

Frame count		[1] ast Room [2]	0 [3]		
Water exit	Axe grab [4]	8-X	0		60.0988139
	3341	8-C	0:55.592	im eddiecatgaming	
	3342	8-B	0:55.608	kosmicZ	kosmicGZ
	3343	8-A	0:55.625		
	3344	8-9	0:55.642		
	3345	8-8	0:55.658		
	3346	8-7	0:55.675		
	3347	8-6	0:55.692		
	3348	8-5	0:55.708		
	3349	8-4	0:55.725		
	3350	8-3	0:55.742		
	3351	8-2	0:55.758		
	3352	8-1	0:55.775		
	3353	8-0	0:55.791		
	3354	8-K	0:55.808		
	3355	8-J	0:55.825		
	3356	8-I	0:55.841		
	3357	8-H	0:55.858		
	3358	8-G	0:55.875		
	3359	8-F	0:55.891		
	3360	8-E	0:55.908		
	3361	8-D	0:55.925		
	3362	8-C	0:55.941		
	3363	8-B	0:55.958		
	3364	8-A	0:55.974		
	3365	8-9	0:55.991		
	3366	8-8	0:56.008		
	3367	8-7	0:56.024		
	3368	8-6	0:56.041		
	3369	8-5	0:56.058		
	3370	8-4	0:56.074		
	3371	8-3	0:56.091		
	3372	8-2	0:56.108		
	3373	8-1	0:56.124		
	3374	8-0	0:56.141		
	3375	8-K	0:56.158		
	3376	8-J	0:56.174		
	3377	8-I	0:56.191		
	3378	8-H	0:56.207		
	3379	8-G	0:56.224		
	3380	8-F	0:56.241		
	3381	8-E	0:56.257		

3382	8-D	0:56.274
3383	8-C	0:56.291
3384	8-B	0:56.307
3385	8-A	0:56.324
3386	8-9	0:56.341
3387	8-8	0:56.357
3388	8-7	0:56.374
3389	8-6	0:56.390
3390	8-5	0:56.407
3391	8-4	0:56.424
3392	8-3	0:56.440
3393	8-2	0:56.457
3394	8-1	0:56.474
3395	8-0	0:56.490
3396	8-K	0:56.507
3397	8-J	0:56.524
3398	8-I	0:56.540
3399	8-H	0:56.557
3400	8-G	0:56.573
3401	8-F	0:56.590
3402	8-E	0:56.607
3403	8-D	0:56.623
3404	8-C	0:56.640
3405	8-B	0:56.657
3406	8-A	0:56.673
3407	8-9	0:56.690
3408	8-8	0:56.707
3409	8-7	0:56.723
3410	8-6	0:56.740
3411	8-5	0:56.757
3412	8-4	0:56.773
3413	8-3	0:56.790
3414	8-2	0:56.806
3415	8-1	0:56.823
3416	8-0	0:56.840
3417	8-K	0:56.856
3418	8-J	0:56.873
3419	8-I	0:56.890
3420	8-H	0:56.906
3421	8-G	0:56.923
3422	8-F	0:56.940
3423	8-E	0:56.956
3424	8-D	0:56.973

3425	8-C	0:56.989
3426	8-B	0:57.006
3427	8-A	0:57.023
3428	8-9	0:57.039
3429	8-8	0:57.056
3430	8-7	0:57.073
3431	8-6	0:57.089
3432	8-5	0:57.106
3433	8-4	0:57.123
3434	8-3	0:57.139
3435	8-2	0:57.156
3436	8-1	0:57.173
3437	8-0	0:57.189
3438	8-K	0:57.206
3439	8-J	0:57.222
3440	8-I	0:57.239
3441	8-H	0:57.256
3442	8-G	0:57.272
3443	8-F	0:57.289
3444	8-E	0:57.306
3445	8-D	0:57.322
3446	8-C	0:57.339
3447	8-B	0:57.356
3448	8-A	0:57.372
3449	8-9	0:57.389
3450	8-8	0:57.405
3451	8-7	0:57.422
3452	8-6	0:57.439
3453	8-5	0:57.455
3454	8-4	0:57.472
3455	8-3	0:57.489
3456	8-2	0:57.505
3457	8-1	0:57.522
3458	8-0	0:57.539
3459	8-K	0:57.555
3460	8-J	0:57.572
3461	8-I	0:57.588
3462	8-H	0:57.605
3463	8-G	0:57.622
3464	8-F	0:57.638
3465	8-E	0:57.655
3466	8-D	0:57.672
3467	8-C	0:57.688

3468	8-B	0:57.705
3469	8-A	0:57.722
3470	8-9	0:57.738
3471	8-8	0:57.755
3472	8-7	0:57.772
3473	8-6	0:57.788
3474	8-5	0:57.805
3475	8-4	0:57.821
3476	8-3	0:57.838
3477	8-2	0:57.855
3478	8-1	0:57.871
3479	8-0	0:57.888
3480	8-K	0:57.905
3481	8-J	0:57.921
3482	8-I	0:57.938
3483	8-H	0:57.955
3484	8-G	0:57.971
3485	8-F	0:57.988
3486	8-E	0:58.004
3487	8-D	0:58.021
3488	8-C	0:58.038
3489	8-B	0:58.054
3490	8-A	0:58.071
3491	8-9	0:58.088
3492	8-8	0:58.104
3493	8-7	0:58.121
3494	8-6	0:58.138
3495	8-5	0:58.154
3496	8-4	0:58.171
3497	8-3	0:58.188
3498	8-2	0:58.204
3499	8-1	0:58.221
3500	8-0	0:58.237
3501	8-K	0:58.254
3502	8-J	0:58.271
3503	8-I	0:58.287
3504	8-H	0:58.304
3505	8-G	0:58.321
3506	8-F	0:58.337
3507	8-E	0:58.354
3508	8-D	0:58.371
3509	8-C	0:58.387
3510	8-B	0:58.404

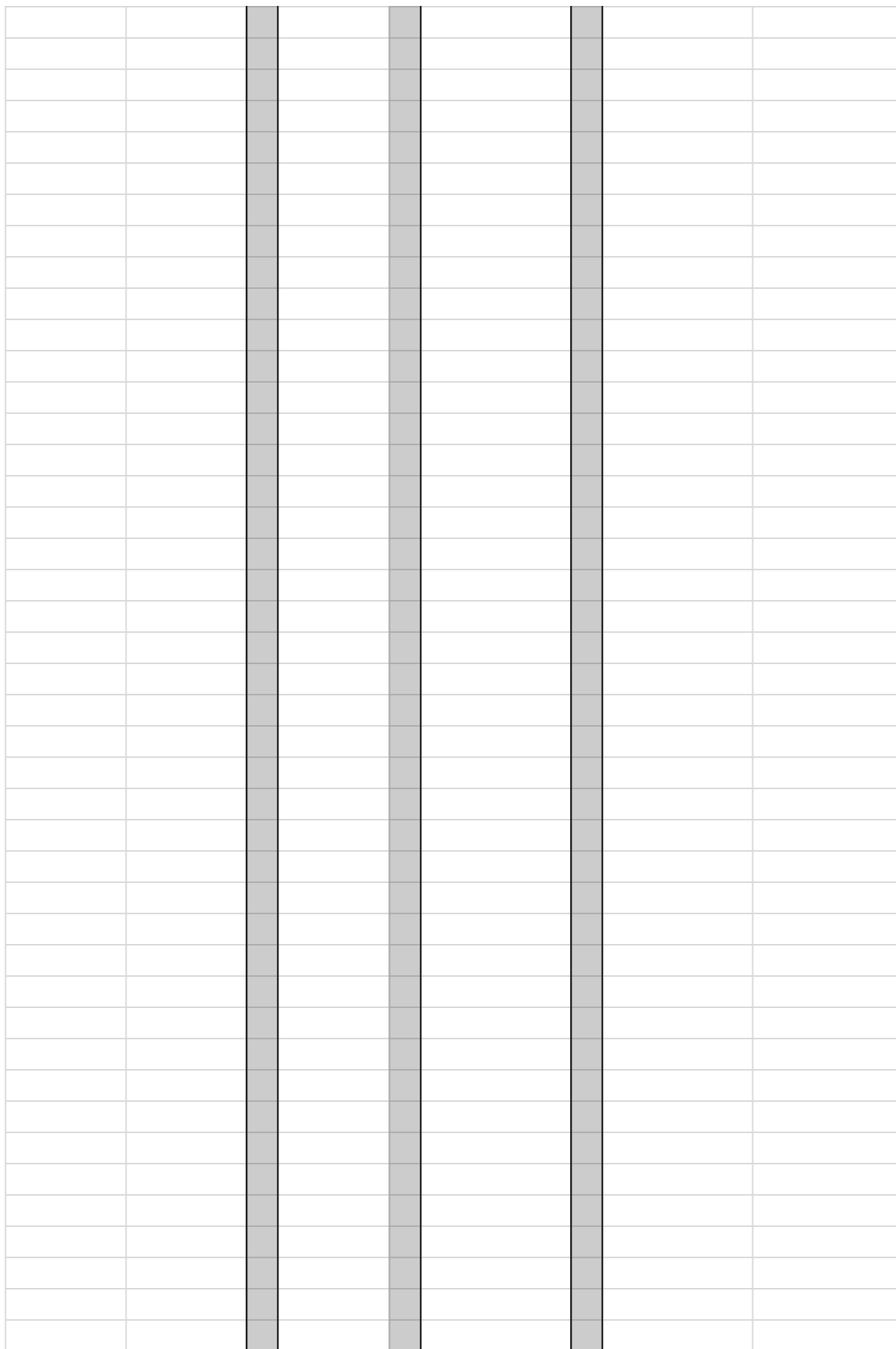
3511	8-A	0:58.420
3512	8-9	0:58.437
3513	8-8	0:58.454
3514	8-7	0:58.470
3515	8-6	0:58.487
3516	8-5	0:58.504
3517	8-4	0:58.520
3518	8-3	0:58.537
3519	8-2	0:58.554
3520	8-1	0:58.570
3521	8-0	0:58.587
3522	8-K	0:58.603
3523	8-J	0:58.620
3524	8-I	0:58.637
3525	8-H	0:58.653
3526	8-G	0:58.670
3527	8-F	0:58.687
3528	8-E	0:58.703
3529	8-D	0:58.720
3530	8-C	0:58.737
3531	8-B	0:58.753
3532	8-A	0:58.770
3533	8-9	0:58.787
3534	8-8	0:58.803
3535	8-7	0:58.820
3536	8-6	0:58.836
3537	8-5	0:58.853
3538	8-4	0:58.870
3539	8-3	0:58.886
3540	8-2	0:58.903
3541	8-1	0:58.920
3542	8-0	0:58.936
3543	8-K	0:58.953
3544	8-J	0:58.970
3545	8-I	0:58.986
3546	8-H	0:59.003
3547	8-G	0:59.019
3548	8-F	0:59.036
3549	8-E	0:59.053
3550	8-D	0:59.069
3551	8-C	0:59.086
3552	8-B	0:59.103
3553	8-A	0:59.119

3554	8-9	0:59.136
3555	8-8	0:59.153
3556	8-7	0:59.169
3557	8-6	0:59.186
3558	8-5	0:59.202
3559	8-4	0:59.219
3560	8-3	0:59.236
3561	8-2	0:59.252
3562	8-1	0:59.269
3563	8-0	0:59.286
3564	8-K	0:59.302
3565	8-J	0:59.319
3566	8-I	0:59.336
3567	8-H	0:59.352
3568	8-G	0:59.369
3569	8-F	0:59.386
3570	8-E	0:59.402
3571	8-D	0:59.419
3572	8-C	0:59.435
3573	8-B	0:59.452
3574	8-A	0:59.469
3575	8-9	0:59.485
3576	8-8	0:59.502
3577	8-7	0:59.519
3578	8-6	0:59.535
3579	8-5	0:59.552
3580	8-4	0:59.569
3581	8-3	0:59.585
3582	8-2	0:59.602
3583	8-1	0:59.618
3584	8-0	0:59.635
3585	8-K	0:59.652
3586	8-J	0:59.668
3587	8-I	0:59.685
3588	8-H	0:59.702
3589	8-G	0:59.718
3590	8-F	0:59.735
3591	8-E	0:59.752
3592	8-D	0:59.768
3593	8-C	0:59.785
3594	8-B	0:59.802
3595	8-A	0:59.818
3596	8-9	0:59.835







































Frequency	Band	Channel	Power	Modulation	Video	Audio	4.35	4.36	4.37	4.38	4.39	4.40	4.41	4.42	4.43	4.44	4.45	4.46	4.47	4.48	4.49	4.50	4.51	4.52	4.53	4.54	4.55	4.56	4.57	4.58	4.59	4.60	4.61	4.62	4.63	4.64	4.65	4.66	4.67	4.68	4.69	4.70	4.71	4.72	4.73	4.74	4.75	4.76	4.77	4.78	4.79	4.80	4.81	4.82	4.83	4.84	4.85	4.86	4.87	4.88	4.89	4.90	4.91	4.92	4.93	4.94	4.95	4.96	4.97	4.98	4.99	5.00	5.01	5.02	5.03	5.04	5.05	5.06	5.07	5.08	5.09	5.10	5.11	5.12	5.13	5.14	5.15	5.16	5.17	5.18	5.19	5.20	5.21	5.22	5.23	5.24	5.25	5.26	5.27	5.28	5.29	5.30	5.31	5.32	5.33	5.34	5.35	5.36	5.37	5.38	5.39	5.40	5.41	5.42	5.43	5.44	5.45	5.46	5.47	5.48	5.49	5.50	5.51	5.52	5.53	5.54	5.55	5.56	5.57	5.58	5.59	5.60	5.61	5.62	5.63	5.64	5.65	5.66	5.67	5.68	5.69	5.70	5.71	5.72	5.73	5.74	5.75	5.76	5.77	5.78	5.79	5.80	5.81	5.82	5.83	5.84	5.85	5.86	5.87	5.88	5.89	5.90	5.91	5.92	5.93	5.94	5.95	5.96	5.97	5.98	5.99	6.00	6.01	6.02	6.03	6.04	6.05	6.06	6.07	6.08	6.09	6.10	6.11	6.12	6.13	6.14	6.15	6.16	6.17	6.18	6.19	6.20	6.21	6.22	6.23	6.24	6.25	6.26	6.27	6.28	6.29	6.30	6.31	6.32	6.33	6.34	6.35	6.36	6.37	6.38	6.39	6.40	6.41	6.42	6.43	6.44	6.45	6.46	6.47	6.48	6.49	6.50	6.51	6.52	6.53	6.54	6.55	6.56	6.57	6.58	6.59	6.60	6.61	6.62	6.63	6.64	6.65	6.66	6.67	6.68	6.69	6.70	6.71	6.72	6.73	6.74	6.75	6.76	6.77	6.78	6.79	6.80	6.81	6.82	6.83	6.84	6.85	6.86	6.87	6.88	6.89	6.90	6.91	6.92	6.93	6.94	6.95	6.96	6.97	6.98	6.99	7.00	7.01	7.02	7.03	7.04	7.05	7.06	7.07	7.08	7.09	7.10	7.11	7.12	7.13	7.14	7.15	7.16	7.17	7.18	7.19	7.20	7.21	7.22	7.23	7.24	7.25	7.26	7.27	7.28	7.29	7.30	7.31	7.32	7.33	7.34	7.35	7.36	7.37	7.38	7.39	7.40	7.41	7.42	7.43	7.44	7.45	7.46	7.47	7.48	7.49	7.50	7.51	7.52	7.53	7.54	7.55	7.56	7.57	7.58	7.59	7.60	7.61	7.62	7.63	7.64	7.65	7.66	7.67	7.68	7.69	7.70	7.71	7.72	7.73	7.74	7.75	7.76	7.77	7.78	7.79	7.80	7.81	7.82	7.83	7.84	7.85	7.86	7.87	7.88	7.89	7.90	7.91	7.92	7.93	7.94	7.95	7.96	7.97	7.98	7.99	8.00	8.01	8.02	8.03	8.04	8.05	8.06	8.07	8.08	8.09	8.10	8.11	8.12	8.13	8.14	8.15	8.16	8.17	8.18	8.19	8.20	8.21	8.22	8.23	8.24	8.25	8.26	8.27	8.28	8.29	8.30	8.31	8.32	8.33	8.34	8.35	8.36	8.37	8.38	8.39	8.40	8.41	8.42	8.43	8.44	8.45	8.46	8.47	8.48	8.49	8.50	8.51	8.52	8.53	8.54	8.55	8.56	8.57	8.58	8.59	8.60	8.61	8.62	8.63	8.64	8.65	8.66	8.67	8.68	8.69	8.70	8.71	8.72	8.73	8.74	8.75	8.76	8.77	8.78	8.79	8.80	8.81	8.82	8.83	8.84	8.85	8.86	8.87	8.88	8.89	8.90	8.91	8.92	8.93	8.94	8.95	8.96	8.97	8.98	8.99	9.00	9.01	9.02	9.03	9.04	9.05	9.06	9.07	9.08	9.09	9.10	9.11	9.12	9.13	9.14	9.15	9.16	9.17	9.18	9.19	9.20	9.21	9.22	9.23	9.24	9.25	9.26	9.27	9.28	9.29	9.30	9.31	9.32	9.33	9.34	9.35	9.36	9.37	9.38	9.39	9.40	9.41	9.42	9.43	9.44	9.45	9.46	9.47	9.48	9.49	9.50	9.51	9.52	9.53	9.54	9.55	9.56	9.57	9.58	9.59	9.60	9.61	9.62	9.63	9.64	9.65	9.66	9.67	9.68	9.69	9.70	9.71	9.72	9.73	9.74	9.75	9.76	9.77	9.78	9.79	9.80	9.81	9.82	9.83	9.84	9.85	9.86	9.87	9.88	9.89	9.90	9.91	9.92	9.93	9.94	9.95	9.96	9.97	9.98	9.99	10.00
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<b>What is this spreadsheet for?</b>	
	<p>This spreadsheet allows SMB1 speedrunners to accurately time their runs by comparing the Bowser hammer patterns to the replications on emulator.</p>
<b>How do you know the final time of a run simply based on Bowser patterns?</b>	
	<p>Bowser's behaviour is determined by the amount of frames the game has been running for when he is loaded. If everything goes normally, there is a fixed amount of frames between loading Bowser and beating the game. As a result, finding the frame Bowser was loaded on leads to knowing the frame the game was beaten on. From there, a simple conversion using the NES framerate allows us to find the final time with pinpoint precision.</p>
<b>What does "Water exit", "Axe grab" and all these numbers mean?</b>	
	<p>The numbers are the number of frames that have elapsed since power on for the pattern that's detailed in that row. Water exit is the frame where Mario disappears into the pipe at the end of the water room. From there, if everything is done right, there is a fixed amount of frames until the game is beaten. Axe grab is the frame at which Mario touches the axe and the game is beaten.</p>
<b>What's going on in the Patterns column?</b>	
	<p>The first one is the Podoboo. The Podoboo is often trivial (marked with a -), but it will sometimes be exceptionally low and require you to do a very late jump to get past it without dying. Those instances are marked with a Low.</p>
	<p>The second one is Bowser's fireball. It can be low and force you to jump over, it can be in the middle, or it can be high. Noting this information simply helps narrowing down the amount of possible hammer patterns.</p>
	<p>The third one is the direction in which Bowser moves. He can move forward, allowing you to simply run under him (colored in green). He can jump backwards, forcing you to jump over, or he can jump backwards and then switch directions and go forward (marked with a Turn). This last pattern also forces you to jump over him, and tends to give more treacherous hammers.</p>
<b>Why are certain patterns colored in green, yellow or red?</b>	
	<p>Patterns in green are the patterns in which Bowser jumps forward and you can simply run under. Those are the easiest patterns by far.</p>
	<p>Patterns in yellow are the ones in which Bowser gives you very difficult hammers with a very small survivability window, but they are actually possible. Those are the hardest possible patterns.</p>
	<p>Patterns in red are impossible to get through unless you slow down, no matter what you do. Those are obviously the worst patterns to be on.</p>
	<p>Patterns with no color force you to jump, but will generally give you a decent window to jump through the hammers (4+ frames). Some of them are harder than others, but none of them should be extremely hard.</p>
<b>What is 842 vs. 843 BBG?</b>	

		The number is the framerule you load 8-3 on after getting BBG. There are two viable framerules next to each other. Some people aim for the faster one (842), and can fall back on the slower one if they're 1 framerule behind. Other runners aim for the slower one (843). This has an impact on both the title screen delay and the final timing, because you would wait more to reach the slower one, and you would also finish 21 frames later.

[1] movie end +516

[2] The 8-X value you get in the last room of 8-4

[3] 8-4 IL times

[4] Assuming perfect axe grab

[5] movie end +516

[6] Assuming perfect axe grab

[7] Bowser is barely survivable, but he doesn't allow to grab the axe