

(F) Not Quite Right (1/2) [10 Points]

A chatbot is a computer program that is designed to have conversations with people. NacloCorp has recently developed a chatbot, and it is your job to test it out.

First, you ask NacloChat to decode five sentences written in a cipher, where each letter has been replaced by a different letter. The table below shows what you found, but some cells in the table are blank.

Cipher text	Correct answer	NacloChat's answer
IPVFDDN ZSJ DPQJ SFT BLQJ	a.	finally the time has come
ZSJN BSFVZJG ZSJ LIIPBPF D ULDPBN	b.	they changed the official policy
SJ TZYIIJG ZSJ ULTZJW PVTPGJ F ZYEF	c.	he stuffed the poster inside a tube
ZSJN TFPDJG FXFN PV F ELLZ	d.	e.
XJ QYTZ EJ APVG ZL JFBS LZZJW	f.	g.

F1. Fill in the blanks **a.** to **g.** in the table above.

Hints:

- The same cipher has been used in all five sentences. For example, if Q stands for m in the first sentence, it will stand for m in all other sentences too.
- In each of the five sentences, NacloChat got exactly one letter wrong.

Next, you ask NacloChat to form acronyms from the names of several organizations. An acronym is created by combining the first letters from all the words in a sequence of words. The table on the next page shows what you find.

F2. Fill in the blanks **h.** to **i.** in the table on the next page.

Hints:

- There is one case where NacloChat gets the right answer. In all other cases, it gets exactly one letter wrong.
- The "Organization" column is provided for fun, but it is not necessary for solving the problem.



(F) Not Quite Right (2/2)

Organization	Correct answer	NacloChat's answer
Waiting Room Enthusiasts Network	WREN	WHEN
Architects Building Office Units Near Deserts	ABOUND	AROUND
Seriously Creative Hat Manufacturers Organizational League	SCHMOL	SCHOOL
Society Incentivizing Lateness — Earlybirds Not Allowed!	SILENA	SILENT
People Improving Tomorrow's Yesterday	PITY	CITY
Annoyingly Friendly Thimblemakers — Northern Region	AFTNR	h.
Vancouver Eggplant Relocation Bureau	VERB	i.
Pseudoscientists Embracing Obviously Counterfeited Evidence	PEOCE	j.
Filmmakers Reimagining Old Memoirs	FROM	k.
Western Indiana Typewriter Society	WITS	l.

Finally, you ask NacloChat to count how many words there are in some lists of words. For example, given the list “elephant jacket spaghetti mattress,” NacloChat should answer 4. You observe that it sometimes gets the answer wrong.

F3. Below are some questions about three of the cases that NacloChat answered incorrectly. For each one, select the correct letter (A or B) by filling in the bubble to the left of your choice. *Note: To save some space, we are not providing the lists that were given to NacloChat — we are just saying how long each list was.*

1. When the length of the list was 91, what number did NacloChat produce? ☐ A. 90 ☐ B. 92
2. When the length of the list was 59, what number did NacloChat produce? ☐ A. 58 ☐ B. 60
3. When the length of the list was 74, what number did NacloChat produce? ☐ A. 73 ☐ B. 75

In the past few years, many chatbots — powered by a type of technology called large language models (LLMs) — have been developed that can perform impressively well on a wide range of tasks. For example, they can summarize text and write computer code. However, despite their impressive performance, there are certain types of situations where chatbots often have trouble. This problem illustrates one type of issue that many chatbots display.

