

Instructions (shown before students start the test)**Codebusters C****UT Regional****Exam Authors:**

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- Make sure you have read the rules and have **PRINTED** the reference sheet.
- You will have **50 minutes** to complete **18 questions**
- There is a **TIMED QUESTION**. To earn bonus points, click submit answer at the end of the question and it will tell you if it is correct or not.
- Tiebreakers are point values in decreasing order.
- Browser time will be recorded to ensure no wandering off. You should have the reference sheet printed out
- Feel free to set up a communication call with your team members such as FaceTime, Zoom, or Discord **BEFORE** you start the test. Any time setting up the call after starting WILL count as time out of browser.
- Per Texas Science Olympiad rules, you must have printed notes for this event. If you are communicating with your partner through a voice or video call, please start it before you begin the test itself.

Significant time spent outside of the browser window is grounds for a penalty or disqualification per TSO policies.

Introduction (shown after students start the test)

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1. (300.00 pts)

[TIMED] Decrypt this **ARISTOCRAT**, which is a quote from a 20th century musical. Make sure only one person is entering the letters or else your progress might be written over. Make sure to press SUBMIT when you think you have the correct solution. The system will notify you if your answer is correct and you will receive the appropriate time bonus.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Ñ	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	0	0	1	12	6	1	0	8	1	5	1	4	2	1	0	1	10	4	1	0	9	8	7	2	1	4	7
Replacement																											

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

T	V	H	E	P	Z	P	L	K	D	Z	P	I	P	L	J	H	T	Q	J	W	P	N	C	Z	P	V	V	T	D	U	D	Q	R	E	L	H
T	V	X	D	D	M	T	U	H	E	T	V	Y	D	J	U	H	Z	F	D	Q	D	J	Z	V	H	E	L	U	H	E	P					
T	U	U	D	Y	P	U	H	O	D	T	Y	P	V	D	Q	D	J	Z	Y	E	T	W	M	Z	P	U	?									

2. (100.00 pts) Solve this quote from a scientist which has been encrypted with the **CAESAR** cipher.

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

KGKBNNDDROXKDSYXKVWONKVYPCMSOXMOBOFOBON

LSYMRROWSCDOKBVC DKNDWKXGKC AEYDONKCCKISXQ,

"KQSXQS SC K NSCOKCO. "

3. (125.00 pts) Solve this **AFFINE** cipher which is a quote from "The Legend of Sleepy Hallow". You realize that a = 17 and b = 22.

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

H L A Y U L H L M J C U L H G W Q V W Z K W J V V C Q S W B O M H H L M D A Z S

A D H L M Y J K J A G J S C U L H J A G C J Q A S M

V M U Z M M N M W Q E M Z H W C J M V .

4. (250.00 pts) Decrypt this **ARISTOCRAT**, which is a quote from the first-person shooter game VALORANT. **Hint:** The last word in the quote is "RIGHT".

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Ñ	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	1	9	2	0	0	3	1	11	0	6	0	1	5	8	0	4	6	11	3	2	0	4	2	0	6	5	11
Replacement																											

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

J A J ' Y X N Z H Z M Q H H Q R , Z P Q X V N O H P N O F R X N Z C Q

H Z M Q H H Q R . J Y Q B X F N N G B Z Y Q , U N N F B H B U O U O Y C Q M .

L B , Z P B Z ' H Z P Q Z P J X S B Y Q M J U B X H H B V , M J S P Z ?

5. (250.00 pts) Solve this quote from "Broken Embraces" that was encrypted with the **VIGENERE** cipher. The keyword is MORNING.

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

T S N B Z X Y T O I Q B B K Z G L E M G N M H K U M L H A H Y F B N X F

H Y R Q E J M M N V B U Z T S Y R T C U R O X R V R X A I J N V Q

B M F Z R L O X Q O B S I F Z , F C R F B , W A U Q V , P W S L Q S R A L G K M ,

A R E U N R M R V , G W N Y F S U O Z R G P G G E M N J I W K U W V R M B U

G	W	Z	G	F	C	,
						,

A large grid of 100 emoji faces, each with a different expression, arranged in 10 rows and 10 columns. The expressions range from happy (smiling, laughing) to sad (frowning, crying) and neutral. The grid is used to illustrate the concept of a large dataset or a complex system.

[illegible][illegible]

4819137381334569876781969
3188196232883134819396887
7171569192743323684964542
7132569196828483839152717
51923519425944379

$$\begin{pmatrix} B & E \\ A & T \end{pmatrix} \equiv \begin{pmatrix} 1 & 4 \\ 0 & 19 \end{pmatrix}$$

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

[illegible][illegible]

10. (300.00 pts) Encrypt this quote from a romance manga with the **VIGENERE** cipher. The keyword is HORIMIYA.

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

I	W	O	N	D	E	R

I	F

T	H	E	R	E

A	R	E

O	T	H	E	R

P	E	O	P	L	E

W	H	O

C	A	N

S	E	N	D

T	E	X	T

M	E	S	S	A	G	E	S

W	I	T	H

T	H	E

P	U	R	P	O	S	E

O	F

C	O	R	N	E	R	I	N	G

S	O	M	E	O	N	E	,	
							,	
U	S	I	N	G				
E	M	O	T	I	C	O	N	S
L	I	K	E					
T	H	I	S	.				

11. (400.00 pts) Decrypt the following quote from a Disney movie. You know that the quote is an **ARISTOCRAT** with spelling mistakes.

[illegible]

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

M	K	B	O	'	X	H	M	F	J	J	M	O	L	F	U	W	O	X	K	.	T	O	H	M	M	W	H	E	O	W	F	U	X	H	E	O	X	.
				,																.																.		

G	S		W	H	U	O	C		I	V	H	U		U	F	N	O		S	B		H	G	F	W	H	M		A		H	C	O	,		R	V	H	G	Q	O		
																																			,								

X	U	C	U	X	I	F	U	V	K	A	.
											.

12. (250.00 pts) A quote has been encoded using the **POLLUX** Cipher for you to decode. You are told that 6=x, 4=●, 2=●, 0=●, 1=x, 5=.

4066254263536000364662596436960605266

40469936653600563432 6224066426629633

6645664024630396340625463556600006333

63562464

13. (450.00 pts) Decrypt the following **PATRISTOCRAT**, which is a quote from the army official General Douglas MacArthur. **Hint:** One of the words is "HONOR".

[illegible]

R F Y M S K T K P U K F T Y P M Y S K I W Y S P W W S Q E E K G W R G
 K P R I P W C W P W T Y E M R N U Y Q Y W G S Q Y M K F K F H S Y Y K
 J W G S Q Y M K F U Q T J W G S Q Y M K F G N E E J W

[illegible][illegible]

F	H	S	R	A
E	Z	J	H	S
V	R	W	W	J
E	M	D	J	L
D	L	T	Q	D
N	A	R	U	R
H	E	M	Q	H
T	J	H	Q	H
W	L	X	R	J
H	M	H	G	M
H	M	Z	R	E
M	D	J	W	G
A	J	T	Z	M
Q	H	Q	G	J
W	W	M	V	J
H	Z	Z	Q	F
H	S	R	A	E
Z	J	H	S	

[illegible]

C	V	Ñ	M	T	Z	R	E	F	G	G	F	T	Z	Z	E	G	F	Z	F	R	K	F	Z	Ñ	K	T	T	S	F	Z	F	G	F				
Ñ	K	T	T	S	F	Z	T	G	L	E	F	Z	.	C	V	Ñ	M	T	Z	R	E	F	G	T	Z	Z	E	T	C	Ñ	K	T	T	T	G		
													.																								
G	F	Z	F	R	K	F	Z	,	D	F	K	A	M	T	Z	E	G	F	Ñ	K	T	T	,	T	Z	R	V	S	F	Z	X	F	L	E	L	F	Z

G F Z F R K F Z , D F K A M T Z E G F Ñ K T T , T Z R V S F Z X F L E L F Z .

17. (400.00 pts) Solve this **ARISTOCRAT**.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Ñ	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	6	9	0	17	0	9	6	4	2	10	9	0	2	0	0	4	4	18	0	2	2	4	2	1	11	0	3
Replacement																											

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

G	D	Q	F	H	J	B	U	D	X	Q	Z	F	D	Q	P	G	P	A	G	Q	D	J	B	B	D	X	Q	U	Z	Q	P	Q

K	J	T	T	B	J	K	O	F	D	X	J	G	S	Q	Q	D	;	F	K	H	D	A	V	F	G	G	D	X	Q	D	J	I	Q

M	K	D	J	B	D	X	Q	U	I	F	H	Q	D	X	Q	J	P	S	J	K	F	B	O	M	B	V	,	X	Q	Z	F	D	W	X	Q	H

D	X	Q	A	K	B	U	D	X	J	K	O	A	K	D	X	Q	B	F	O	A	A	K	.												

18. (350.00 pts) Solve this **ARISTOCRAT**.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	Ñ	O	P	Q	R	S	T	U	V	W	X	Y	Z
Frequency	12	9	2	11	5	6	3	6	3	6	1	0	6	2	0	2	4	0	4	3	3	1	6	3	0	10	5
Replacement																											

Type your letters below the corresponding given letters. Your letters can be lower or upper case.

U	Z	H	B	D	F	,	P	A	C	Y	D	B	Y	F	M	D	V	D	F	J	,	W	V	D	Z	T	D	I	M	A	J	J	C	A	P	P	,

H	D	V	Y	E	G	M	E	G	M	D	J	Y	B	W	D	A	B	H	F	A	H	M	E	B	Z	B	J	F	Y	V	N	A	B	R			

P	A	B	Y	,	A	I	A	K	Y	T	S	O	N	A	Y	F	Z	W	D	B	H	M	Y	J	Z	S	S	A	H	D	I	E				

G	V	E	R	R	O	V	A	T	R	Y	.

Thanks for taking our test! Feel free to contact us at martinmnguyen@utexas.edu and siddhant.arora@utexas.edu.

Good luck on the rest of your events!

If you have any feedback about any of the exams at this tournament, please let us know through this form: <https://tinyurl.com/utreg21feedback> (<https://tinyurl.com/utreg21feedback>)