

# **Demystifying the Slot machine – It’s just another Random Number Generator!**



1. Fair Game – odds, probabilities and things
2. House advantage
3. Can you ever win?
4. Slots as a random number generator
5. Slot simulation
6. Entertainment cost
7. Varying entertainment cost per (hour)

# **1. Fair Game – odds, probabilities and things**

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# Making money by gambling...



NATIONAL

# Responsible Gambling

PROGRAMME

*“Using responsible gambling education to enhance our youth’s education – including life skills, controlling high risk behaviour, mathematics, statistics, core business principles, and HIV education”*



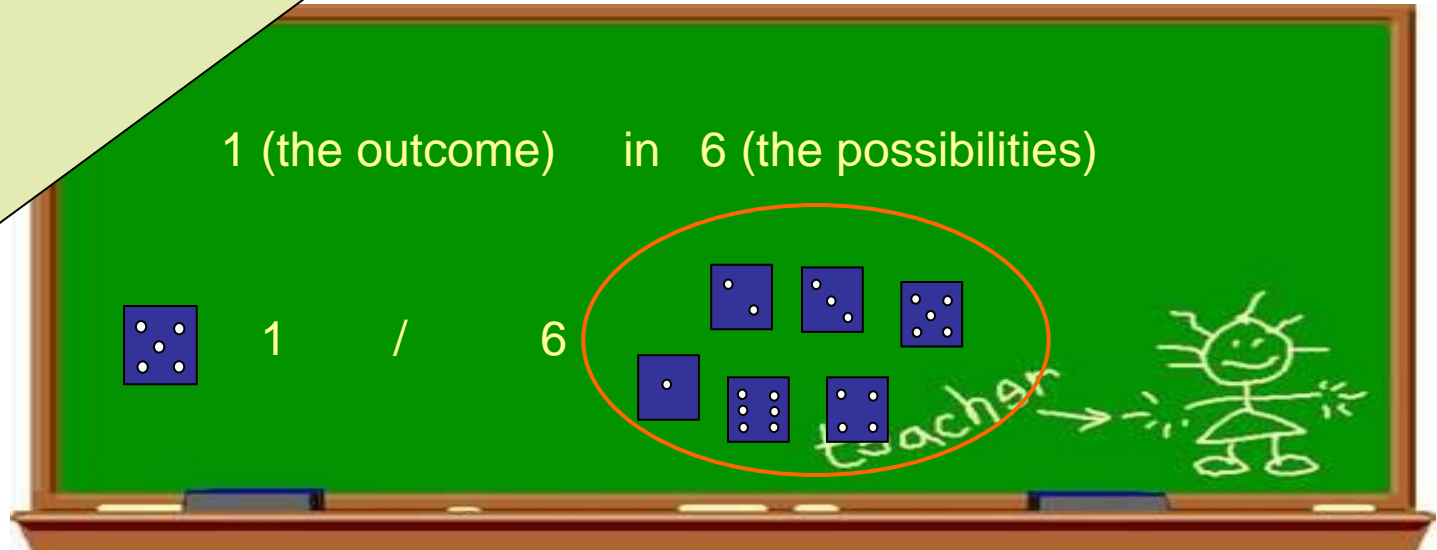
**The Basics : probability**

One can assume that the **chance** of the die landing on any of these numbers is the same.

This is also known as the *probability* (chance/likelihood)

Since there are 6 possible outcomes, the chance of one of them happening, is :

1 (the outcome) in 6 (the possibilities)

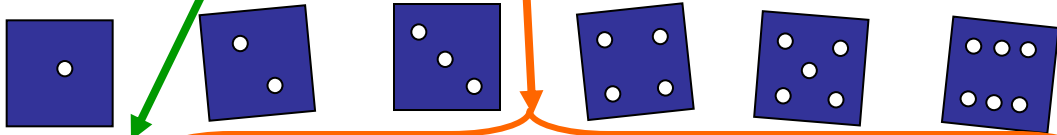


**Creating a game**

Below is a diagram showing the required payout for the game to break even. Remember, the player is betting on number 1 coming up. 6 games are played, with a different number coming up after each game.

This R1 is kept by the player on the winning bet.

These are all lost.



Game no	1	2	3	4	5	6	
Amt bet	R1	R1	R1	R1	R1	R1	R6
Amt lost	-	R1	R1	R1	R1	R1	R5
Amt won	R5	-	-	-	-	-	R5

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**Creating a game with a house advantage**

The advantage that we want to give the stall is called the “house advantage”.

Let’s decide on paying out a little less than the usual R5 per win (in the fair game) and pay out R4.50 instead.

We now need to determine what the “house advantage” will be in this case in %.



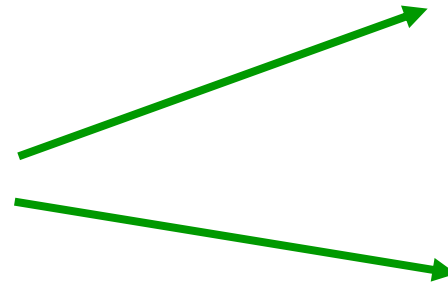
Fair game  
winnings



New game  
winnings



House  
advantage

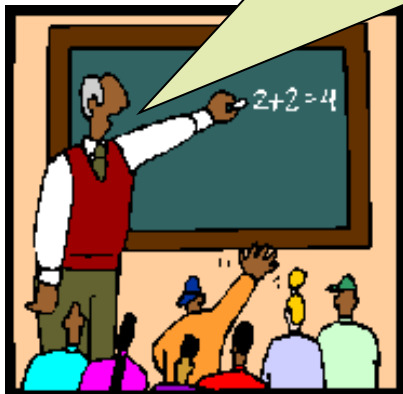


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Creating a game

In the long run then, no money will be won or lost by player or ‘host’ of the game (e.g. casino). Often you will hear people talking about ‘in the long run’ when talking about probability.

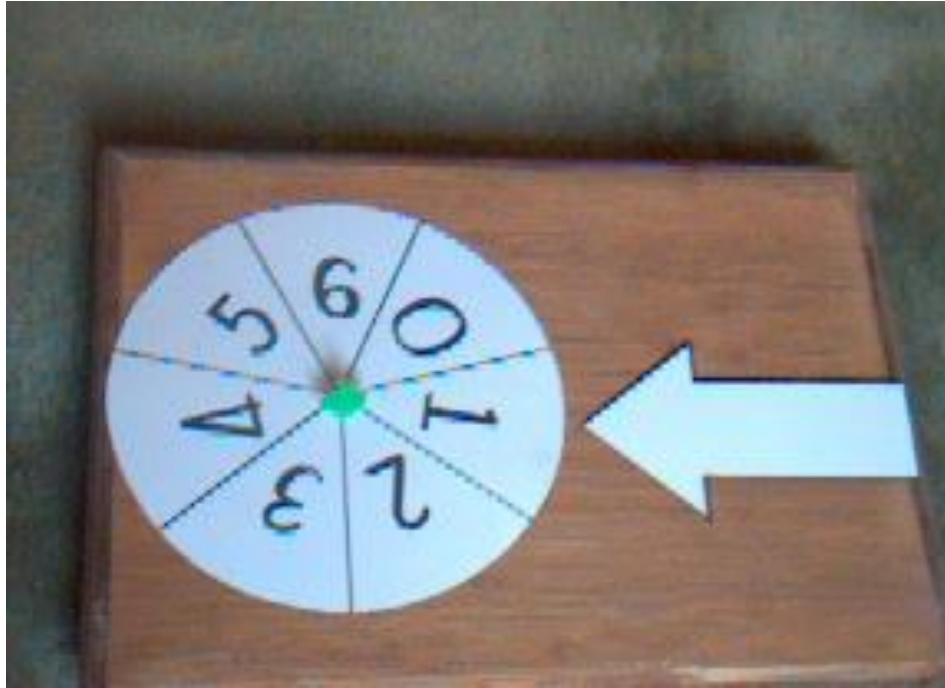
So how long do you have to wait !!!?



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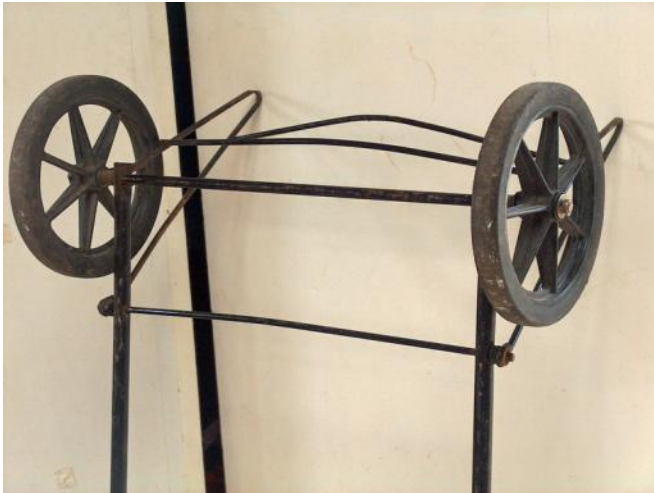
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**Alternative to the die :  
the spinning disc**



**Better Alternative : well balanced wheel**

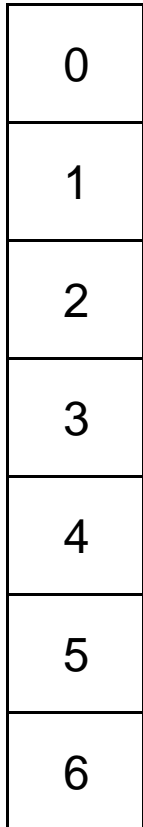
She, however, is never short of ideas and brings in the axle of an old pram with two wheels.



These wheels spin very smoothly around the axis.

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**Better Alternative : well balanced wheel**



**Extra tab for gluing**

She starts cutting out a long strip of cardboard which will wrap around the wheel.



She measures the length of the strip and divides it into 7 equal pieces. Each piece gets numbered 0 to 6.

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**Better Alternative : well balanced wheel**

0
1
2
3
4
5
6
.....

She wraps the strip around the wheel, gluing it onto itself using the tab.





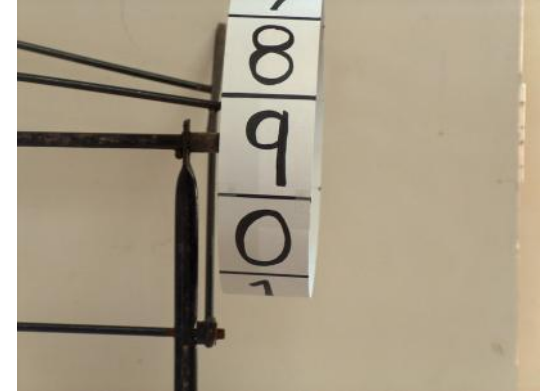
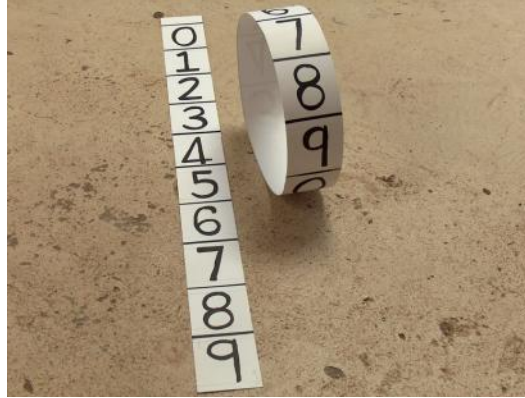
Enoch uses the second pram wheel to create a similar random number generator.



(Note, the 2 wheels spin independently)

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**Better Alternative : well balanced wheel**

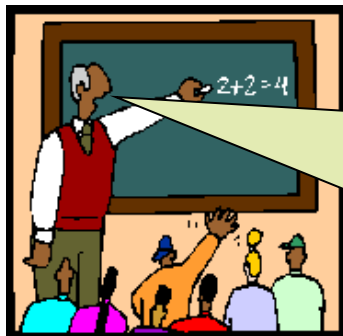


To simplify the calculations, instead of using 7 numbers on each wheel, let's use 10 numbers on each wheel – numbers 0 to 9.

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**Better Alternative : well balanced wheel**

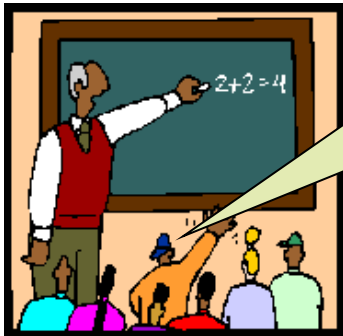
		wheel 2									
		0	1	2	3	4	5	6	7	8	9
wheel 1	0	00	01	02	03	04	05	06	07	08	09
	1	10	11	12	13	14	15	16	17	18	19
	2	20	21	22	23	24	25	26	27	28	29
	3	30	31	32	33	34	35	36	37	38	39
	4	40	41	42	43	44	45	46	47	48	49
	5	50	51	52	53	54	55	56	57	58	59
	6	60	61	62	63	64	65	66	67	68	69
	7	70	71	72	73	74	75	76	77	78	79
	8	80	81	82	83	84	85	86	87	88	89
	9	90	91	92	93	94	95	96	97	98	99



This leads to 100 possible numbers coming up... from 00 to 99.  
 The chance of any number coming up therefore is 1 in 100 – which will be great for doing for calculations!

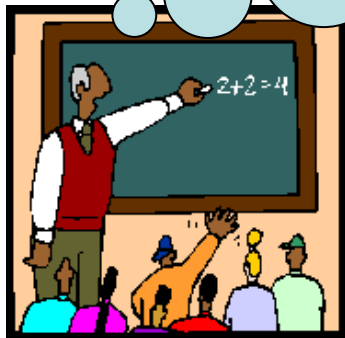
Joshua (who else), shouts out :

Sir, sir, this is like a gambling machine; except gambling machines have cherries and oranges rather than numbers.



Enoch thinks to himself :

How does Joshua know about these machines? He is not allowed to gamble. Only those 18 or over are allowed to gamble.  
I might have to have a word with his parents....



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Better Alternative : well balanced wheel

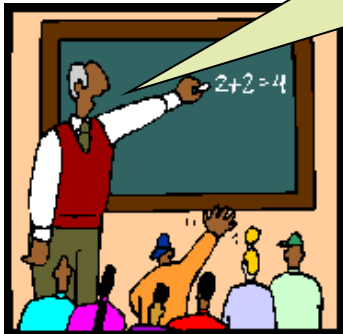
What is Joshua thinking about...?  
He is thinking about SLOT machines...



**Better Alternative : well balanced wheel**

Joshua is quite right of course....

Perhaps if we took our strips and used blanks and symbols instead of numbers....



He considers using 3 different symbols :  
Lemon, Orange and BAR, rather than the  
numbers.







He divides strip 1 (he now calls it reel 1) into 10  
equal segments as before and depicts the  
segments in the following sequence:



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**Better Alternative : well balanced wheel**

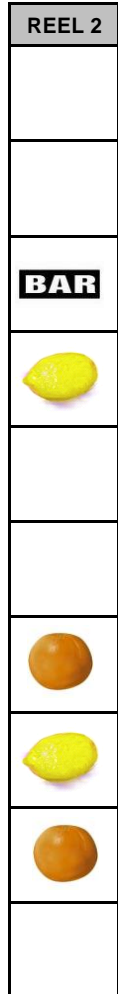
REEL 1


<b>BAR</b>



## REEL 1

{*blank,*  
*blank,*  
**lemon,**  
**lemon,**  
*blank,*  
**BAR,**  
**orange,**  
*blank,*  
**lemon,**  
*blank}*

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**Better Alternative : well balanced wheel**



The 2nd strip (also divided into 10 equal segments) depicts the segments as:

**REEL 2**

{*blank,  
 blank,  
 BAR,  
 lemon,  
 blank,  
 blank,  
 orange,  
 lemon,  
 orange,  
 blank*}

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**Better Alternative : well balanced wheel**











Both strips are attached to the pram wheels:

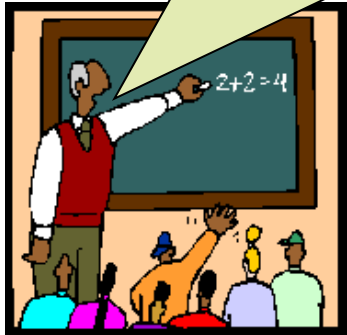


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A slot machine

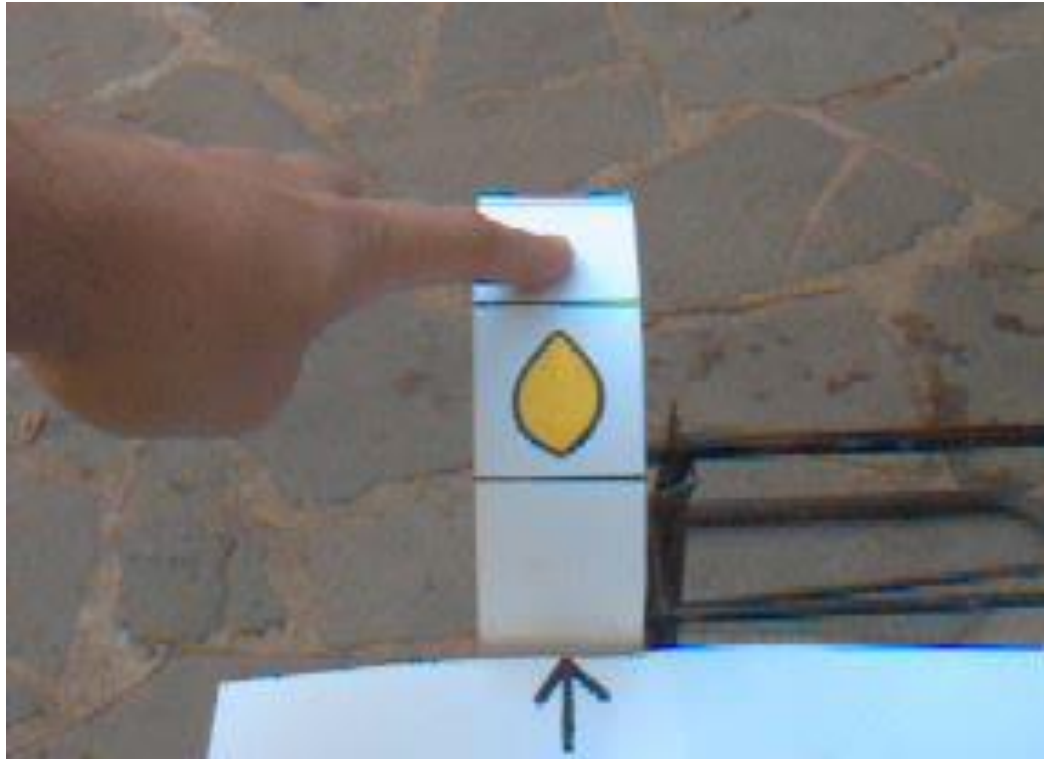
REEL 1	REEL 2
	<b>BAR</b>
	
<b>BAR</b>	
	
	
	

I agree with you Joshua – this now looks just like a simple slot machine.

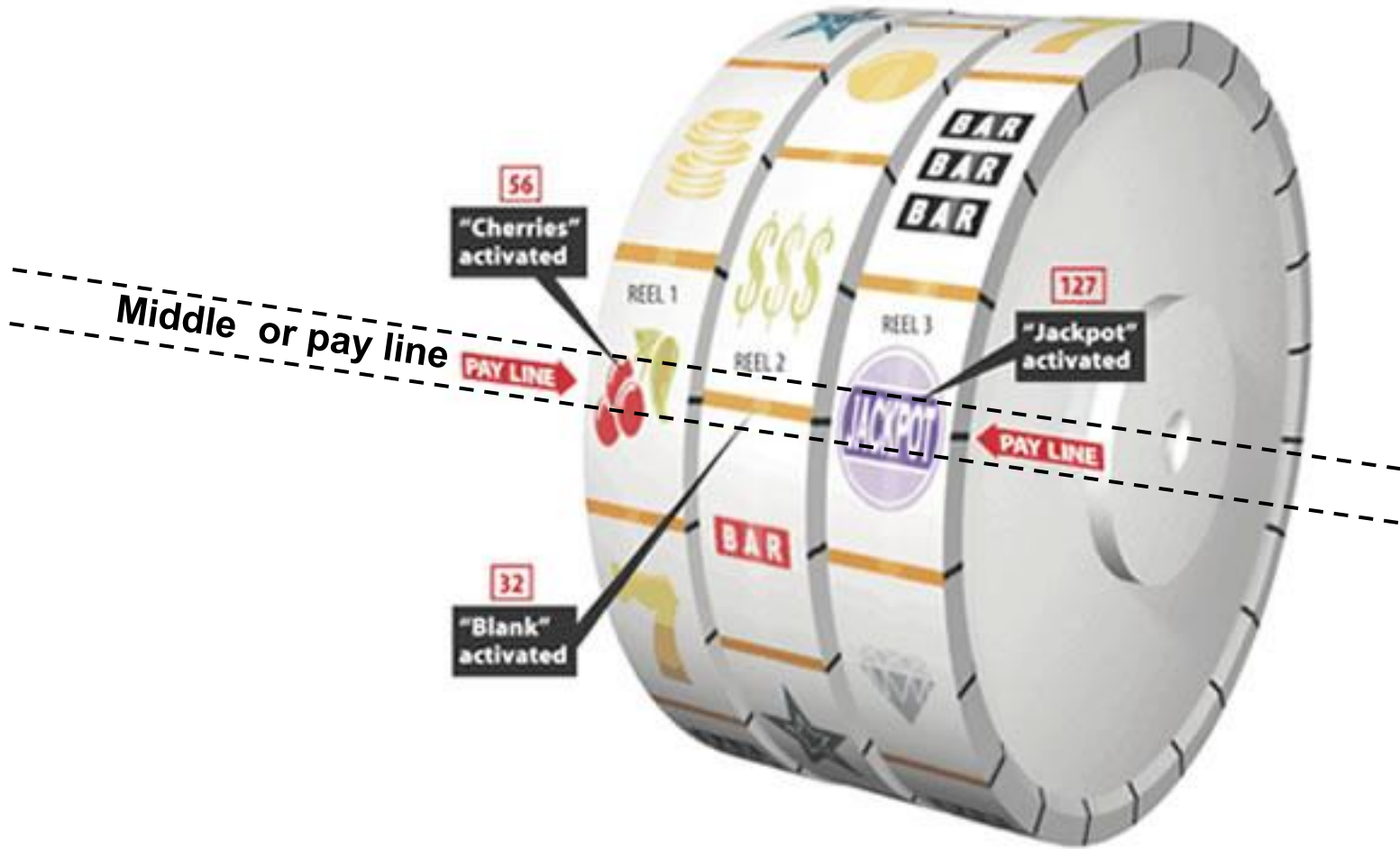


Inside of a real SLOT machine

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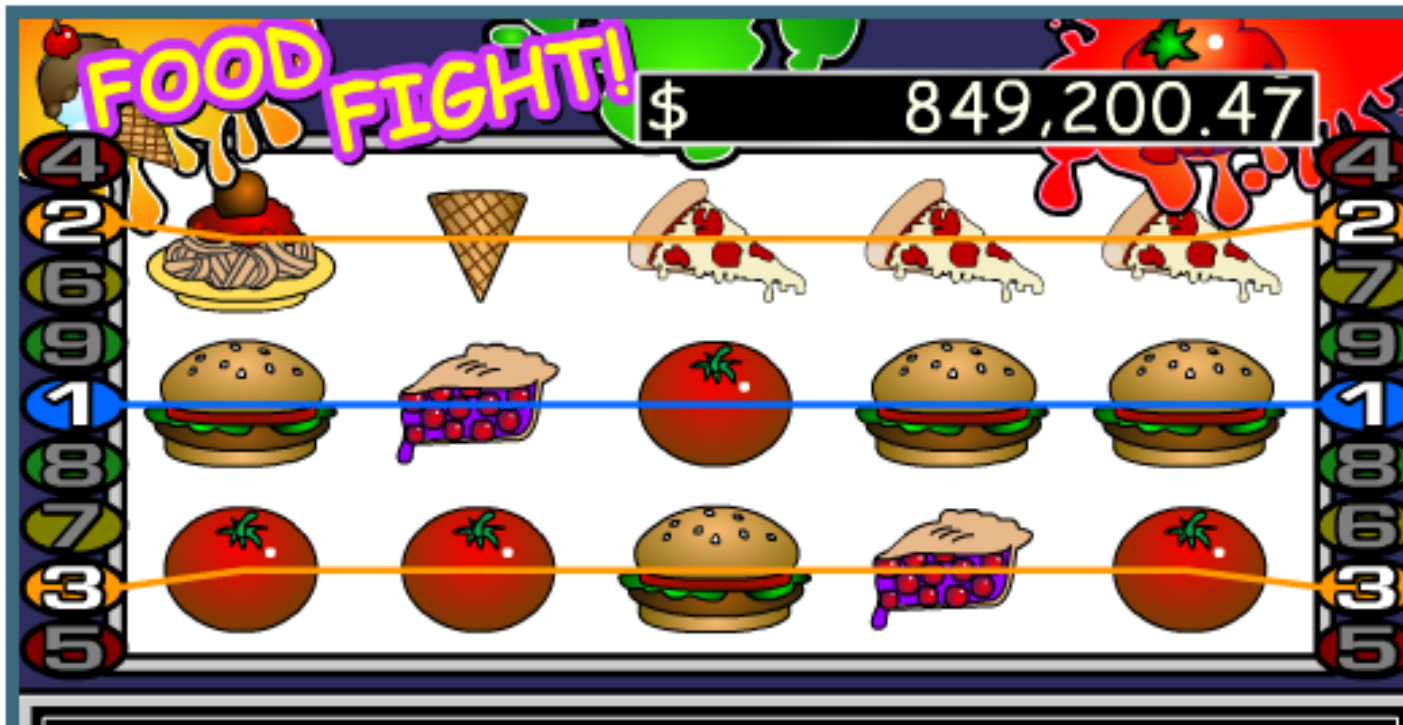


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## Slots – Multi line play



3 line play

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5 line play



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9 line play

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# Questions