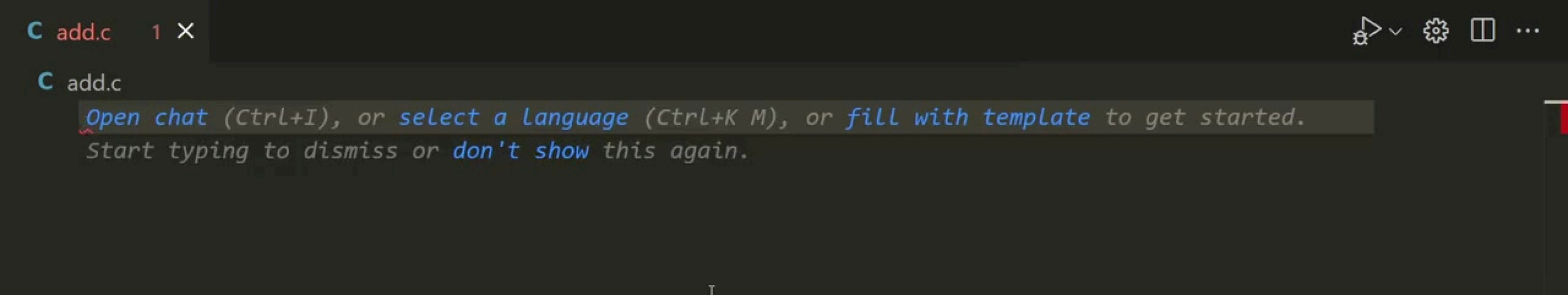
BINARY EXPLOITATION

MADE WITH ❤ BY WRTH


add.c 1
add.c
Open chat (Ctrl+I), or select a language (Ctrl+K M), or fill with template to get started.
Start typing to dismiss or don't show this again.

Buatlah program C yang menginput 2 angka dan mengoutputkan hasilnya

Berikut adalah contoh program C sederhana yang menginput dua angka dari pengguna, kemudian menghitung dan menampilkan hasil penjumlahan, pengurangan, perkalian, dan pembagian:

c Copy Edit

```c
```

add.c

add.c > ...

```c
#include <stdio.h>

int main(){
    int angka1;
    int angka2;
    scanf("%d %d", &angka1, &angka2);
    int angka3 = angka1 + angka2;
    printf("%d\n", angka3);
}
```

add.c

add.c > ...

```c
#include <stdio.h>

int main(){
    int angka1;
    int angka2;
    scanf("%d %d", &angka1, &angka2);
    int angka3 = angka1 + angka2;
    printf("%d\n", angka3);
}
```

PROBLEMS OUTPUT DEBUG CONSOLE PORTS TERMINAL

sh - laos

```
$ ./calc
10 9
19
$ ./calc
111111111111 111111111111
-1116077170
$
```

Binary Exploitation: Convincing Computers To Hurt Themselves

Computers are weird

They’re not like humans

You need to be **specific**

Not being specific creates all sorts of problems

P

```c
#include <stdio.h>

int main(){
    int angka1;
    int angka2;
    scanf("%d %d", &angka1,
    int angka3 = angka1 + an
    printf("%d\n", angka3);
}
```

Integer (int)

Stores numbers

```c
#include <stdio.h>

int main() {
    // Integer types
    short s = 1;
    unsigned short us = 1;
    int i = 1;
    unsigned int ui = 1;
    long l = 1;
    unsigned long ul = 1;
    long long ll = 1;
    unsigned long long ull = 1;
    float f = 1;
    double d = 1;
    long double ld = 1;
}
```

Be Specific!

There are 11 ways to store a number in C

Integer

32 Bit

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

I

Integer

1 + 31 Bit

R

Integer

1 + 31 Bit

Sign Bit

Indicates the sign
of a number

R

Integer

1 + 31 Bit

0 1 0 1 1 1 0 1 0 0 1 1 1 1 1 0 1 0 1 1 0 1 1 1 1 1 1 1 0 0 1 1

=

1564391411

*Technically this is NOT the accurate visualization of integers but this is good enough for now I’m not gonna bother you with too much explanation, it’s a thing we like to call “something we’re not gonna get into”

R

Integer

1 + 31 Bit

1 1 0 1 1 1 0 1 0 0 1 1 1 1 1 0 1 0 1 1 0 1 1 1 1 1 1 1 1 0 0 1 1

–

–1564391411

*Technically this is NOT the accurate visualization of integers but this is good enough for now I’m not gonna bother you with too much explanation, it’s a thing we like to call “something we’re not gonna get into”

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Integer

The Problem

0 1 0 1 1 1 0 1 0 0 1 1 1 1 1 0 1 0 1 1 0 1 1 1 1 1 1 1 0 0 1 1

0 1 0 1 1 1 0 1 0 0 1 1 1 1 1 0 1 0 1 1 0 1 1 1 1 1 1 1 0 0 1 1

1 0 1 1 1 0 1 0 0 1 1 1 1 1 0 1 0 1 1 0 1 1 1 1 1 1 1 0 0 1 1 0

TeePublic Pinterest

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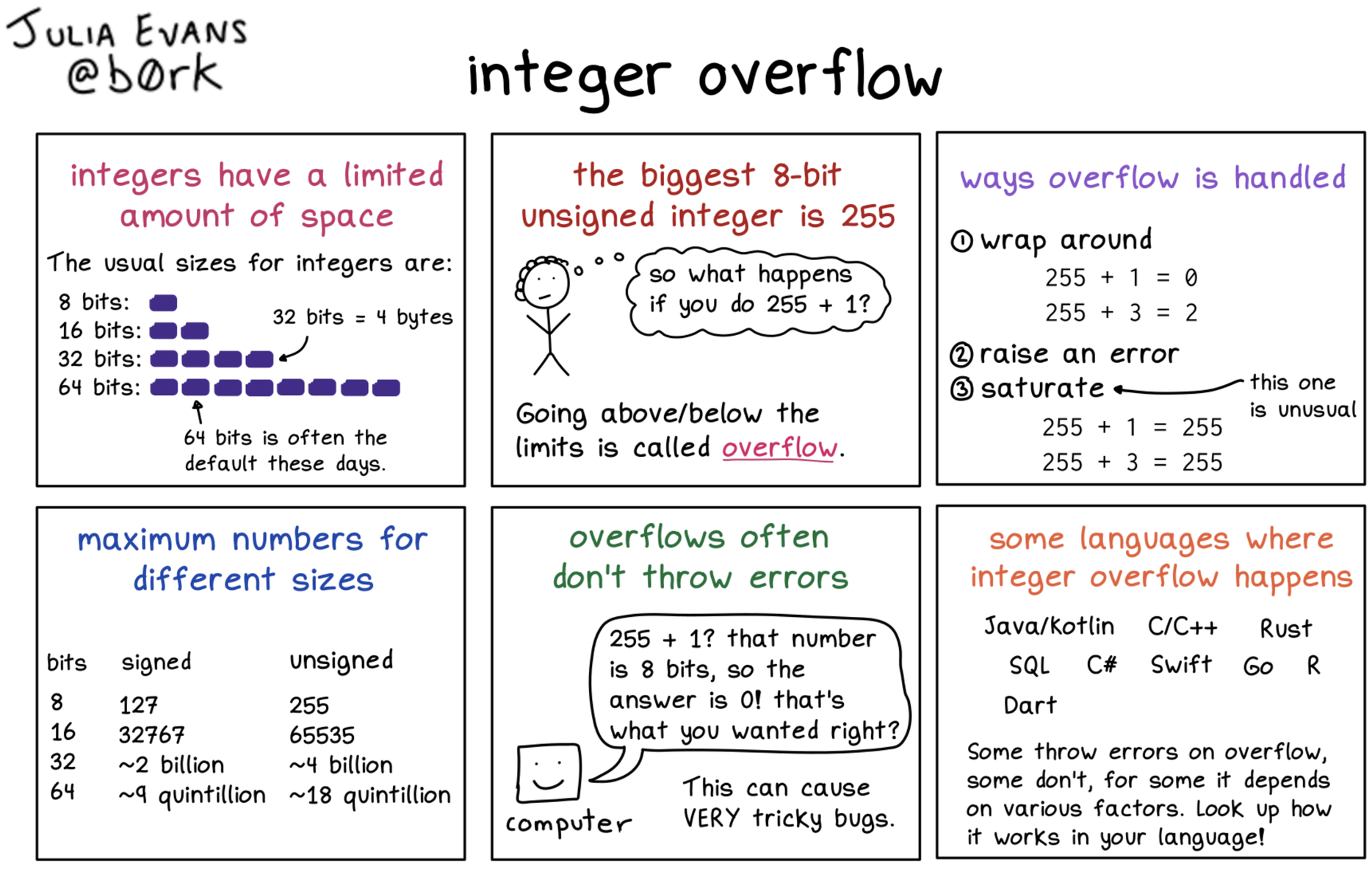
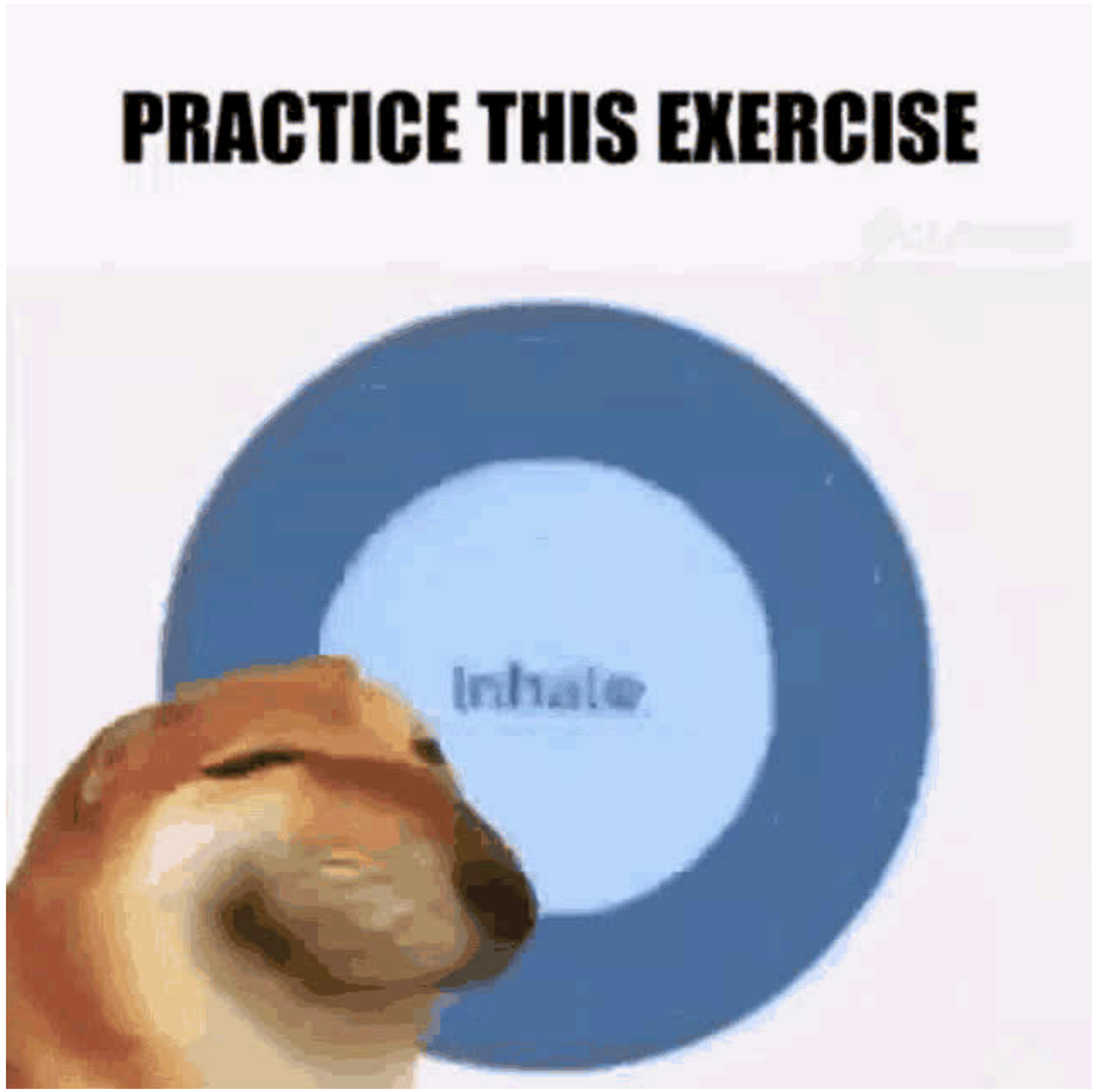
New Bug Unlocked!

Occurs when an arithmetic operation on integers attempts to create a numeric value that is outside of the range that can be represented with a given number of digits



Simple Case

Water Break



```c
#include <stdio.h>

int main(){
    char name[8];
    printf("Your name: ");
    scanf("%s", name);
    printf("Hello %s, Mada
    kono sekai wa", name);
}
```

```c
#include <stdio.h>

int main(){
    char test[8] = "mikudayo";
    printf("%s", test);
}
```

Characters (char)

Stores characters

TECHNICALLY it can also stores integers, since everything is binary anyways

https://www.reddit.com/r/linuxmemes/comments/1guythg/me_after_using_a_diy_distro_for_the_first_time/

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ASCII TABLE

Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char	Decimal	Hex	Char
0	0	*[NULL]*	32	20	*[SPACE]*	64	40	@	96	60	`
1	1	*[START OF HEADING]*	33	21	!	65	41	A	97	61	a
2	2	*[START OF TEXT]*	34	22	"	66	42	B	98	62	b
3	3	*[END OF TEXT]*	35	23	#	67	43	C	99	63	c
4	4	*[END OF TRANSMISSION]*	36	24	$	68	44	D	100	64	d
5	5	*[ENQUIRY]*	37	25	%	69	45	E	101	65	e
6	6	*[ACKNOWLEDGE]*	38	26	&	70	46	F	102	66	f
7	7	*[BELL]*	39	27	'	71	47	G	103	67	g
8	8	*[BACKSPACE]*	40	28	(	72	48	H	104	68	h
9	9	*[HORIZONTAL TAB]*	41	29	)	73	49	I	105	69	i
10	A	*[LINE FEED]*	42	2A	*	74	4A	J	106	6A	j
11	B	*[VERTICAL TAB]*	43	2B	+	75	4B	K	107	6B	k
12	C	*[FORM FEED]*	44	2C	,	76	4C	L	108	6C	l
13	D	*[CARRIAGE RETURN]*	45	2D	-	77	4D	M	109	6D	m
14	E	*[SHIFT OUT]*	46	2E	.	78	4E	N	110	6E	n
15	F	*[SHIFT IN]*	47	2F	/	79	4F	O	111	6F	o
16	10	*[DATA LINK ESCAPE]*	48	30	0	80	50	P	112	70	p
17	11	*[DEVICE CONTROL 1]*	49	31	1	81	51	Q	113	71	q
18	12	*[DEVICE CONTROL 2]*	50	32	2	82	52	R	114	72	r
19	13	*[DEVICE CONTROL 3]*	51	33	3	83	53	S	115	73	s
20	14	*[DEVICE CONTROL 4]*	52	34	4	84	54	T	116	74	t
21	15	*[NEGATIVE ACKNOWLEDGE]*	53	35	5	85	55	U	117	75	u
22	16	*[SYNCHRONOUS IDLE]*	54	36	6	86	56	V	118	76	v
23	17	*[END OF TRANS. BLOCK]*	55	37	7	87	57	W	119	77	w
24	18	*[CANCEL]*	56	38	8	88	58	X	120	78	x
25	19	*[END OF MEDIUM]*	57	39	9	89	59	Y	121	79	y
26	1A	*[SUBSTITUTE]*	58	3A	:	90	5A	Z	122	7A	z
27	1B	*[ESCAPE]*	59	3B	;	91	5B	[	123	7B	{
28	1C	*[FILE SEPARATOR]*	60	3C	<	92	5C	\	124	7C	|
29	1D	*[GROUP SEPARATOR]*	61	3D	=	93	5D	]	125	7D	}
30	1E	*[RECORD SEPARATOR]*	62	3E	>	94	5E	^	126	7E	~
31	1F	*[UNIT SEPARATOR]*	63	3F	?	95	5F	_	127	7F	*[DEL]*

Wikimedia

Strings

N + 1 bytes

```
6f 70 65 6e 00 70 61 69 64 00 70
72 6f 6d 6f 74 65 00 64 6d 00
```

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Strings

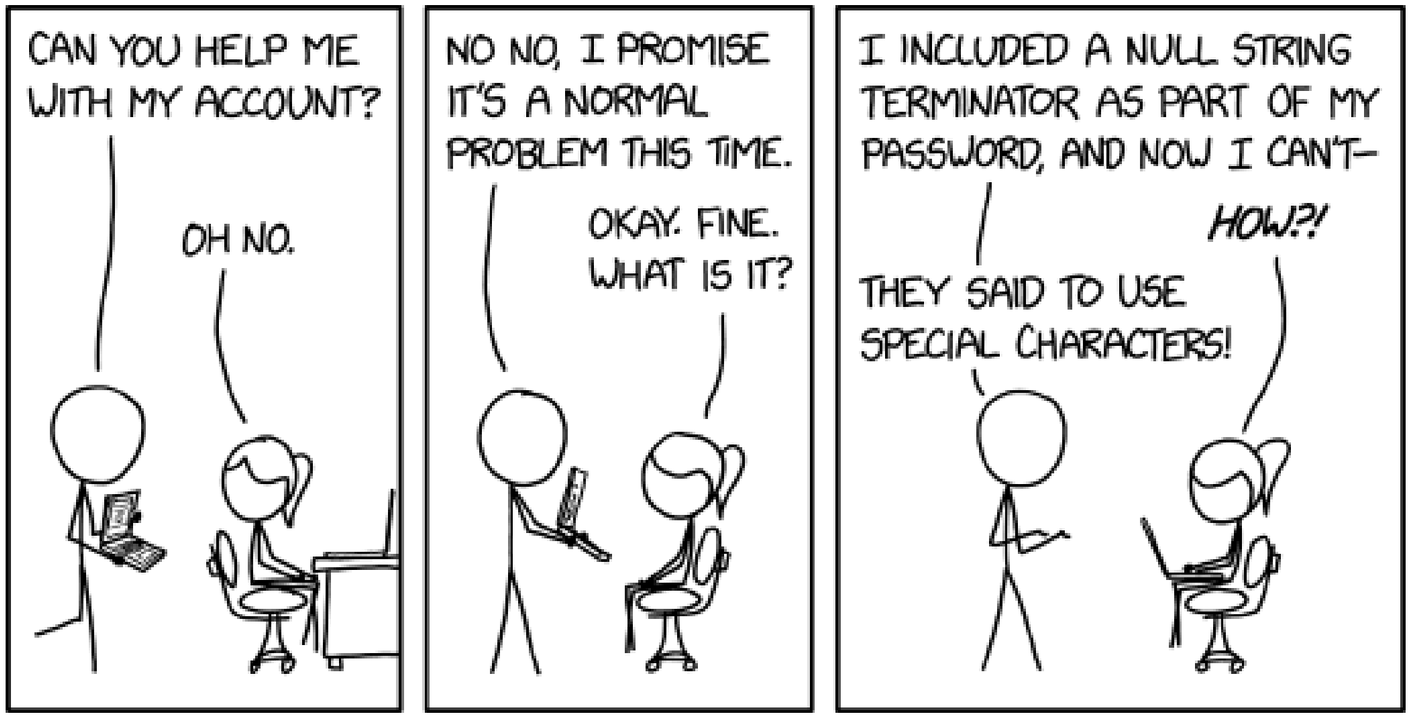
The Problem

¯_(ツ)_/¯

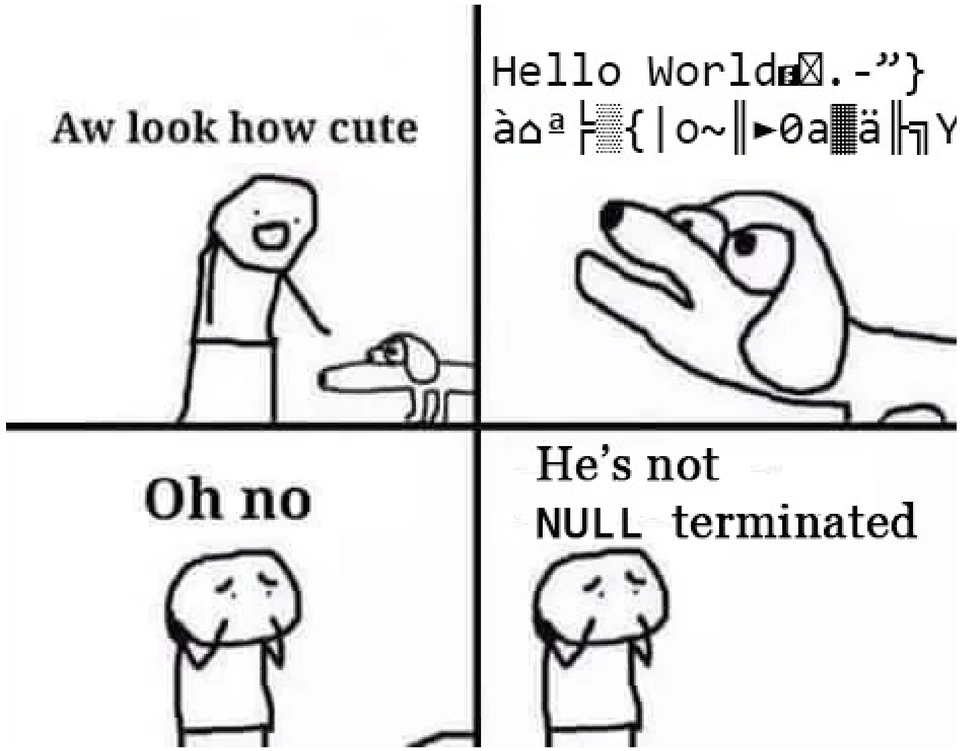
New Bug Unlocked!

Null Terminated Strings issue

This is usually not a problem, because normal text never contains null characters. However, if somehow a null character were to end up in the string, it would cause problems: any code that uses that string would assume this null character marks the end of the string, so the string would effectively be cut off.



XKCD 2700



https://www.reddit.com/r/ProgrammerHumor/comments/8win5c/please_train_your_dog_good_behavior/

New Bug Unlocked!

Buffer Overflow (Basic)

A buffer overflow or buffer overrun is an anomaly whereby a program writes data to a buffer beyond the buffer's allocated memory, overwriting adjacent memory locations.

https://infosecwriteups.com/lets-talk-about-buffer-overflow-54764101030b

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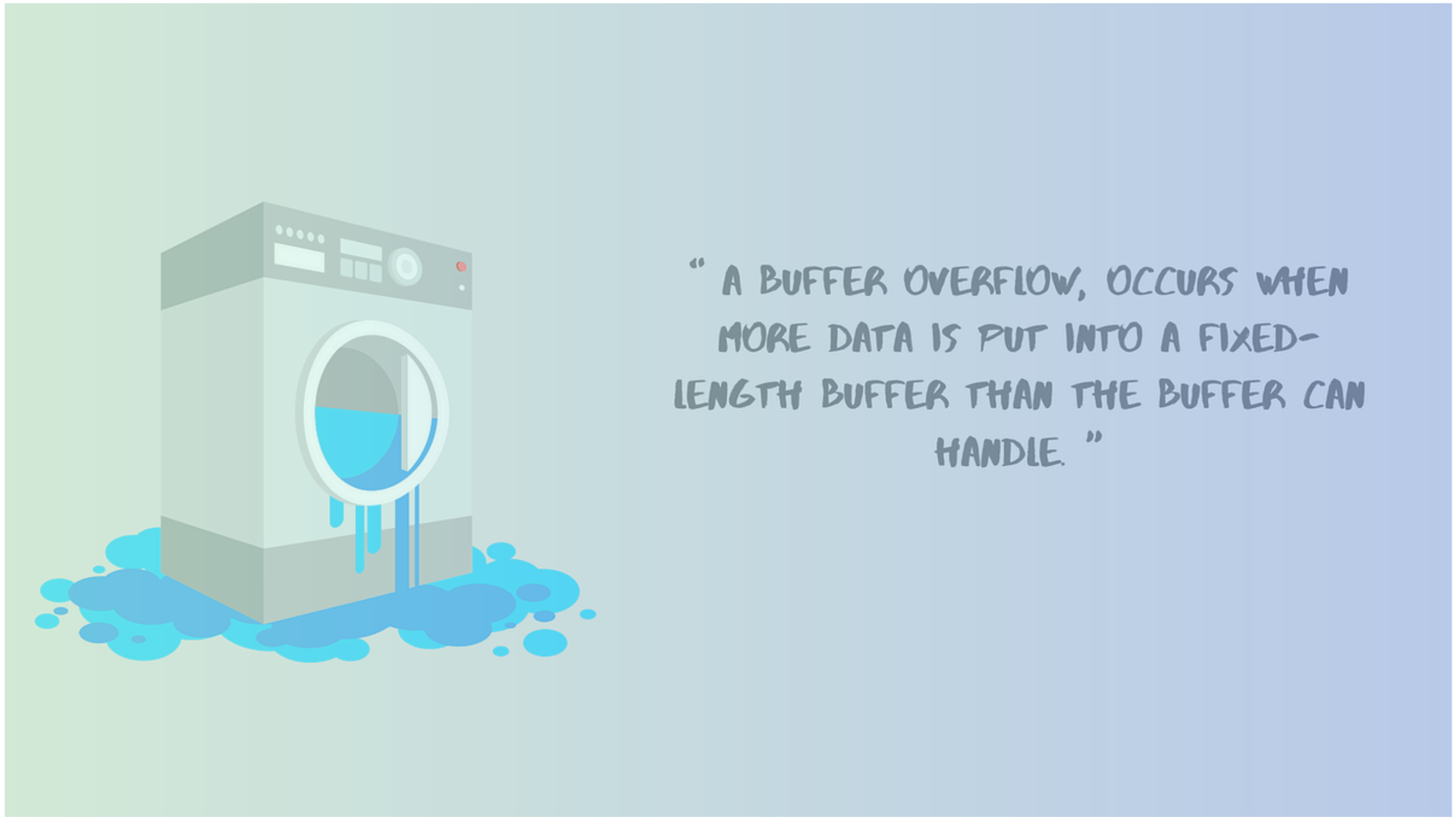
New Bug Variant Unlocked!

Buffer Overflow, Off By One Variant

A product calculates or uses an incorrect maximum or minimum value that is 1 more, or 1 less, than the correct value. In this case an input function is taking 1 more bytes than it should



https://infosecwriteups.com/lets-talk-about-buffer-overflow-54764101030b

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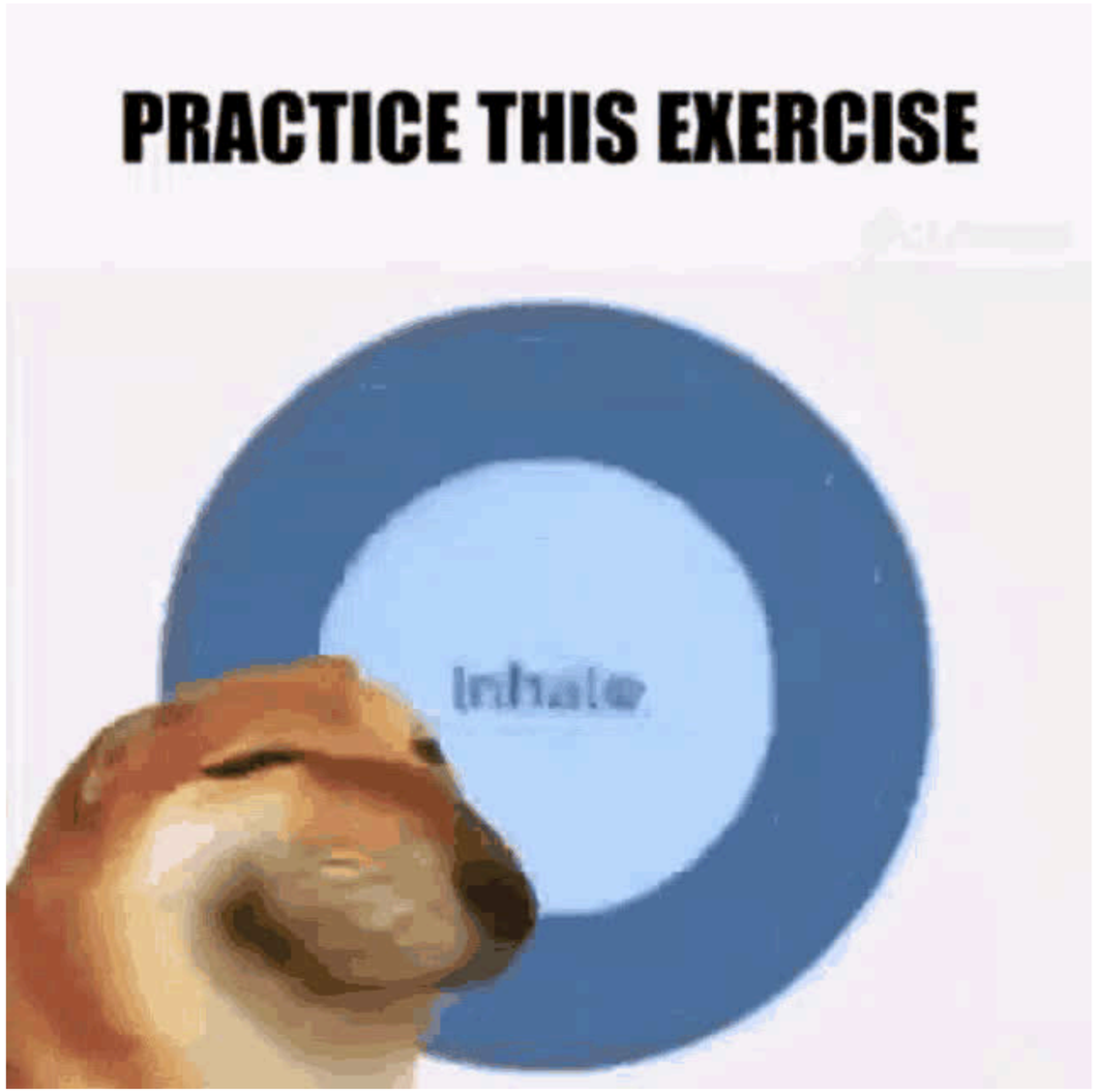
Simple Case

Water Break



```c
#include <stdio.h>

int main(){
    int a[8] = {1,2,3,4,5,6,7,8};
    for(int i = 0; i < 8; i++){
        printf("%d\n", a[i]);
    }
}
```

Array

Stores multiple <types>

Accessed using whats called an index
Index starts at 0

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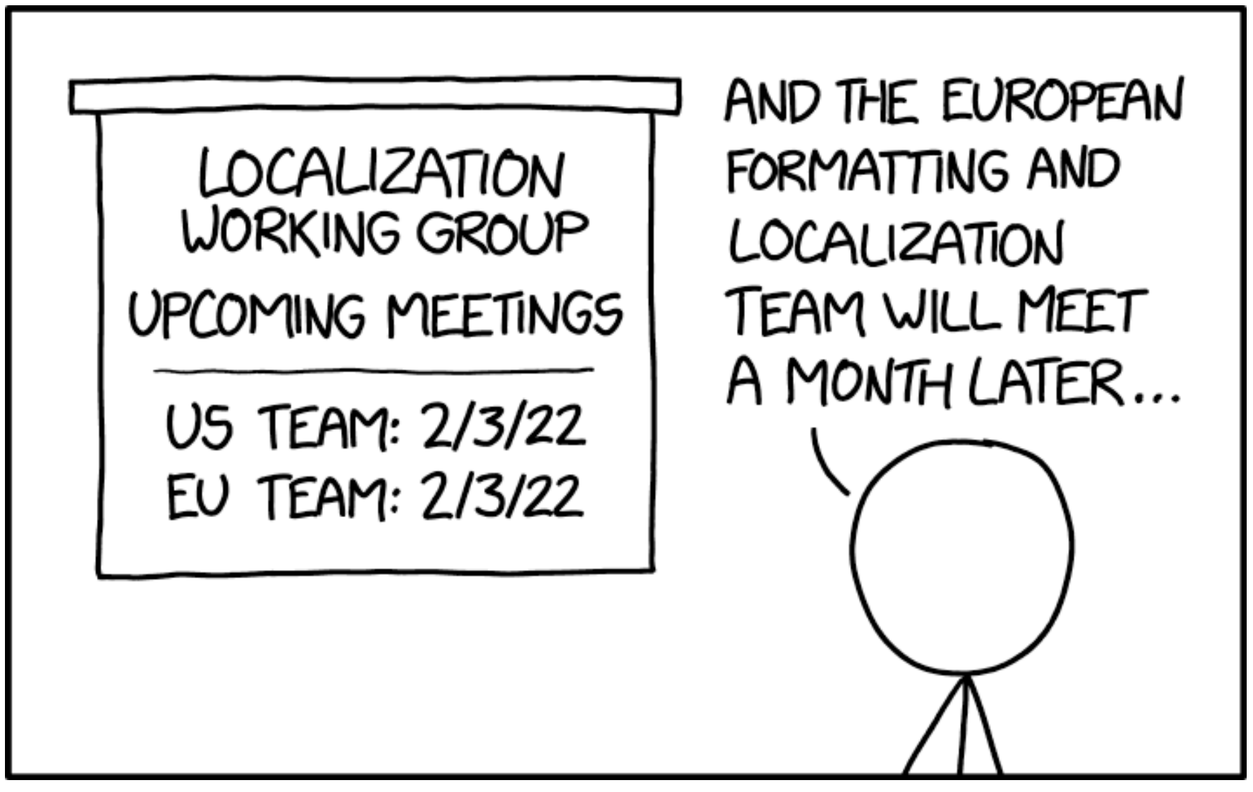
New Concept Learned!

Endianness

the order in which bytes are arranged within a multi-byte data unit, like an integer or a floating-point number, when stored in memory or transmitted over a network



XKCD 2562

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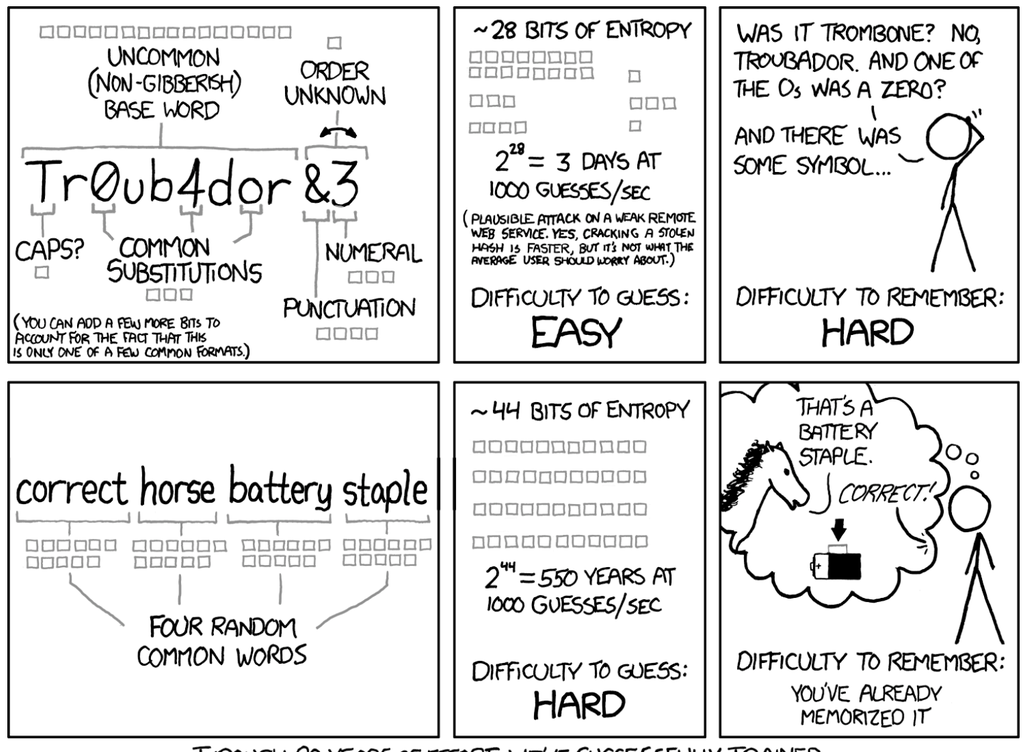
New Bug Unlocked!

Out Of Bounds (OOB)

An out-of-bounds happens when a program tries to read (or write) data from a memory location that's outside the allocated buffer



XKCD 936

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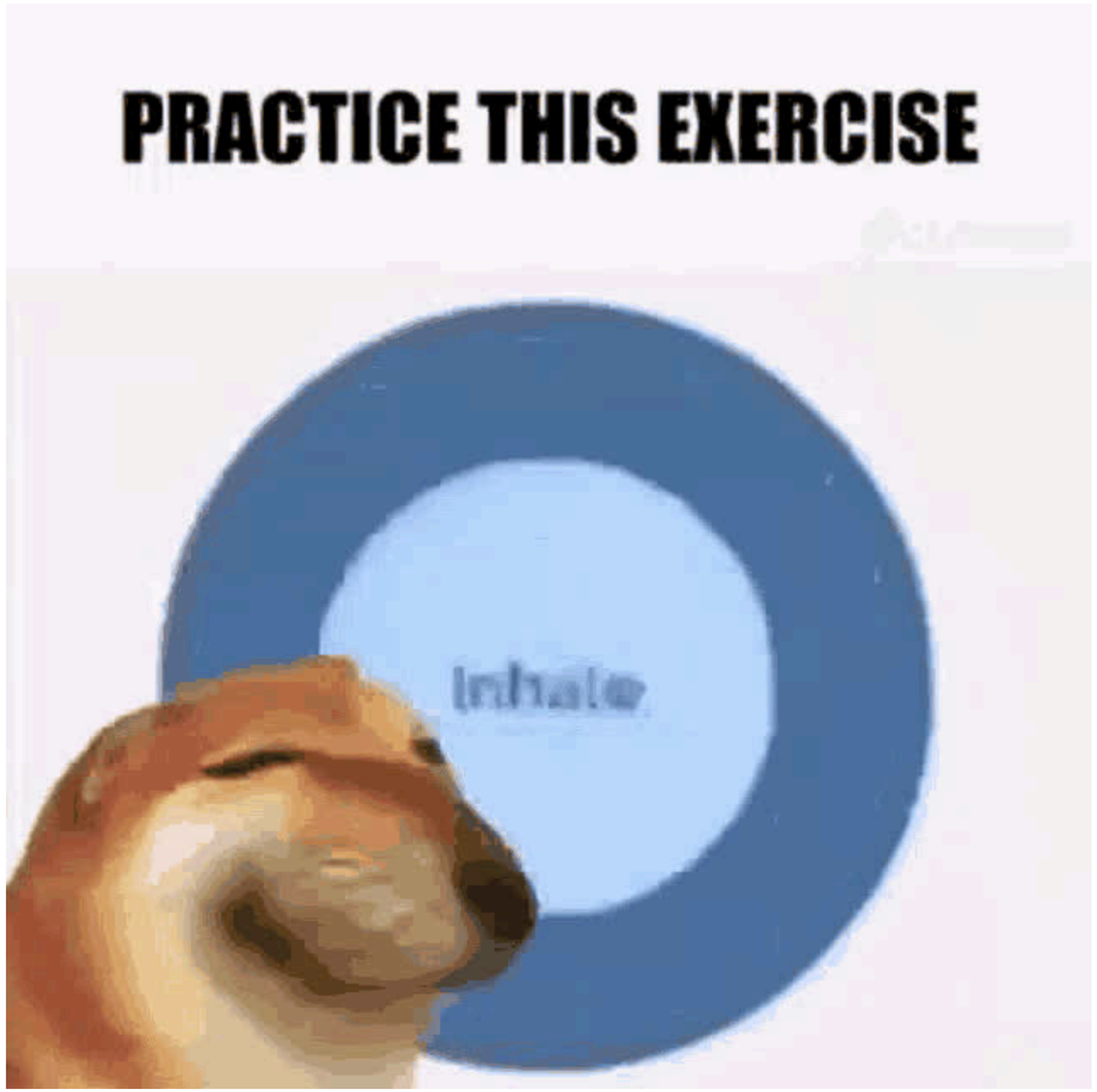
Simple Case?

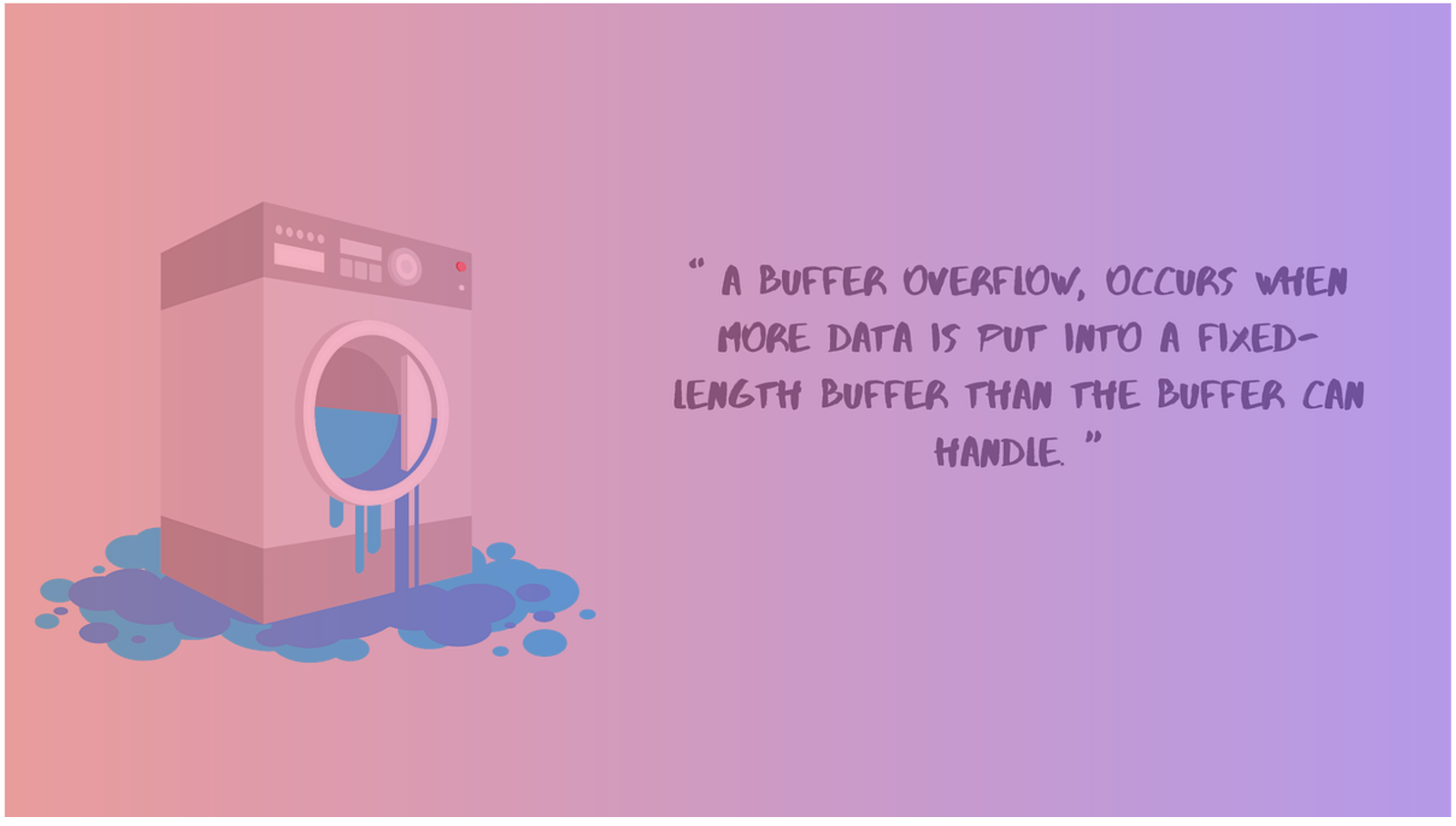
CHAPTER 1 COMPLETE!



New Bug Unlocked!

Buffer Overflow (Advanced)

A buffer overflow or buffer overrun is an anomaly whereby a program writes data to a buffer beyond the buffer's allocated memory, overwriting return address and thus controlling the program’s flow.



https://infosecwriteups.com/lets-talk-about-buffer-overflow-54764101030b

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New Concept Learned!

Shellcode

the order in which bytes are arranged within a multi-byte data unit, like an integer or a floating-point number, when stored in memory or transmitted over a network

XKCD 1247

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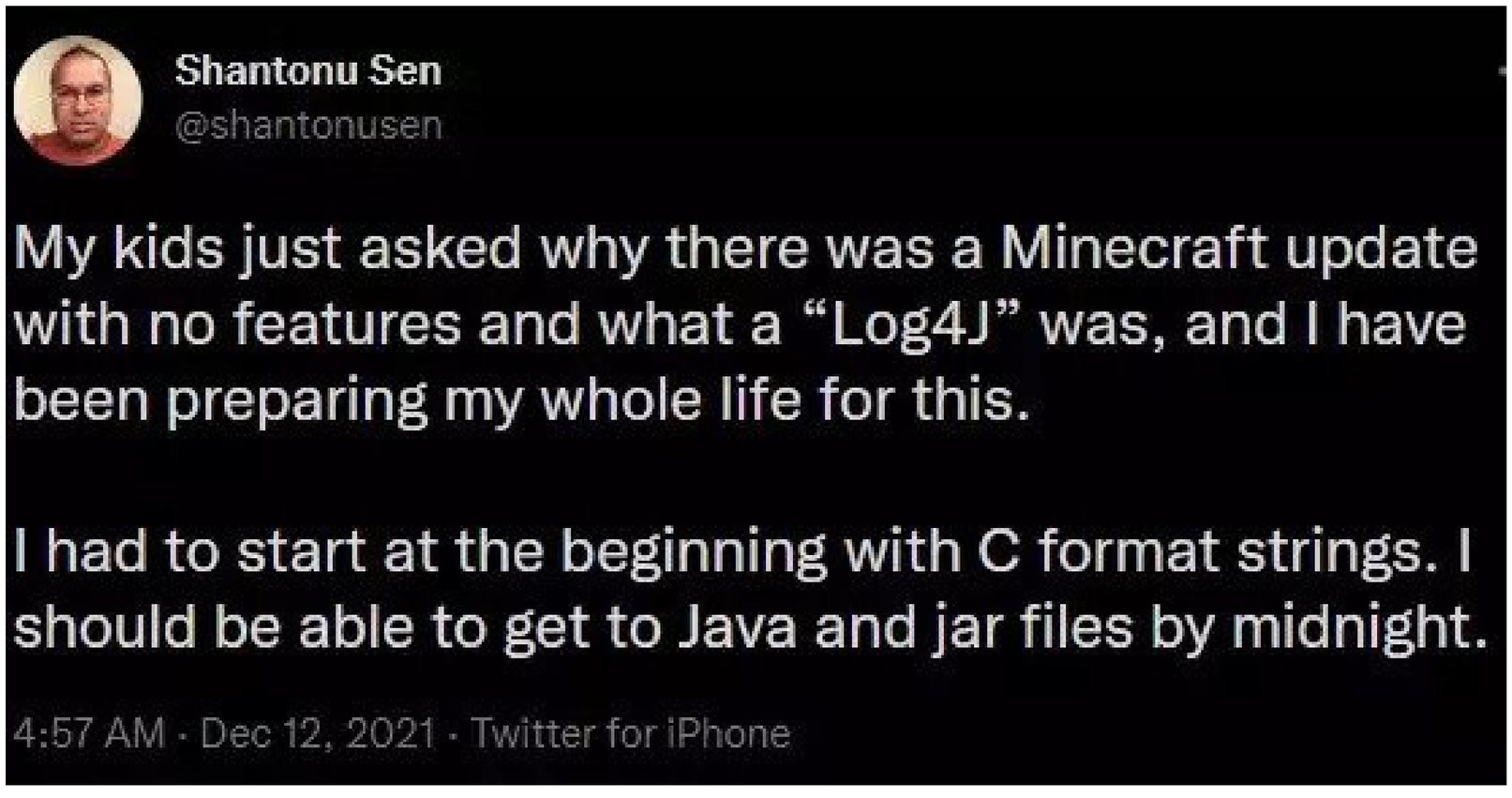
New Bug Unlocked!

Format String Bug (FSB)

the use of unchecked user input as the format string parameter in certain C functions that perform formatting, such as printf()



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See You Next Campaign!

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