



NSA Challenge 2019

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Welcome to the NSA Challenge 2019 at SACNAS Conference – Try your hand at analysis and decryption! Anyone interested in data analysis, cryptography or math is encouraged to participate.

NSA Challenge 2019 consists of solving the **Metapuzzle**, then answering the encrypted **Question**. The Challenge's **Answer Sheet** should be submitted to NSA representatives at the SACNAS Career Fair on Thursday, October 31, 2019 from 9am to 12pm. Participants correctly completing the challenge will be entered into a raffle for a chance to visit NSA-Hawaii on Saturday, November 1, 2019.

Receive a copy of the Challenge from any of the NSA info tables at the conference or download from nsa.gov. Once at nsa.gov search for SACNAS.

Due to security restrictions, all NSA employees, candidates for employment, and site visitors are required to hold U.S. Citizenship. NSA Challenge 2019 winner(s) are required to provide one form of ID as proof of U.S. citizenship in order to participate in NSAH Field Trip. IDs will be required at the time of entering NSA facilities. Below is a list of accepted U.S. citizenship ID forms:

1. Raised Seal Birth Certificate
2. Current/Valid US Passport
3. Valid US Citizen Birth Abroad Certificate
4. Valid Naturalization Certificate

*** Please note Real ID Act compliant Driver's Licenses or IDs are NOT valid proofs of citizenship ***

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Cave



In Cave, the objective is to blacken some of the empty cells such that:

1. All white cells are connected horizontally and vertically in one contiguous block.
2. From any black cell, it is possible to reach the puzzle's edge by moving horizontally and vertically through other black cells. (In other words, there are no islands of black surrounded by white.)
3. Cells containing numbers must be left white. Each such number must equal the total number of cells that you would see by standing in that cell and looking horizontally and vertically, including the cell itself. You cannot see through a black cell.

EXAMPLE				
	5		4	
		7		7
4				5
		5	7	

SOLUTION				
	5		4	
		7		7
4				5
		5	7	

5			
			7
	3		

			4
		4	
	6		
5			2
			5

3	3		
4			4
3		2	

11				
	5			5
				5
			5	
	5			

	2	3		
	4			
			5	6
7				8

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A House Divided



Help these families design floor plans for their bedrooms such that older children get larger rooms. Each number in the grid represents one of n children, age 1 to n . Assign the remaining floor tiles to the given children such that:

1. Every floor tile is assigned to one of the given children.
2. Each child's room is a perfect rectangle (or possibly a square).
3. When comparing any two children, the older child's room must occupy a larger area than the younger child's.

EXAMPLE

2	3		
1			

SOLUTION

2	3	3	3
2	3	3	3
2	3	3	3
1	3	3	3

1	2		
			3

			2	
		1		
		4		
	3			

			3		
5					
		1			
				4	
	2				

3					5
		1			
4					2

	1					?
		?		?		?
	?			?		

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Stardust



Put black holes in some of the empty grid cells such that:

1. Each star is adjacent (horizontally, vertically, or diagonally) to exactly one black hole.
2. No grid cell (filled or empty) is adjacent to more than one black hole.

EXAMPLE

			*
*	*		
*			

SOLUTION

		●	*
*	*		
*	●		

*	*		*	
*				*
			*	
		*		

			*	
	*	*		
	*			
*				*
	*			*

				*	
	*		*		*
		*			*
			*		
		*			
	*				

	*	*	*	*		
	*				*	
	*				*	
	*				*	
	*	*	*	*		
	*				*	
	*					*

*						
	*		*		*	*
	*			*	*	
	*	*				
*						
				*	*	
			*	*		
		*	*			

NSA Challenge 2019

Ponderer's Pond



The Ponderer's Pond is a magical pond filled with talking toads and frogs. Unfortunately, the only way to distinguish toads from frogs is that toads always tell the truth and frogs always lie. Figure out if each speaker is a toad or a frog, marking each statement with a T or F corresponding to each animal's species.

EXAMPLE:

Amy: Bruce and Carlos are the same species. (F)

Bruce: Carlos is a frog. (T)

Carlos: Amy is a toad. (F)

Andrew: Betty is a toad.

Betty: Andrew and I are different species.

Adam: There are an odd number of toads here.

Brenda: Claire and I are the same species.

Claire: Adam is a frog.

Alice: 2 of us are frogs and 2 are toads.

Bill: Alice and Chet are the same species.

Chet: Debra is a frog.

Debra: Alice and I are different species.

Angel: Christine is a toad.

Bonnie: At least one of Christine and Darryl is the same species as I am.

Christine: There is/are exactly # frog(s) here.

Darryl: There is/are exactly # toad(s) here.

Editor's Note: Sorry, I don't remember what (whole) number Christine and Darryl said; just that they both said the same number.

Aaron: At least one of Boris and Dwayne is a toad.

Boris: Exactly one of the other 3 animals is a frog.

Celia: Boris is a frog and I am a toad.

Dwayne: ????? is a frog.

Editor's Note: Sorry again, this time I forgot whether Dwayne referred to Aaron, Boris, or Celia. I do remember that with that knowledge, I was able to be sure of the species of all four animals.

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Metapuzzle

A metapuzzle is a puzzle, typically without explicit instructions, which allows you to combine the answers to previous puzzles to yield a one-word answer.



		3			4
3					
4	3		5	7	
					3

	1			3	
2					
			5		
	4			6	

	*	*		*	
*			*		
		*			
		*	*	*	
	*				*

Alexis: There are an odd number of frogs among Bonnie, Carrie, and myself.
Bonnie: I am older than Alexis and Carrie but younger than Dennis.
Carrie: I am the oldest frog here.
Dennis: Neither the oldest nor youngest animal here is a toad.

- Black holes are also lily pads.
- Spelunking toads are interested in how many white cells they can see horizontally and vertically, including the square they are on.
- Spelunking frogs are interested in how many black cells are in the same row or column as them.

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Cipher



KIWIOIZEPQFVFXWSSWJMJKHRAMUSWMQIK

Possibly useful table:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
A:	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
B:	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A
C:	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B
D:	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C
E:	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D
F:	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E
G:	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F
H:	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G
I:	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H
J:	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I
K:	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J
L:	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K
M:	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L
N:	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M
O:	O	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N
P:	P	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Q:	Q	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
R:	R	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
S:	S	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
T:	T	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S
U:	U	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
V:	V	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
W:	W	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V
X:	X	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W
Y:	Y	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
Z:	Z	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y

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Answer Sheet



Name: _____

Preferred contact method: Phone Email

Phone: _____

Email: _____

Can you confirm that you are a US Citizen and can provide one form of Identification from the list of accepted documents (see below for list)?

Yes No

Metapuzzle answer: _____

Challenge answer: _____

Accepted US citizenship documents:

1. Raised Seal Birth Certificate
2. Current/Valid US Passport
3. Valid US Citizen Birth Abroad Certificate
4. Valid Naturalization Certificate

*** Real ID Act compliant Driver's Licenses or IDs are NOT valid proofs of citizenship ***