Australian Reels Slot Machine

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Game Description

This is a three-reel, single-line, stepper slot.
URL: wizardofodds.com/play/slot-ausreels/
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Pay Table

Win	1 coin	2 coins	3 coins
Three flags	8,000	16,000	25,000
Blue 7, white 7, red 7 (in order)	1,000	2,000	3,000
Three blue 7's	300	600	900
Three white 7's	200	400	600
Three red 7's	100	200	300
Any three 7's	40	80	120
Three kangaroos	40	80	120
Three platypuses	30	60	90
Thee echidnas	20	40	60
Any three animals	2	4	6
Any three symbols	1	2	3

The next table shows the symbols on each reel, and the weighting. The symbols do not have to necessarily be the same on each reel, but in this case, they are. Each stop of each reel has an individual weighting. The probability the reel will stop in any given position is proportional to the weighting. The sum of all weights of each reel is 64. So, for example, the probability that reel 1 will stop on the kangaroo in stop number 8 is 5/64.

Reel Strips and Weights

Stop	Symbol	Reel 1	Reel 2	Reel 3
1	blank	3	4	6
2	flag	1	1	1
3	blank	3	4	6
4	echidna	5	5	4
5	blank	2	2	3
6	blue 7	1	3	3
7	blank	2	2	3
8	kangaroo	5	4	3
9	blank	1	2	2
10	white 7	6	1	4
11	blank	1	2	2
12	echidna	6	6	5
13	blank	2	2	2
14	red 7	4	3	1
15	blank	1	2	2
16	platypus	5	5	4
17	blank	1	2	2
18	kangaroo	4	4	3
19	blank	1	2	2
20	red 7	3	2	1
21	blank	2	2	2
22	platypus	5	4	3

Stop Ranges

Stop	Symbol	Reel 1	Reel 2	Reel 3
1	blank	1 to 3	1 to 4	1 to 6
2	flag	4 to 4	5 to 5	7 to 7
3	blank	5 to 7	6 to 9	8 to 13
4	echidna	8 to 12	10 to 14	14 to 17
5	blank	13 to 14	15 to 16	18 to 20
6	blue 7	15 to 15	17 to 19	21 to 23
7	blank	16 to 17	20 to 21	24 to 26
8	kangaroo	18 to 22	22 to 25	27 to 29
9	blank	23 to 23	26 to 27	30 to 31
10	white 7	24 to 29	28 to 28	32 to 35
11	blank	30 to 30	29 to 30	36 to 37
12	echidna	31 to 36	31 to 36	38 to 42
13	blank	37 to 38	37 to 38	43 to 44
14	red 7	39 to 42	39 to 41	45 to 45
15	blank	43 to 43	42 to 43	46 to 47
16	platypus	44 to 48	44 to 48	48 to 51
17	blank	49 to 49	49 to 50	52 to 53
18	kangaroo	50 to 53	51 to 54	54 to 56
19	blank	54 to 54	55 to 56	57 to 58
20	red 7	55 to 57	57 to 58	59 to 59
21	blank	58 to 59	59 to 60	60 to 61
22	platypus	60 to 64	61 to 64	62 to 64

Game Operation

1. Choose 3 random integers from 1 to 64, one for each reel. Map each number to the corresponding symbol in the reel strips, according to the given weights.
2. Stop the reels on those positions.
3. Score the result.
4. Pay the player.

Example

The random numbers chosen are 52, 8, 63. The screen will look like this:

Total Symbol Weights

Totals	Reel 1	Reel 2	Reel 3	Product
flag	1	1	1	1
blue 7	1	3	3	9
white 7	6	1	4	24
red 7	7	5	2	70
kangaroo	9	8	6	432
platypus	10	9	7	630
echidna	11	11	9	1,089
blank	19	26	32	15,808
total	64	64	64	262,144

Winning Combinations

Next is the fun part, calculating the number of combinations for each win. Let's start at the top.

Three flags: Obviously 1 x 1 x 1 = 1

Blue 7, white 7, red 7 (in order): Flag or blue 7 in reel 1 x flag or white 7 in reel 2 x flag or red 7 in reel 3 - three flags (because it pays more) = (1+1) x (1+1) x (1+2) - 1 = 12 - 1 = 11

Three blue 7's: Flag or blue 7 in reel 1 x flag or blue 7 in reel 2 x flag or blue 7 in reel 3 - three flags - blue 7 in reel 1 x wild in reel 2 x wild in reel 3 (because it pays more as blue 7, white 7, red 7) = 2x4x4 - 1 – (1x1x1) = 32 - 2 = 30.

Three white 7's: Flag or white 7 in reel 1 x flag or white 7 in reel 2 x flag or white 7 in reel 3 - three flags - flag in reel 1 x white 7 in reel 2 x wild in reel 3 (because it pays more as blue 7, white 7, red 7) = (7x2x5) - 1- (1x1x1) = 68.

Three red 7's: Flag or red 7 in reel 1 x flag or red 7 in reel 2 x flag or red 7 in reel 3 - three flags - flag in reel 1 x flag in reel 2 x red 7 in reel 3 (because it pays more as blue 7, white 7, red 7) = (8x6x3) - 1- (1x1x2) = 141.

Any three sevens: Any seven or flag in reel 1 x any seven or flag in reel 1 x any seven or flag in reel 2 x any seven or flag in reel 3 - all higher paying wins = 15x10x10-(1+11+30+68+141) = 1500 - 251 = 1249.

Three kangaroos: Flag or kangaroo in reel 1 x Flag or kangaroo in reel 2 x Flag or kangaroo in reel 3 - three flags = (10x9x7) - 1 = 629.

Three platypuses: Flag or platypus in reel 1 x Flag or platypus in reel 2 x Flag or platypus in reel 3 - three flags = (11x10x8) - 1 = 879.

Three echidnas: Flag or echidna in reel 1 x Flag or echidna in reel 2 x Flag or echidna in reel 3 - three flags = (12x12x10) - 1 = 1439.

Any three animals: Any animal or flag in reel 1 x Any animal or flag in reel 2 x Any animal or flag in reel 3 - three flags - three higher animal pays = 31x29x23 - (1+629+879+1,439) = 20,677 - 2948 = 17,729.

Any three symbols = Non-blank in reel 1 x Non-blank in reel 2 x Non-blank in reel 3 - all higher pays = (64-19)x(64-26)x(64-32) - (1+11+30+68+141+1249+629+879+1,439+17,729) = 32,544.

The next table summaries everything. The pay column is the win per coin, based on three coins bet. The probability column is the number of winning combinations, calculated above. The return column is the product of the win and combinations. The probability is the number of combinations divided by the total possible (64^3=262,144). The return is the product of the win and probability. The lower right cell shows a return of 97.01%.

Return Table

Combination	Pays	Probability Combinations	Return Combinations	Probability	Return
Three flags	8333	1	8333	0.000004	0.031789
Blue 7, white 7, red 7[1]	1000	11	11000	0.000042	0.041962
Three blue 7's	300	30	9000	0.000114	0.034332
Three white 7's	200	68	13600	0.000259	0.051880
Three red 7's	100	141	14100	0.000538	0.053787
Any three 7's	40	1249	49960	0.004765	0.190582
Three kangaroos	40	629	25160	0.002399	0.095978
Three platypuses	30	879	26370	0.003353	0.100594
Thee echidnas	20	1439	28780	0.005489	0.109787
Any three animals	2	17729	35458	0.067631	0.135262
Any three symbols	1	32544	32544	0.124146	0.124146
Total		54720	254305	0.208740	0.970098

Notes
    1   In order

If the player bets one or two coins, instead of 3, his win per coin will be reduce by 333.33 for three flags. The expected cost of that reduction is (1/262144)*(333.33) = 0.13%. So, the total return for one or two coins bet is 97.05% - 0.13% = 96.92%.

Summary

1 coin return	96.88%
2 coin return	96.88%
3 coin return	97.01%
Hit freq.	20.87%
Variance	84.15
Std dev	9.17

The next three tables show the probability that the return of the game will fall between the specified markers and number of spins. For example, with one million spins there is a 95% chance that the return of the game will fall between 95.21% and 102.70%. It is beyond the scope of this document to explain how these were calculated, but any introductory statistics text will explain it under "confidence intervals."

90% Confidence Interval – Max Coins Bet

Spins	Lower Bound	Upper Bound
1,000	49.30%	144.72%
10,000	81.92%	112.10%
100,000	92.24%	101.78%
1,000,000	95.50%	98.52%
10,000,000	96.53%	97.49%

95% Confidence Interval – Max Coins Bet

Spins	Lower Bound	Upper Bound
1,000	40.16%	153.86%
10,000	79.03%	114.99%
100,000	91.32%	102.70%
1,000,000	95.21%	98.81%
10,000,000	96.44%	97.58%

99% Confidence Interval – Max Coins Bet

Spins	Lower Bound	Upper Bound
1,000	22.29%	171.73%
10,000	73.38%	120.64%
100,000	89.54%	104.48%
1,000,000	94.65%	99.37%
10,000,000	96.26%	97.76%

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