enemy</div></div>	<div><div>- pipe valley</div><div>- 2-path</div></div>	<div><div>- 2-path</div><div>- gap</div><div>- enemy</div></div>	<div><div>- pipe wally</div><div>- 2-path</div></div>	<div><div>- multiple gaps</div><div>- risk/reward</div><div>- stairs up</div><div>- 3 path</div></div>	<div><div>- 3-path</div><div>- enemy</div><div>- pipe valley</div></div>	<div><div>- bonus zone</div><div>- reward</div></div>	<div><div>- pipe valley</div><div>- stairs up</div><div>- 3 hord</div></div>	<div><div>- staur up</div><div>- flagpole</div><div>- enemy</div></div>



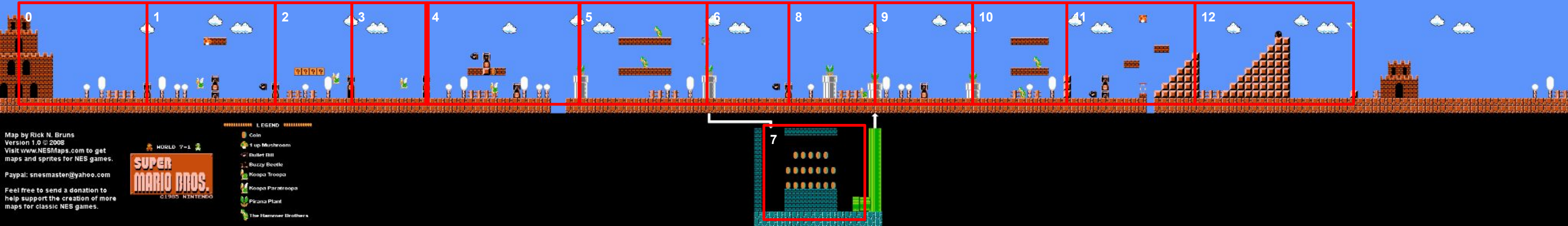
w6l3

0	1	2	3	4	5	6	7	8	9
- beginning	- Variable gaps	- Variable gaps - moving platform	- Variable gaps - moving platform - 2-path	- risk/reward - Variable gaps - moving platform	- Variable gaps - moving platform	- Variable gaps - enemy	- Variable gaps - moving platform - enemy	- Variable gaps - moving platform	- gap - flagpole



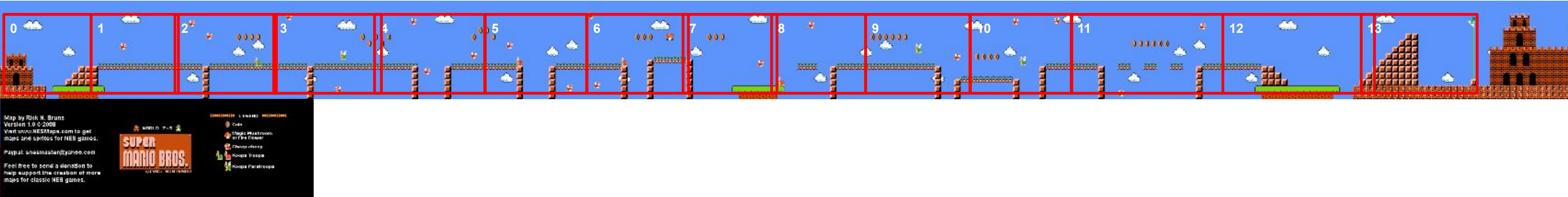
w7l1

0	1	2	3	4	5	6	7	8	9	10	11	12
<ul style="list-style-type: none">- beginning- enemy	<ul style="list-style-type: none">- enemy valley- risk/reward	<ul style="list-style-type: none">- enemy valley- roof- 2-path	<ul style="list-style-type: none">- enemy valley	<ul style="list-style-type: none">- enemy valley- roof- gap- 2-path	<ul style="list-style-type: none">- 3-path- enemy- pipe valley	<ul style="list-style-type: none">- enemy valley- risk/reward	<ul style="list-style-type: none">- bonus zone	<ul style="list-style-type: none">- empty valley- enemy valley	<ul style="list-style-type: none">- empty valley- enemy valley	<ul style="list-style-type: none">- 3-path- enemy	<ul style="list-style-type: none">- 3-path- enemy valley- gap- stairs up	<ul style="list-style-type: none">- stairs up- enemy- flagpole

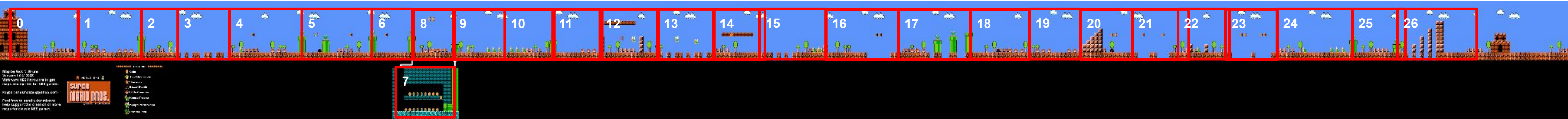


w7l3

0	1	2	3	4	5	6	7	8	9	10	11	12	13
<ul style="list-style-type: none">- beginning- gap- stairs up	<ul style="list-style-type: none">- enemy	<ul style="list-style-type: none">- enemy	<ul style="list-style-type: none">- enemy	<ul style="list-style-type: none">- enemy gap- gap	<ul style="list-style-type: none">- enemy gap	<ul style="list-style-type: none">- enemy gap- gap- risk/reward	<ul style="list-style-type: none">- enemy gap	<ul style="list-style-type: none">- enemy- Variable gaps	<ul style="list-style-type: none">- enemy gap	<ul style="list-style-type: none">- enemy gap	<ul style="list-style-type: none">- Variable gaps	<ul style="list-style-type: none">- gap stairs down	<ul style="list-style-type: none">- stairs up- flagpole

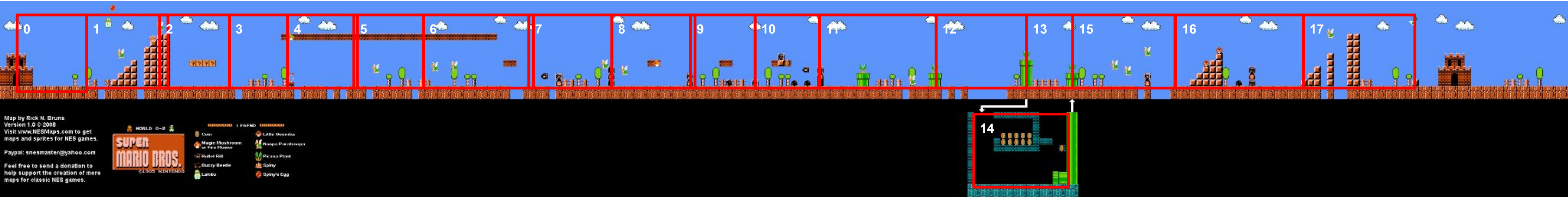


	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
enemy 3-hord	<ul style="list-style-type: none">- enemy valley- risk/reward- pipe valley	<ul style="list-style-type: none">- pipe valley	<ul style="list-style-type: none">- bonus zone	<ul style="list-style-type: none">- 3-hord- enemy valley	<ul style="list-style-type: none">- enemy- 3-hord	<ul style="list-style-type: none">- 3-hord	<ul style="list-style-type: none">- 3-hord- enemy valley	<ul style="list-style-type: none">- enemy valley- 2-path	<ul style="list-style-type: none">- 2-hord- Variable gaps	<ul style="list-style-type: none">- reward- 2-path	<ul style="list-style-type: none">- Variable gaps- 2-hord	<ul style="list-style-type: none">- gap	<ul style="list-style-type: none">- 3-hord- Pillar gaps	<ul style="list-style-type: none">- enemy- 3-hord	<ul style="list-style-type: none">--



w8l2

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
<ul style="list-style-type: none">- begin ning enem y	<ul style="list-style-type: none">- enem y stairs up- multi ple gaps	<ul style="list-style-type: none">- 2-pat h enem y	<ul style="list-style-type: none">- gap enem y	<ul style="list-style-type: none">- multi ple gaps rewar d	<ul style="list-style-type: none">- enem y multi ple gaps	<ul style="list-style-type: none">- 2-hor d gap	<ul style="list-style-type: none">- enem y valley gap	<ul style="list-style-type: none">- enem y valley- risk/r ewar d roof- 2 path	<ul style="list-style-type: none">- enem y valley- roof- 2-pat h	<ul style="list-style-type: none">- 2-hor d enem y valley- roof- 2-pat h	<ul style="list-style-type: none">- empt y valley- gap- enem y valley- pipe valley	<ul style="list-style-type: none">- Varia ble gaps	<ul style="list-style-type: none">- pipe valley	<ul style="list-style-type: none">- bonu s zone	<ul style="list-style-type: none">- 3-hor d Varia ble gaps	<ul style="list-style-type: none">- 2-hor d enem y valley stairs up	<ul style="list-style-type: none">- enem y stairs up- Varia ble gap flagp ole



w8l3

0	1	2	3	4	5	6	7	8	9	10	11
<ul style="list-style-type: none">- beginning enemy- enemy	<ul style="list-style-type: none">- enemy valley	<ul style="list-style-type: none">- empty valley	<ul style="list-style-type: none">- 3-path enemy- gap risk/reward	<ul style="list-style-type: none">- stairs down gap enemy	<ul style="list-style-type: none">- enemy valley empty valley	<ul style="list-style-type: none">- 3-path risk/reward enemy	<ul style="list-style-type: none">- Pillar gap	<ul style="list-style-type: none">- enemy	<ul style="list-style-type: none">- enemy	<ul style="list-style-type: none">- enemy valley	<ul style="list-style-type: none">- stairs up multiple gaps flagpole

